TO ALL ECONOMIC POISONS CONTROL OFFICIALS:

Gentlemen:

The Secretary's remarks are again presented in this form to conserve time on the program and to provide an opportunity for discussion of other business.

The Association's realization of its plan for a publication naturally became the most important activity of the Secretary's office during the past year. Acceptance of the book was well beyond anticipation, and despite the fact that a larger printing was made than had been planned at first, no copies remain available for distribution.

Approximately 150 companies each purchased one or more copies, for a total of 350 books. Enforcement agencies accounted for 140 copies; 25 were distributed on a complimentary basis to technical organizations and the agricultural press; and the remainder were used to replace transportation fatalities. The schedule of distribution followed was:

- Membership: 1 free copy
- Additional copies for members: $1.50 plus postage
- Industry: $3.00 per copy

The Association is indebted to the National Agricultural Chemicals Association, Chemical Specialties Manufacturers Association, and the Manufacturing Chemists' Association for their special efforts in promoting sales; also to other organizations for their assistance in advertising the availability of the book. This latter group is responsible for the fifty-odd requests now on file. These orders have been accepted for copies of the 1954 edition.

The dissemination of data on samples found deficient by state regulatory agencies was continued again this year. It should be noted that there has been no increase in the interest in this phase of activity. The same states continue to participate regularly, with occasional reports from some of the other members. Emphasis should be placed on the fact that only seven states are collaborating in the Federal-State Cooperative plan. Figures were outlined in the June Pest Controller giving the results of this program. Each state is urged to become an active participant in these programs for better regulation of the pesticide trade.

News releases under the heading of the "Pest Controller" were circularized whenever sufficient items accumulated. Bits of information of interest to the membership must occur in your offices and you are urged to send them in for distribution. Copies of letters, magazine articles, miscellaneous data, and similar newsworthy information can be used. Your expression of opinion for or against the continuation of the "Pest Controller" is solicited.
Correspondence increased many fold as the result of the expanded value of the publication. Inquiries continued to come in for information on state laws and problems of enforcement. Direct replies to the questions were rendered when possible or referred to the state official better prepared to fulfill the request.

It is interesting to note that paid-up membership in the six years of operation has increased from twenty-eight in 1948 to forty for the current period. Two of the remaining ten states have limited laws, seven have no laws, and the single unpaid member is being coaxed into the fold. Also, Puerto Rico is being approached with the hope that it will join the group.

Resumes of last October's panel discussion containing helpful hints on Pesticide enforcement and pertinent points resulting from the Executive Committee session last spring were distributed.

* * * *

Attached hereto is a copy of the Treasurer's account covering receipts and disbursements from October 1, 1952 to September 30, 1953.

* * * *

Announcement of the Trade Associations' Open House, Friday and Saturday, October 16 and 17 is included.

* * * *

Respectfully submitted,

Albert B. Heagy
Secretary
OFFICIAL PUBLICATION

ASSOCIATION OF
ECONOMIC POISONS CONTROL OFFICIALS

INCORPORATED

1953

Copies May Be Obtained From The Secretary-Treasurer
A.B. Heagy, College Park, Maryland
INTRODUCTION

This publication introduces a new phase of the associations activity under the heading of the pesticopoeia or description of pesticide chemicals. A committee, with the assistance of investigators, has been working for five years to compile data on the various chemicals used as pesticides. This work is by no means complete; but it was considered advantageous to publish the results, both as a service to industry and control officials, and as a means of arousing interest in extending the scope of the project. You, as a specialist, are urged to submit additional data and comments to the chairman of this committee.

Also is included the customary resume of the annual meeting held in Washington. Three of the major addresses are reprinted in full. The principal points of the committee reports are listed under the secretary's activities.

Recommendations for certain revisions pertaining to large-package products are now being formulated by the Executive Committee for presentation to the Uniform Sampling Committee. It is anticipated that this material will be ready for submission to the association at the next annual meeting.

One new regulation and one definition were tentatively adopted at the last meeting, and will be found in their appropriate sections.
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OFFICERS, COMMITTEES AND INVESTIGATORS - 1952-53
ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS, INC.

President
Rodney C. Berry
Richmond, Virginia
Vice-Pres.
Floyd Roberts
Bismarck, North Dakota
Sec.-Treas.
A. B. Heagy
College Park, Maryland

EXECUTIVE COMMITTEE

President, Vice-President, Secretary-Treasurer and Retiring President, Ex Officio

W. G. Reed (1953) Washington, D. C.
E. A. Epps, Jr. (1953) Baton Rouge, Louisiana
F. H. Gates (1954) Denver, Colorado
C. A. Bower (1954) Oklahoma City, Oklahoma
E. W. Constable (1953) Raleigh, North Carolina

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C. A. Bower Oklahoma City, Oklahoma
J. D. Patterson Salem, Oregon
J. J. Taylor Tallahassee, Florida
H. J. Hoffmann St. Paul, Minnesota
A. B. Lemmon Sacramento, California
C. H. Jefferson Ottawa, Canada
A. B. Heagy College Park, Maryland

Toxicity and Antidotes

J. C. Ward, Chairman Washington, D. C.
A. B. Lemmon Sacramento, California
J. A. Noone Washington, D. C.
J. H. Foulgar Wilmington, Delaware
Carlos Kampmeier Philadelphia, Pennsylvania
C. H. Hine San Francisco, California
S. D. Silver Edgewood, Maryland
J. C. Krantz Baltimore, Maryland
M. D. Farrar Clemson, South Carolina

Description of Pesticide Chemicals

J. L. St. John, Chairman Pullman, Washington
C. V. Marshall Ottawa, Canada
H. J. Fisher New Haven, Connecticut
E. L. Griffin Washington, D. C.
F. A. Gunther Riverside, California
W. T. McGeorge Tucson, Arizona
M. P. Etheredge State College, Mississippi

Uniform Sampling

A. D. Cromartie, Chairman Washington, D. C.
D. W. Deen San Francisco, California
G. W. Downard Washington, D. C.
Methods Clearing House

J. J. T. Graham  Washington, D. C.
T. H. Harris  Washington, D. C.

Special Committee on Coloring Treated Seeds

H. J. Hoffmann, Chairman  St. Paul, Minnesota
P. H. Millar  Little Rock, Arkansas
W. C. Geagley  Lansing, Michigan
M. E. Christensen  Salt Lake City, Utah
D. J. Mitchell  Vermillion, South Dakota

INVESTIGATORS

Ingredients  S. B. Randle  New Brunswick, N. J.
Registration Procedure  J. L. Monaghan  Topeka, Kan.
Uniform Regulations and Terms  J. Claggett Jones  Richmond, Va.
Pesticide-Fertilizer Mixtures  A. B. Lemmon  Sacramento, Calif.
THE CONSTITUTION OF THE ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS, INC.

Section 1. Name. The name of the association shall be the Association of Economic Poisons Control Officials.

Section 2. Object. The object of the association shall be to promote uniform and effective legislation, definitions, rulings, and enforcement of laws relating to the control of sale and distribution of insecticides, fungicides, and other economic poisons.

Section 3. Membership. The membership of the association shall consist of the officials charged by law with the active execution of the laws regulating the sale of economic poisons and such deputies as shall be duly designated by these officials, and research workers employed by state, territory, dominion or federal agencies who are engaged in the investigation of economic poisons and their component parts.

Section 4. Officers. The officers of the association shall be the president, the vice-president, the secretary-treasurer, and an executive committee.

Section 5. The executive committee. The executive committee shall consist of the president, the vice-president, the secretary-treasurer, the retiring president, and four elected members, two members of whom shall be elected at each annual meeting of the association, except at the 1947 meeting two shall be elected for a one-year term and two for a two-year term.

The executive committee shall have the control and management of the association during the interim between regular meetings, and shall take action on majority vote of the committee and report its official activities to the association.

The executive committee shall report on such matters as may be referred to it by the association, and review and present to the association with recommendations all the recommendations of the investigators and special committees and such resolutions and regulations as pertain to economic poisons.

Section 6. Voting. Each state, territory, dominion and federal agency engaged in control of sale and distribution of economic poisons is entitled to a single vote. Voting by proxy shall be permitted.

Section 7. Amendments. The constitution or by-laws may be amended at any regular meeting by a two-thirds vote of the voting membership present. All proposed amendments to the constitution shall be submitted in writing to the secretary at least 30 days prior to the opening of the annual meeting, and the secretary shall distribute copies to the members at least 10 days prior to the meeting. All proposed amendments to the by-laws shall be submitted in writing prior to the opening of the annual meeting.

Section 8. Investigators and special committees. For the purpose of studying the subject of uniformity in legislation, definitions, and rulings, and the enforcement of laws concerning economic poisons, the president may appoint investigators and committees. These investigators shall have the authority to appoint such assistants as may be necessary. Investigators shall be appointed for one year and may be re-appointed. Special committees may be appointed by the
president. No appointment shall be made for a period exceeding two years.

Section 9. Dues. Each state, territory, dominion, and federal agency engaged in the regulation or investigation of economic poisons shall pay dues of $15.00 for each year of its membership, and this shall entitle the members to the services and publications of the association.

BY-LAWS

Section 1. Regular meetings of the association shall be held at least once each year, except in the case of an emergency which would prevent an adequate representation of the membership. Special meetings may be called by the executive committee.

Section 2. Election of officers. All officers shall be elected by ballot, and shall hold office until the adjournment of the annual meeting following their election, or until their successors are elected.

In the event of a vacancy occurring in any office, except that of president or vice-president, the president shall fill the vacancy by appointment and such appointment shall continue until the close of the next regular meeting of the association, at which meeting the unexpired term shall be filled by election in the usual way.

Section 3. Duties of officers. The president, vice-president, and secretary-treasurer shall perform the duties usual to such officers.

The secretary-treasurer shall keep a record of all proceedings of the association and attend to all necessary correspondence. He shall also receive all moneys due the association and shall keep an accurate account of all receipts and disbursements, and report with proper vouchers at each annual meeting.

Resolutions, other than those of the resolution committee shall be presented in writing to the executive committee, which shall provide a place for them on the program.

The following shall be the order of business unless changed at the time by the vote of the association:

1. Reading of the minutes of preceding meeting
2. Report of secretary-treasurer
3. Announcements and appointment of committees
4. President's address
5. Roll call by states
6. Special addresses
7. Reports of investigators and special committees
8. Reports of credentials committee
9. Special topics or executive session
10. Resolutions referring to economic poisons
11. Report of executive committee
12. Report of auditing committee
13. Report of resolutions committee
14. Unfinished business
UNIFORM STATE ECONOMIC POISONS BILL

(Title. It should conform to state requirements. The following is a suggestion; a more complete title should be used where necessary:

"An Act relating to the distribution, sale, or transportation of adulterated or misbranded insecticides, fungicides, rodenticides, and other economic poisons (and devices); regulating traffic therein; providing for registration and examination of such materials, imposing penalties, and for other purposes".)

(Be it enacted, etc.)

Section 1. Title. This Act may be cited as the Economic Poisons Act of __________. (State) __________. (Date)

Section 2. Definitions. For the purpose of this Act --

(a) The term "economic poison" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, fungi, weeds, or other forms of plant or animal life or viruses, except viruses on or in living man or other animals, which the Commissioner shall declare to be a pest.

(b) The term "device" means any instrument or contrivance intended for trapping, destroying, repelling, or mitigating insects or rodents or destroying, repelling, or mitigating fungi or weeds, or such other pests as may be designated by the Commissioner, but not including equipment used for the application of economic poisons when sold separately therefrom.

(c) The term "insecticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects which may be present in any environment whatsoever.

(d) The term "fungicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any fungi.

(e) The term "rodenticide" means any substance or mixture of substances intended for preventing, destroying, repelling or mitigating rodents or any other vertebrate animal which the Commissioner shall declare to be a pest.

(f) The term "herbicide" means any substance or mixture of substances intended for preventing, destroying, or mitigating any weed.

(g) The term "insect" means any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class Insecta, comprising six-legged, usually winged forms, as, for example, beetles, bugs, bees, flies, and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as, for example, spiders, mites, ticks, centipedes, and wood lice.

(h) The term "fungi" means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts) as, for
example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.

(i) The term "weed" means any plant which grows where not wanted.

(j) The term "ingredient statement" means a statement of the name and percentage of each active ingredient, together with the total percentage of the inert ingredients, in the economic poison; and, in case the economic poison contains arsenic in any form, a statement of the percentage of total and water soluble arsenic, each calculated as elemental arsenic.

(k) The term "active ingredient" means an ingredient which will prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds, or other pests.

(l) The term "inert ingredient" means an ingredient which is not an active ingredient.

(m) The term "antidote" means the most practical immediate treatment in case of poisoning and includes first aid treatment.

(n) The term "person" means any individual, partnership, association, corporation, or organized group of persons whether incorporated or not.

(o) The term "Commissioner" means the (Commissioner, Secretary or Director of Agriculture).

(p) The term "registrant" means the person registering any economic poison pursuant to the provisions of this Act.

(q) The term "label" means the written, printed, or graphic matter on, or attached to, the economic poison (or device), or the immediate container thereof, and the outside container or wrapper of the retail package, if any there be, of the economic poison (or device).

(r) The term "labeling" means all labels and other written, printed, or graphic matter.

(s) The term "adulterated" shall apply to any economic poison if its strength or purity falls below the professed standard or quality as expressed on labeling or under which it is sold, or if any substance has been substituted wholly or in part for the article, or if any valuable constituent of the article has been wholly or in part abstracted.

(t) The term "misbranded" shall apply --

(1) to any economic poison (or device) if its labeling bears any statement, design, or graphic representation relative thereto or to its ingredients which is false or misleading in any particular;

(2) to any economic poison --
(a) if it is an imitation of or is offered for sale under the name of another economic poison;
(b) if its labeling bears any reference to registration under this Act;
(c) if the labeling accompanying it does not contain instructions for use which are necessary and, if complied with, adequate for the protection of the public;
(d) if the label does not contain a warning or caution statement which may be necessary and, if complied with, adequate to prevent injury to living man and other vertebrate animals;
(e) if the label does not bear an ingredient statement on that part of the immediate container and on the outside container or wrapper, if there be one, through which the ingredient statement on the immediate container cannot be clearly read, of the retail package which is presented or displayed under customary conditions of purchase;
(f) if any word, statement, or other information required by or under the authority of this Act to appear on the labeling is not prominently placed thereon with such conspicuousness (as compared with other words, statements, designs, or graphic matter in the labeling) and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use, or
(g) if in the case of an insecticide, fungicide, or herbicide, when used as directed or in accordance with commonly recognized practice, it shall be injurious to living man or other vertebrate animals or vegetation, except weeds, to which it is applied, or to the person applying such economic poison.

Section 3. Prohibited Acts.
(a) It shall be unlawful for any person to distribute, sell, or offer for sale within this State or deliver for transportation or transport in intrastate commerce or between points within this State through any point outside this State any of the following:
(1) Any economic poison which has not been registered pursuant to the provisions of Section 4 of this Act, or any economic poison if any of the claims made for it or any of the directions for its use differ in substance from the representations made in connection with its registration or if the composition of an economic poison differs from its composition as represented in connection with its registration: Provided, That, in the discretion of the Commissioner a change in the labeling or formula of an economic poison may be made within a registration period without requiring reregistration of the product.
(2) Any economic poison unless it is in the registrant's or the manufacturer's unbroken immediate container, and there is affixed to such container, and to the outside container or wrapper of the retail package, if there be one through which the required information on the immediate container cannot be clearly read, a label bearing
(a) the name and address of the manufacturer, registrant, or person for whom manufactured;
(b) The name, brand, or trade mark under which
said article is sold; and
(c) the net weight or measure of the content
subject, however, to such reasonable variations as the Com-
missioner may permit
(3) Any economic poison which contains any subst-
ances in quantities highly toxic to man, determined as pro-
vided in Section 5 of this Act, unless the label shall bear,
in addition to any other matter required by this Act,
(a) the skull and crossbones;
(b) the word "poison" prominently, in red, on
a background of distinctly contrasting color; and
(c) a statement of an antidote for the economic
poison.
(4) The economic poison commonly known as standard
lead arsenate, basic lead arsenate, calcium arsenate, magnesium
arsenate, zinc arsenate, zinc arsenite, sodium fluoride, sodium
fluosilicate, and barium fluosilicate unless they have been
distinctly colored or discolored as provided by regulations
issued in accordance with this Act, or any other white powder
economic poison which the Commissioner, after investigation of
and after public hearing on the necessity for such action for
the protection of the public health and the feasibility of
such coloration or discoloration, shall, by regulation, require
to be distinctly colored or discolored; unless it has been so
colored or discolored. Provided, That the Commissioner may
exempt any economic poison to the extent that it is intended
for a particular use or uses from the coloring or discoloring
required or authorized by this section if he determines that
such coloring or discoloring for such use or uses is not
necessary for the protection of the public health.
(5) Any economic poison which is adulterated or
misbranded, (or any device which is misbranded).
(b) It shall be unlawful --
(1) for any person to detach, alter, de-
face, or destroy, in whole or in part, any label or labeling
provided for in this Act or regulations promulgated hereunder,
or to add any substance to, or take any substance from, an
economic poison in a manner that may defeat the purpose of this
Act;
(2) for any person to use for his own
advantage or to reveal, other than to the Commissioner or
proper officials or employees of the State or to the courts
of this State in response to a subpoena, or to physicians, or
in emergencies to pharmacists and other qualified persons, for
use in the preparation of antidotes, any information relative
to formulas of products acquired by authority of Section 4 of
this Act.

Section 4. Registration.

(a) Every economic poison which is distributed, sold
or offered for sale within this State or delivered for trans-
portation or transported in intrastate commerce or between
points within this State through any point outside this State
shall be registered in the office of the Commissioner, and
such registration shall be renewed annually; Provided, That
products which have the same formula, are manufactured by the same person, the labeling of which contains the same claims, and the labels of which bear a designation identifying the product as the same economic poison may be registered as a single economic poison; and additional names and labels shall be added by supplement statements during the current period of registration. The registrant shall file with the Commissioner a statement including:

(1) the name and address of the registrant and the name and address of the person whose name will appear on the label, if other than the registrant;

(2) the name of the economic poison;

(3) a complete copy of the labeling accompanying the economic poison and a statement of all claims to be made for it including directions for use; and

(4) if requested by the Commissioner a full description of the tests made and the results thereof upon which the claims are based. In the case of renewal of registration, a statement shall be required only with respect to information which is different from that furnished when the economic poison was registered or last reregistered.

(b) The registrant shall pay an annual fee of $________ for each economic poison registered, such fee to be deposited (in the Treasury of the State) (to the credit of a special fund to be used only for carrying out the provisions of this Act): Provided, however, That any registrant may register annually any number of brands after the payment of annual fees aggregating $________.

(c) The Commissioner, whenever he deems it necessary in the administration of this Act, may require the submission of the complete formula of any economic poison. If it appears to the Commissioner that the composition of the article is such as to warrant the proposed claims for it and if the article and its labeling and other material required to be submitted comply with the requirements of Section 3 of this Act, he shall register the article.

(d) If it does not appear to the Commissioner that the article is such as to warrant the proposed claims for it or if the article and its labeling and other material required to be submitted do not comply with the provisions of this Act, he shall notify the applicant of the manner in which the article, labeling, or other material required to be submitted fail to comply with the Act so as to afford him an opportunity to make the necessary corrections. If, upon receipt of such notice, the applicant insists that such corrections are not necessary and requests in writing that the article be registered, the Commissioner shall provide him with opportunity for hearing before refusing to issue registration. In order to protect the public, the Commissioner, on his own motion, after hearing, may at any time, cancel the registration of an economic poison. In no event shall registration of an article, be construed as a defense for the commission of any offense prohibited under Section 3 of this Act.

(e) Notwithstanding any other provision of this Act, registration is not required in the case of an economic poison shipped from one plant within this State to another plant
within this State operated by the same person.

Section 5. Determinations; Rules and Regulations; Uniformity.

(a) The Commissioner is authorized, after opportunity for a hearing,

(1) to declare as a pest any form of plant or animal life or virus which is injurious to plants, man, domestic animals, articles, or substances;

(2) to determine whether economic poisons are highly toxic to man; and

(3) to determine standards of coloring or discoloring for economic poisons, and to subject economic poisons to the requirements of Section 3a (4) of this Act.

(b) The Commissioner is authorized, after due public hearing, to make appropriate rules and regulations for carrying out the provisions of this Act, including rules and regulations providing for the collection and examination of samples of economic poisons (or devices).

(c) In order to avoid confusion endangering the public health, resulting from diverse requirements, particularly as to the labeling and coloring of economic poisons, and to avoid increased costs to the people of this state due to the necessity of complying with such diverse requirements in the manufacture and sale of such poisons, it is desirable that there should be uniformity between the requirements of the several States and the Federal Government relating to such poisons. To this end the Commissioner is authorized, after due public hearing, to adopt by regulation such regulations, applicable to and in conformity with the primary standards established by this Act, as have been or may be prescribed in the United States Department of Agriculture with respect to economic poisons.

Section 6. Enforcement

(a) The examination of economic poisons (or devices) shall be made under the direction of the Commissioner for the purpose of determining whether they comply with the requirements of this Act. If it shall appear from such examination that an economic poison (or device) fails to comply with the provisions of this Act, and the Commissioner contemplates instituting criminal proceedings against any person, the Commissioner shall cause appropriate notice to be given to such person. Any person so notified shall be given an opportunity to present his views, either orally or in writing, with regard to such contemplated proceedings. And if thereafter in the opinion of the Commissioner it shall appear that the provisions of the Act have been violated by such person, then the Commissioner shall refer the facts to the (District Attorney) for the county in which the violation shall have occurred with a copy of the results of the analysis or the examination of such article: Provided, however, That nothing in this Act shall be construed as requiring the Commissioner to report for prosecution or for the institution of libel proceedings minor violations of the Act whenever he believes that the public interests
will be best served by a suitable notice of warning in writing.

(b) It shall be the duty of each (District Attorney) to whom any such violation is reported to cause appropriate proceedings to be instituted and prosecuted in the ________ Court without delay.

(c) The Commissioner shall, by publication in such manner as he may prescribe, give notice of all judgments entered in actions instituted under the authority of this Act.

Section 7. Exemptions

(a) The penalties provided for violations of Section 3a of this Act shall not apply to --

(l) any carrier while lawfully engaged in transporting an economic poison within this State, if such carrier shall, upon request, permit the Commissioner or his designated agent to copy all records showing the transactions in and movement of the articles;

(2) public officials of this State and the Federal government engaged in the performance of their official duties;

(3) the manufacturer or shipper of an economic poison for experimental use only

(a) by or under the supervision of an agency of this State or of the Federal Government authorized by law to conduct research in the field of economic poisons, or

(b) by others if the economic poison is not sold and if the container thereof is plainly and conspicuously marked "For experimental use only - Not to be sold", together with the manufacturer's name and address. Provided, however, That if a written permit has been obtained from the Commissioner, economic poisons may be sold for experimental purposes subject to such restrictions and conditions as may be set forth in the permit.

(c) No article shall be deemed in violation of this Act when intended solely for export to a foreign country, and when prepared or packed according to the specifications or directions of the purchaser. If not so exported, all the provisions of this Act shall apply.

Section 8. Penalties

(a) Any person violating Section 3a(1) of this Act shall be guilty of a misdemeanor and upon conviction shall be fined not more than $______

(b) Any person violating any provision of this Act other than Section 3a (1) shall be guilty of a misdemeanor and upon conviction shall be fined not more than $______ for the first offense and upon conviction for a subsequent offense shall be fined not more than $______: Provided, That any offense committed more than five years after a previous conviction shall be considered a first offense.

(c) Notwithstanding any other provisions of this section, in case any person, with intent to defraud, uses or reveals information relative to formulas of products acquired under authority of Section 4 of this Act, he shall be fined not more than $______ or imprisoned for not more than one year, or both.
Section 9. Seizures

(a) Any economic poison (or device) that is distributed, sold or offered for sale within this State or delivered for transportation or transported in intrastate commerce or between points within this State through any point outside this State shall be liable to be proceeded against in any Court in any county of the State where it may be found and seized for confiscation by process of libel for condemnation:

(1) in the case of an economic poison:
   (a) if it is adulterated or misbranded;
   (b) if it has not been registered under the provisions of Section 4 of this Act;
   (c) if it fails bear on its label the information required by this Act;
   (d) if it is a white powder economic poison and is not colored as required under this Act.

(2) In the case of a device, if it is misbranded.

(b) If the article is condemned, it shall, after entry of decree, be disposed of by destruction or sale as the court may direct and the proceeds, if such article is sold, less legal costs, shall be paid to the State Treasurer; Provided, That the article shall not be sold contrary to the provision of this Act; and Provided, further, That upon payment of costs and execution and delivery of a good and sufficient bond conditioned that the article shall not be disposed of unlawfully, the court may direct that said article be delivered to the owner thereof for relabeling or reprocessing as the case may be.

(c) When a decree of condemnation is entered against the article, court costs and fees and storage and other proper expenses shall be awarded against the person, if any, intervening as claimant of the article.

Section 10. Delegation of Duties. All authority vested in the Commissioner by virtue of the provisions of this Act may with like force and effect be executed by such employees of the (Department of Agriculture) as the Commissioner may from time to time designate for said purpose.

Section 11. Cooperation. The Commissioner is authorized and empowered to cooperate with, and enter into agreements with, any other agency of this State, the United States Department of Agriculture, and any other State or agency thereof for the purpose of carrying out the provisions of this Act and securing uniformity of regulations.

Section 12. Separability. If any provision of this Act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, the constitutionality of the remainder of this Act and the applicability thereof to other persons and circumstances shall not be affected thereby.

Section 13. Effective Date. All provisions of this Act, except Section 3, "prohibited acts"; Section 8 "penalties" and Section 9 "seizures", shall take effect upon enactment,
and Sections 3, 8, and 9, shall take effect as follows:

(1) as to devices, upon enactment;
(2) as to rodenticides and herbicides, 6 months after
and
(3) as to insecticides, fungicides, and all other
economic poisons, one year after enactment.

Section 15. Repeals. Jurisdiction in all matters pert-
taining to the distribution, sale and transportation of
economic poisons (and devices), is by this Act vested exclu-
ively in the Commissioner, and all acts and parts of acts
inconsistent with this Act are hereby expressly repealed.
AN ACT RELATING TO CUSTOM APPLICATION OF INSECTICIDES, FUNGICIDES, AND HERBICIDES

Title It should conform to State requirements. The following is a suggestion; a more complete title should be used where necessary;

"AN ACT relating to the application of insecticides, fungicides, and herbicides by aircraft or ground equipment."

(Be it enacted, etc.)

Section 1. Declaration of Purpose. The purpose of this act is to regulate, in the public interest, the custom application of insecticides, fungicides, and herbicides. In recent years a great many new materials have been discovered or synthesized which are valuable for the control of insects, fungi, and weeds. However, such materials may seriously injure health, property, or wildlife if not properly used. Insecticides may injure man or animals, either by direct poisoning or by gradual accumulation of poisons in the tissues. Crops may also be injured by improper use of insecticides or fungicides. The drifting or washing of insecticides into streams or lakes can cause appreciable damage to aquatic life. A herbicide applied by aircraft or ground equipment for the purpose of killing weeds in a crop which is not itself injured by the herbicides may drift, sometimes for miles, and injure other crops with which it comes in contact. Therefore it is deemed necessary to provide for regulation of the custom application of insecticides, fungicides, and herbicides.

Section 2. Definitions. For the purposes of this act --
(a) The term "insecticide" means any substance or mixture of substances intended for preventing, destroying, repell­ ing, or mitigating any insects which may be present in any environment whatsoever.
(b) The term "fungicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any fungi.
(c) The term "herbicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any weed.
(d) The term "insect" means any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class Insecta, comprising six-legged, usually winged forms, as, for example, beetles, bugs, bees, and flies, and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as, for example, spiders, mites, ticks, centipedes, and wood lice.
(e) The term "fungi" means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.
(f) The term "weed" means any plant which grows where not wanted.
(g) The term "person" means any individual, firm
partnership, association, corporation, company, joint stock
association, or body politic, or any organized group of
persons whether incorporated or not; and includes any trustee,
receiver, assignee, or other similar representative thereof.

(h) The term "Commissioner" means the Secretary,
Commissioner, or Director of Agriculture.

(i) The term "custom application of insecticides,
fungicides, or herbicides" means any application of insecti-
cides, fungicides, or herbicides by aircraft or ground equip-
ment for hire.

(j) The term "aircraft" means any contrivance now
known or hereafter invented, used or designed for navigation
of, or flight in, the air.

(k) The term "ground equipment" means any machine or
device (other than aircraft), for use on land or water, des-
digned for, or adaptable to use in applying insecticides, fung-
icides, or herbicides as sprays, dusts, aerosols, or fogs, or
in other forms.

Section 3. Licenses.

(a) No person shall engage in custom application of
insecticides, fungicides, or herbicides within this State **
at any time without a license issued by the Commissioner.
Application for a license shall be made to the Commissioner.
Each application for a license shall contain information
regarding the applicant's qualifications and proposed opera-
tions and other relevant matters as required pursuant to reg-
ulations promulgated by the Commissioner.

(b) The Commissioner may require the applicant to
show, upon examination, that he possesses adequate knowledge
concerning the proper use and application of insecticides,
fungicides, and herbicides, and the dangers involved and pre-
cautions to be taken in connection with their application.
If the applicant is other than an individual, the applicant
shall designate an officer, member, or technician of the
organization to take the examination, such designee to be
subject to the approval of the Commissioner. If the extent of
the applicant's operations warrant it, the Commissioner may
require more than one officer, member, or technician to take
the examination.

(c) If the Commissioner finds the applicant qualified
(and if the applicant files the bond required under paragraph
(e) of this section), the Commissioner shall issue a license,
for such period as he may by regulation prescribe, to perform
custom application of insecticides, fungicides, and herbicides
within this State. The license may restrict the applicant to
the use of a certain type or types of equipment or materials
if the Commissioner finds that the applicant is qualified to
use only such type or types. If a license is not issued as
applied for, the Commissioner shall inform the applicant in

* See section 10 for exemptions.

** In States where only certain areas are liable to be affect-
ed by the application of insecticides, fungicides, or herb-
icides, the following could be inserted: "in counties or
areas designated by the Commissioner."
writing of the reasons therefor.

(d) The Commissioner may suspend, pending inquiry, for not longer than ten days, and, after opportunity for a hearing may revoke or modify the provisions of any license issued under this section, if he finds that the licensee is no longer qualified, has engaged in fraudulent business practices in the custom application of insecticides, fungicides, or herbicides, or has made any custom application in a faulty, careless, or negligent manner, or has violated any of the provisions of this act or regulations made thereunder.

(e) The Commissioner shall require a reasonable bond, with surety satisfactory to the Commissioner, from each applicant, under such rules and regulations as he may prescribe to secure the performance of contractual obligations of the licensee with respect to custom application of insecticides, fungicides, or herbicides. Any person injured by the breach of any such obligations shall be entitled to sue on the bond in his own name in any court of competent jurisdiction to recover the damages he may have sustained by such breach.

(f) The Commissioner may issue a license without examination to a non-resident who is licensed in another State substantially in accordance with the provisions of this act.

(g) Any person aggrieved by any action of the Commissioner may obtain a review thereof by filing in the court within 30 days of notice of the action a written petition praying that the action of the Commissioner be set aside. A copy of such petition shall forthwith be delivered to the Commissioner, and within days thereafter the Commissioner shall certify and file in the court a transcript of any record pertaining thereto, including a transcript of evidence received, whereupon the court shall have jurisdiction to affirm, set aside or modify the action of the Commissioner, except that the findings of the Commissioner as to the facts, if supported by substantial evidence, shall be conclusive.

Section 4. Inspection. The Commissioner may provide for inspection of any ground equipment or of any device or apparatus used for custom application of insecticides, fungicides, or herbicides by aircraft and may require proper repairs or other changes before its further use for custom application.

Section 5. Materials and Methods of Application. The Commissioner may, by regulation after public hearing, prescribe materials or methods in custom application of insecticides, fungicides and herbicides, to the extent necessary (to protect health or property) (to protect health or to prevent injury, by reason of the drifting, washing or application of such materials, to desired plants or animals (including pollinating insects and aquatic life) on property other than that owned or leased by the person for whom the materials are applied. In issuing such regulations, the Commissioner shall give consideration to pertinent research findings and recommendations of other agencies of this State or of the Federal Government.
Section 6. Reports. The Commissioner may be regulation require any licensee to maintain such records and furnish reports giving such information with respect to particular applications of insecticides, fungicides, or herbicides and such other relevant information as the Commissioner may deem necessary.

Section 7. Regulations. The Commissioner may, after public hearing, make regulations for carrying out the provisions of this act: Provided, That the regulations shall not be inconsistent with regulations issued by this State or by the Federal Government respecting safety in air navigation or operation of aircraft. Before issuing regulations directly related to any matter within the jurisdiction of any other official of this State the Commissioner shall consult with that official with reference thereto.

Section 8. Information. The Commissioner may, in cooperation with (the State Agricultural College) publish information regarding injury which may result from improper application or handling of insecticides, fungicides, or herbicides and methods and precautions designed to prevent such injury.

Section 9. Penalties. Any person violating the provision of this act or the regulations issued hereunder shall be guilty of a misdemeanor and, upon conviction, shall be fined not more than _____ dollars for the first offense, and not more than _____ dollars for each subsequent offense.

Section 10. Exemptions. This act shall not apply to custom application of insecticides, fungicides, or herbicides to prevent, destroy, repel, or mitigate insects or fungi within or under buildings (except farm buildings other than dwellings) or within vehicles, ships, aircraft, or other means of transporting persons or property by land, water, or air.

Section 11. Enforcement. For the purpose of carrying out the provisions of this act the Commissioner may enter upon any public or private premises at reasonable times in order to have access for the purpose of inspecting any aircraft or ground equipment subject to this act.

Section 12. Delegation of Duties. The functions vested in the Commissioner by this act may be delegating by him to such employees of the (Department of Agriculture) as the Commissioner may from time to time designate for such purposes.

Section 13. Cooperation. The Commissioner may cooperate with any other agency of this State or its subdivisions or with any agency of any other State or of the Federal Government for the purpose of carrying out the provisions of this act and of securing uniformity of regulations.
Section 14. Separability. If any provision of this act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, by a court of competent jurisdiction, the constitutionality of the remainder of the act and the applicability thereof to other persons and circumstances shall not be affected thereby.

Section 15. Repeal. All acts and parts of acts inconsistent with this act are hereby expressly repealed.

Section 16. Effective Date. This act shall become effective
REGULATORY PRINCIPLES

1. Applicability of Principles: These principles are designed primarily for the guidance of State Economic Poisons Control Officials in those states which have adopted the Uniform State Insecticides, Fungicide and Rodenticide Act, but should be used by other state officials insofar as their statutes will permit.

2. Definitions and Standards. The definitions and standards established for this Association should be adopted by state officials insofar as their statutes will permit.

3. Methods of Analysis: The current methods of analysis of the Association of Official Agricultural Chemists of North America shall be adopted as the official methods insofar as they are applicable, and such other methods shall be used as may be necessary to determine whether the product complies with the law.

4. Registration of Products. Uniform application forms for registration should be used by State Officials. Two specimens or exact copies of the labeling of each proposed product should be submitted with the application. Also, there should be submitted the name and percentage of each active ingredient and the total percentage of inert ingredients in the product, the proposed directions for use, and a list of the specific pests for control of which it is to be sold, if such information is not contained in the labeling. Such other pertinent information concerning inert ingredients and physical properties of the product shall also be included on request.

5. Registration, General Application of: A registration of an economic poison is held to apply to the product even though manufactured at or shipped from other than the registered address. When a product has been registered by a manufacturer or jobber, no registration shall be required of other sellers of the product so registered, provided shipments or deliveries thereof are in the manufacturer's or registrant's original, unopened, and properly labeled immediate containers.

6. Registration, Refusal or Cancellation of: Any of the following causes is sufficient to justify refusal or cancellation of registration of a product:
   (a) If the labeling bears any statement, design, or graphic representation relative thereto, or to its ingredients, which is false or misleading in any particular;
   (b) If found to be an imitation of or illegally offered for sale under the name of another economic poison;
   (c) If the labeling bears reference to registration procedure, or number;
   (d) If the labeling accompanying the economic poison does not contain directions for use which are adequate for the protection of the public under customary conditions of use;
(e) if the label does not contain a warning or caution statement which may be necessary to prevent injury to living man and other vertebrate animals, vegetation (except weeds), and useful invertebrate animals;

(f) if the label does not bear an ingredient statement on that part of the immediate container and on the outside container or wrapper, if there be one, through which the ingredient statement on the immediate container cannot be clearly read, of the retail package which is presented or displayed under customary conditions of purchase. Provided that the control official may permit the ingredient statement to appear prominently on some other part of the container, if the size or form of the container makes it impracticable to place it on the part of the retail package which is presented or displayed under customary conditions of purchase.

(g) if any word, statement, or other information required to appear on the label or labeling is omitted or not prominently placed thereon and in such terms as to render it likely to be read and understood under customary conditions of purchase and use;

(h) if an economic poison is found to be injurious to living man or other useful vertebrate animals, or to vegetation (except weeds), to which it is applied or to the person applying such economic poison when used as directed or in accordance with commonly recognized safe practice.

(i) if the registrant has been guilty of fraudulent and deceptive practices in the evasions or attempted evasions of the provisions of this act or any rules and regulations promulgated thereunder; Provided, that no registration shall be revoked or refused until the registrant shall have been given a hearing by the Commissioner. (Adopted as tentative - 1952.)

7. Changes in Labeling or Ingredient Statement: Changes in the substance in the labeling or ingredient statement of a registered economic poison shall be submitted in advance to the control official. The registrant must describe the exact change desired and proposed effective date and such other pertinent information that justify such changes. After the effective date of a change in labeling or ingredient statement the product shall be marketed only under the new claims or ingredient statement, except that a reasonable time may be allowed by the control official for disposal of properly labeled stocks of the old product. Changes in the composition shall not be allowed if such changes would result in a lowering of the product's value as an economic poison.

8. Label Requirements: Each package of economic poison sold separately shall bear a complete label. The label shall contain the name of the product; name and address of the manufacturer, registrant, or person for whom manufactured; directions for use when necessary; statement of net content; and an ingredient statement. The label of every economic poison, if necessary to prevent injury to man, other animals, and useful vegetation, must contain a warning or caution statement, in non-technical language based on the hazard involved in the
use of the economic poison. In addition, any economic poison, highly toxic to man shall be labeled conspicuously with the word "poison" and the skull and cross-bones symbol all in red on a background of distinctly contrasting color, and the first-aid antidote for the poison shall be given.

9. Directions for Use - When Necessary: Directions for use are required whenever they are necessary for the protection of the public. The public includes not only users of economic poisons, but also those who handle them or may be affected by their use, handling, or storage. Directions for use are considered necessary in the case of most small retail containers which go into the hands of users, and in the case of larger containers with the following exceptions:

(a) Directions may be omitted where the economic poison is sold in containers of 50-pounds or more of a solid or 20 gallons or more of a liquid, Provided: The economic poison is a well-known substance or mixture of substances for economic poison purposes and is intended only for the use to which it is ordinarily applied, and it bears an ingredient statement giving the names and percentages of each of the active ingredients.

(b) Directions may be omitted if the economic poison is to be used by manufacturers in their regular manufacturing processes, Provided: The label clearly shows that the product is intended for use only in manufacturing processes, and bears an ingredient statement giving the name and percentages of each of the active ingredients.

(c) Directions may be omitted if the economic poison is sold only to physicians or veterinarians, Provided; the label bears an ingredient statement giving the name and percentages of each of the active ingredients.

(d) Directions may be omitted if the economic poison is sold to distributors for dilution or mixing with carriers to prepare economic poisons for sale to the public, Provided; The label bears an ingredient statement giving the name and percentages of each of the active ingredients, and the economic poison is a well-known substance or mixture of substances, and there is readily available general knowledge of the composition, methods of use, and effectiveness of the product for economic poison purposes.

10. Other Claims: No claim shall be made for products in any written, printed or graphic matter accompanying the product at any time which differ in substance from representations made in connection with registration.

11. Name of Product: The name of the product shall appear on the labeling so as not to emphasize any one ingredient, or otherwise be misleading. It shall not be arranged on the label in such a manner as to be confused with other terms, slogans, or legends.

12. Brand Names, Duplication of, or Infringement on: A brand name is distinctive with reference to the material to which it applies, and the registration of economic poisons under the same brand name by two or more manufacturers or shippers
should be discouraged. This principle applies also to the registration of brand names so similar in character as to be likely to be confused by the purchaser. In the event the same name, or a closely similar one is offered by another manufacturer, the official should acquaint both parties with the fact, with the view of avoiding the confusion which follow the duplication of brand names.

13. Ingredient Statement: A label shall state: The name and percentage by weight of each active ingredient, together with the total percentage by weight of the inert ingredients. In the ingredient statement all names shall be printed in type of the same size, and in such terms as to render them likely to be read and understood under customary conditions of purchase.

14. Name of Ingredients: The well-known common name of the ingredient must be given or, if the ingredient has no common name, the correct chemical name. If there is no common name and the chemical composition is unknown or complex, the enforcement official may permit the use of a new or coined name which he finds to be appropriate for the information and protection of the user. If the use of a new or coined name is permitted, the enforcement official may prescribe the terms under which it may be used. A trademark or trade name may not be used as the name of an ingredient except when it has become a common name.

15. Sliding Scale Percentages: The "sliding scale" method of expressing percentages shall not be used. (Example: "phosphorus, 2-3%"). This is not to be construed as forbidding the use of qualifying statements descriptive of the basic active material or materials, provided such statements do not constitute an integral part of the percentage of total active ingredients. (Example: "Technical Chlorinated Camphene XX% (Combined Chlorine 67% - 69%".)

16. Net Contents: Each package of an economic poison shall show the net weight or measure of content, either stenciled or printed on the package or container, or on a tag attached thereto. Indefinite statements or content such as "......oz, when packed" shall not be used. Statements of liquid measure, or of specific gravity or density of liquid preparations, or expression of composition in terms of pounds per gallon, shall be made on the basis of 68°F. (20°C) except when other basis has been established through trade custom.

17. Coloration of Highly Toxic Materials: The white economic poisons hereinafter named shall be colored or discolored in accordance with this section. Provided, however, that any such white economic poison which is intended solely for use by a textile manufacturer or commercial laundry, cleaner or dyer as a moth proofing agent, which would not be suitable for such use if colored and which will not come into the hands of the public when incorporated into a fabric, shall not be required to be so colored or discolored in accordance with
this section. The hues, values, and chromas specified are those contained in the Munsell Book of Color, Munsell Color Company, 10 East Franklin Street, Baltimore, Maryland.

(a) The coloring agent must produce a uniformly-colored product not subject to change in color beyond the minimum requirements during ordinary conditions of marketing and storage and must not cause the product to become less effective or cause damage when used as directed or in accordance with commonly recognized safe practice.

(b) Standard lead arsenate, basic lead arsenate, calcium arsenate, magnesium arsenate, zinc arsenate, zinc arsenite, and barium fluosilicate shall be colored any hue, except the yellow-reds and yellows, having a value of not more than 8 and a chroma of not less than 4, or shall be discolored to a neutral lightness value not over 7.

(c) Sodium fluoride and sodium fluosilicate shall be colored blue or green having a value of not more than 8 and a chroma of not less than 4, or shall be discolored to a neutral lightness value not over 7.

(d) Others. Other white powder economic poisons may be required to be colored or discolored, after investigation and public hearing.

(e) The enforcement official may permit other hues to be used for any particular purpose if the prescribed hues are not feasible for such purposes, and if such action will not be injurious to the public.

(f) The coloration requirements above shall apply to the materials named therein, and not to non-highly toxic mixtures consisting of other ingredients with highly toxic materials.

18. Highly Toxic: An economic poison which falls within any of the following categories when tested on laboratory animals (mice, rats and rabbits) is highly toxic to man within the meaning of these principles:

(a) Oral Toxicity. Those which produce death in half or more than half the animals of any species at a dosage of 50 milligrams at a single dose, or less, per kilogram of body weight when administered orally to ten or more such animals of each species.

(b) Toxicity on inhalation: Those which produce death in half or more than half of the animals of any species at a dosage of 200 parts or less by volume of the gas or vapor per million parts by volume of air when administered by continuous inhalation for one hour or less to ten or more animals of each species, provided such concentration is likely to be encountered by man when the economic poison is used in any reasonably foreseeable manner.

(c) Toxicity by skin absorption: Those which produce death in half or more than half of the animals (rabbits only) tested at a dosage of 200 milligrams or less per kilogram of body weight when administered by continuous contact with the bare skin for 24 hours or less to ten or more animals. Provided, however, that an enforcement official may exempt any economic poison which meets the above standard but which is not in fact highly toxic to man, from these principles with respect to economic poisons highly toxic to man, and may
after hearing designate as highly toxic to man any economic poison which experience has shown to be so in fact.

19. Sale or Possession of Sodium Fluoroacetate: No person shall sell or possess any sodium fluoroacetate except federal, state, county, municipal officers or their deputies for use in their official duties in pest control; research or chemical laboratories in their respective fields; regularly licensed pest control operators for use in their own service work; and wholesalers or jobbers of economic poisons for sale to the aforementioned persons, or for export.

20. Sale or Possession of Thallium: No person shall sell or possess any thallium or thallium compound except federal, state, county, municipal officers or their deputies for use in their official duties in pest control; research or chemical laboratories in their respective fields; regularly licensed pest control operators for use in their own service work; properly registered ant poisons containing thallium expressed as metallic not more than 1%; wholesalers or jobbers of economic poisons for sale to the aforementioned persons; or for export.

21. Labeling Sodium Arsenite Solution: An economic poison labeled or sold as sodium arsenite solution for control of weeds, termites, or wood-destroying fungi shall bear a statement of the percentage of arsenic trioxide contained therein as the active ingredient, and in addition shall bear a statement of the total arsenic in water-soluble form expressed as metallic, and the pounds of arsenic trioxide per gallon at 68°F. The weight of the solution in pounds per gallon at 68°F, may also be given.

22. Labeling Products Containing Arsenic: The label of any economic poison containing arsenic as an active ingredient in any form shall show the total amount of arsenic, expressed as metallic, and the amount of arsenic in water-soluble form, expressed as metallic, in addition to other required statements.

23. Labeling Products Containing Copper: If an economic poison contains a copper compound of uncertain composition, the ingredient statement may be given in terms of copper expressed as metallic providing the type of compound is also shown. For example, the name of active ingredient may be stated as "Copper expressed as metallic (derived from basic copper sulfate)".

24. Labeling Products Containing Alkaloids: Products compounded with tobacco, nux vomica, sabadilla seed, or any other alkaloid-bearing material, shall be stated in terms of the alkaloid and not in terms of the plant material. Where accurate methods for determining alkaloid content are unknown, manufacturer and enforcement official shall agree on an acceptable analytical procedure.
25. Labeling Products Containing Organic Thiocyanates: Materials containing organic thiocyanates under the general classification of esters, ethers, and similar compounds, containing up to and including 18 carbon atoms shall be guaranteed according to the actual ester or other content, rather than the percentage of commercial material present. In addition, the application for registration should contain a qualifying statement showing the percentage by weight of the combined nitrogen in the finished product.

26. Physical properties. The physical properties of an economic poison shall be such that the economic poison is effective when used according to directions given in the labeling, or if no directions are given, when used in accordance with common practice.

27. On products claiming "microfine", "micronized", "micron", "mike", "micron size", or similar terms implying the equivalent, the average particle size in microns should be stated. (This particularly applies to dusting sulfurs making such claims, or making claims for control which necessitate a certain micron size or smaller.)

28. Numerals in names. When numerals appear in the name of an economic poison, there should be a realistic correlation between the numerals and the percentages to which they refer, or which are inferred by them. If the numerals refer to the weight of active ingredient per gallon, the same correlation is required. Certain expressions universally accepted through long trade practice, such as "Rotenone 75" and "20-20-60 Dust", as well as numerals obviously having no reference to active ingredients, such as numbers of a formula, as "1080", may be accepted.
DEFINITIONS OF TERMS

Active Ingredients: An ingredient which will in itself, when present in sufficient quantity, prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds, or other pests; it must not be antagonistic to the activity of the principal active ingredient or ingredients.

Adhesive or Sticker: A substance which increases the firmness of attachment of finely-divided solids or other water-soluble materials to a solid surface, and may be measured in terms of resistance to time, wind, water, mechanical and chemical action.

Antidote: A practical immediate treatment, including first aid, in case of poisoning.

Antiseptic: A substance which opposes sepsis, putrefaction or decay; one that prevents or arrests the growth or action of micro-organisms, either by destroying them or by inhibiting their growth and activity; when used for short periods of time must be a disinfectant or germicide; but when used for long periods of time may act by preventing growth and development of disease germs; used especially of agents applied to living tissue.

Bactericide: Anything that destroys bacteria. The term is synonymous in large part with germicide, the chief difference being that the latter is somewhat broader, inasmuch as it may include micro-organisms other than bacteria. Bactericide is a precise term applying only to bacteria and to bacteria of all kinds. In practice, however, it is ordinarily regarded in the same light as germicide with respect to the resistance of different bacteria; that is, a substance, in order to be called a bactericide, is not necessarily required to be capable of destroying bacterial spores.

Brand: The name, number, trade-mark, or designation applied to an economic poison of any particular description by the manufacturer, distributor, importer, or vendor thereof. Each economic poison differing in the ingredient statement, analysis, manufacturer or distributor, name, number, or trade-mark shall be considered as a distinct and separate brand.

Disinfectant: A substance that frees from infection; usually a chemical agent which destroys disease germs or other harmful micro-organisms, but not necessarily the resistant spore forms; commonly used of substances applied to inanimate objects.

The term disinfectant suggests the cleaning of sick rooms, clothing, bedding, lavatories, stables and in fact of any places or things that might harbor disease. By contrast, germicide is a precise, colorless word, conveying its literal meaning and little more. The two terms appear to have the same meaning when applied to substances used in fighting disease. If it is accepted that substances called disinfectants are germicides, and, in general, germicides may act as
antiseptics but that antiseptics are not necessarily germicides, then it follows that disinfectants may, theoretically at least, act as antiseptics, but that antiseptics may not necessarily act as disinfectants.

Detergent: A substance used in aqueous or other medium to facilitate removal of foreign matter from solid surfaces.

Deflocculating Agent: A substance which aids in the production or maintenance of a dispersion of a solid within a liquid.

Deposit Builder: A substance which increases the material adhering to the surface during a reasonable period of application; it decreases the affinity between the desirable material and water, resulting in a greater deposit of material and shedding of water with less run-off of desirable material.

Economic Poison: A substance or mixture of substances intended for use as an insecticide, rodenticide, herbicide, fumigant, pruning paint or wood preservative; also a substance or mixture of substances intended for use as a fungicide, disinfectant, germicide, or bactericide except when for use on or in living man or other animals, and any other product intended for use on other forms of undesirable plant, animal or virus, except viruses on or in living man or other animals.

Emulsifying Agent: A substance which aids in the production or maintenance of a dispersion of one liquid within another.

Fumigant: A substance or mixture of substances which produce gas, vapor, fume, or smoke intended to destroy insects, bacteria or rodents.

Fungicide: A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any fungi.

Fungi: All non-chlorophyll bearing thallophytes (that is, all non-chlorophyll bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts and bacteria, except those on or in living man or other animals.

Germicide: A substance that destroys germs (microorganisms); applied especially to agents that kill disease germs. In practice it is assumed that a substance represented as a germicide, when used as directed, will kill all ordinary disease germs, but is not necessarily required to be capable of destroying bacterial spores.

Herbicide: A substance or mixture of substances intended to prevent, destroy, repel or mitigate any weed.

Inhibitor (Bacterial): A bacterial inhibitor is a substance which will prevent the growth and multiplication of bacteria. (Adopted as tentative - 1952).
Insect: Any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class insecta, comprising six-legged, usually winged forms, as for example, beetles, bugs, bees and flies; and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as for example, spiders, mites, ticks, centipedes and wood lice, also nematodes and other worms, or any other invertebrates which are destructive, constitute a liability, and may be classed as pests.

Insecticide: A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any insects which may be present in any environment whatsoever.

Label: All written, printed, or graphic matter on, or attached to the economic poison, or the immediate container thereof, and the outside container or wrapper to the retail package of the economic poison.

Labeling: All information and other written, printed, or graphic matter upon the economic poison or any of its accompanying containers or wrappers to which reference is made on the label or in supplemental literature accompanying the economic poison.

Larvacide: A substance or mixture of substances intended to prevent, destroy, repel or mitigate larva.

Package: The carton, box, barrel or other receptacle into which an economic poison is placed for use, handling, removal, shipment, or conveyance; a single container of such article or articles, or several containers packed together, including both the immediate container of the material and the box, carton, or other container (if any) in which it is enclosed or displayed.

Package, Original Unbroken: The unit retail package as ordinarily displayed on and sold from the shelves of the dealer, distributor, or other vendor.

Package, Unbroken: The package delivered by the shipper to the carrier at the initial point of shipment. It may contain one or more original unbroken packages as defined above.

Rodent: All animals of the order Rodentia, such as rats, mice, gophers, prairie dogs, or squirrels.

Rodenticide: A substance or mixture of substances intended to prevent, destroy, repel or mitigate rodents or any other undesirable vertebrate animal.

Sanitizer: A substance which reduces the number of casual bacterial contaminants to safe levels as judged by health requirements; commonly used of substances applied to inanimate objects.
Selective Wetting Agent: A substance which by affecting the surface, alters the relative ease of setting a solid by various fluids, for example, causes lead arsenate to be preferentially wetted by oil rather than by water.

Spreader or Film Extender: A substance which increases the area that a given volume of liquid will cover on a solid, or on another liquid.

Sterilize: To render sterile, that is, free from all living microorganisms. Heating for a sufficient time at a temperature at which microorganisms cannot live is recognized as a physical method of freeing inanimate objects and their surroundings from all living microorganisms. Usually understood as referring to the treatment of surgeons' instruments, gauze bandages, culture dishes, and other apparatus rather than the treatment of the sick room or of the human body.

Disinfect refers particularly to the destruction of disease germs, especially the vegetative forms, while sterilize denotes the freeing from all organic life. Sterilize is the more drastic, and it might easily happen that something is thoroughly disinfected without being completely sterilized.

Synergist: A substance which produces in combination with another a pharmacological effect in that the efficiency of one or more of the components may be greatly heightened or potentiated by the other.

Water Modifier: A substance which is used to change the pH or the chemical composition of dissolved or suspended material in the spray water in order to prevent undesirable behavior.

Weed: Any plant which grows where not wanted.

Wetting Agent: A substance which appreciably lowers the interfacial tension between a liquid and a solid, and increases the tendency of a liquid to make complete contact with the surface of a solid, so that no dry area may remain.
APPLICATION FOR REGISTRATION OF ECONOMIC POISONS

Control Office, 19

Application is hereby made for the registration of the following (number) Economic Poisons for a period beginning with the actual date of registration and continuing until December 31, 19__. There is submitted as part of this application individual data sheets (8½ X 11) to which is attached a copy of the label for each product. (See instructions on reverse side).

Remittance payable to the State of in an amount of $__ is enclosed herewith to cover annual inspection fees for the following products.

BRANDS

I hereby certify that the information appearing on the attached data sheets is true and correct in every respect; that each and every package of the above named materials will be labeled as described (and in addition that net weight and manufacturer's name and address will be shown); that the attached declarations are the guarantees of the applicant as to the chemical composition of the material above named for and on behalf of:

Address correspondence to: Submitted by:

Firm ______________________ Firm ______________________
Attention __________________ By ______________________
Street & No. __________________ Title ______________________
City & State __________________ Date ______________________

(Applicant not to fill in below this line)

CERTIFICATE OF REGISTRATION

This certifies that the above named applicant is hereby licensed to sell the above brands of economic poisons in the State of for a period beginning with the actual date of registration and ending December 31, 19__ when sold, offered or exposed for sale under the grand name and guarantees as described.

Date ______________________ State Chemist ______________________
Comptroller ______________________
APPLICATION FOR REGISTRATION OF ECONOMIC POISONS

For the Calendar Year 19__

Application is hereby made to the Secretary of the State Board of Agriculture, for registration, under the provisions of the Economic Poisons Act of ___, of the following economic poisons:

There is submitted, herewith, a copy of the label (affixed to 8½ X 11 sheet of paper) and all other written, or graphic matter used on, or attached to, the containers of the above listed economic poisons. Ingredient statements are shown on label sheets when required under Section ___ of the Act.

I hereby certify that all labels submitted, herewith, are exact copies of labels that have been registered without protest with the U.S. Department of Agriculture, except those marked with an asterisk (*).

Remittance is enclosed to cover the registration fee for ___ products ($___ for each product) in the amount of ___.

Address correspondence to:

Submitted by:

Firm

By

Attention

Title

Street & No.

Date __________, 19__

City & State

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CERTIFICATE OF REGISTRATION OF ECONOMIC POISONS

TO:

On the basis of the information furnished by the registrant, and the receipt of the registration fee, the following named economic poisons are hereby registered under the provisions of the ________ State Economic Poisons Act of ________, and the sale of said economic poisons is hereby authorized in the State of ________, when offered and exposed for sale, or sold under a label showing the information required by law and otherwise in compliance therewith, for the calendar year 19____, unless said registrations, or any of them, are canceled for cause:

Claims or directions for use which differ in substance from the representations made in connection with the application or changes in the name or formula of the economic poison covered by this notice should not be made prior to their submission to the Secretary of the ________ Board of Agriculture, and receipt of notice that they have been accepted.

Registration of a product is in no way to be construed as an endorsement of approval by this department or any claims made for it. The labeling must not bear any reference to registration under the Economic Poisons Act of ________. In order to protect the public, the Secretary may at any time cancel the registration of an economic poison. Request for registration under a new formula or labeling may be submitted at any time.

Dated at _____________, this _____ day of ____________, 19____

__________________ Title

__________________ State Board of Agriculture

Receipt No. ____________, Secretary
SECRETARY'S REPORT COVERING THE SIXTH ANNUAL MEETING OF THE ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS, INC.

The sixth annual convention of the Association of Economic Poisons Control Officials convened at the Shoreham Hotel, Washington, D.C., October 4, 1952. A total of 104 registered, 13 less than last year. Forty control officials represented 27 states and Canada; the previous year 58 officials came from 32 states and Canada, 20 from federal agencies, and 39 from the industry. It should be noted that both industry and federal department representatives equalled their totals of 1951.

On Friday evening, October 3 in the Louis Seize Room at the Shoreham, the States Relations Committee held its annual session. A good representation from all phases of the pesticide field joined in the discussion of 13 control problems. These questions were submitted by interested trade groups and committee members.

Among questions discussed the following two were considered of sufficient import that definite recommendations to the Executive Committee were made:

(1) that an investigator be appointed to study the advisability of requiring the addition of a distinctive coloring agent to seed disinfectant products to distinguish possible contamination of untreated seed.

(2) that the Executive Committee consider the desirability of contacting the Federal Trade Commission to ascertain whether this association can be of assistance to them in speeding up their action against extravagant and misleading advertising claims for pesticides and pesticide products.

Representatives of the National Agricultural Chemicals Association revealed that they are considering a proposal to amend the Uniform Bill providing for a specified time limit for filing claims against manufacturers for alleged crop damage. It is their belief that a definite time limit is necessary to allow the manufacturer suitable opportunity for proper inspection of the circumstances surrounding the case.

At the Saturday morning meeting President Constable spoke on "Pesticide Control and Public Relations" which was followed by Dr. Haller whose subject was "Problems in the Development of Insecticides"; Dr. Lehman speaking on "Toxicity of some of the Newer Pesticides"; and, Mr. Crass covering the subject of "Labeling Principles and Problems". With the exception of Dr. Lehman's paper, these talks are reproduced elsewhere in this publication.

To conserve space in this publication some of the committee reports are summarized:
In the report of Allen B. Lemmon, Investigator for Pesticides in Fertilizers some problems involved in the use of pesticides-fertilizer mixtures were brought out as follows: (1) Toxicity to plants; (2) Residual nature in the soil for a period of years; (3) Accumulative effects; (4) Compatibility of ingredients; (5) Effects on beneficial soil organisms; (6) Deleterious effects on edible plant parts; (7) Translocation to other parts of plants; and (8) Residual effect from plants growing in treated soils.

Justus C. Ward, Chairman of the Toxicity and Antidotes Committee reported the revised Interpretation 18 was about ready for distribution for committee comment.

J.J.T. Graham, Methods Clearing House reported continued interest by state and industry laboratories in methods for the newer pesticides and revisions for some of the older ones.

Legislative action from the membership as revealed in J. D. Patterson's report as Chairman of the Legislative Committee showed changes in laws in three states and Canada. Laws covering application of hormones and other pesticide materials do not fit any over-all pattern. Approximately one-third of the states have some type of legislation covering application with the legislation, in most cases, being adopted to meet a particular situation.

As a result of a resolution proposed by F. H. Gates of Colorado and his committee the membership voted to present plaques to Past Presidents in recognition of their efforts in behalf of the Association.

Officers elected are: President, R.C. Berry, Virginia; Vice-President, Floyd Roberts, North Dakota; Secretary-Treasurer, A.B. Heagy, Maryland; Executive Committee, W.G. Reed, Washington, D.C.; E.A. Epps, Jr., Louisiana; F. H. Gates, Colorado; and C. A. Bower, Oklahoma.
REPORT OF THE EXECUTIVE COMMITTEE

The Executive Committee met at the Shoreham Hotel immediately following adjournment of our convention of 1951, to assist the president in the selection of committee personnel and plan our program.

In April 1952 the Executive Committee met in the offices of the Insecticide Division, Production & Marketing Administration, U.S.D.A., Washington, D.C. This conference of five days was held without cost to our association. All phases of pesticide control activities of both the federal and state agencies were discussed. Representatives of other federal agencies interested in pesticide control met with our committee and gave reports of research and investigative studies on many new products. One day's session was devoted to a discussion of enforcement procedures with representatives of trade associations.

The Executive Committee convened at 4:00 P.M. on October 2, 1952 at the Shoreham Hotel to consider reports of committee chairmen and investigators.

Reports of Committees to study Toxicity and Antidotes, Legislation and Methods Clearing House were reviewed and accepted. The Committee expresses its appreciation to these groups and suggests this work be continued.

The report of the Uniform Registration Procedure was approved and special emphasis is placed on their recommendation that all states not using the uniform blank consider its adoption.

It is recommended that the Committee on Ingredients be discontinued and that this subject be referred to an investigator.

The committee approves the report of the Regulations and Terms Committee and recommends the adoption of regulations 17(f), 26, 27, and 28 as official. Also, the adoption of regulation 6(i) as tentative and the definition of inhibitor (bacterial) as tentative.

Approval was given to the investigator report on Pesticides in fertilizers and the committee recommends that if and when any Pesticide-Fertilizer mixtures are registered for agricultural use that the manufacturers be required to identify these combinations clearly for the purchasers' protection.

The committee recommends the adoption of the uniform sampling procedure as official with the deletion of Part II B & C covering bulk sampling.

Several objections were raised by the committee concerning the report on Uniform Sampling Procedure for large-
package dry products. It is recommended that the report be re-studied by this group with a view toward aligning the procedure with those used for feed, fertilizer and lime. It is further recommended that the Executive Committee submit their views on the subject to this group.

The report of the Uniform Standards Committee was approved and it is suggested that the completed data on the approximately ninety materials be included in the annual report.

In view of the anticipated increased size and cost of the association's publication, it is recommended that the Executive Committee determine the sale price per copy.

The committee expresses sincere thanks and appreciation to the speakers on the program, and to the committee members and investigators for their work during the past year on behalf of the Association.

The Executive Committee recommends that the Secretary receive an honorarium of $100.
PESTICIDE CONTROL AND PUBLIC RELATIONS
E. W. Constable, State Chemist
North Carolina

It is a pleasure indeed to extend to you - members of the Association of Economic Poisons Control Officials, members and representatives of the industry and to all others - a hearty welcome to this the Sixth Annual Convention of the Association of Economic Poisons Control Officials, Inc. It is your attendance, cooperation and work which enables the Association to best serve those purposes for which it was organized and without which all of us would be greatly handicapped.

For my brief part in our program I should like first to recognize in summary the present status of the Association and then to discuss briefly the topic "Pesticide Control and Public Relations".

Certainly we can take just pride in the accomplishments of the Association in its six short years of existence. I know of no similar organization which has excelled it in progress and accomplishment in so large a field and in so limited a period of time. I am happy in the privilege of being a member of the crew.

In this recognition, however, I would by no means choose to neglect those things which have not been done, the many, and sometimes acute problems which still remain unsolved, the greater public service we would have chosen to render had the means to that end been available to us.

These things give us continued concern. We wish to see them cleared. We wish to avoid the damage and destructiveness that may ensue as the result of having left lying around those oversights or inadequacies which, as missiles may be seized and wantonly hurled about by those who, because of alarm or for other reasons, resort to such activity.

We have made good progress in effective and uniform laws, applications, registration and labeling requirements, and in other items. This good work continues. The pesticide industry and trade as a whole is on a sound and ethical basis, although we make no pretense of overlooking exceptions. The pesticide using public has been well served, but we are acutely aware of certain tragic accidents. The all-important problem of safety has been well handled even though there is opinion to the contrary. Overall, the Nation's food and fibre supply is more abundant, and the prevalence of pests and disease less, because of a dependable supply of pesticides.

In all, much has been accomplished and we are gratified for our part in it. In this, much credit is due to the wholehearted cooperation of many agencies, organizations and individuals - too much for detailed presentation here. This spirit of cooperation is indispensable. Too high a value can hardly be placed on it.
While we recognize commendable progress on the credit side, we also can profitably turn our attention to liabilities. As with any organization of our kind, a number, regretfully, could be cited. But, one in particular I wish to emphasize at this time.

On a number of occasions and in different areas we have experienced disturbing and damaging publicity in connection with pesticides. Most of us feel that these flares are unjustified and ill founded. Justly or not, they are variously labeled as grossly exaggerated, extremists views, the outbursts of crackpots, machinations for self-promotion, and - we could go on at length. In other minds, however, these reports are feared to carry elements of truth. Regrettably, we cannot be fully assured otherwise.

Nevertheless, these outbursts do occur and our opinions do not alleviate the trouble they cause. They are taken up by the press, apparently not free of sensationalism at times, and they cause alarm and fear. It is obvious to us that they do not impartially disclose the full facts. We are unable to find substantiation of the conditions they allege. If we could, we would, of course, immediately move in on them.

The fact that they do occur, that they do cause alarm and that this alarm is due in part to lack of information may be evidence of inadequacy in our own programs. From that point of view, it is of value to review a few of the allegations and contradictions occurring in the most recent outbreak which doubtless is no longer news to you.

In this review a number of items are cited, but without identification of authors or publishers since we are concerned here with the situation and not individuals. There is no intention to indulge in controversy. The review is only exploratory and an attempt to evaluate the material at hand. It is limited to these considerations. Where necessary, deletions or substitutions are made to these ends.

In this publicity, newspaper headlines appeared as follows: 'DDT may be Poisoning the State', 'Little is Known of the Effect of Insecticides on People', 'No Insecticide Danger Seen if Carefully Used', 'Insecticide Challenge Accepted' 'Doctor Demands Study of DDT Danger', 'Poisonous Insecticide Danger to man is Told', 'Three Insecticide Tests Required by Law', 'Farmer Says Fruit is not Poisoned by DDT', 'DDT is Talked by State Officials', 'Doctor Offers Challenge to State Official', 'Insecticide Row Called Old Story', 'Asserts State Leaders Abreast of Insecticide Tests', and finally - that is to date, 'A Spotlight, now, on the Bug Baths'.

For those who love controversy, obviously this list of headlines would offer an agenda for a Roman holiday. Under them was given extensive detail. A few excerpts or summaries will serve in demonstrating their character. They are as follows:
'The wholesale and perhaps reckless use of new insecticides has made this State one of the "most poisonous" states in the Union and may have made serious inroads on the public health'. 'In almost every county in the State's big fertilizer belt (estimate here as approximately 60 or more counties) there are instances of farmers and animals dying from insect spraying—often in convulsions'. In referring to a post-mortem examination following a death in an area adjacent to an insecticide mixing plant, the newspapers transmitted the following statements: 'There were perforations in the stomach and pneumonia in the lungs. The poisons from the nearby plant were found to be mixtures of DDT, benzene hexachloride and sulphur'. These latter two parallel statements were not accompanied by further statement as to possible chemical or other analyses showing poison to be present in the body or to be the cause of death.

Further items of relatively similar character are, 'Lindane classified as a deadly killer' and 'public agencies helpless to prevent these poisons from going on the market'. These two statements are particularly puzzling; the first, since arsenic and others of the older insecticides which were used many years prior to the advent of present newer one, also are deadly killers; the second, because it is not the purpose of the agencies we represent to keep insecticides off the market, but rather, since they are indispensable in bringing crops to fruition, to see them put on the market, surrounded by every practical safeguard that can be devised. Also, there remains the fact that these governmental agencies, for legal reason, can stop the sale of any insecticide now on the market or can hold up the introduction of new ones until they are acceptably qualified.

In another instance it is cited that one of the insecticides now in use was developed as a war gas. The intended significance of this statement is obscure. Its potentiality for alarm however is obvious. In an equally meaningless manner, we may observe that one of the earlier war gases was chlorine, a constituent of common salt (sodium chloride). Should we forthwith discontinue the use of salt because of this or should we, in a less impassioned mood, continue to use it sensibly? The second of these statements, my own, is biased, but it appears not different in principle from the first.

It is sometimes considered that procedure by "shock", a characteristic of these publicity outbursts, may be useful in focussing attention where it is needed. If this be true in the present case and if there be fact behind this publicity, certainly we wish it brought into the open where it can be dealt with. The authors of this publicity have an excellent opportunity for public service by adding demonstrable facts to their opinions and conclusions. As yet, such facts have not been forthcoming.
As to our own responsibility in the work, we wish to do the best possible job, to offer the greatest public service, or, in terms of the marksmen, to make the best possible scores. We attribute the same ambition to the authors of this publicity, but in their efforts to chalk up "bulls' eyes" we feel that the full, present status and significance of the pesticide field should be recognized and, in dealing with it, that certain ethics should be observed. By way of illustration I use a borrowed story, as follows:

An expert marksman with top honors in his field, while visiting a small town, noted that there were targets painted in every convenient place - "bulls' eyes" with bullet holes in dead center each time. He was greatly impressed by the number of these targets, the skill of the marksman and the accuracy of his gun, therefore decided that he still had much to learn. In questioning local townsmen regarding the display, he ran into some reticence, but one citizen, with an attitude of sympathy, explained that the town humored the local lad in his marksmanship whims because of a rather limited mental outlook. The visitor, still thinking that there was something to learn, sought out the local lad, complimented him on his skill and asked to be instructed in how such a record could be made. "Simple" said the local lad. "You want bulls' eyes with bullet holes in the center. You get a gun and a bucket of paint, shoot some holes and paint bulls' eyes around them."

As is indicated in the headlines given earlier herein, the newspapers also printed replies converse to the foregoing detail. These included statements such as, 'Death known to be due to insecticides were the result of improper and careless handling' and 'Recommended poisons which were used according to instructions present no health hazards'. Reference also was made to certain requirements for clearing and registering insecticides for sale and to the Delaney Report. Other replies coming from government agencies, industry and growers set forth facts in the pesticide situation more as they are known to those of us closely connected with that field.

In a somewhat lighter but more searching vein, an editorial given under the formerly referred to "Bug Baths" headline raises this question - "Does death lie in wait on our pantry shelves?" This editorial reviews various charges which are previously referred to and concludes, 'Their author may be a victim of his own imagination, or of his own fear, or of a desire to pioneer in a new field, or in reporting these charges, the reporter may have developed an inadvertent undertone of sensation'. The editorial further reads, "We tend to believe that the deadly threat of the poisons has been exaggerated, however, unintentionally. But we don't know. And it is important that we, and all Americans, be quickly and reliably informed concerning the substance or lack of it in (the referred to) conclusions. The hazards we face in our daily living are awesome enough without an added killer in the closet".
The basic reasoning of this editorial is inescapable. It closes however, without indicating awareness of the existing means for dealing with insecticides or without citing other means by which all Americans are to be reliably informed as to the status of insecticides.

As previously has been indicated, some good may result from these publicity flares, but certainly there should be less alarming, less destructive, and according to our point of view, more ethical means to that end. We doubtless will not be able to prevent recurrence of the "alarm" technique, but we should be able to immunize against its undesirable effects by getting before the public sound, unbiased and uncolored facts about insecticides, the need for them and their proper use.

We have been inclined, or have chosen to look upon these publicity flares as side issues which, to take issue with would be a needless waste of time; or as groundless crusades which, if left alone, would spend themselves. While not electing the job of qualifying crusaders, we should not overlook that certain types of them do not readily bury their "one talent" or abandon their one outlook for "distinction". And, it would be an error to dismiss as side issues those things which may become, or may be fashioned into pitfalls.

By way of illustration and in closing, I'll pass on to you the following story: The local police court of a small town had just concluded its adjudication of certain differences and exchanges which had taken place during a recent ball game. A lad who had been intensely interested in the proceedings was seen to depart, a complete picture of dejection, both in face and attitude. On the street he met a partner-in-mischief who, on looking him over, observed, "Your face hurt today?". "Yep", was the reply. "What about" was the next obvious question. The dejected one explained, "Baseball is ruined, we got to find another game. They just decided we can't throw pop bottles at the umpire any more."

Throwing pop bottles may be classed as a side issue, nevertheless it can carry serious import. The umpire certainly could better attend his duties if there were no flying pop bottles to dodge. The purveyors of the commodities contained therein could well be relieved of the threat of having their products disqualified. The public could well be free of the hazards of flying glass. And, with respect to pesticides, we could well stand changes in some of the applications now pertaining to publicity. A better informed press and public would be of much help.

We might ask of ourselves and of the industry what we are doing along this line. Do we have a positive public relations program, and, if so, how effectively is it serving? Certainly we could well be rid of the hazards of this "pop bottle tossing" in the insecticide field. A more adequate public relations program may be a means to that end.
PROBLEMS IN THE DEVELOPMENT OF INSECTICIDES
H. L. Haller, Assistant Chief
Bureau of Entomology and Plant Quarantine

After I had outlined the subject matter of my talk for this morning, it seemed to me that a more suitable title for it would be "Problems in the Development of New Insecticides". That there are questions to be answered in this field, I am sure, most of you will agree. I have no intention, however, to discuss all of them. The several that I have chosen will, I hope, be of interest to this group.

Among the more important problems in the development of new insecticides are methods of analysis. It is highly desirable to have accurate and specific methods of analyses for each pesticide. Most of the newer products are relatively complex synthetic organic compounds. They differ from the inorganic insecticides, such as the arsenicals and fluorine products, in that their effectiveness is dependent upon the composition or structure of the molecule as a whole rather than upon a specific element such as arsenic, lead or fluorine.

For convenience, the newer insecticidal chemicals may be divided into four general groups - (1) chlorinated hydrocarbons, (2) organo-phosphorus compounds, (3) synthetic pyrethrin-like esters and (4) synergists. For their analysis, it is not sufficient to determine one element, for example, the organically bound chlorine in the chlorinated hydrocarbons or the phosphorus content of the organo-phosphorus insecticides and calculate back to the original chemical. Inert contaminants and degradation products containing these elements would interfere and lead to erroneous results. Numerous studies have been reported of efforts to find specific methods of analysis for members of each of the classes listed above. For the greater part the studies have concerned themselves with procedure useful only for the insecticidal chemical and not for the formulated or finished insecticides. Although accurate methods for the determination of the insecticidal chemical are necessary and useful, methods are also needed that will permit the detection and accurate estimation of the chemicals in various formulations - dusts, wettable powders, emulsifiable concentrates and aerosols. Methods are also needed for determining the products in combination with other insecticides and fungicides and in spray residues. That such problems are much more difficult and complex need hardly be emphasized to this group.

That the problem is also one of considerable importance to the ethical manufacturer, producer or formulator of insecticides may not be generally recognized. Many of the State regulatory agencies publish analyses of insecticidal compositions purchased in the open market. If the method used gives erroneous results, especially values that indicate a lower content than claimed on the label, the manufacturer is subject not only to a fine, but future sales of his product may suffer. In an effort to aid in the solution of some of these problems
our Bureau of Entomology and Plant Quarantine several years ago initiated collaborative studies between government and industry. The first such study concerned itself with benzene hexachloride and this was shortly followed by hexaethyl tetraphosphate and tetraethyl pyrophosphate. Since last spring, government and industry workers have collaborated in a thorough study of methods for the gamma isomer content of benzene hexachloride in insecticidal formulations. The AOAC method is being intensively studied and already much progress has been made in the solution of this difficult problem. Cooperative government industry studies are also underway on allethrin, the recently discovered pyrethrin-like ester. Here we are confronted with not only determining the purity of allethrin, but also developing methods that will permit the determination of allethrin in the presence of pyrethrins. These are but two examples of typical problems that are in need of urgent solution and which cannot be solved by part-time effort by analysts burdened with a heavy routine schedule. As pointed out in his presidential address at the AOAC meeting earlier this week by Mr. Lepper, precise and accurate methods of analyses are especially important in law enforcement activities.

Another subject which I believe will be of interest to this group and one to which I have devoted considerable time is the subject of coined names for pesticidal chemicals having long and complicated technical names. That there is world-wide interest in this problem is evidenced by the fact that at the Third International Congress of Crop Protection held in Paris two weeks ago, and which I was privileged to attend, there was a special session to consider the subject. After devoting a full morning to various aspects of the problem, the following recommendation was made to the Executive Council of the Congress.

This Congress having considered the problems arising in the nomenclature of the many complex substances used in the field of Crop Protection and the desirability of achieving world-wide uniformity in the common names for these compounds, recommends:

(1) That where they do not already exist, organizations, should be set up by members of the Congress in their own countries to adopt common names for chemicals used in Crop Protection.

(2) That such organizations should establish close liaison with each other and with the International Standards Organization and with, if possible, the cooperation of the Committee of Phytopharmacy.

I believe I am correct in saying that the first intensive effort to develop coined names for pesticidal chemicals was made by the late Dr. Rohwer, whom many of you know. Under the auspices of the Interdepartmental Committee on Pest Control, of which Dr. Rohwer was Chairman, coined names for 8 insecticidal chemicals, 5 fungicides, and one rodenticide were developed. All of the names developed are specific trivial names.
intended to define a definite pesticidal chemical. They are not generic names, as is sometimes stated. Superficially it may appear that the coining of suitable names is a trivial task. Experience gained over the past 6 years has shown that many factors need to be considered and that several groups having an indirect interest in pesticides need to be consulted if unanimity is to be achieved. As an example of some of the problems involved, I shall cite the experience we have had with the first name developed by the Interdepartmental Committee on Pest Control, named Chlordane. This name emerged following a lengthy discussion between members of the Interdepartmental Committee on Pest Control and representatives of the then two producers of the product.

Chlordane was defined as $1,2,4,5,6,7,8,8$-octachloro-$4,7$-methano-$3a,4,7,7,7a$ tetrahydroindane. Technical chlordane was defined as a commercially produced chemical containing 60-75% chlordane, together with 25 to 40% of related compounds occurring in the normal manufacturing processes which are toxic to insects.

The group selecting the name agreed that the name and definition should be submitted to organizations interested in pesticides with the recommendation that the name be adopted as a standard. This was done and the American Medical Association and the American Association of Economic Entomologists indicated they had no objection to the name. The editor of Chemical Abstracts, American Chemical Society, however, objected to the ending "ane" and proposed that the spelling be changed to chlordan. Shortly after the adoption of the name, chlordane, and editorial appeared in Chemical and Engineering News, entitled "What's in a Name", and cited specifically chlordane. The editorial indicated its approval of coined names for chemicals having complicated technical names, but stated that in their selection the names "should conform to the principles of chemical nomenclature in regard to endings. The latter provision is important because the ending of a chemical name is indicative of the class of compounds to which it belongs". Accordingly, the editorial went on to state that in American Chemical Society publications, the term chlordan would be used. In my opinion this arbitrary action is uncalled for. There is no relation between a trivial name and exact chemical nomenclature. Certainly not all names have chemical significance.

Although steps were taken in our Patent office so that the name chlordane could not be Trade-marked in this country, this action did not prevent the issuance of a trade-mark for chlordane in a foreign country. As most of you know, a trade-mark does not necessarily cover a specific chemical and can only be used with the consent of the trade-mark registrant. About two years ago one of the larger American insecticide distributors marketing an insecticidal preparation containing chlordane, in Cuba, was confronted with the fact that the term "chlordane" had been registered in that country by an individual and could not be used without his consent. Certain
necessary legal steps were taken to bring the facts to the attention of Cuban officials and the situation has been clarified - not, however, without expenditure of considerable time and expense. A similar situation was encountered by an American Company marketing lindane in Egypt, where this name had been registered as a Trade-mark.

Last June the name "isodrin" was approved as a coined name for an insecticidal chemical produced by the J. Hyman Company. Shortly after the announcement of its approval, it was brought to our attention that nor-isodrin was the trademark of a drug sold by the Abbott Company. This company is now requesting that the name isodrin for an insecticidal chemical be reconsidered. Experience has also taught - with chlordane and some of the other coined names - that the name should be applied only to the 100 percent pure chemical. These are but some of the problems encountered in this field.

In the spring of 1951, the Interdepartmental Committee on Pest Control decided to initiate a new procedure in regard to coined names for pesticidal chemicals. In the future the sponsoring organization will be requested to submit one or more names for a new pesticidal chemical that has reached the stage of commercial development. The name shall apply to the pure chemical and a suitable definition shall be developed for the technical or commercial grade. As in the past, a name for a mixture of two or more chemicals will not be considered. The sponsoring organization will also be required to submit data on the value of the product for the purposes for which it is intended, together with pharmacological and other relevant data. The Interdepartmental committee believes it is desirable that the coined name be trade-marked and then released for use as a common name. Such a procedure, it is believed, will reduce the chances of having a coined name developed in this country registered as a Trade-mark in a foreign country. The foregoing procedure was used in developing the coined name, malathion, for an organo-phosphorus compound produced by the American Cyanamid Company. In the development of coined names for pesticidal chemicals the Committee will continue to cooperate with all groups having an interest in this field, and it has no desire or intention of usurping the prerogative of any organization.

The third and final subject that I want to discuss briefly this morning is "systemic insecticides". This term is applied to insecticides which are taken up by a growing plant in quantities great enough to destroy insects that may feed upon the plant. In the case of animals where chemicals are introduced into the blood-stream for the control of external parasites, the term "internal medication" or "inner therapeutics" have been used. The subject is an old one and has intrigued workers for more than 150 years. The first studies with plants concerned themselves with preservation of wood by introducing water soluble inorganic salts into the sap-stream. Some success was had, but the results did not warrant commercial exploitation. About 5 years ago Schrader,
working in Germany, found that certain synthetic organic phosphorus and fluorine compounds were not only toxic to some species of insects but were capable of absorption by plants which thereby became systemically insecticidal. Schrader found this property among widely-separated types of compound, the most effective being, on the one hand, certain derivatives of fluoroethyl alcohol - and on the other hand, certain alkylammonio-phosphorus compounds.

Of the various systemic insecticides so far examined, octamethyl pyrophosphoramide frequently designated OMPA, has proved outstandingly promising and has been widely explored. Systox, the active ingredient of which is diethyl ethyl mercaptoethyl thiophosphate has also been found to act systemically. It is natural to inquire what are the requirements for an insecticide to be a "systemic". British workers, who have probably exploited this field more extensively than other workers, state that a compound must be soluble in water. This definition, however, is difficult to reconcile with experimental data showing that parathion, which is insoluble in water, is translocated in plants. Also, the experiments of Fulton and Mason, who found that when derris is applied to the first true leaves of bean plants, the leaves formed subsequently are less readily attacked by larvae of the Mexican bean beetle than are similar leaves of untreated plants.

At the recently-held Paris Congress on Crop Protection mentioned above, Dr. Walter Ripper, an enthusiastic proponent of systemic insecticides presented a paper on the subject. In it, he suggested that systemics be divided into three classes - (1) stable, (2) endolithic, and (3) endo-metatoxic. By stable systemics are meant such chemicals as sodium selenate, which is known to be taken up by plants and translocated but is not metabolized or broken down into an inert product. Endolithic systemics are those compounds which are absorbed and translocated in the plant and effect their toxic action in the same manner as when sprayed on plants, i.e. they act as unchanged chemicals to the extent of at least 98 percent. Endo-metatoxic systemics are those compounds which are absorbed and translocated in the plant and are wholly or partly transformed to products toxic to insects feeding upon the plant.

Whether or not these terms will be generally accepted by the workers in the field of economic entomology remains to be seen. It is clear, however, that compounds which act systemically present numerous problems that need to be solved before they can be widely recommended for use by the public. Of the more promising systemics, it is known that they are also highly toxic to warm-blooded animals. It, therefore, becomes necessary to determine the length of time they persist in the plants; whether or not the degradation products are toxic to warm-blooded animals; in these cases where there is evidence that the compounds are broken down or converted into products toxic to insects, it would appear that it will
be necessary to isolate the chemical, determine its composition and effect on warm-blooded animals. That these are exceedingly difficult problems, I am sure, need no emphasis to this group.

In closing, I think it may be safely said, that although there are many challenging problems in the field of pest control, greater progress has been made in the past decade in the control of injurious pests with chemicals than in all the preceding years. The advance in this field has had widespread and fundamental effects on agriculture in matters of improved production and quality of food. In the field of medicine the use of chemicals to control disease-carrying insects has had a profound effect in protecting and improving human health. The values accruing to man through progress in the field are difficult to estimate fully, but one very evident result is a substantial increase in food, feed and fiber crops where pesticides have been applied. I am convinced that the studies in this field now under way, will yield even greater results in the years to come.
LABELING PRINCIPLES AND PROBLEMS

M. F. Crass, Jr., Secretary
Manufacturing Chemists Association

The subject of labeling is a hardy perennial and at first I was reluctant to talk to you on a topic which has been so well covered in the past. However, I think we have all come to realize that labeling is far from static and I trust that a review of our current thinking will not be without profit.

The incentive for a program of adequate labeling probably dates back to the introduction in Congress of the so-called Bingham bill in 1932. Prior to that time there were officially in existence only the Federal Caustic Poison Act and the regulations of the Interstate Commerce Commission, both concerned with labeling within well-defined but narrow limits, plus a smattering of limited state requirements. The Bingham bill was prepared in response to the activities of the late Dr. Yandell Henderson of the Yale University Medical School, and Dr. Alice Hamilton - at that time the head of the New York State Department of Labor. The bill was introduced by Senator Bingham of Connecticut - a Republican.

It called for the labeling of certain chemical products, particularly those evolving potentially injurious vapors, requiring as a warning the word "poison" and the well-known skull and crossbones. The bill did not require specific warnings as to the nature of the hazards involved or protective measures for overcoming such hazards.

The bill's introduction, however, aroused the chemical industry to the necessity of initiating prompt measures for the guidance and implementation of a program of adequate labeling, and a committee was organized to meet with a group representing the proponents of the bill, in the office of Dr. Homer C. Cumming, the Surgeon-General of the U.S. Public Health Service, in Washington. At the conference it was agreed that voluntary methods were preferable to a Federal Act, and a permanent committee, subsequently called the Chemical Products Agreements Committee, was formed to work out with the Surgeon-General a series of agreements between manufacturers of 6 chemical product groups and the Surgeon-General. Dr. J. G. Townsend, at that time Director of the Division of Industrial Hygiene, headed the committee until his retirement two years ago.

The manufacturers voluntarily agreed to affix specific warning labels on shipments of these products and to certify such action on bills of lading and invoices. Texts of the several labels were prepared by the committee and the Surgeon-General's office and applied to Methanol, Carbon Tetrachloride and related volatile chlorinated hydrocarbons, the chlorinated naphthalenes, diphenyls, and diphenyl oxides; carbon disulfide, aniline oil, and benzene. MCA undertook to print the labels and to supply them to all users at cost. These agreements
were entered into early in 1934 and were lived up to faithfully by all manufacturers who were parties to the agreements until their discontinuance in the summer of 1952. Discontinuance came as the result of the large number of new products on the market not covered by the agreements and the existence of the MCA labeling principles which were considered to be better adapted for present conditions. The U.S.P.H.S. has recently taken steps to reactivate the committee, however, in order to provide a continual evaluation of current needs.

I think that most of you are familiar with the history of MCA's Labels and Precautionary Information Committee, which was formed in 1944 and promptly dubbed the "LAPI" Committee. By that time, the Association had drafted, and persuaded a large number of manufacturers to use, many additional product warning labels over and above those covered by the Surgeon-General's agreements.

In addition, MCA had prepared and distributed to its members a pamphlet entitled "A Confidential Report on Adequate Labeling - Its Importance to the Chemical Manufacturer". Part I of this report dealt with the question of adequate labeling and Part II was entitled "The Manufacturer's Duty as Interpreted by the Courts".

On the whole, however, the labeling of hazardous materials was sketchy and unpopular. The few regulatory requirements in the field suffered from lack of uniformity and took no recognition of relative degrees of hazard. While certain chemicals were being pointed to as "villains", many other more hazardous materials were being happily distributed with no recognition of their dangerous properties. Meanwhile, the organic insecticides and other new and useful products possessing hazardous characteristics were being synthesized by the chemical industry and markets were being developed.

By the end of 1945, the Committee had evaluated the several degrees of hazard, established basic principles applicable to a wide variety of chemical products, and published Manual L-1, "Warning Labels". At your meeting here in 1949 we distributed the 2nd edition of our Manual L-1. We had hoped that it would remain valid for many years but it became quite apparent last year that a further revision was needed to correct errors and take advantage of more recent data. Some of you have seen the mimeographed revision draft which we hope will go to press before the end of the year.

The LAPI Committee sought from the start to establish a program of labeling which would provide uniformity in terminology and indicate the relative hazards of all chemicals. In many cases data for even the common chemicals were sadly lacking and, as a result, some of the early illustrative labels were later found to be either too strong or too weak. The Association's program served to focus attention on this lack of data and much has been done to fill in the gaps and develop more authentic information. No doubt additional facts
will make further revisions necessary but we shall continue to look forward to a "permanent edition" some day.

Although it has been necessary to change many illustrative labels in Parts II and III, it has been gratifying to note that the Principles in Part I have required only minor changes, largely to improve their clarity. We believe that the soundness of these principles has been well proven.

The MCA Manual is directed primarily to the labeling of industrial packages but in Part I a section has been devoted to small package labeling. Due to the growing demand for guidance in this field there seems to be a real need for a separate manual, patterned after the MCA publication and possibly containing a Part I - Principles of Small Package Labeling, and Part II - Illustrative Labels for Small Packages. MCA believes that such a manual should be prepared. I understand that the Chemical Specialties Manufacturers Association is organizing a committee to consider the drafting of such a publication. This committee is expected to include MCA Committee members who are also CSMA members and who can contribute their experience to this much-needed extension of the basic MCA program. The task will be a difficult one, but CSMA is well equipped for the undertaking, and MCA will be happy to assist in any way requested.

As regulatory officials in the pesticide field you are perhaps more interested in Part III of the Manual, as it provides illustrative labels for certain pesticide chemicals. In deciding to add Part III to the Manual, the following points were considered. First and foremost, pesticides are chemicals and many of them are classified as hazardous. Since pesticides are probably the most regulated group of chemicals, uniformity in precautionary labeling requirements is greatly to be desired. Because the conditions of use of pesticides generally vary from those encountered in the use of industrial chemicals, it seemed desirable to illustrate the application of MCA principles to pesticide labeling.

As you know, every effort was made to work closely with the Federal Insecticide Division and other officials to develop satisfactory labels that would be consistent with Interpretation 18, which was published in the Federal Register shortly after the 2nd edition of our Manual appeared. The typographical limitations of the Federal Register are such, however, that an optimum display of labeling is not feasible and there results a pattern of compactness which unfortunately may cause a lack of attention being given to this information by registrants unfamiliar with the general clarity of LAPI layout.

We are quite sure that the Insecticide Division agrees with MCA that appropriate signal words -- "DANGER!", "WARNING!", "CAUTION!" -- used with statements of significant hazards are desirable and should be encouraged by industry. Since signal words cannot yet be chosen with complete accuracy, however, the officials do not have the legal backing to require as
many "Warnings" or "Dangers" as our Committee would recommend. Suggestions along this line to registrants, however, are followed in most cases.

Our Committee does not and cannot represent itself as able to provide specific precautionary labeling for all chemicals of hazardous nature. Part I, however, is applicable to all such products. The permutations and combinations possible in pesticide products are infinite. Therefore we endeavored to select a representative group of products to show the application of our principles to pesticide labeling and hoped that those responsible for labeling would then work out their own labels for specific products. However, in response to numerous requests for an expanded Part III, we are planning to add a number of new labels in the forthcoming revision. The rapid development of new pesticide chemicals makes it difficult to keep abreast of current developments unless frequent manual revisions can be made, or some provision set up for additions and changes between revisions. MCA realizes that it has a responsibility in maintaining a useful and accurate manual, and is constantly considering better ways and means of achieving this end. The Association invites your suggestions for making the manual a more useful publication and requests your continued cooperation in preparing the necessary labels.

Obviously we are quite proud of our program. We are convinced it has stood the test of time, adaptability, and much official scrutiny. Its rapid and favorable acceptance by the chemical industry and many regulatory agencies is most gratifying. We recently had the pleasure of assisting the New Jersey and New York State Health Departments in getting started on their proposed uniform labeling regulations. We stand prepared to furnish immediate counsel to other bodies on request, if and when the time comes for them to undertake similar programs. In this connection, the recent indorsements of MCA uniform labeling principles by the U.S. Public Health Service and the Council of Governmental Industrial Hygienists should catalyze action in other states.

We have on hand a small supply of current manuals for those officials who may not have received one. We plan to distribute the new edition as soon as it is printed. It has been our custom to supply copies of the manual to interested regulatory officials, and with the help of your Secretary, Mr. Heagy, we will see to it that each registrant at today's meeting receives one.
UNIFORM SAMPLING PROCEDURE

This proposed Uniform Sampling Procedure contains suggestions with respect to sampling operations and gives schedules for sampling specific insecticides and fungicides, as follows:

I. Where to locate samples.
II. How to collect the material sample.
III. Promotional literature and advertising.
IV. Types of products likely to deteriorate.
V. Types of products likely to be frauds.
VI. Schedule on quantity of insecticide and fungicide materials needed for testing.
VII. Schedule on quantity of herbicides needed for testing.
VIII. Schedule on quantity of disinfectants, sterilizers, sanitizers, etc., needed for testing.
IX. Schedule on quantities for rodenticides needed for testing.
X. Determination of net weights.

I. LOCATING SAMPLES

Efficient enforcement dictates that all possible sources of samples must be visited. Often inspectors or investigators will fall into a pattern of visiting a certain type of dealer only and thereby pass up possible violations which may be found in other types of dealers. Stocks of economic poisons will often be found in possession of the following types of dealers:

1. Barber and Beauty supply houses.
2. Grocery supply houses and grocers.
3. Drug supply houses and drug stores.
4. Chicken hatcheries.
5. Exterminators.
6. Hardware stores.
7. Paint stores.
8. Feed and fertilizer dealers.

Inspectors should be on the alert for new products, watch for advertisements, and make inquiries when visiting dealers.

II. HOW TO SAMPLE

The quantity needed will be found by referring to the sampling schedule.

A. Retail units

When more than one unit is required, take one from each of different cases, if possible. The shipping case and retail unit should be examined for code or batch numbers. If more than one code is found, each should be sampled -- within a reasonable total. The shipment should also be
checked for different labels which may possibly be found in it. Samples are always to be preferred from unopened shipping cases rather than from the retail shelf.

B. Sampling large-package dry products. (Under revision)

Whenever possible, previously unopened containers should be sampled. If this is not possible, the inspector should ascertain from the dealer that no changes have been made in the product since delivery and a written statement should be obtained stating that the composition of the product is unchanged. If there is any question of contamination or other change in composition, the sample should not be collected.

The container should be sampled by means of a trier long enough to reach the bottom. The trier should be inserted into the container at four equidistant points and probed diagonally toward the center of the bottom. The top inch of material should be discarded. The sample should be placed in glass containers, whenever possible, to avoid any metallic contamination which might occur. The trier should be thoroughly washed after each use.

The label should be copied or traced and particular attention given to the code or batch marks. As many different codes as are reasonable should be sampled.

C. Sampling large-package liquid products. (Under revision)

Since many of these products tend to separate, the containers should always be well agitated before the sample is drawn. The container should be inverted -- particularly in the case of emulsions, allowed to settle, and then rolled until it is certain the contents are well mixed. If possible, emulsions or other viscous substances which are stored in cold locations should be placed in a warm place before mixing, as in that way a more efficient job can be done. The sample may be drawn by means of glass, plastic, or rubber tubing. The use of rubber tubing has limitations and should not be resorted to for the drawing of creosote products or organic solvents, such as chloroform, acetone, and mineral oil. Samples should be placed in glass containers, preferable with glass lids or cork stoppers. Avoid the use of rubber jar rings in the case of jars containing oils, creosote and organic solvents. (The label should be copied or traced and the container examined for code or batch marks. As many different codes as are reasonable should be sampled.)

III. PROMOTIONAL MATERIAL

The dealer should be questioned regarding any advertising being done in behalf of the product. Copies of this and any promotional literature should be submitted with the sample. Frequently the claims found in advertising and in literature will differ from those submitted in connection
with registration. The dealer should be asked to initial all promotional material submitted for identification purposes -- should this material be required at a later date.

IV. PRODUCTS WHICH DETERIORATE

Whenever lots of confiscable size of the following products are found which are six months of age or older, samples should be collected:

1. Nicotine dusts or other nicotine products in which the nicotine content may be reduced by volatilization.
2. Bleaching powder, chlorinated lime or hypochlorite solutions.
3. Lice or flea powders containing naphthalene or paradichlorobenzene.
4. Carbon disulphide, carbon tetrachloride, or tetrachloroethylene capsules for bot fly treatments in horses.
5. Formaldehyde dusts for seed treatments.

V. FRAUDULENT PRODUCTS.

The following type of products may be considered possible frauds and should be sampled for label review:

1. Products for poultry drinking water to control external parasites.
2. Products represented as sterilizers.
3. Products represented as killing all germs.
4. Paradichlorobenzene or naphthalene products for use in a room to expel all insects or to disinfect toilets or similar equipment.
5. Cedar bark, leaves, or shavings represented as killing insects, repelling fleas, or having disinfectant properties.
## Sampling Schedule for Insecticides and Fungicides for Use on Plants

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Title</th>
<th>Including</th>
<th>Size of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>Arsenicals</td>
<td>All compounds</td>
<td>One pound from bulk shipment or smallest retail package.</td>
</tr>
<tr>
<td>A-2</td>
<td>Copper Fungicides</td>
<td>Bordeaux mixture, insoluble copper, ammoniacal copper solutions</td>
<td>Powders: Two pounds from bulk or two small retail units. Liquids: One pint from bulk or smallest retail unit.</td>
</tr>
<tr>
<td>A-3</td>
<td>Sulphur Fungicides</td>
<td>Sulphur, lime-sulphur dry and liquid preparations, etc.</td>
<td>Dusts; One retail unit or one pound from bulk. Dry Lime Sulphur: Same as dusts. Pastes: Two pounds from bulk container. Liquids: One quart from bulk or one retail unit.</td>
</tr>
<tr>
<td>A-4</td>
<td>Organic Fungicides</td>
<td>Ferbam, Ziram, Nabam, Zineb, Di-thane and other dithiocarbamates either straight or in mixtures.</td>
<td>Dusts: Four pounds from bulk container or equivalent in retail units. Wettable Powders: Two or more retail units to make two pounds or equivalent amount from bulk container. Liquid: One quart from bulk or retail units to make one quart.</td>
</tr>
<tr>
<td>A-5</td>
<td>Arsenicals with Fungicides</td>
<td></td>
<td>One pound from bulk or one small retail unit.</td>
</tr>
<tr>
<td>A-6</td>
<td>Organic Phosphates</td>
<td>Parathion, tetra-ethyl pyrophosphate, thiotep, tetraethyl dithiopyrophosphate etc.</td>
<td>Dusts: One pound from bulk or equivalent retail units. Wettable Powders: One half pound from bulk or one retail unit. Liquids: One pint from bulk or one small retail unit.</td>
</tr>
<tr>
<td>A-8 Plant Origin</td>
<td>nicotine, derris, pyrethrum, rotenone, ryania, salsabellana, cube, etc.</td>
<td>Nicotine Sulphates: Take 4 fluid ounces or one retail unit. Sabadilla: For all preparations, take 5 pounds. All Others: Same as A-6.</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>A-9 Oils and Oil Emulsions</td>
<td>Take one quart from bulk or one or more retail units for equivalent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-10 Seed Protectants Soil Fungicides</td>
<td>formaldehyde, chloropicrin, methylbromide, ethylene dibromide, organic mercurials, thiram, chlorinated hydrocarbons, copper carbonate, etc.</td>
<td>Dusts: Take one pound from bulk or two small retail units equal to 8 ounces or more. Envelopes: Usually 1/6 ounces; take twelve. Liquid: Take one pint from bulk or one small retail unit.</td>
<td></td>
</tr>
<tr>
<td>A-11 Miscellaneous Insecticides and Fungicides for Plants</td>
<td>Dust guns which usually contain a mixture of several insecticides, tree wound dressings or any dressings or any product not classified above.</td>
<td>Usually one pint, one pound or one retail unit. Dust guns: Take 3 units.</td>
<td></td>
</tr>
</tbody>
</table>

**FUNGICIDES FOR PLANT OR ANIMAL PRODUCTS**

<table>
<thead>
<tr>
<th>F-1 Wood Preservatives</th>
<th>Paint, varnishes, stains or dips for wood surfaces to prevent fungus growth in the wood.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-2 Manufactured Plant Products</td>
<td>Products for treating canvas, fish nets, retail unit or one pint from bulk. Aerosol: Take two 12-oz. Bombs.</td>
</tr>
<tr>
<td>F-4 Miscellaneous Products not classified above for fruit wrap, or fruit, mold inhibitors for food and tobacco products</td>
<td>Submit copies of labeling and advertising literature to consideration as to sampling.</td>
</tr>
</tbody>
</table>

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### INSECTICIDES FOR INSECTS INFESTING LIVESTOCK AND OTHER ANIMALS

<table>
<thead>
<tr>
<th></th>
<th>Products for treating horn flies, stable flies, deer flies, horse flies and others</th>
<th>Products containing: D.D.T., methoxychlor, or chlordane take one retail package. In bulk, take one pint in fluid or one point of solid. Other products: Take one gal. if ready for use or four lbs. if solid. If a concentrate, take 1 quart if fluid or 2 lbs. if solid.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-1 Fly control on animals and their premises</td>
<td>Products for treating internal parasitic flies on cattle, sheep, horses and other animals</td>
<td>Products for bots: Retail pkg. usually contains 12 ampules or less. Take 1 pkg. Grubs and Screwworm: Wettable powders: Take 1 retail container or two lbs. if in bulk. Smears: Take two retail containers or 1 pint if liquid. Sprays: Take one quart from bulk container or one or more equivalent retail units.</td>
</tr>
<tr>
<td>L-2 Control of cattle grubs, screwworm and bots</td>
<td>Products for controlling blue bugs, fleas, lice, ticks, mites and mange. Poultry roost paints, etc.</td>
<td>Wettable Powders: If for use on large animals, take two lbs. If for small animals and pets, take 1/2 lb. if in bulk; or equivalent retail container. Liquids: If concentrate take one small retail container or one pint if in bulk. If ready for use, two retail containers or one quart if in bulk. Roost Paints: Take one quart.</td>
</tr>
<tr>
<td>L-3 Control of lice, ticks, fleas and poultry mites</td>
<td>Any preparation not classified above</td>
<td>Usually one retail pkg. In bulk one pint or one pound.</td>
</tr>
</tbody>
</table>
### OTHER INSECTS

**M-1 Principally**

<table>
<thead>
<tr>
<th>for fly control</th>
<th>Household fly sprays, products with word &quot;fly&quot; in brand name, exterior or interior paints for fly control. Does not include products in L-1</th>
</tr>
</thead>
</table>

**Sprays:** Take one retail container or one pint from bulk package.  
**Paint:** One quart.

**M-2 Principally**

<table>
<thead>
<tr>
<th>for moth control</th>
<th>Products for moth-proofing clothing and house furnishings. Products with word &quot;moth&quot; in brand name. Dips, aerosols, etc.</th>
</tr>
</thead>
</table>

**Blocks:** Take six retail units.  
**Crystals:** Take one pound from bulk or smallest retail container.  
**Other solids:** Take one pound from bulk or equivalent in retail units.  
**Liquid:** Take one pint from bulk or equivalent retail unit.

**M-3 Principally**

<table>
<thead>
<tr>
<th>for roach control</th>
<th>Products for roach control, products with word &quot;roach&quot; in brand name, interior paints, etc.</th>
</tr>
</thead>
</table>

**Tablets:** Take one retail package.  
**Baits:** Take sufficient retail packages to make 1/2 pound.  
**Other Solids:** Take 1/2 pound from bulk container or equivalent amounts in retail units.

**M-4 Principally**

<table>
<thead>
<tr>
<th>for ant control</th>
<th>Products for control of all types of ants. Products with word &quot;ant&quot; in brand name.</th>
</tr>
</thead>
</table>

**Syrups:** Take 2 retail units.  
**Traps:** Take one doz.  
**Dusts:** Take enough retail packages or bulk to make one pound.

**M-5 Control of**

<table>
<thead>
<tr>
<th>Mill fumigants, seed and grain treatments, residual mill sprays, stored food etc.</th>
</tr>
</thead>
</table>

**Liquids:** Take retail packages to make 1 qt. or same amount from bulk container.  
**Solids:** One pound.  
**Gas Cylinders:** Submit copy of label and advertising to for sampling recommendations. This does not apply to aerosol containers which may be sampled according to M-7.

**M-6 Control of**

<table>
<thead>
<tr>
<th>Wood-destroying insects destroying wood, soil</th>
</tr>
</thead>
</table>

**Products for treatment**

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poisons for wood-destroying insects.  

For the following products:
- Pentachlorophenol: 5% and over
- Zinc naphthanate - 2% metallic zinc or over
- Ortho dichloro benzene solution -25% or over

Other Fluids: Take one pint if bulk or one retail unit. If concentration below the percentages given, 5 gallons are required.

Solids: Arsenicals or other metallic products take 1/2 lb. from bulk containers or one retail unit.

Liquids: Creosote—take one pint.

For the following products:
- Pentachlorophenol: 5% and over
- Zinc naphthanate - 2% metallic zinc or over
- Ortho dichloro benzene solution -25% or over

Other Fluids: Take one pint if bulk or one retail unit. If concentration below the percentages given, 5 gallons are required.

Solids: Arsenicals or other metallic products take 1/2 lb. from bulk containers or one retail unit.

Liquids: Take one pint from bulk or one equivalent retail unit.

Solids: Take 1/2 lb. from bulk or one or more retail units to make 1/2 pound.

Aerosols: Take at least four household units of one-pound size or two units if larger.

Smoke Dispensers: Take four household units.

Specimens of labeling and advertising literature should be submitted to determine as to sampling.

### VII. SAMPLING SCHEDULE FOR HERBICIDES

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Title</th>
<th>Including</th>
<th>Size of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-1</td>
<td>2,4-D</td>
<td>All salts and esters of di- or tri-chloro-phenoxycetic acids.</td>
<td>Tablets: Usually 24 in pkg., take 1 pkg. or equivalent.</td>
</tr>
<tr>
<td></td>
<td>2,4,5-T</td>
<td>Caution: From time of sampling until shipment, do not allow samples in this group to come in content with other products -- including other samples in the group. Ship each sample separately.</td>
<td>Powder: In 3 or 8 grams per pkg., take 12 pkg. or equivalent.</td>
</tr>
</tbody>
</table>

Dusts: Take one of smallest retail pkgs. but no pkg. over 1 lb. If bulk, take one pint on glass container.
H-2  T.C.A.  Trichloroacetic acid, pentachlorophenol and their salts  
       P.C.P.  Powders: Take 3-5 lbs.  
                 Solutions: Take at least 1 qt. but no more including bulk container.

H-3  P.M.A.  Phenyl mercuric acetate and derivatives  
          If half-pints, take 12.  
          If pints, take 6.  
          If bulk, take 1 pint

H-4  Metallic Arsenicals, or metallic salts  
          Powders: One or more retail pkgs. to make one lb. If bulk, one pound.  
          Solutions: One retail container if pint or quart. If bulk, one pint.

H-5  Oils  Petroleum derivatives  
          Stoddard solvent with or without aromatics

          One gallon required - retail or bulk packages.

H-6  Fertilizers  Products for soil improvement or similar materials with herbicide claims and containing 2,4-D  
          Potassium cyanate or P.M.A.

          Retail pkgs.: Take one if less than 12 pounds.  
          Bulk: take 10 lbs.

H-7  Defoliants  Any product with herbicide claims

          One pint or one pound.

H-8  Others  Any product not classified above

          Usually one pint or 1 pound

VIII. SAMPLING SCHEDULE FOR GERMICIDES, DISINFECTANTS, ANTISEPTICS, STERILIZERS AND SANITIZERS

Any of the following terms appearing on a label may serve to place a product in this section:

1. Antiseptic (when used in a sense that it prevents decay or putrefaction).
2. Bactericide, Bactericidal, Bacteriostatic

3. Controls bacteria, Germs, or Infections
4. Destroys Bacteria (or Germs)
5. Disinfectant, Disinfects, Disinfecting
6. Germicide - Germicidal
7. Inhibits bacteria (or germs)
8. Kills bacteria (or germs)
9. Prevents bacteria (or germs) slime, infection, putrefaction
10. Preservative
11. Reduces bacteria (or germs)
12. Treatment of bacteria (or germs)
13. Sanitize, Sanitizer, Sanitizing
14. Sterilize, Sterilizer, Sterilizing
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Title Including</th>
<th>Size of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-1</td>
<td>Coal Tar Disinfectants Liquor cresolica, cresol and cresylic acid, disinfectants, creosote emulsions Phenols and derivatives</td>
<td>2 retail pkgs. if pint size or less. If bulk, then one pint is sufficient.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D-2</td>
<td>Pine Oil, Pine Type or Pine Odor Disinfectants Mixtures and derivatives including Terpineols</td>
<td>As above</td>
</tr>
<tr>
<td>D-3</td>
<td>Chlorine-type germicides Sodium or calcium hypochlorite, chloramine-T, and other chloramines or chloramides</td>
<td>3 pint bottles or 2 quarts or 1 gallon according to size. Each unit to be taken from different containers. If shipment over 3 months old, triple size of sample if seizureable quantity on hand.</td>
</tr>
<tr>
<td>D-4</td>
<td>Quaternaries or substituted phenolic disinfectants Chloride or bromide salts of complex amines, pyridinium or imidacolinium. Salts and emulsions of the various synthetic phenols.</td>
<td>Ampules: 2 retail containers if 6 or less ampules per pkg. If more than 6, take one pkg. tablets/-2 smallest retail pkgs. If 50 tablets or over per pkg., take 1 pkg. Powders: 2 retail pkgs. If each 8 ozs. or less. If 1 lb pkg., take one. If over 1 lb pkg., this is bulk container - and take 1/2 lb. Solutions: 2 pts. if in pints and concentration is 25% or less. If concentration over 25%, take 1 pt. bottle. If in quarts, take one bottle.</td>
</tr>
<tr>
<td>D-5</td>
<td>Detergent Sanitizers Washing compounds and cleaning agents other than pine oil and hypochlorites represented for both cleaning and preventing, destroying or mitigating bacteria</td>
<td>Powders: Two retail units one point or less. If over, take one unit. If bulk pkg., take 1 lb. Liquids: In pints or less, take two; if larger containers, take one, if not over one gallon. If bulk, take 2 pints.</td>
</tr>
</tbody>
</table>
Air Sanitizers

Glycols and other products represented as sanitizing the air, reducing bacteria in air, etc.

At least two retail containers and more if required to have a minimum sample of one pint.

All Others

Lye, toilet bowl cleaners, formaldehyde preparations, mercurial compounds, poultry drinking water products, iodine preparations, etc.

Usually 2 retail pkgs. If one pint or one pound or less. Pint or pound if in bulk containers.

Devices

Ozonizers, ultraviolet lamps, sterilizers for home use and other except laboratory autoclaves

Report such products to with samples of labeling and advertising literature, especially if new manufacturer or new device in order that determination as to sampling can be made.

---

**IX. SAMPLING SCHEDULE FOR RODENTICIDES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-1</td>
<td>Strychnine</td>
<td>All compounds</td>
</tr>
<tr>
<td>R-2</td>
<td>Red Squill</td>
<td>All preparations</td>
</tr>
<tr>
<td>R-3</td>
<td>Ants</td>
<td>All preparations</td>
</tr>
<tr>
<td>R-4</td>
<td>Thallium</td>
<td>All compounds</td>
</tr>
<tr>
<td>R-5</td>
<td>Warfarin</td>
<td>All preparations</td>
</tr>
<tr>
<td>R-6</td>
<td>Others</td>
<td>&quot;1080&quot;, arsenic, barium, phosphorus, zinc compounds and miscellaneous</td>
</tr>
<tr>
<td>R-7</td>
<td>Fumigants</td>
<td>Chloropicrin, cyanide preparations, methyl bromide, carbon disulphide and other fumigants</td>
</tr>
<tr>
<td>R-8</td>
<td>Devices</td>
<td>Other than ordinary traps which are encountered should be reported to _______. All available advertising literature and labeling should be submitted in order that sampling can be considered.</td>
</tr>
</tbody>
</table>

**X. DETERMINATION OF NET WEIGHTS**

Every product of each manufacturer should be periodically weighed. A minimum of 10 units should be weighed as a preliminary, and if it appears the product is full weight, no more need be weighed. If a weight shortage is indicated, more weighings should be made as indicated by the chart. The
units submitted to the laboratory should be identified on the weight sheet.

If it is not possible to make the weighings on a Gurley Balance, the scale and weights which will be used should be checked by using a standard weight which is within the weight range of the item to be weighed.

<table>
<thead>
<tr>
<th>UNIT IN SHIPMENT</th>
<th>MINIMUM UNITS TO BE WEIGHTED</th>
<th>MINIMUM NO. OF TARE WEIGHTS TO BE MADE BY INSPECTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 50</td>
<td>all</td>
<td>2</td>
</tr>
<tr>
<td>51 to 200</td>
<td>50</td>
<td>3</td>
</tr>
<tr>
<td>201 to 400</td>
<td>75</td>
<td>4</td>
</tr>
<tr>
<td>401 to 800</td>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td>801 to 1600</td>
<td>120</td>
<td>6</td>
</tr>
<tr>
<td>1601 or more</td>
<td>3 times the square root</td>
<td>1/5 the square root of total number of units</td>
</tr>
</tbody>
</table>

The units to be weighed should be selected so that they will represent as many cases, batches, code, or lot numbers as possible.
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Alan Thistle, Director
Div. Ent. & Marketing
Board of Agr. & Marketing
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Phone 91171

MEMBERS WHO HAVE SERVED
AS PRESIDENT

J.L. St. John, Washington ....... January 1947-48
H.J. Hoffmann, Minnesota .............. 1948-49
J.F. Fudge, Texas .................... 1949-50
A.B. Lemmon, California ............... 1950-51
E.W. Constable, North Carolina ........ 1951-52
R.C. Berry, Virginia .................. 1952-53
OTHER CONTROL OFFICIALS IN ATTENDANCE

CALIFORNIA
William L. Hunter Asst. Chief, Food Crops
I. Levin State Food Chemist
E. R. Tobey Chemist
J. E. Schueler Chemist
R. W. Neal, Jr. Inspector
Massachusetts
John W. Kuzmeski Official Chemist
Mississippi
O. T. Guice, Jr. General Inspector
North Carolina
Harry A. Miller Asst. State Chemist
North Dakota
L. A. Koehler Chemist
New Hampshire
Henry A. Davis Asst. Chemist
New Jersey
Oklahoma
Willis Richerson Chemist
Rhode Island
Tennessee
Glenn C. Mowery Chief Chemist
Wisconsin
W. E. Griem Chemist
Canada

FEDERAL AGENCIES

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A. David Baskin Plant Pathologist
S. C. Billings Entomologist
Edward Bunch Entomologist
R. L. Caswell Chemist
A. D. Cromartie Admr. Officer
C. G. Donovan In Charge, Chem. Lab.
G. M. Downard Admr. Officer
Raymond Edens Admr. Asst.
E. L. Griffin Asst. Chief
C. F. Hoffman Admr. Officer
David Kelsey Technologist
G. W. Lloyd Entomologist
L. S. Stuart Chief Bacteriologist
E. A. Walker Chief Pathologist
J. C. Ward Chief Pharmacologist
R. O. White Entomologist

BUREAU OF ENTOMOLOGY & PLANT QUARANTINE
H. L. Haller Asst. Chief

FOOD & DRUG ADMINISTRATION
A. J. Lehman Chief, Div. Pharmacology

68
The Standards Committee of the Association is assembling a compilation of summarized data on pesticidal chemicals, more particularly the newer organic pesticides. Formulations are not included. Lists of the large variety of commercial formulations are available elsewhere. The data are more diverse than the data found in the Pharmacopoeia and Merck's Index but the total number of compounds is more limited. Resulting from an earlier announcement and from the review of preliminary copies a substantial interest in a publication of this type has been expressed.

Investigators of the Association accumulated the information for each chemical. The compilations have been reviewed by a fairly large number of individuals in regulatory and research work. Additional data have been supplied and constructive suggestions have been made. Industry scientists have made many contributions.

This initial copy is not complete. The pesticide field is rapidly growing and changing, resulting in a fluid situation. Annual revision is planned. Therefore, the data herein are NOT FOR RELEASE, QUOTE OR PUBLICATION WITHOUT PERMISSION. Additional pesticide chemicals will be included as rapidly as investigators accumulate data and reviews are completed. The objective is to include complete data for each chemical according to the outline shown on the next page. You are urged to submit information to complete the following incomplete compilations.

Pesticide is a coined name which was approved and adopted by the Pesticide Subdivision of the American Chemical Society following extended consideration. The name Pesticide is used to include the four groups, Insecticides, Fungicides, Rodenticides, Herbicides, etc. Pesticopoeia is a companion name adapted from Pharmacopoeia. These names appear descriptive of the nature and function of these chemicals.

Additional data, corrections, and suggestions are solicited from readers. Please direct these to the chairman of the Standards Committee. A project of this type requires the cooperation of many interested scientists. The generous assistance of many individuals is appreciated.

Committee - Description of Pesticide Chemicals

W.T. McGeorge           M.P. Etheredge
H.J. Fisher             P.A. Gunther
E.L. Griffin            C.V. Marshall
J.L. St. John - Chairman
DATA SHEET FOR
DESCRIPTION OF PESTICIDE CHEMICALS

Common Name: Chemical Name:
Empirical Formula: Definition, standard or grade:

Chemical and Physical Properties:
Melting point Boiling Point Vapor Tension
Inflammability Density Stability
Solubility Taste Odor
Color Corrosive action Dye properties

Analytical Methods:

Toxicity, Oral to Mammals:
Acute: Chronic:
Symptoms:

Antidote and First Aid: Hazards to Wildlife:
Skin Absorption: Use Precautions:

Residues:
Levels:
Prevention-practices and precautions:
Removal Methods:

Uses (types of pests):
Formulations (and compatibility):
Application:
Directions, rate and number:
Precautions: (food)
Equipment-cleaning, disposal:

Phytotoxicity:
Accumulation in Soil:
Storage and Shipping Directions:
DESCRIPTION OF PESTICIDE CHEMICALS

Common Name: ALDRIN
Chemical Name: Hexachloro-diendomethano-hexahydro naphthalene
Empirical Formula: C_{12}H_{6}Cl_{6}
Definition: Not less than 95%

Chemical & Physical Properties:
- Melting point 100-102°C Taste unknown
- Boiling Point 145°C at 2mm. Hg. Odor None, unless warm-pine
- Non-flammable Color white
- Stable in presence of alkaline and aqueous acids.
- Soluble in paraffinic and aromatic hydrocarbons and in oxygenated organic solvents.


Toxicity, Oral to Mammals:
- Acute LD/50 for white rats, 40-50 mg/kg
- Chronic: Highly dangerous; absorbed through skin and stored in body fats; central nervous system poison; safe feeding level rats 5-75 ppm in diet.
- Symptoms: May be latent period of several weeks. Headache followed by sudden unexpected loss of wt. and appetite in animal experiments.

Antidote and First Aid: Call physician immediately. Administer barbiturates as for anticonvulsive therapy. Watch patient carefully as repeated treatment may be needed. If swallowed give tbsp. salt in glass warm water, repeat till vomit is clear. Keep victim prone and quiet.

Skin Absorption and other: Extremely dangerous if absorbed through skin. Wash immediately with soap and warm water. Dangerous if inhaled.

Use Precautions: Use mask or respirator passed by USDA for Aldrin. Do not get in eyes or mouth, avoid skin contact.

Residues:
- Levels: At recommended dosages no harvest residues greater than 0.1 ppm have been found in fresh or processed foods.
- Prevention-practices and precautions: Should not be applied to feed or forage crops within 21 days of harvest.
- Uses (types of pests): For control of certain cotton insects & for grasshoppers when treated material not to be used as food or for feed for dairy or slaughter stock.
- Formulations (and compatibility): No incompatibilities) Available as 20-25% dusts or wettable powders; emulsifiable conc. 2 lbs. aldrin/gal.; 60% aldrin equiv. sol.; 1-2½% dusts; with DDT.

Application:
- Directions, rate & number: Should be limited to applications known to be effective without residue.
- Precautions: Food use questioned - do not apply to food or forage crops.
- Equipment-cleaning,disposal: Rinse with kerosene and detergent solutions.

Phytotoxicity: None shown at recommended levels. Honey sorghum sensitive at 10 ppm.
Accumulation in Soil: Soil treated at several times recommended dosage for subterranean pest control had no harmful effects on plants.

Storage and Shipping Directions: ICC shipping directions for class B poisons.

Common Name: ALLETHRIN
Chemical Name: Allyl homolog of Cinerin I
Definition: 92% allyl homolog of cinerin I & 8% related cpds.
Toxicity, oral to mammals:
Acute: MLD 50, 680mg/kg.
Chronic: 16 weeks animals tolerates 5000 ppm.
Symptoms: Tremors
First Aid: Induce vomiting
Skin Absorption and other: Poorly absorbed
Residues:
Levels: No harmful residues on leafy vegetables
Removal Methods: Readily soluble in oils
Uses (types of pests): Flies, aerosols; Variety of insects on cole crops, lice on animals
Formulations (and compatibility): Synergized by piperonyl butoxide and others and compatible with sulfur in horticultural dusts. Oil sprays and dusts, both with or without synergists.
Application:
Directions, rate and number: Comparable to pyrethrum, but not as effective against as wide variety of insects.

Common Name: AMMONIUM SULFAMATE
Chemical Name: Ammonium sulfamate
Empirical Formula: NH4. SO2. NH2
Definition: Shall contain 80% ammonium sulfamate.
Chemical & Physical Properties: Crystalline solid.
Melting point 131°C Color White
Soluble in water Corrosive action on metals
Toxicity, Oral to Mammals:
First Aid: In case of contact wash off promptly with water.
Skin Absorption and other: Avoid prolonged contact of skin with concentrated solution.
Uses (types of pests): Herbicide; general weed killer; spray for poison ivy, woody perennials, shallow and deep-rooted perennials.
Formulations: Marketed as commercial product cont. 80% ammonium sulfamate.
Application:
Equipment-cleaning, disposal: Completely empty spray tank after use and wash spray equipment to avoid corrosion.
Phytotoxicity: Avoid spraying lawns, young trees and commercial plants.
Accumulation in Soil: Heavy applications may cause non-productivity of soil. Apply fertilizer after weeds are killed.
Common Name: ANTU  
Chemical Name: Alpha-naphthylthiourea  
Empirical Formula: C_{10}H_{7}N_{4}CSN_{2}H_{2}  
Definition: Pure ANTU is a white powder, commercial is gray or tan powder, varying from dull green to dull purple.

Chemical & Physical Properties:
- Molecular weight - 202.28  
- Melting point - 198°C  
- Stability - good  
- Solubility - In water 0.006 gms./100 ml.  
- Triethylene glycol 8.6. Acetone 2.43. Other solvents, intermediate.

Analytical Methods: A.O.A.C. Official Methods of Analysis - 7th Ed. (1950) - Sec. 5.127 page 76.

Toxicity, Oral to Mammals: LD₅₀. For monkeys 4250 mg./kg. Dog .38 mg./kg. Other animals intermediate. 2mg. dose kills Norway rats. Rats develop tolerance.  
Symptoms: Norway rats - dyspnea, rales, lowered body temperature. Profuse pulmonary edema and pleural effusion.  
Antidote: None known.

Formulations: ANTU is customarily sold to the public as a prepared bait containing from 1 to 5%, as a dusting powder or concentrate for use in mixing baits from 20 to 30%, as the technical material containing from 90 to 89%.

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Common Name: ARSENIC (WHITE ARSENIC)  
Chemical Name: Arsenous Oxide - Arsenic Trioxide  
Empirical Formula: As₂O₃  
Definition: Commercial Grade White Arsenic Technical 99%  
Chemical & Physical Properties: White amorphous powder  
- Melting point-monoclinic 313-315°C, octahedral 275°C  
- Boiling point-sublimes at 193, Tasteless, Odorless  
- Vapor tension-at triple point 312,°C=66.1 mm/Hg.  
- Non-Flammable  
- Color-white  
- Density-3.865  
- Unstable in acid or alkaline solutions.  
- Soluble in water, alcohol, acids and alkalies.  

Toxicity, Oral to Mammals:  
Acute - LD₅₀(rat) - 13 mg/kg.  
Symptoms: Chronic effects, pains in abdomen, itching, nausea, headache, followed by lethargy, dysentery, vomiting, loss of weight and appetite.  
Antidote: Give emetic, salt or mustard in warm water, followed by milk of magnesia or hydroxide of iron. Call a physician.  
Skin absorption and others: Slight. Shows mild irritation. Remove by washing in mild soap and water.  
Hazards to Wildlife: Hazardous  
Use Precautions: Protect nostrils by dust respirator, hands by gloves (to be discarded after use) during handling. Wash all exposed parts of the body with mild soap and water.  
Residues:  
Removal Methods: Remove residues with water containing wetting agent.  
Uses: (Types of Pests) For certain ants and rodents.
Formulations (and compatibility): 3% solution in sugar/water mixture for ants, 3% solution in water added to baits for rats and mice.

Applications:
Precautions (food) - Prevent food contamination
Equipment - cleaning, disposals clean equipment with either dilute caustic or soap solution, or with water containing wetting agent. Treat with bleaching powder (calcium hypochlorite) to convert into relatively insoluble calcium arsenate.

Phytotoxicity: Very toxic to plants.

Accumulation in Soil: Accumulates, due to low solubility in water.

Storage & Shipping Directions: Can be shipped in bulk carloads, or in containers, but all such shipments, and containers used must be in accordance with regulations of the Interstate Commerce Commission covering shipments of explosives and other dangerous articles. These regulations cover type of container which may be used and also the use of poison labels.

Common Name: BARIUM CARBONATE
Chemical name: Barium carbonate
Empirical Formula: BaCO₃ Mol. wt. 197.36
Definition: Dense, white, colorless powder, containing 98 or 99% BaCO₃
Chemical and Physical Properties: rhombic crystals
Melting point - 795°C. Decomposes at 145°C.
Vapor tension - not appreciable
Density 4.43
Stable
Solubility - 0.0022 gm. in 100 gm. water at 184°C.; 0.0065 gm. in 100 g. water at 100°C. Soluble in acids and in solutions of NH₄Cl and NH₄NO₃.


Toxicity, Oral to Mammals:
Acute: Fatal oral dose: human 4-40 gms., rate 630-7 50mg/kg, dog 4 gms., poultry 6 gms., sheep 16 gms., horse 48 gms., cow 160 gms.
Chronic: no data.

Symptoms: Excessive salivation, vomiting, diarrhea, convulsive tremors, slow hard pulse, high B.P., hemorrhages into stomach, muscular paralysis, death.

Antidote: Give 2 tbsp. Epsom salts in glass warm water and repeat till vomit fluid is clear. Follow with milk or white of eggs beaten with H₂O.

Use Precautions: Avoid swallowing and particular care to avoid contaminating foodstuffs. Baits can kill dogs and cats.

Residues: Not used on foods.
Uses: Control of rats and mice.
Formulations: 20-25% in food bait or 98% BaCO₃. sold for
mixing with bait materials. Mixed by users 1 part to 4 parts food.

Precautions: Should not be exposed where it may contaminate food.

Storage and Shipping Directions: Compound is stable. Not hydroscopic. No special precautions except labeling all containers to avoid mistakes and food contamination.

Common Name: BASIC LEAD ARSENATE
Chemical Name: Basic Lead Arsenate
Empirical Formula: Indefinite Mixtures of $\text{Pb}_4(\text{PbOH})(\text{AsO}_4)_3$ and $\text{Pb}_2(\text{PbOH})(\text{AsO}_4)_5$.

Chemical and Physical Properties: White to gray-white amorphous powder, relatively stable in solutions having pH between 11.0 and 6.5, slightly soluble in water. Soluble in Nitric and Hydrochloric Acid.

Analytical Methods: A.O.A.C.

Toxicity, Oral to Mammals:
Acute: LD$\text{}_{10}$ to 100 mg/kg
Symptoms: Chronic effects, severe pains abdomen, nausea, headache, itching followed by lethargy, dysentery, loss of appetite, weight - vomiting.
Antidote: Give emetic, warm salt water until vomit is clear, followed by hydroxide of iron, milk of magnesia or olive oil. Call physician.

Use Precautions: Use approved mask, wash thoroughly after using with mild soap and water. Do not spray or dust on food crops where residues cannot be removed easily by washing.

Uses: Most commonly used in a mixture with other insecticides and fungicides. Compatible with most. Commonly used with lime-sulfur, copper, sulfate, zinc sulfate, ferrate, zerlate, etc. For control of scab, coddling moth, Oriental fruit moth, leaf spot and other fruit tree pests in a one shot treatment.

Formulations: Usually sold as basic lead arsenate and mixed with Bordeaux, DDT, sulfur, lime-sulfur, ferrate. On the spot according to the various Expt. Sta. schedules as these vary considerably in different areas.

Phytotoxicity: Safer to use on tender foliage than other forms of lead or calcium arsenate. No damage when used according to recommendations.

Storage & Shipping Directions: I.C.C. Regulations for Class B Poisons.

Common Name: BARIUM FLUOSILICATE
Chemical Name: Barium fluosilicate, barium silicofluoride
Empirical Formula: $\text{BaSiF}_6$ Mol. wt. 279.4

Definition: White crystals or powder (above).

Chemical & Physical Properties:
Density 4.3
Solubility 1 part in 4000 cold water; 1 part in 1100 hot water. Hydrolyses in $\text{H}_2\text{O}$ to give fluoride. Decomposition is complete in presence of sufficient alk.

Toxicity, Oral to Mammals:
Acute: Dependent on amount of fluoride in solution. Not as toxic as NaF because of high insolubility in water.
Chronic: Highly toxic when brought into solution.

Symptoms: See NaF
Antidote and First Aid: See NaF
Skin Absorption and other: None
Use Precautions: Harmful if swallowed. Avoid prolonged breathing of dust or spray mist. Keep away from children or domestic animals.

Residues:
Levels: Apples sprayed showed average residues of 5.6 ppm before washing.
Removal Methods: Necessary to wash off.

Uses (types of pests): Dusts and sprays against flea beetles, blister beetles & Mexican bean beetles. Baits used against silver fish.

Formulations (and compatibility): Dusts in 1 to 3 form dilut-ed with inerts. Poison baits. Sprays at 4 lbs./100 gal. water. Required to be colored to avoid mistaking for food.
Not compatible with hydrated lime, gypsum, Bordeaux, lime-sulfur, nicotine sulfate or other sulfates.

Precautions: (foods) Avoid contamination of food and feed.
Equipment-cleaning, disposal: Commercial products must contain 8% cryolite, sodium fluoaluminate, to prevent corros. of met. sprayers.

Phytotoxicity: Liable to injure plant life but can be used dry due to insolubility.

Common Name: BHC
Chemical Name: Hexachlorocyclohexane
Empirical formula: C₆H₆C₁₆
Definition: Standards not set. Tech. product has following ca comp.: 

Chemical & Physical Properties: 

<table>
<thead>
<tr>
<th>Composition</th>
<th>Melting Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha isomer</td>
<td>65-70%</td>
</tr>
<tr>
<td>beta &quot;</td>
<td>6-8%</td>
</tr>
<tr>
<td>gamma &quot;</td>
<td>12-15%</td>
</tr>
<tr>
<td>delta &quot;</td>
<td>2-5%</td>
</tr>
<tr>
<td>Epsilon &quot;</td>
<td>3-7%</td>
</tr>
<tr>
<td>related comps.</td>
<td>2-3%</td>
</tr>
</tbody>
</table>

vap. ten. at 20°C 

<table>
<thead>
<tr>
<th>acetone</th>
<th>alcohol</th>
<th>benz.</th>
<th>gm/100 ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>.02 mg Hg</td>
<td>13.9</td>
<td>2.5</td>
<td>11.3</td>
</tr>
<tr>
<td>.005</td>
<td>10.2</td>
<td>.93</td>
<td>1.12</td>
</tr>
<tr>
<td>.03</td>
<td>45.4</td>
<td>6.7</td>
<td>33.7</td>
</tr>
<tr>
<td>.02</td>
<td>71.1</td>
<td>31.2</td>
<td>46.2</td>
</tr>
<tr>
<td>--</td>
<td>33.2</td>
<td>4.2</td>
<td>14.8</td>
</tr>
</tbody>
</table>

Decomposes at 288°C. All stable to heat, moisture & strong acid, dehydrohal. in alkali.

Analytical Methods: J.A.O.A.C. 32, 751 (1949); Schecter &
Toxicity, oral to mammals: Mean lethal dose to rats, alpha 500 mg/kg; beta, 6000 mg/kg; gamma 125 mg/kg; delta 1000 mg/kg. Varies with species and age. Toxic to livestock especially young calves when sprayed or dipped. Lifetime diets to rats retarded growth at 800 ppm alpha or gamma and at 100 ppm gamma. Tech. BHC increased liver size at 100 ppm.

Symptoms: In acutely poisoned animals, stimulation of nervous system, sometimes convulsions, finally depression. Death depends on dose of gamma isomer.


First Aid: May treat neurological effects with phenobarbital.

Skin Absorption and other: Toxic effects from dermal application and injection as well as orally. Wash immediately with soap and water.

Use precautions: Avoid prolonged breathing of vapor, dust or spray mist. Do not leave in eyes or on skin. Do not use on household pets or humans.

Residues: Serious problem because of stability & chronic toxicity of some isomers.

Levels: See also phytotoxicity and soil accumulation, and effect on flavor.

Prevention-practices and precautions: Best avoided by following directions recommended.

Removal Methods: Same as for DDT but removal does not correct any adverse taste or flavor which has been generated.

Uses (types of pests): Limited because of toxic hazards & off-flavor caused. On forage crops not fed to dairy or slaughter animals, cotton plants, trunks of fruit trees.

Formulations (and compatibility): Dusts cont. 3-10% Tech. BHC; wettable powder cont. 50%; sol. usually 10% in petroleum solvent or emulsion, 10% BHC in petroleum solvent. 3-12% gamma isomer in dusts & powders. 10% gamma isomer in petroleum solvents or emulsions.

Application: Incompatible with lime-sulfur, sol. or with lime or Ca arsenate in dusts.

Directions, rate and number: Use for ticks, biting flies and lice limited on young animals, no application to calves under 3 months; for poultry roost paint.

Precautions: (food) If used in excess of requirement for parasite control, may be absorbed in fat of cattle or chickens and give off odor and taste.

Equipment-cleaning, disposal: Corrosive to some extent; spraying equipment should be cleaned after use with petroleum solv., soap or detergent.

Phytotoxicity: More toxic than & toxic to more plants than DDT. Except at low conc. interferes with germination, suppresses growth and reduces yield.

Accumulation in soil: Varies with type of soil, less persistent than DDT; gives off flavor to potatoes, peanuts & other tubers. Used for wireworms.

Storage and shipping directions: No ICC regulations. Heavy fibre drums are commonly used as containers. Tech. BHC
should not be stored in paper bags near products which absorb odors.

Common Name: BORIC ACID
Chemical Name: Boracic or ortho boric acid. Hydrogen Borate
Empirical formula: H₃BO₃
Definition: Transparent crystals or white powder containing 99.5% H₃BO₃.

Chemical & Physical Properties:
- Melting point 170°C.
- Taste slight, acid & bitter.
- Vapor tension Volatilizes sweetish after taste readily in steam
- Odor none
- Density Sp. Gr. 1.435
- Color none, pearly lustre
- Stable up to 100°C.
- Corrosive action slight at ordinary temperature
- Solubility One gram of boric acid dissolves in 18 ml. of alcohol, or 4 ml. of glycerine or 6 ml. of boiling alcohol.

4.88 g/100 ml. water at 20°C. and 38 g/100 at 100°C.

Analytical Methods: U.S. Pharmacopoeia XIV, p. 89; Reagent Chem. & Standards (Rosin).
Toxicity, oral to mammals: Very low.
Acute: Estimated lethal dose (adult) 0.5-1.0 oz. J.A.M.A. 90,382 (1928)
Chronic: Is accumulative in the system; it is eliminated slowly by kidneys in unchanged form.
Symptoms: Gastro-enteritis, nephritis, dermatitis, visual disturbances, muscular weakness and collapse.
Skin Absorption and others: Non-irritant to skin, concentrated sol. should be diluted equally for opthalmic use.
Uses (types of pests) No germicidal action but is distinctly antiseptic, a non-irritating isotonic cleaner; has considerable fungicidal action, thrush remedy.
Formulations (and compatibility): Ointment cont. 9-11% H₃BO₃ (U.S.P.) Boric acid and glycerine ointment cont. 0.9-1.1% H₃BO₃ (B.P.) Dose: 5-15g (U.S.P.)
Application: Used as ointment or solution in certain local infections.
Precautions: (food) Has been used as food preservative but its harmfulness is disputed.
Phytotoxicity: As herbicide affects all types of vegetation.
Storage: Preserve boric acid solutions in well-stoppered, closed containers & avoid temperatures below 20°F.

Common Name: BLUE VITRIOL
Chemical Name: Copper sulfate, pentahydrate
Empirical formula: CuSO₄. 5H₂O (63.93% CuSO₄, 36.07% water, 25.46% copper)
Definition: Shall contain at least 25% copper expressed as metallic.

Chemical and Physical Properties: Triclinic crystals.
- Melting point -ΔH₂O @ 110°C.; -5H₂O @ 150°C.
- Density 2.284
- Solubility 31.6 g/100 ml. H₂O @ 0°C., 203.3 g/100 ml. methyl alcohol at 18°C.;
Analytical Methods: A.O.A.C. Methods 7th Ed. 1950 #5.13 (electrolytic) and #5.14 (titration).

Toxicity, Oral to Mammals: Taken in large quantities may give symptoms of gastric enteritis with fatal results in extreme cases. Action said to be due not to copper but characteristic of any local irritant. Continued ingestion of small amounts said to be injurious. Metal is not toxic in same degree as lead, mercury and nickel.

Symptoms: See above.

Antidote: Give potassium ferrocyanide, 0.5 g (7 1/2 gr.) in water, or soap in water.

Use Precautions: Harmful if swallowed.


Formulations (and compatibility): Marketed usually as commercially pure material (98–99%). Incompatible with soap.

Equipment—cleaning, disposal: Spray equipment should be thoroughly cleaned to prevent corrosion.

Phytotoxicity: Burns foliage and is usually converted to basic sulfate for use on crops.

Common Name: BORAX
Chemical Name: Sodium tetraborate decahydrate
Empirical Formula: Na₂B₄O₇·10H₂O
Definition: Shall contain not less than 52.3% Na₂B₄O₇, equivalent to 64.3% boric acid.

Chemical and Physical Properties: White hard crystals or powder.

Melting point - 75°C
Density - 1.73 at 20°C
Inflammability - None

Stability - Effloresces in warm dry air
Solubility - Soluble in 2 parts glycerine, insoluble in alcohol. 5.14 g/100 ml. water at 20°C. and 191 g/100 ml. at 100°C.

Analytical Methods: Dissolve approx. 2 g of sodium borate in 50 ml. dist. water; titrate with N/2 HCl using methyl red. 1 ml. N/2 = 0.05032 g Na₂B₄O₇.

Toxicity, Oral to Mammals:

Acute: Sufficient amounts depress heart, spinal centers and in some cases have caused death.

Chronic: Continued use has produced "borism"—gastric irritation, skin eruptions, and absence of fatty matter and moisture from the skin.

Symptoms: See above.

Use Precautions: Avoid contamination of feed or food-stuffs; keep away from children and domestic animals.

Uses (types of pests): Herbicide, non-selective weed-killer; also for control of ants and silverfish. Housefly larvae in manure piles especially in chicken sheds.

Formulations (and compatibility): Marketed usually in dry mixtures with other ingredients. May be used as powder or spray.
Application:
Directions, rate and number: 150 to 400 lb/A
Phytotoxicity: Affects all types of vegetation. Used as general soil sterilant.
Storage and Shipping Directions: Keep in tight containers to avoid loss of water of crystallization.

Common Name: BORDEAUX MIXTURE
Chemical name: Copper sulfate and lime
Empirical formula: Composed of CuSO₄·5H₂O and CaO or Ca(OH)₂
Definition: Shall contain at least 12.50% copper, expressed as metallic.
Chemical & Physical Properties:
Inflammability - none  Color - blue
Solubility - almost insoluble in water
Analytical Methods: A.O.A.C. Methods 7th Ed. 1950 #5.13 (electroly.) #5.14 (titrat.)
Toxicity, oral to mammals:
Acute: In large quantities may cause gastroenteritis with fatal results in extreme cases. Action characteristic of any local irritant not due to Cu.
Chronic: Continued ingestion of small amounts of copper can be injurious.
Symptoms: See above.
Antidote: Give potassium ferrocyanide, 0.5 g(7½ gr.) in water or soap & water.
Skin Absorption and other: no hazard
Hazards to Wildlife: None
Use precautions: Harmful if swallowed.
Residues:
Levels ; 0. to 20 ppm on celery and fruits.
Removal Methods: Wash detergent water
Uses (types of pests): Fungicide-veg. & flower downy mildew, blights & leaf spots, apple scab & bitter rot, cherry leaf spot, brown rot, peach leaf curl.
Formulations (and compatibility): Marketed usually as mixture cont. 12.50% to 13% copper as metallic. Do not use with lime sulfur, BHC, TEPP, Cryolite, etc. Newer organics being studied.
Equipment-cleaning, disposal: Spray equipment should be thoroughly cleaned to prevent corrosion and clogging.
Phytotoxicity: Tolerated by some, toxic to other plants particularly at low temperatures.

Common Name: CALCIUM ARSENATE (containing other calcium cpds.)
Chemical Name: Calcium Arsenate
Empirical Formula: Indefinite, various proportions of the following, dependent on the reacting temperatures: CaHAsO₄, Ca₂H₂(AsO₄)₂, Ca₃(AsO₄)₂, Ca₃(AsO₄)₂·3Ca(OH)₂, with some free calcium carbonate and unreacted calcium hydroxide.
Definition, Standard or Grade: Commercial calcium arsenate (containing other cal. compounds), active ingredients as Tri-calcium arsenate 70.0%, arsenic expressed as metallic 26%. Arsenic in water soluble forms expressed as metallic 0.70%.
Chemical & Physical Properties: White powder, colored pink by law in most states.

- Inflammability - non-inflammable
- Taste - bitter, acid
- Density - variable
- Soluble in water
- Odor - slight odor of lime
- Corrosive action - slight
- Stability - unstable in acid solutions. Stable as dust or in basic solutions.

Analytical Methods - A.O.A.C.

Toxicity, Oral to Mammals:

Acute: LD 35-100 mg/kg

Symptoms: Same as other arsenic compounds, chronic effects, pains in abdomen, itching, nausea, headache, lethargy, vomiting, dysentery, loss of weight and appetite.

Antidote: Warm salt water until vomit is clear, followed by white of egg or olive oil. Rest and quiet. Call physician. Give milk of magnesia or hydroxide of iron.

Skin Absorption and Others: Slight, wash with soap & water.

Use Precautions: Use approved dust mask. Wash body and clothes with mild soap and water after dusting.

Uses (Types of Pests): Bollweevil and boll worm and some other crop insects. Not recommended for use on stone fruit trees.

Formulations: Calcium arsenate commercial. Principally as a dust alone or in combination with 1% parathion, DDT, DDD, sulfur or others.

Phytotoxicity: Do not use on stone fruit trees. Causes leaf and fruit damage. No damages shown at recommended levels on cotton and similar crops.

Storage & Shipping Directions: I.C.C. Regulations for Class B Poisons.

Common Name: CALCIUM CYANIDE
Chemical Name: Calcium Cyanide

Empirical Formula: Ca(CN)₂

Definition: Shall contain not less than 42% calcium cyanide.

Chemical & Physical Properties: Dark gray amorphous flakes or powder. When exposed to the natural moisture in the atmosphere HCN vapor is evolved, by chemical reaction, to the extent of 25% of the weight of the calcium cyanide.

Analytical Methods: AOAC 7th Ed. 1950

Toxicity, Oral to Mammals:

Acute: See HCN

Symptoms: Toxicity is due to cyanide ion which inhibits brain respiratory center. From small dose; dizziness, headache, shortness of breath followed by convulsions, coma and collapse.

Antidote: Call physician immediately.

First Aid: If inhaled use amyl nitrite inhalation for 20 sec. repeated 5 times; give artificial respiration. If swallowed, same treatment also tbsp. salt in glass warm water repeated until vomit is clear.

Skin Absorption and others: In high concentration in enclosed spaces vapor absorbed by skin.

Use Precautions: Wear recommended mask when used in enclosed spaces if high concentration possible. Avoid inhalation or skin contact.
Residues:
Levels: Drop rapidly upon aeration.
Removal Methods: Food - Aeration
Uses (types of pests): Used as fumigant in greenhouses, grain and sometimes enclosed spaces such as warehouses. As rodenticide for rats, field mice, etc.
Formulation: Product sold undiluted as dust, coarse granules and flakes.

Common Name: CARBON DISULFIDE
Chemical Name: Carbon disulfide
Empirical Formula: CS₂ Mol. wt. 76.13
Definition: Colorless or faintly yellow, clear, very inflammable liquid.
Chemical & Physical Properties:
- Melting point: -111°C.
- Boiling point: 46.3°C.
- Vapor tension: 296.5 mm. at 25°C.
- Flammability: Flash point: 20°C. Expl. in air
- Density: 1.272 15/15
- Stability: Explosive limits in air 2 to 50%.
- Solubility: 1 cc. in 530 cc. water; miscible with anhydrous alcohol, chloroform and ether.
Toxicity, Oral to Mammals: Highly toxic to all forms of life.
- Acute: Mental disturbances, affected vision, paralysis, nausea, early pulse. Chronic poisoning from vapors chief danger.
First Aid: Call physician at once. Remove to fresh air; give stimulant, hot coffee or tea. Keep patient warm and quiet.
Use Precautions: Use limited by explosive nature; voids fire insurance. To reduce hazard, mix with carbon tetrachloride or sulfur dioxide.
Uses (types of pests): Rice weevil, flour weevil, granary weevil and Indian meal moth.
Formulations (and compatibility): 80% C₄Cl₂/20% CS₂ by vol. for grain fumigation.
Application:
- Directions, rate and number: Pour liquid into evaporating pan of vault, 5 lbs. per 1000 cu. ft. to 30 lbs. per 1000 cu. ft.
- Equipment-cleaning, disposal: No problem.
Phytotoxicity: Toxic to plants and certain seeds, - not recommended for greenhouse fumigation.
Accumulation in Soil: Frequently used as soil insecticide as emulsion with soap, alcohol and oil. Diffusion in soil studied by O'Kane.

Storage & Shipping Directions: Red label required. Not acceptable for express. M.C.A. caution label used.

Common Name: CARBON TETRACHLORIDE
Chemical Name: Carbon tetrachloride, Tetrachloromethane, Perchloromethane, Benzinoform.
Empirical Formula: CCl₄, Mol. wt. 153.83
Definition: Colorless liquid, boil pt. 77°C. from CS₂·2 S₂Cl₂

Chemical & Physical Properties:
- Boiling point - 76.7°C.
- Taste - sweet, sharp
- Vapor tension - 144.4 mm. at 25°C.
- Odor - pleasant aromatic
- Inflammability - not flammable
- Color - colorless
- Density - 1.589 25°C; gas 1.6486 25°C
- Solubility - Slightly in water (1 cc in 2000 cc.) Miscible with alcohol, benzene, chloroform, ether, carbondisulfide, petroleum ethers and oils.


Toxicity, Oral to Mammals: Vapors may cause acute poisoning in conc. of over 1000 ppm
- Acute: Minimal fatal dose liquid - 3 to 4 cc. Exposure 100 ppm, legal in N.J. and 40 ppm, M.A.C. Mass.
- Chronic: Repeated exposure at low concentration dangerous. More toxic to humans under the influence of alcohol, or chronic drinkers.
- Symptoms: Dizziness, headache, nausea, vomiting, subnormal temperature and feeble pulse, coma, fever, uremia, death.
- Antidote: One tbsp. Epsom salts in water; one tbsp. salt in warm water as emetic.
- First Aid: Artificial respiration if necessary; black coffee as stimulant if conscious. Keep patient warm and quiet. Call physician.
- Skin Absorption and others: Is absorbed through the skin. Wash skin thoroughly with soap and warm water.

Use Precautions: Do not inhale repeatedly or take internally.

Uses (types of pests): Rice weevil, flour weevil, granary weevil and Indian meal moth. Because of cost limited to use when fire hazard present.

Formulations (and compatibility): With ethylene dichloride, 3 vol. to 1 vol. carbon tetrachloride as general fumigant, also with ethyl acetate, or with CS₂.

Application: Proper dosage for fumigating box cars is about 45 lbs. per 1000 cu.ft.
- Directions, rate and number: Complete kill of weevils obtained with 6 lbs. per 1000 cu.ft. at 85°F. Larger doses at lower temperature.
- Precautions: Gives characteristic sweetish taste which persists in foodstuffs rich in oil.

Equipment-cleaning, disposal: No problem.
Phytotoxicity: Does not affect germinating qualities of wheat.
Storage & Shipping Directions: None (M.C.A. caution label used)
Storage in galvanized iron drums.
Common Name: CASTRIX. Formerly called W491.
Chemical Name: 2-chloro-4, dimethylamino-6 methylpyrimidine
Empirical Formula: C7H10ClN3.
Definition: Brownish, wax-like, solid. Chlorine 20.68%, nitrogen 24.49%.
Chemical & Physical Properties:
- Molecular weight - 171.631
- Solubility - Not very soluble in water. 2 ozs. denatured alcohol dissolves 1/2 oz. castrix.
Analytical Methods: Not published.
Toxicity, Oral to Mammals:
- Acute: LD rat 1.25 mg/kg, Guinea pig 2.66 mg/kg, rabbit 5.0 mg/kg.
- Symptoms: Causes considerable pain to animals. Convulsions occur within 15 to 45 minutes after oral or intraperitoneal administrations.
- Antidote: "Nembutal" as anticonvulsant effective antidote for 10 times medium lethal dose. In emergency, give tbsp. salt in glass warm water; repeat until vomit fluid is clear. Call a physician.
- Skin Absorption and other: Material should not be handled in such a manner that it might contaminate food or feed. Residues: Should be strictly eliminated from foods.
Uses (types of pests): Proposed as rodenticide.
Formulations (and compatibility): 1/2 oz. castrix in 2 ozs. denatured alcohol, make to 3 qts. with water. Not used with other pesticides.
Application:
- Direction, rate and number: Used in shallow cups or to soak solid bait, such as bread crumbs, cereal or meat.
- Precautions: (food) Accidental contamination of food must be strictly avoided. Use locked bait stations.
Storage & Shipping Directions: Keep under lock and key or in custody of trained personnel.
Comment: By end of 1951 use of Castrix appears to be abandoned.

Common Name: CHLORDANE
Chemical Name: Octachloro-methano-tetrahydroindane
Empirical Formula: C10H6Cl8
Definition: Liquid, Tech. product contains 60-75% pure comp. & 25-40% related comp.
Chemical & Physical Properties:
- Boiling point 175 at 2 mm.
- Color- Amber
- Density Viscous liquid (viscosity 209-324)
- Stability - Dehydrohalogenates in presence of alkali.
- Insoluble in water; soluble in practically all organic solvents.
Toxicity, Oral to Mammals:
- Acute: Mean lethal dose 500 mg/kg.
- Chronic: Toxicity in dogs - dietary levels 660 ppm - death in 4 weeks. Chronic toxicity is detected at 5 ppm or less in diet for 15-18 months.
- Symptoms: None listed - Stomach poison.
Skin Absorption and other: In solution can be absorbed through skin. Wash with soap and warm water.
Use Precautions: Avoid excessive inhalation or skin contact. Varies with formulations (See Interpretation 18, U.S.D.A.). Treat as DDT.

Residues:
Levels: Velsicol claims little remains after 3 weeks.
Removal Methods: Probably none necessary.
Uses (types of pests): Experimental on ants, crickets, wireworms, caterpillars, etc. but limited in use due to toxicity hazards to man & animals.
Formulations (and compatibility): 40% & 50% dusts or wettable powders; 25 to 72% emulsion concentrates. Should not be mixed with any alkaline solvent or carrier.
Applications:
Precautions: (food) Incomplete information but reported to cause adverse flavor of plums and sweet corn.
Storage & Shipping Directions: For tech. material containers have baked phenolic linings & storage of any formulation in unlined drums is not encouraged.

Common Name: COPPER ARSENATE (BASIC)
Chemical Name: Copper Arsenate (basic)
Empirical Formula: Cu(CuOHAsO₄)
Definition: Shall contain not less than 22.5% arsenic, expressed as metallic equivalent to 30% arsenic trioxide and not more than .35% arsenic, water-soluble, expressed as metallic, and 43% copper, expressed as metallic.
Toxicity, Oral to Mammals:
Antidote: Give a tbsp. salt in a glass of warm water and repeat until vomit fluid is clear. Then two tbsp. of epsom salts or milk of magnesia in water and force fluids. Have patient lie down and keep warm. Call a physician.
Use Precautions: Avoid excessive skin contact and wash off thoroughly after exposure. If on clothing, remove them and wash. Avoid inhalation of dust or spray mist. Keep away from children, domestic animals and foodstuffs.
Rating: Requires word "Poison", etc.
Uses: Insecticide - Fungicide.

Common Name: COPPER OXYCHLORIDE SULFATE
Chemical Name: Copper oxychloride sulfate
Empirical Formula: Probably 30u(OH)₂.CuCl₂. 3Cu(OH)₂.CuSO₄
Definition: A mixture of basic chloride & basic sulfate of copper.
Chemical & Physical Properties: Refer to individual salts in the mixture.
Analytical Methods: A.O.A.C. 7th Ed. 1950, #5.13(electrolytic)* or #5.14 (titration) *remove chlorides by evaporating to dryness twice with 1:1 HNO₃.
Toxicity, Oral to Mammals: Taken in large quantities may cause gastroenteritis with fatal results in some cases. Action
not due to copper but characteristic of any local irritant in sufficient quantity. Continued ingestion of small quantities of copper can be injurious. Metal not toxic to same degree as lead, mercury and nickel.

Symptoms: See above.
Antidote: Give potassium ferrocyanide 0.5 g (7½ gr.) in water or soap in water.
Use Precautions: Harmful if swallowed.
Uses: (types of Pests): Fungicide sprays or dusts for veg. and flower downy mildew; blights, leaf spots; cherry leaf spot and brown rot.
Formulations (and compatibility): Marketed usually in combination with insecticides at levels of 10-12% copper oxychloride sulfate, or 5-7% metallic copper.
Application:
Directions, rate and number: 4 lb/100 gal. in 3 to 10 applications.
Equipment-cleaning, disposal: Spray equipment should be thoroughly cleaned to prevent corrosion.
Phytotoxicity: Literature indicates suitability for use on most vegetables and fruit crops including melons and tomatoes.

Common Name: CRYOLITE, SODIUM FLUOALUMINATE
Chemical Name: Sodium fluoaluminate, aluminum sodium fluoride
Empirical formula: Na₃AlF₆ AlF₃·3NaF 209.96
Definition: Monoclinic colorless crystals or white powder (see above).
Chemical & Physical Properties:
Melting point - 1000°C.  Density - 2.9
Solubility - 0.04% at 25°C. in water, decomposes in alkali.
Insol. in alcohol.
Analytical Methods: Commercial Formulations - A.O.A.C. 5.17
Toxicity, oral to mammals:
Acute: Acute doses of cryolite appear to be incapable of causing death as 13,500 mg/kg was fed without fatality.
Uses (types of pests): Dusts on truck crops, cotton, sugar cane, soy bean and peanut insects. Sprays used on tomato, citrus and apple insects.
Formulations (and compatibility): Dusts 40%-70% mixed with inerts. Sprays 3-6 lbs/100 gal. of water. Incompatible with alkaline materials either as dust or spray.
Phytotoxicity: Produce little plant injury though peach injury may be serious.
Soil: No deleterious effect from amounts used and no cumulative effect from their continued use.

Common Name: CUPROUS OXIDE, YELLOW
Chemical Name: Cuprous oxide
Empirical Formula: Cu₂O  Mol. wt. 143.14
Definition: Shall cont. 80% copper as metallic equiv. to 90% Cu₂O.
Chemical & Physical Properties:
Melting point - 1235°C  Color - Yellow to rust brown
Boiling point loss of oxygen at 1800°C.

Vapor tension - negligible

Non-flammable

Density 6.0

Stability - Oxidized at higher temp. in presence of moisture.

Sol. in HNO₃, HCl; insol. in alcohol, water.


Toxicity, Oral to Mammals:

Acute: Taken in large quantities may give symptoms of gastroenteritis with fatal results in extreme cases, due not to copper but local irritant.

Chronic: Continued ingestion of small amounts may be injurious. Metal not toxic to same degree as lead, mercury and nickel.

Symptoms: See above.

Antidote: Give potassium ferrocyanide, 0.5 g (7½ gr.) in water or soap in water.

Use Precautions: Harmful if swallowed.

Uses (types of pests): Fungicide; veg. seed treatment; veg. downy mildew, blight and leaf spot, citrus scab. Can be used on most crops including melons.

Formulations (and compatibility): Marketed as commercial material cont. 90% yellow cuprous oxide and in comb. with insecticides at levels of 4.5% to 7% metallic Cu. Incompatible with lime-sulfur.

Phytotoxicity: Low on recommended crops.

Storage & Shipping Directions: Container should be kept tightly closed.

Common Name: DICHLORO-DICHLOROETHANE, DDD, TDE, OR "RHOTHANE D-3"

Chemical Name: 2:2 bis-(p-chlorophenyl)-1:1-dichloroethane

Empirical Formula: \((\text{C}_6\text{H}_4\text{Cl})_2\text{-CHCHCl}_2\)

Definition: White, odorless powder. Chlorine 46%.

Chemical & Physical Properties:

- Molecular weight - 320.05
- Taste - practically none
- Boiling point - (185-193°C.)
- Odor - similar DDT, somewhat (at 1 to 1.2 mm.) like sweet fruit.
- Vapor tension - vol. low
- Color - white
- Density - 1.385 gm/cc.
- Stable

Solubility - Acetone & methyl ethyl ketone 100 gm/100 ml., benzene 70 gm/100 gm, chlorobenzene 92 gm/100 gm, and in smaller quantities in various other organics.


Toxicity (Oral to Mammals):

Acute: 2500 mg/kg (rats)

Chronic: About 1/4 to 1/10 as toxic as DDT by ingestion to rats.

Symptoms: No visible outward signs yet described. Diminished growth first sign in chronic poisoning.

Antidote: None developed. Vomiting should be induced or stomach emptied with stomach tube.
Skin Absorption and other: Wash with soap and water. Use Precautions: Wear dust masks during long exposure. Caution statement for wettable powder; avoid excessive inhalation of dust and spray mists. Do not use on dairy cattle, or as a residual spray in dairy barns.

Formulations (and compatibility): Available as technical, 50% dust concentrate, 50% wettable, 3, 5, and 10% dusts, 25% emulsion concentrate, and 30% solution. Compatible with nearly all standard insecticides, fungicides, (except Bordeaux mixture and lime sulfur), and miticides.

Application: As spray 1-3#/wettable powder, or 1-2 qts. emulsion concentrate. 5 & 10% dusts applied at 10-50#/acre. 30% solution primarily used household and livestock spray.

Precautions: (food) Do not contaminate foodstuffs. Wash edible portions of fruits or vegetables thoroughly before using. Do not use on forage crops or dairy cattle or animals being finished for slaughter.

Phytotoxicity: Probably toxic at high levels.

Common Name: DDT
Chemical Name: Dichloro-diphenyl-trichlorethane
Empirical Formula: \( (C_6H_4Cl)_2CHCCl_3 \)
Definition: Para para' Isomer 2,2-bis (p-chlorophenyl) 1,1,1-trichlorethane. White, odorless, crystalline material.
Chlorine content 48% - 50.5%

Chemical & Physical Properties:
Molecular weight - 354.50
Melting point - 108.5°-109.0°C.
Stability - decomposes at 110°C.
Solubility - benzene 106, cyclohexanone 100, chloroform 96, petroleum ether 6 gms/100 gms. Intermediate solubilities in other organics.


Toxicity: LD 50 to man is esti. 250 mg/kg. Not toxic in certain solvents. Emulsion might be toxic, or non-toxic, depending upon emulsifier. Toxicity varies greatly with formulation.
First Aid: If swallowed, induce vomiting and call a physician. Keep patient quiet and warm. If spilled on skin, wash thoroughly with large quantities of soapy water.
Skin Absorption: Solution absorbed in toxic amounts through unbroken skin. No skin irritation ever reported from use of 10% powder.

Use Precautions: Avoid skin contact, inhalation, food contamination.

Residues:
Tolerance: California law provides fresh or dried fruits or vegetables should not carry residues in excess of 0.049 grain DDT per pound.
Prevention-practices and precautions: Care should be taken not to contaminate food. DDT in lanolin or polyethylene-glycol can be absorbed and translocated in plants. Treated forage crops should not be fed to dairy animals or those being finished for slaughter.

Formulations (and compatibility): Applied as a dust, wettable powder in a water suspension, emulsion in water, solution in various solvents, space spray in aerosols, insecticidal smoke,
and as a gas from a vaporizer. Is compatible with practically all other materials except those of an alkaline nature. Phytotoxicity: Cucurbits and beans often injured by DDT applied at usual dosages.

**Common Name:** DDT (technical)  
**Chemical Name:** Dichloro-diphenyl-trichloroethane  
**Empirical Formula:** \((\text{C}_6\text{H}_4\text{Cl})_2\text{CHCCl}_3\)  
**Definition:** standard or grade: A complex mixture containing about 75% 2,2-bis(p-chlorophenyl) 1,1,1-trichloroethane, para para'isomer, with the major impurity being the ortho para'isomer. A white, odorless, crystalline material having a chlorine content of from 48 to 50.5%.

**Chemical & Physical Properties:**
- Molecular weight - 354.50
- Setting point - 89°C., minimum
- Stability - Decomposes at 1300-1700°C.
- Insoluble in water, moderately soluble in mineral and vegetable oils and readily soluble in most common organic solvents. Example, benzene 89, cyclohexanone 122, ethyl ether 39, Stoddard solvent 12, refined kerosene 5. (These figures are given in grams of purified DDT soluble in 100 grams of solvent).

**Analytical Methods:** AOAC 7th Ed. 5.146 to 5.148. Anal. Ed. 17: 470 (1945) and 17 (1946).

**Toxicity:** Oral, LD50 (mg 1 kg) for various animals; mice and rats, 150-250; cats, dogs 150-300; cows and horses, 300; sheep and goats, 1000; estimated for man, 500. Solutions are generally more toxic than powder formulations. Cutaneous, powdered formulations are not absorbed and rarely cause irritation. Solutions may be absorbed through skin and may produce toxic symptoms. Under circumstances of ordinary use DDT insecticides are not likely to be harmful; however, certain precautions must be observed to guard against its potential toxic properties and those of the constituents commonly found in DDT formulations.

**Antidote:** Phenobarbital should be administered in sufficient doses to control nervous system.

**First Aid:** Induce vomiting and call a physician. Keep patient quiet and warm. If solutions are spilled on skin, wash thoroughly with large quantities of soapy water.

**Skin Absorption:** See cutaneous toxicity above.

**Use Precautions:** Avoid inhalation and skin contact. Avoid contamination of feed and foodstuffs. Treated forage crops should not be fed to dairy animals or those being finished for slaughter.

**Residues:** Levels: Generally under 7 ppm if approved recommendations for applications are followed. Removal methods: Commercial washing and brushing removes up to 50% of residues on fruit and vegetables. Tolerance: Informal tolerance of 7 ppm on apples and pears. (U.S., F.D.A. statement Nov. 5, 1945). California law provides a tolerance of .049 grains per pound on fresh or dried fruit or vegetables.

**Uses:** Effective in controlling a wide range of insects including nearly all of our economic pests.

**Formulations and compatibility:** Applied as a dust, wettable powder in a water suspension, emulsion in water, solution in
various solvents, space spray in aerosols, insecticidal smoke, and as a gas vaporizer. It is compatible with practically all other materials except those of an alkaline nature. Applications: For field or row crops, 1 to 2 lbs. of DDT. Gallonage sprays, 1/2 to 1 lb. of actual DDT in wettable powders or emulsion concentrates per 100 gallons of spray. Phytotoxicity: Certain varieties of cucurbits and young tomato plants may be injured by DDT applications. Accumulation in Soil: DDT has been found to accumulate in top layer of soil where heavy applications are made annually to such crops as apples.

Common Name: DFDT
Sometimes referred to as "the Fluorine analog of DDT", fluoro-DDT, fluorogesarol.
Chemical Name: 1,1,1-trichloro-2,2-bis (p-fluorophenyl) ethane.
Empirical Formula: \((C_6H_4F)_2-CHCl_3\)

Chemical & Physical Properties:
- Molecular weight - 321.6
- Odor - ripe apple
- Melting point - 44-45°C
- Color - white
- Boiling point - 177-178°C at 9 mm. mercury
- Vapor tension - 15 times that of DDT, about 0.5 mm.mercury at 178°C.

Solubility - Highly soluble in certain emulsifying agents. Stable emulsions in water up to 90%. Soluble in mineral oil, kerosene, carbon tetrachloride and other organics from 83-859 gm/100 ml.

Toxicity, Oral to Mammals:
- Acute: Oral median lethal dose in olive oil reported to be 900 mg/kg of body weight. Less than one-third as toxic as DDT. Accumulates in perirenal fat.
- Skin Absorption and other: Accumulates in the perirenal fat.

Uses (types of pests): Similar to DDT.

Common Name: DIELDREN
Chemical Name: Principal constituent hexachloro-epoxy-octahydro-dimethano naphthalene
Empirical formula: \(C_{12}H_{8}C_1_6O\) (of principal ingredient)
Definition: Product containing not less than 85% of above, not more than 15% of insecticidally active rel. comp.

Chemical & Physical Properties:
- Melting point - approx. 150°C
- Taste - not determined
- Non-flammable
- Odor - Pine-like when warm
- Color - Buff
- Stable in presence of org. or inorg. alk., also acids except strong mineral.
- Solubility Mod.sol. in usual organic solvents except aliphatic petroleums and methanol. Insoluble in water.


Toxicity, Oral to Mammals:
- Acute: To white rats 40-50 mg.
- Chronic: Highly dangerous from standpoint of chronic toxicity to man.

Symptoms: Chronic toxicity probably first characterized by headache, may be several weeks after exposure. Animals show weight loss and anorexia.

First Aid: Call physician immediately. Give tsp. salt in warm water - repeat till vomit is clear. Keep victim prone
and quiet. 
Skin Absorption and other: Hazard if absorbed through skin or in eyes.
Use Precautions: Do not swallow, absorb through skin or get in eyes. Do not breathe vapor fumes or spray. Use mask recommended by USDA for dieldrin.
Residues: Levels at recommended application dosages, no harvest residues above 0.1 ppm found in any fresh or processed foods.
Formulations (and compatibility): Available as crystalline material; as 25% wettable powder & 25% dust conc.; as emulsifiable conc. cont. 1/2 lb./gal.; & es low % dusts alone or with DDT. No incompatibilities with current fungicides or insecticides.
Precautions: (foods) Do not apply to food or forage crops.
Equipment-cleaning, disposal: Rinse containers with aromatic solvents as benzene, toluol or xylol.
Phytotoxicity: Relatively safe on crops except sensitive ones such as cabbage.
Accumulation in soil: No harmful effects shown to soil microorganisms and no off flavor in plants grown on soil treated with excessive amounts dieldrin.
Storage & Shipping directions: ICC regulations for Class B poisons.

Common Name: EPN
Chemical Name: O-Ethyl O-p-nitrophenylbenzenethiophosphonate
Empirical Formula: C_{14}H_{14}O_{4}NP
Definition: Off-white crystals; phosphorus content 9.59%
Chemical & Physical Properties:
  Molecular weight – 323
  Color – off-white
  Melting point – 36°C.
  Hydrolysis rate – Stable at pH 7 and below; slow above pH 7
  Solubility – Essentially insoluble in water.

Common Name: ETHYLENE DICHLORIDE
Chemical Name: Ethylene dichloride or 1,2-dichloroethane
Empirical Formula: C_{2}H_{4}Cl_{2}
Mol. st. 98.95
Chemical & Physical Properties: Colorless liquid by-product of ethylene chlorhydrin
  Melting point – about -40°C.
  Taste – sweet
  Boiling point – 83.5°C
  Odor – like chloroform
  Vapor tension – 79.6 mm. at 25°C.
  Inflammability – Flash point 15°C. Not dangerously inflammable at ordinary temperatures.
  Density – 1.2569 20°/4°
  Solubility – 0.43130 in water, soluble in alcohol, soluble in all proportions in ether.
Toxicity, Oral to Mammals: Affects liver, kidneys, causes eye
damage. Vapors have anaesthetic affect on man. Exposure to 4000 ppm. for 1 hr. produces serious illness. Working conc. limit N.J. & Mass. 100 ppm. M.A.C. 75 ppm.

Symptoms: Nausea, headache, irritation of eye, ears, nose and throat. Palor, weak pulse, subnormal temp. Partial paralysis and coma.

First Aid: Summon physician immediately. Give hot coffee or tea. Remove to fresh air. Keep patient warm and quiet.

Use Precautions: Use gas mask.

Uses (types of pests): Rice weevil, flour weevil, granary weevil and Indian meal moth, peach tree borer, Japanese beetle larvae and others.

Formulations (and compatibility): 3 volumes of ethylene dichloride with 1 vol. CCl₄; emulsion with mono- and triethanolamine oleate.

Applications:

Directions, rate and number: Emulsion diluted with water poured into soil at base of peach tree at 10-20% ethylene dichloride. 3 to 1 mixture with carbon tetrachloride at rate of 14 lbs. per cu. ft. for air tight vaults.

Precautions: These mixtures should not be used for foodstuffs with high fat content which are likely to retain bad odor and taste.

Phytotoxicity: Not injurious when used in soil but may predispose peach trees to winter injury.

Common Name: FERBAM
Chemical Name: Ferric dimethyl dithiocarbamate
Empirical Formula: Fe(CS₂N(CH₃)₂)₃

Chemical & Physical Properties:
Melting point - decomposes before melting
Vapor tension - negligible
Color - black, solid
Inflammability - flash pt. above 300°F.
Stability - Somewhat unstable to heat, light and moisture.
May decompose slightly on extended storage, Decomposition products may be flammable.
Solubility: 120 ppm. at room temp. in distilled water.
Soluble in chloroform, acetone, pyridine acetonitrile, etc.


Toxicity, Oral to Mammals: In terms of ferbam. Low in acute toxicity.

Acute: Rats, approx. lethal dose, stomach tube in gum acacia 5700 mg/kg; guinea pigs, same way 1140. Albino mice LD₅₀ 1000 mg/kg orally, chicks 2860.

Symptoms: No cases of acute poisoning encountered.

First Aid: In case of contact, flush with water, if in eyes get medical attention.

Skin Absorption and other: Skin and throat irritation in some sensitive individuals.

Use Precautions: Avoid breathing dust, avoid contact with skin, eyes and clothing. Keep away from fire.

Residues:
Levels: Of 22 samples tested (celery) after 12 applications
of ferbam tested from 0 to 75 days only 2 samples had residues over 5 ppm.

Removal Methods: Reduced by weathering, brushing or commercial washing methods.

Uses (types of pests): Effective against large number of fungous diseases, - most extensively used on fruit crops and tobacco.

Formulations (and compatibility): Fermate, 76% ferbam, 1/2 to 2 lbs./100 gal. or diluted with inerts as dusts 10-20% fermate. Compatible except with FeCuHg or lime which weakens efficiency.

Application:
Directions, rate and number: Multiple applications have little or no tendency to increase residues. 1/2 lb./100 gal. often supplemented by sulfur on apples.

Phytotoxicity: One of least phytotoxic of present day commercial fungicides. Used on grapes, apples, cherries, peaches, plums without evidence of injury.

Storage & Shipping Directions: Should be protected in storage from moisture and excessive heat. No ICC regulations pertaining to shipping.

Common Name: HEPTACHLOR
Chemical Name: Heptachloro-tetrahydro-methanoindane
Empirical Formula: C<sub>10</sub>H<sub>5</sub>Cl<sub>7</sub>
Definition: A complex chlorinated hydrocarbon rel. to chlor-dane.

Chemical & Physical Properties: Crystalline solid.
Melting point - 95-96°C. (pure) Odor - Mild, camphor-like
Boiling point - 135-145°C. at 1-1.5 mm
Vapor tension - Very low at ordinary temp.
Stable at 150-160°C.; to 5% alk. or acid; to expos. to light, moist. & air.
Solubility - Readily in paraffin hydrocarbons, aromatics; at 26°C. in 100 ml. solv., 75 g. in acetone, 106 g. in benzene, 15 in kerosene, 102 in xylene, 33 hexane.

Analytical Methods: Specific method using silver acetate in glacial acetic acid (available from Velsicol Corp.).

Toxicity:
Use Precautions: Household uses are questioned because of lack of information on toxicity and antidote.

Residues:
Levels: Little remains after 3 weeks.
Removal Methods: Probably not necessary.
Formulations (and compatibility): Dusts, wettable powders, liquids, emulsifiable concentrates & oil sol. compatible with most insecticides & fungicides - not with alk.
Application:
Directions, rate and number: For grasshoppers, 2 oz./acre as spray or dust; cotton weevil 1/2 lb./acre; plum curculio 3 lbs. 25% wettable powder/100 gals. water. Soil insects, 1/2 to 2 1/2 lb./acre according to type of soil.
Phytotoxicity: Not known toxic to plants at recommended concentrations.
Accumulation in soil: Not shown toxicity when placed in soils at recommended conc.

Common Name: HYDROCYANIC ACID OR PRUSSIC ACID
Chemical Name: Hydrocyanic acid
Empirical Formula: HCN 27.02
Definition: Colorless gas at temp. above 26°C, liquid below.

Chemical & Physical Properties:
- Melting point -14°C
- Boiling point 26°C
- Vapor tension (gas) 738.8 mm. et Corrosive action - very weakly acid.
- Inflammability - Burns with blue flame
- Density - (gas) 0.921; liquid 0.987
- Solubility - Miscible with water, alcohol; slightly soluble in ether.


Toxicity, Oral to Mammals: One of more poisonous substances known. In pure state death results immediately from fraction of a gm. Inhalation in high conc. causes immediate death, 1 part in 500 is fatal. Allowable working conc. in N.J. and Mass. 20 ppm; M.A.C. 10 ppm.

Symptoms: Toxicity is due to cyanide ion which inhibits brain respiratory center. From small dose, dizziness, headache, shortness of breath followed by convulsions, coma and collapse.
First Aid: Call physician immediately. If inhaled use amyl nitrite inhalation for 20 sec. repeated 5 times; give artificial respiration. If swallowed, same treatment, also tbsp. salt in glass warm water repeated till vomit is clear.

Skin Absorption and other: In high concentration is absorbed by skin, therefore gas mask not entirely effective.
Use Precautions: Wear recommended mask, avoid skin contact. See below.

Residues:
Removal Methods: Foods-aeration.
Uses (types of pests): Used as fumigants to rid ships and warehouses of rodents and vermin. To kill insects & other lower animal life. Not a germicide or bactericide. Compressed as pure liquid HCN containing 5-10% lachrymators as warning. Used to fumigate citrus trees. Also compressed salts (eggs). Absorbed on fiber discs.
Applications:

Common Name: ISOPROPYL ALCOHOL
Chemical Name: Dimethyl carbinol or 2-propanol
Empirical Formula: \((CH_3)_2CHOH\)

Definition: Anhydrous, minimum purity 99%.

Chemical & Physical Properties:
- Melting point: \(-88.9 \, {^\circ}C\) (\(-89.5; -87.9\)\(^\circ\)C)
- Boiling point: \(-82.3 \, {^\circ}C\) at 760 mm. hg
- Vapor tension: 31.5 mm. at \(20^\circ\)C
- Inflammability: Flash pt. open cup 69°F
- Density: \(0.7848 \, (0.7854) \, g/ml\) at \(20^\circ\)C

Solubility: Miscible with water, ethanol and ether. Analysis for ketones and aldehydes, hydroxylamine hydrochloride.

Analytical Methods: A.O.A.C. Methods; Reag.Chem. & Standards (Rosin); OH group in conc. sol. acetyl chloride method, in dilute sol., nitrite ester.

Toxicity, Oral to Mammals: Both acute and chronic toxicity said to be about 1.5 times as toxic as ethanol but does not produce the permanent injurious effects characteristic of methanol. No cases of toxicity due to inhalation in industrial use have been reported.

Symptoms: Same as for ethanol.

Use Precautions: Not potable and should not be given by mouth. Should not be relied on to destroy Clostridium tetani, Cl. welchii, Bac. Anthracis.

Uses (types of pests): Used as denaturant for ethanol, and as rubbing compound. Anti-infective action about same as EthOH. Disinfection of skin or hypodermic syringes or needles; skin prophylactic against creosote.

Formulations (and compatibility): Rubbing compound 68-72% isopropanol by volume.

Storage & Shipping Directions: Store in tight containers.

Common Name: LEAD ARSENATE (STANDARD LEAD ARSENATE)
Chemical Name: Acid Lead Arsenate
Empirical Formula: \(PbHASO_4\)
Definition: Acid Lead Arsenate 95%.

Chemical & Physical Properties:
- Melting point: Decomposes above \(200^\circ\)C
- Boiling point: Decomposes
- Inflammability: Non-flammable
- Density: \(5.79\) pink by law in most states
- Solubility: Insoluble in water, sol. in dil. nitric and alk.

Analytical Methods: A.O.A.C.

Toxicity, Oral to Mammals:
- Acute: LD\(_{10}-50\) mg/kg
- Symptoms: Similar to other arsenicals, severe ache or pain in abdomen, headache, vomiting, nausea, itching followed by lethargy, dysentery, loss of weight and appetite.
- First Aid: Induce vomiting with solution of warm salt water until vomit is clear, follow with milk of magnesia, hydroxide of iron, olive oil or epsom salts. Call a physician. Keep quiet.
- Skin Absorption and others: Slight - causes mild skin irritation - remove with soap and water.
- Hazards to Wildlife: Slight

Use Precautions: Use goggles and dust mask. Remove from
skin and clothes by washing with mild soap and water.

Residues:
Removal Methods: Hydrochloric acid or sodium silicate followed by thorough rinse with large amount of water.

Uses (types of pests): Codling moth, Oriental fruit moth, leaf rollers and other chewing insects.

Formulations (and Compatibility): Lead arsenate may be used with summer oil emulsion, spray lime, wettable sulfur; compatible with some of the chlorinated hydrocarbons and nicotine sulfate.

Applications:
Precautions (food): Do not apply within 30 days of harvest. Remove residue.

Phytotoxicity: May cause foliage and fruit injury if humidity is high.

Accumulation in Soil: Continuous annual application may eventually sterilize soil.

Storage & Shipping Directions: I.C.C. Regulations for Class B Poison.

Common Name: LETHANE 60
Chemical Name: B-thiocyanato ethyl esters of aliphatic fatty acids whose av. C. content is 10-18.
Empirical Formula: \( \text{C}_n\text{H}_{2n+1}\text{COOCH}_2\text{CH}_2\text{SCN} \)
Definition: Consists of minimum of 50% by wt. of above esters.

Chemical & Physical Properties:
- Flash point - not less than 125°F. Taste - oily
  (open cup) Odor - sl. organic
- Vapor tension - 0.89-915 at 20°C. Color - amber
- Stable
- Solubility - water insoluble. Freely soluble in petroleum and organic solvents.


Toxicity, Oral to Mammals:
- Acute: Approximate LD 50 10 ml/kg.
- Skin Absorption: Non-irritating.
- Use Precautions: Do not leave on skin. Avoid prolonged inhalation of spray mists. Avoid contamination of feed and food.

Residues: Do not persist.
Formulations (and compatibility): Marketed with 50% by wt. of ester.

Phytotoxicity: Generally safe at dilutions recommended.

Storage & Shipping Directions: Separation may occur at freezing temp.

Common Name: LETHANE 384
Chemical Name: B-butoxy Bithioctano di-ethyl ether
Empirical Formula: \( \text{CH}_2, \text{CH}_2-\text{O-CH}_2-\text{O-CH}_2,\text{CH}_2,\text{SCN} \)
Definition: 53.0% to 56.0% (average 54.5%) by wt. or 50% by vol. of above compound.
Chemical & Physical Properties:
  * Flamability - flash point not less than 125°F. (closed cup)
  * Density - 0.910 - 0.935 at 20°C. Color - pale yellow
  * Stable
  * Solubility - Insoluble in water. Freely soluble in petroleum and organic solvents.

Analytical Methods: When other N compounds not present N by official A.O.A.C. methods 1950 Ed. #2.24 using Hg or HgO. For separation of above comp. method of Samuel 1950 A.O.A.C. meeting.

Toxicity, Oral to Mammals:
  * Acute: LD-50 Rat 0.5 ml/kg; rabbit 0.12 ml/kg; dog 0.03 ml/kg; guinea pig 0.25 to 0.4 ml/kg.
  * Chronic: 4% Lethane 384 fed to rats for four years without ill effects.

Skin Absorption and others: No local irritation

Use Precautions: Do not leave on skin. Avoid prolonged inhalation of spray mists. Avoid contamination of feed and food.

Uses (types of pests): Contact insecticide used in fly and cattle sprays and aerosols.

Storage & Shipping Directions: No special precautions.

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Common Name: LETHANE 384, SPECIAL
Chemical Name: Mixture of aliphatic thiocyanates
Definition: A mix. of 1 vol. of Lethane 384 & 3 vol. Lethane 60 which see. Consists of 54.5%-56.6% thiocyanate comps. by weight.

Chemical & Physical Properties:
  * Inflammability - Flash point not less than 125°F.
  * Density - 0.895-0.920 Odor - sl. organic
  * Stable Color - yellow to amber
  * Solubility - Insoluble water. Soluble in petroleum and organic solvents.

Analytical Methods: See Lethane 60. Lethane 384 and Lethane 60 can be separated from each other and from other thiocyanates by method of Samuel at 1950 A.O.A.C. meetings.

Toxicity, Oral to Mammals:
  * Acute: Approximate LD 50 l ml/kg.
  * Other information not available.

Skin Absorption and others: Non-irritating.

Use Precautions: Same as Lethane 384.

Uses (types of pests): Contact insecticide used in fly and cattle spray, and industrial sprays.

Formulations (and compatibility): As above and at 1 to 10% in sprays.

Storage & Shipping Directions: Separation may occur at freezing temperatures.

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Common Name: LINDANE
Chemical Name: Gamma isomer of Benzene hexachloride
Empirical Formula: C₆H₅Cl₆
Definition: 99% pure gamma isomer
Chemical & Physical Properties: Monoclinic prisms
Melting point - 112°C.
Vapor tension - 0.03 mm Hg at 20°C, 0.48 mm at 60°C.
Stable to heat, moisture & strong acids; dehydrohalogenated in alk.
Corrosive action - Much less than BHC
Solubility - 43.5 g/100 ml. in acetone, 6.7 g./100 ml. in abs. alcohol, 2.0 in deobase and 33.7 g./100 ml. in benzene.


Toxicity, Oral to Mammals: Mean lethal dose to rats of gamma isomer is 125 mg/kg. 3 cattle sprayed once with a wetable powder cont. 50% gamma BHC all died. Emulsion sprays cont. 0.05% gamma in xylene killed 3 of 11 calves saturated with it. Suckling lambs & pigs much more resistant to lindane.

Symptoms: Humans - nervousness and incoordination.
First Aid: Direct treatment toward removal from stomach by saline catharsis.

For other data see BHC

Residues: Not as serious a problem as BHC. Residue on plants lasts about 4 days.
Levels: High residues can best be avoided by applying according to directions.
Prevention - practices and precautions: Apply according to directions.
Removal Methods: Same methods as for DDT might be effective.
Uses (types of pests): Lindane use somewhat reduces objections to BHC. Can be used for seed treatments, strawberry weevils, lice on dairy animals, household insects, fruits, crops, storage pests.
Formulations (and compatibility): Dusts cont. 0.5 to 2.0% lindane; wetable powder cont. 25% liquid sol. cont. 20% lindane in solvent; emulsion conc. 20%. Compatible with most non-alkaline insecticides except 10% lime-sulfur sol. & in dust form. with lime or cal. arsenate.
Accumulation in Soil: About one year maximum.

Common Name: MAGNESIUM ARSENATE
Chemical Name: Magnesium Arsenate
Empirical Formula: Mg₃(AsO₄)₂
Definition: Shall contain 48% magnesium arsenate, not less than 20% arsenic, as metallic, and not more than 0.23% arsenic in water-soluble form, as metallic.
Analytical Methods: Arsenic A.O.A.C. Method #6.3 or #6.6
Toxicity, Oral to Mammals:
Antidote: Give a tbsp. of salt in a glass of warm water and repeat until vomit fluid is clear. Then two tbsp. of epsom salt or milk of magnesia in water and force fluids. Have patient lie down and keep warm. Call a physician.
Use Precautions: Avoid excessive skin contact and wash off thoroughly after exposure. If on clothing, remove them and wash. Avoid inhalation of dust or spray mist. Keep away from children, domestic animals and foodstuffs.
Rating: Requires word "Poison", skull and crossbones and antidote.

Common Name: MALATHON
Chemical Name: 0,0-Dimethyl dithiophosphate of diethyl mercaptosuccinate
Empirical Formula: \( \text{C}_{10}\text{H}_{19}\text{O}_6\text{PS}_2 \)
Definition: Deep brown to yellow liquid; phosphorus content 9.38%.

Chemical & Physical Properties:
- Molecular weight - 330
- Melting point - \(-7^\circ\text{C.}\)
- Boiling point - 156 - 157\(^\circ\text{C.}\) at 0.7 mm. (slight decomposition)
- Density - 1.23 at 25\(^\circ\text{C.}/4^\circ\text{C.}\)
- Refractive index - \(\text{n}^\circ_{25} 1.4985\)
- Hydrolysis rate - Hydrolyzes above pH 7. Stable at pH 7 and lower.
- Solubility - in water 145 ppm.

Analytical Methods: Colorimetric, sensitive to 0.1 ppm. Method available from manufacturer.

Toxicity, Oral to Mammals:
- Acute: LD/50 ranges from 479 - 1156 mg/kg to lab. animals
- Chronic: Lab. animals dietary level 5000 ppm. 104 weeks - 65% technical. 5000 ppm., 63 weeks - 90% technical.
- Symptoms: Headache
- Antidote: Atropine
- First Aid: Give emetic, call a physician
- Skin Absorption and others: 2460 - 12300 mg/kg.
- Use Precautions: Do not swallow, avoid getting in eyes, on skin, or on clothing, avoid breathing spray mist or dust; wash after using.

Residues:
- Levels: Rapidly disappear from treated crops, falling to less than 1 ppm. in 7 to 14 days at normal dosage levels.
- Removal Methods: None used since persistence not a problem.
- Uses (types of pests): Many aphids, mites, scale, leaf miners, mealybugs, whitefly, leafhoppers, thrips, larvae of Lepidopterae, Mexican bean beetle.
- Formulations: Aerosols 10%, Dusts 4%, 5%. Wettable powder 25%. Emulsifiable concentrate 50%. Strongly alkaline materials will lower period of effectiveness.
- Phytotoxicity: Little danger with recommended dosages.

Common Name: METHOXYCHLOR
Chemical Name: 2,2-bis(p-methoxyphenyl)-1,1,1-trichlorethane
Empirical Formula: \( \text{C}_{16}\text{H}_{15}\text{Cl}_3\text{O}_2 \)  Mol. wt. 345.65
Definition: Contains 89.5% para para isomer

Chemical & Physical Properties: White powder
- Melting point 89\(^\circ\text{C.}\), uncorrected (pure) Odor - Sl. fruity
- Vapor tension - low, no data Color - White (Tech.
- Non-flam. at ord. temp. light yellow)
- Density - 1.41 at 25\(^\circ\text{C.}\)
- Stability - Resistant to oxidation, dehydrochlorinated by heavy metal catalysts.
Insol. in water, acids & alkalies; 20 g./100 cc in CCl₄; 74 g./100 cc trichlorethylene; 82 g./100 cc methylene chloride; all at 20°C.

Analytical Methods: J.A.O.A.C. 30, 456 (1947); Ibid. 32, 781 (1949); Ibid. 29, 188 (1946).

Toxicity, Oral to Mammals: Rats LD₅₀ in range 5,000 to 7,000 mg/kg.

Acute: Estimated for man fatal dose 450 g. at one time. Rats fed diets cont. 25 to 200 ppm, no toxic effects after 2 years.

Chronic: 1600 ppm caused growth retardation; dogs no toxic effects from 20, 100 and 300 mg/kg/day for 1 yr. Tissue storage found after 500 ppm 4-18 weeks in young rats. No storage in tissues or secretion in milk of cows fed alfalfa cont. 7-14 ppm for 113 days. 0.1 ppm found in less than 10% of milk samples from cows sprayed 4 times summer with 0.5%.

Symptoms: Onset in about 24 hrs. after ingestion of massive dose, death 2-4 days.

First Aid: Largely limited to depression, Avoid oil cathartics; remove insecticide from stomach. Hazard is slight.

Skin Absorption and others: Single application of sol. of methoxychlor, estimated danger level 169 g.; repeated application 36 g./day for how long?

Use Precautions: If skin contact wash with soap and warm water. Do not use on humans. Avoid contamination of foods and foodstuffs.

Residues: Less than 20 ppm if zero & 1-day levels are excluded. More than 80% samples were below 10 ppm.

Removal Methods: Generally washing removes one-third or more. Maximum residue reported for canned product is 1.9 ppm.

Uses (types of pests): Insects attacking fruits, veg., forage crops, livestock and certain household and industrial insects. Not generally aphidicidal or miticidal.

Formulations (and compatibility): Wettable powders cont. 50% used in sprays; 25% in oil base; dusts cont. 3% to 20%, also aerosols. Incompatible with Ca.arsenate, lime, lime-sulfur, zinc sulfate and summer dinitros.

Precautions: (foods) Little, if any adverse effect on flavor; avoid contamination of foods and feeds.

Phytotoxicity: Injury usually negligible even on highly sensitive crops as melons, cucumbers, beans, squash, etc.

Accumulation in Soil: Up to 100 lbs./acre caused no injury to crops due to accumulation in soil.

Storage & Shipping Directions: Do not store near fire or flame. Do not subject to temp. below 20°F. Not flammable under practical conditions. Will burn only at substantially elevated temperatures.

Common Name: METHYL BROMIDE

Chemical Name: Methyl bromide, Bromomethane, or Monobromomethane

Empirical Formula: CH₃Br Mol. wt. 94.9

Definition: Colorless gas at ordinary temperatures, see above.
Chemical & Physical Properties:

Boiling point - 4.5°C. Odor - sl. sweetish
Non-inflammable although some mixtures with air are explosive.
Density - 1.732 at 0°C. 3.20 at 20°C.
Solubility - Slightly soluble in water, freely in alcohol, chloroform, ether, and carbonisulfide.


Toxicity, Oral to Mammals: One of the most toxic of common organic halides.
Acute: Relatively toxic to warmblooded animals as well as insects.
Chronic: Severe lung irritation from prolonged exposure. Repeated exposures are additive. Serious injury 1 hr. at 2000 ppm. Dangerous because action is delayed. Damage to nervous system, kidneys, and lungs. May be fatal. M.A.C. 10 ppm.

Symptoms: Nausea, headache, pallor, weak pulse, affected vision, collapse, often pneumonia. Send for physician at once. Give hot coffee or tea as stimulant. Keep patient warm and quiet.
Skin Absorption and others: Severe burns caused when methylbromide comes in contact with skin.
Use Precautions: Because odor is so slight, handle with extreme care. Use gas mask. To avoid injury during opening follow manufacturer's directions carefully.
Uses (types of pests): Controls insects at all stages in mills, warehouses, vaults, ships and freight cars. 1 lb. to 1000 cu.ft. for 16-24 hrs.
Formulations (and compatibility): Mixture of methylbromide and carbon dioxide avail. as fumigant in 50 lb. steel pressure cylinders.
Applications:
Precautions: U.S.P.H. and U.S.D.A. have shown that cereal products fumigated with 1 lb. methylbromide per 1000 cu.ft. will probably offer no health hazard, and is now permissible.
Phytotoxicity: Fruits, corn, tubers, bulbs and dormant woody plants usually not injured by recommended dosage.
Accumulation in Soil: Compound may be applied as soil fumigant.

Common Name: METHYL PARATHION Trade Name: NITROX
Chemical Name: 0,0-Dimethyl-0-(P-Nitrophenyl) Thiophosphate
Empirical Formula: C₈H₁₀O₅NPS Molecular Weight: 263.3

Chemical & Physical Properties:
Melting point - 35-36°C. Odor: Pungent-garlic-like
Density - 20⁰/4⁰ 1.358 Color: Pale yellow to dark brown
Refractive Index: 35⁰/D 1.5515 Corrosive Action: Little or none
Stable for several days in neutral water. Very rapidly hydrolyzed in alkaline sol. with a half life of approx. 2.5 min. in N. alkaline
Solubility: Soluble in most aromatic solvents. Only slightly soluble in water.
slightly soluble in paraffin hydrocarbons. Solubility in water at 25°C is approximately 50 ppm.

**Analytical Methods:** Similar to those used for "Parathion" except for the substitution of "Methyl Parathion" as the primary standard.

**Toxicity, Oral to Mammals:** Approximate LD 50 9-25 mg/kg (Rats)

*Acute:* Toxic through dermal absorption and inhalation, but less so than "Parathion".

*Chronic:* Chronic sub-lethal doses will continue to lower cholinesterase level. Normalcy returns upon removal of subject from further exposure.

**Symptoms:** Headache, dizziness, nausea, cramps, constriction of pupil of eye, tightness in chest, diarrhea, labored breathing, convulsions, coma following.

**Antidote:** Atropine in maximal tolerable dosages, repeatedly if necessary. Oxygen helpful.

**First Aid:** Internal: Give a tbsp. of salt in a glass of warm water and repeat until vomit fluid is clear. Have patient lie down and keep quiet. Call physician at once. External: Wash skin immediately with soap and warm water. Keep subject under close observation for several hours following extensive exposure. Call physician upon evidence of symptoms.

**To Physician:** Compound exerts muscarine-like effects, i.e. stimulation of the parasympathetic nervous system. A parasympathetic depressant, such as atropine, is indicated to relieve symptoms. The administration of oxygen is helpful.

**Skin Absorption and others:** Poisonous if swallowed, inhaled, or absorbed through skin. Highly toxic through the eye.

Use Precautions: Do not breath vapors or spray mist. Wear a dust or mist respirator of a type approved by the U.S.D.A. Do not get on eyes, skin, or clothing. Do not take into mouth. Protect eyes with goggles. Wear protective rubber clothing. Change clothing immediately if contaminated and launder before re-use. Wash with soap and warm water before eating or smoking.

**Residues:** General falling to below 1 ppm. in 7-21 days at normal dosage treatments.

**Prevention Practices & Precautions:** Do not harvest crop for 15-30 days (as recommended) following final application.

**Removal Methods:** None required since persistence is not a problem.

**Uses (types of pests):** Effective generally for aphids, mites, and boll weevil.

**Formulations (and compatibility):** Spray and dust formulations.

Compatible with: Lead Arsenate, Rotenone, Pyrethrum, Nicotine Sulfate, Summer Oils, Dormant Oils, DDT, Benzene Hexachloride, Chlordane, Toxaphene, Quinones, Fixed Coppers, Wettable Sulfurs, Dithiocarbamates.

Doubtful Compatibility with: Zinc Arsenate, Calcium Arsenate Paris Green.

**Incompatible with:** Bordeaux, Lime, Lime Sulfur

**Applications:** Sprays, Aerosols, and Dusts at recommended concentrations.

**Precautions (food):** Keep away from feed or food products.

**Equipment Cleaning, Disposal:** Wash with hot caustic soda solution and rinse several times. Never re-use drums,
decontaminate, perforate, and discard. Burn bags.

Phytotoxicity: Little danger in recommended doses.

Accumulation in Soil: Residue level usually drops rapidly in soil, falling to below 1 ppm. in 4-6 weeks.

Storage & Shipping Directions: Store in a well ventilated area. In case of spillage decontaminate the area with hot caustic soda solution and rinse several times. Mark with poison label. Cannot be mailed. Limited quantities by Air Express. Ship via Railroad Express.

Common Name: NABAM
Chemical Name: Disodium ethylenebisdithiocarbamate
Empirical Formula: \((\text{CH}_2)_2(\text{NHCSS})_2\text{Na}_2\)

Chemical & Physical Properties:
- Melting point - decomposes before melting
- Taste - sulfurous
- Odor - sulfurous
- Vapor tension - negligible
- Color - amber
- Inflammability - pure salt non-combustible
- Stability - Dry salt relatively unstable to heat, light and moisture; sol. stable.
- Solubility: Greater than 20% by weight in water (anhydrous basis) at ordinary temperature.

Analytical Methods: See Ferbam

Toxicity, Oral to Mammals: Expressed as Nabam
- Acute: Rat, stomach tube, \(LD_{50} 395 = 12 \text{ mg/kg.}\)
- Chronic: Goitrogenic effect has been reported at 2000 & 2500 ppm. At 5 ppm no thyroid hyperplasia or growth retardation. No case of acute nabam poisoning encountered. It is invariably converted to zineb before applying to crops.
- Skin Absorption and other: In some individuals mild skin irritation; 19% aqueous sol. under lower eyelid non-irritating to rabbit.

Use Precautions: Avoid contact with skin and eyes. In case of contact flush with plenty of water; for eyes get medical attention.

Residues: See Zineb, 147 samples, 11 crops, 1 to 20 applications, samples taken 0 to 30 days after last treatment, only two samples had more than 5 ppm.

Prevention-practices and precautions: Degradation under weathering conditions.

Removal Methods: Washing reduced residue levels but did not entirely remove.

Uses (types of pests): Effective against wide range of fungal diseases on vegetables, tobacco, certain ornamentals.

Applications: "Parzate" Liquid Nabam Fungicide (a 19% water sol. equiv. to 27% dithane hexahydrate) suitable for spray application to foliage when mixed in spray tank with zinc sulfate and water. Less effective if used with copper, mercury or lime. 2 quarts/100 gallons to which 3/4 lb. monohydrated zinc sulfate or 1 lb. flake \(\text{ZnSO}_4\) is added. 100 to 125 gallons of spray per acre to row crops is used. Time interval between applications may vary from 3-10 days.

Equipment-cleaning, disposal: No problem of cleaning equipment or disposal of containers.
Phytotoxicity: Toxic alone but used on crop plants mixed with ZnSO₄. Has been tested as a soil fungicide; no sign of injury to peas planted 15 days after 200#/acre or immediately after 75#/acre.

Storage & Shipping Directions: If below 20°F. containers should be moved to warm storage until thawed and then thoroughly mixed before use.

Common Name: NICOTINE
Chemical Name: 1-methyl-2(3-pyridyl)-pyrrolidine
Empirical Formula: C₁₉H₁₄N₂ - Mol. wt. 162.23
Definition: (see above) Only liquid, becomes brown on exposure to air.

Chemical & Physical Properties:
- Boiling point - 247°C.
- Taste - exceedingly acrid,
- Vapor tension - 1. mm at 61.8°C. burning
- Density - 1.009
- Odor - strong
- Color - colorless to yellow
- Solubility - miscible with water below 60°C and above 210°C; very soluble in alcohol, chloroform, ether, petrol oils. Volatile in steam.

Analytical Methods: AOAC 7th Ed. 5.104

Toxicity, Oral to Mammals:
- Acute: Mean lethal dose to humans 10 mg/kg (Aollman claims 40 mg, total fatal dose). One of the most rapid and deadly poisons known.
- Symptoms: Irritation, tremors, convulsions, curare-like paralysis, death.
- First Aid: Call physician, drink warm water freely, emetic or mustard or empty stomach with tube. Strong tea or coffee; aromatic spirits of ammonia. Keep lower extremities and chest warm; give 1/30 gr. strychinine by hypo. every hr. until 4 doses are taken. Artificial respiration if necessary.
- Use Precautions: Avoid excessive inhalation and skin contact. In case of spillage on skin wash with soap and water.

Uses (types of pests): Insecticide for aphids on plants and lice on animals including poultry. A stomach poison.

Formulations (and compatibility) .05 to 4.0% nicotine sprays and dusts. Concentrates for dilution to low levels. Often used in combination - no incompatibilities.

Application:
- Directions, rate and numbers: Rates of application and frequency depend on insects to be controlled and hazards to animals.

Storage & Shipping Directions: Keep well closed and protect from light. I.C.C. Class B-Liquid-Poison Label. Sect.349.

Common Name: ORTHO-PHENYL-PHENOL
Chemical Name: 2-hydroxy diphenyl
Empirical Formula: C₆H₅C₆H₄OH Mol. wt. 170.2
Definition: White to pinkish crystals.

Chemical & Physical Properties:
- Melting point - 56-57°C.
- Odor - sulfide
- Boiling point - 275°C.
- Color - white
Inflammability - flash point 125°C.
Density - 1.217 at 25/25°C. 1.213 at 25/4°C.
Insoluble in H₂O, soluble in methanol, ethanol, ligroin, alkali.

Analytical Methods: Phenol coefficient, 1 ml. of N/10 bromine = .0048 g. of C₆H₅-C₆H₆OH

Toxicity, Oral to Mammals: White rats. LD 50 = 2.48 g/kg.
Acute: Feeding tests male & female rats on diets containing 0.1, 0.3 and 1% for three months; 0.2 g/kg five days a week for 6 mos.; 0.2, and 0.02 % in diet for 2 yrs., showed no adverse effects on growth, hematological exam., organ wts. or tissue exam. Dogs .02, .2 & .5 g/kg/ day for 1 yr. - no effects.

Symptoms: Similar groups of rats fed diet cont. 2.0% for 2 yrs. showed retarded growth and changes in kidneys.
Preparations containing 5% and above harmful if swallowed.
First Aid: Give emetic.

Skin Absorption and others: Some possibility of skin irritation from severe contacts with dust & solution but no poisoning from absorption.
Use Precautions: Prolonged and repeated exposures with dust and with solutions over 1% should be avoided. Wash with soap & water. Medical treatment for eyes. Wear goggles and rubber gloves.

Uses (types of pests): As disinfectant 1.0% aqueous solution of the sodium salt is recommended by BAI U.S.D.A. Farmer's Bulletin 1991.

Formulations (and compatibility): Sodium salt usually used.
Dilutions of 0.05-1.0% lethal to B. coli and of 0.5% for Staph. aureus. Metal surfaces disinfected by .02-0.1% rougher surfaces require higher conc., longer exposures and higher temp. effective against mycobacterium tuberculosis when used with soap sol. or NaOH or Ca(OH)₂.

Application:
Precautions (food): Avoid contact with foods.
Other Information: Experiments show that dilution of 11.6 ppm. ortho phenyl phenol will disinfect H₂O containing Escherichia coli, Eberthella typhi, Salmonella paratyphic A & B, Vibrio cholera and Shigella dysenteria within 20 min.
Storage & Shipping Directions: Preserve in tight, light-resistant containers. Subject to Federal Caustic Poisons Act for labeling.

Common Name: PARA-OXON
Chemical Name: Diethyl p-nitrophenyl phosphate
Empirical Formula: C₁₀H₁₄N₀₆P
Definition: Reddish-yellow liquid; phosphorus content 11.26%

Chemical & Physical Properties:
Molecular weight - 275
Boiling point - 148-151°C. at 1 mm.
Density - 1.269 at 25°/25°C.
Refractive index - n₂₀ 1.5060
Hydrolysis rate - Very slow at pH 7
Solubility - in water 2500 ppm at 25°C.

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Common Name: PARIS GREEN
Chemical Name: Paris Green, Emerald Green, French Green, and others.

Empirical Formula: Indefinite - compounds of copper metar­senite and copper acetates ratio 3:1 to 2:1. Formula usually shown \((\text{CH}_3\text{COO})_2 \text{Cu},3\text{Cu(AsO}_2\text{)}_2\), or if copper acetoarsenite, the empirical formula is \((\text{CuOAs}_2\text{O}_3)_3\cdot\text{Cu(C}_2\text{H}_3\text{O}_2\text{)}_2\)

Chemical & Physical Properties: Emerald green color, amor­phous powder soluble in acid, insoluble in alcohol and water.

Definition: Standard grade 85% copper acetoarsenite.

Chemical & Physical Properties:
- Stability - good
- Solubility - soluble in acids and ammonia
- Color - green
- Corrosive action - slight on metals

Analytical Methods: A.O.A.C.

Toxicity, Oral to Mammals: Soluble arsenic somewhat higher than other inorganic arsenic pesticides.

Symptoms: Common to all other arsenicals.

Antidote: Induce vomiting, follow with olive oil, milk, egg white or other mucilaginous drinks. 30 grains of potassium bromide in water. Call a physician at once.

Skin Absorption and others: Slight. Wash thoroughly with soap and water.

Hazards to Wildlife: Slight

Use Precautions: Use goggles and dust mask. Remove from skin and clothes with soap and water.

Residues:

Removal Methods: For potatoes none needed. For tobacco none practicable.

Uses (types of pests): Potato beetle, cutworm, grasshoppers, army worms, tobacco horn worm, tobacco flea beetle.

Formulations (and compatibility): As a poison bait for cut­worms, grasshoppers, army worms. As a dust with hydrated lime on tobacco, as a water spray with or without hydrated lime for potato beetles.

Applications:

Rates vary in different localities.

Precautions (food): Keep away from feeds and foods.

Phytotoxicity: Shows considerable damage to tender plants and fruit trees.

Accumulation in Soil: Little data. Probably like lead arsenate.

Storage & Shipping Directions: I.C.C.regulations for Class B poisons.

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Common Name: PARATHION
Chemical Name: O,O-Diethyl O-p-nitrophenyl thiophosphate

Empirical Formula: \((\text{C}_2\text{H}_5\text{O})_2\text{PSOC}_6\text{H}_4\text{N}_2\text{O}_2\)

Definition: Liquid, 100% pure compound.

Chemical & Physical Properties:
- Melting Point 6.0°C.
- Color - Dark brown
- Boiling point 157-162°C. at 0.6 mm
- Corrosive action - little
- Density 1.2655 at 25°C or none
- Stability half life 120 days at pH 10 or lower; 8 hrs. in
Soluble in most organic solvents except kerosenes of low aromatic content. Sol. in water to extent of 15-20 ppm at 20°C.

Analytical Methods: Anal. Chem. 20, 753-756 (1948); Ibid. 22, 706-708 (1950); Ibid. 23, 1167-1169 (1951).

Toxicity, Oral to Mammals: LD/50 ranges from 3-10 mg/kg to usual lab. animals. High toxicity also from dermal absorption & inhalation. Eyes are good absorbing surface; single drop in eye could be fatal to human. Not stored in body, little gross tissue damage noted.

Symptoms: Headache, dizziness, nausea, cramps, constriction of pupil of eye. Tightness in chest, diarrhea, labored breathing, convulsions, coma follow.

Antidote: 1-2 mg. atropine/hr. by physician till fully atropinized, orally for mild cases, I.V. for severe. Oxygen and artificial respiration helpful.

First Aid: Warm salt water to induce vomiting, milk and water freely, keep patient warm. Call physician immediately.

Skin Absorption and other: Wash skin repeatedly with warm soap & water, remove contaminated clothing; eyes, flush immediately with water for 15 min.

Use Precautions: Avoid contact of skin or eyes with liquid or dust. Wear protective equipment and approved respirator or mask, wash thoroughly after contact or before eating, drinking or smoking. Bathe at end of job. Do not contaminate food or feed.

Residues: Rapidly disappear from treated crops, falling to less than 1 ppm in 15-20 days at normal dosage treatments.

Prevention-practices and precautions: None needed because of volatility and disappearance.

Removal Methods: None available since persistence not a problem.

Uses (types of pests): Many aphids and mites, Lepidoptera & beetles, scales, leaf miners, mealy bugs, leaf hoppers, symphyllids and thrips.

Formulations (and compatibility): Aerosols, 10% for hot house use only. Duffs, 0.5%, 1.5%, 2.0%. Wettable powders, 15%, 25%. Emulsifiable concentrates, 25%. Incompat. with alkaline comps. Use with lime not recom., question ed with Bordeaux, Ca arsenate, cryolite, dinitro compounds, Paris green, summer oils and lime-sulfur if used in 2-3 hours.

Applications: 1-2 lbs. wet powd., 20-40 lbs. 1% dust, 1-2 pints 25% emulsion conc./acre.

Equipment-cleaning-disposal: Wash with hot caustic soda sol. and rinse several times. Never re-use drums, decontaminate, perforate and discard. Burn bags.

Phytotoxicity: Little danger in recommended dosages. Some cases of injury to young plants with high dosages or high level of impurities in insecticide.

Accumulation in Soil: No toxic action reported. Residue levels drop rapidly in soil, usually falling below 1 ppm in 4-6 weeks.

Storage & Shipping Directions: Class B poison label required. Not mailable; max. amt. by railway express 55 gal./container. Standard drums ICC Reg. 5-B and 17 E. If spilled, bury sweepings and decontaminate area.
Common Name: PARATHION, E-605  Trade Name: THIOPOS, NIRAN, and Others.

Chemical Name: O,O-Diethyl-O-(p-Nitrophenyl)-Thiophosphate  

Empirical Formula: C_{10}H_{14}O_{7}N_{2}P  

Molecular weight: 291.3

Definition: 96% min. Ingredient Content 0.5% max. free p-Nitrophenol.

Chemical & Physical Properties:
- Melting Point - 6.1°C.
- Boiling Point - Approx. 375°C.
- Vapor Pressure: 3.78 x 10^{-5} mm.
- Odor: Pungent, garlic-like
- Color: Pale yellow to dark brown
- Density: 25°/4° 1.2656
- Refractive Index: 25°/D 1.536

Stability: Hydrolyzes very slowly at pH of 7.0 and below; half life 120 days at 25°C. Rapidly hydrolyzed above pH 7; half life 8.6 minutes at N. alkali @30°C.

Soluble in most aromatic solvents. Only slightly soluble in paraffin hydrocarbons. Solubility in water approximately 20 ppm. at 20°C.


Toxicity, Oral to Mammals: LD_{50} range approximately 3-30 mg./kg. (Rats).
- Acute: Dermal absorption LD_{50} approximately 30-60 mg./kg.
- Intraperitoneal LD 50 approximately 3-20 mg./kg. (usual lab. animals).

Chronic: Chronic sub-lethal doses will continue to lower cholinesterase level. Normalcy returns upon removal of subject from further exposure.

Symptoms: Headache, dizziness, nausea, cramps, constriction of pupil of eye, tightness in chest, diarrhea, labored breathing, convulsions, coma following.

Antidote: Atropine in maximal tolerable dosages, repeatedly if necessary. Oxygen helpful.

First Aid: Internal: Give a tbsp. of salt in a glass of warm water and repeat until vomit fluid is clear. Have patient lie down and keep quiet. Call physician at once. 

External: Wash skin immediately with soap and warm water. Keep subject under close observation for several hours following extensive exposure. Call physician upon evidence of symptoms.

To Physician: Compound exerts muscarine-like effects, i.e., stimulation of the parasympathetic nervous system. A parasympathetic depressant, such as atropine, is indicated to relieve symptoms. The administration of oxygen is helpful.

Skin Absorption and Others: Poisonous if swallowed, inhaled, or absorbed through skin. Particularly toxic through the eye.

Use Precautions: Do not breath vapor or spray mist. Wear a dust or mist respirator of a type approved by the U.S. Dept. of Agriculture. Do not get on eyes, skin, or clothing. Change clothing immediately if contaminated and launder before reuse. Wash with soap and warm water before eating or smoking.

Residues: Generally falling to less than 1 ppm. in 15-21 days
(as recommended) following final application.

Removal Methods: None required as persistence is not a problem.

Uses (types of pests): Recommended for control of aphids and mites on fruits, vegetables, and forage crops. Also effective against codling moth, curculio, and several scale insects on fruits.

Formulations (and compatibility): 25% Emulsifiable Concentrate, 15%–20% Wettable Powders, Dusts (2% or less), Aerosols 10%.

Compatible with: Lead Arsenate, Rotenone, Pyrethrum, Nictine Sulfate, Summer Oils, Dormant Oils, DDT, Benzene Hexachloride, Chlordane, Toxaphene, Quinone, Fixed Coppers, Wettable Sulfur, Dithiocarbamates.

Doubtful Compatibility with: Zinc Arsenate, Calcium Arsenate, Paris Green.

Incompatible with: Bordeaux, Lime, Lime Sulfur.

Applications: Sprays, Dusts, and Aerosols at recommended concentrations.

Precautions (food): Keep away from feed or food products.

Equipment Cleaning, Disposal: Wash with hot caustic soda solution and rinse several times. Never re-use drums, decontaminate, perforate, and discard. Burn bags.

Phytotoxicity: Little danger in recommended doses.

Accumulation in Soil: Residue level usually drops rapidly in soil, falling to below 1 ppm. in 4-6 weeks.

Storage & Shipping Directions: Store in a well ventilated area. In case of spillage decontaminate the area with hot caustic soda solution and rinse several times. Mark with poison label. Cannot be mailed. Limited quantities by Air Express. Ship via Railroad Express.

Common Name: PHENOTHIAZINE

Chemical Name: Phenothiazine (Thiodiphenylamine)

Empirical Formula: C₁₂H₉NS

Definition: Shall contain at least 95% Phenothiazine

Toxicity, Oral to Mammals:
Use Precautions: Avoid contact with the skin and excessive inhalation. Wash off with soap and water.

Common Name: PHOSPHORUS

Chemical Name: Phosphorus, yellow phosphorus, white phosphorus

Empirical Formula: P₄

Definition: Exists in several modifications. Only yellow used. Translucent, nearly colorless solid, waxy.

Chemical & Physical Properties:

Melting point - 44.2°C. Odor - like garlic
Boiling point - 290°C. Color - pale yellow
Vapor tension - 500 mm Hg at 200°C.
Flammable, ignites at 34°C.
Density - 1.82
Solubility - Almost insol. in water, 1g. in about 400 ml. absolute alcohol, 31.5 ml. benzene, 40 ml. chloroform, 60 ml. oil turpentine, 100 ml. almond oil.

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Toxicity, Oral to Mammals:
- Acute: Human, medicinal dose 0.6 mg. Single dose of 100 mg. usually fatal. Fatal dose for dog 50 to 100 mg; horse 500 to 2,000; pig 160-320 mg. per animal.
- Chronic: Daily absorption of 1 mg. of elemental phosphorus may lead to serious bone and liver trouble.
- Symptoms: Nausea, vomiting, garlic taste, thirst, pain in throat & stomach, diarrhea, headache, weakness, collapse. Vomitus luminous in dark.

Antidote: Give copper sulfate 0.3 gm. in water which must be followed by gastric lavage with 1 liter of 1% bicarbonate solution. Give 120 ml. liquid petrolatum as demulcent.

First Aid: Tablespoonful of salt in glass warm water, repeat till vomit fluid is clear, follow with 8 tbsp. mineral oil. Keep patient prone and warm. Carbohydrate diet for liver damage.

Skin Absorption: Toxic quantities may be absorbed through skin or inhaled as vapor.

Use Precautions: Poisonous to humans and to animals - should not be exposed where it may be eaten or contaminate foods. Believed no fire hazard in properly formulated pastes. Can cause severe burns accompanied by tissue poisoning.

Uses (types of pests): On bread for rats and mice. 2 tbsp. paste mixed with 1 lb. ground meat or fish. On bits of paper for cockroaches, (Amer. and Oriental, not German).

Formulation (and Compatibility): Pastes containing phosphorus 1.5% or 2% marketed in collapsible tubes or in jars. Not used with other pesticides.

Application: (Precautions- foods): Should not be used around foods, particularly oily materials which may absorb the poison.

Common Name: PIPERONYL BUTOXIDE
Chemical Name: (Butylcarbityl) (6-Proply Piperonyl) Ether

Chemical & Physical Properties:
- Inflammability - Flash-P. 340°F. Taste - Faint bitter
- Density - 1.04 - 1.07 Odorless
- Stability - Good Color - Gardner -Holdt 10-11
- Corrosive action - No. pH 7.0

Solubility - 100% in oils, most organic solvents, alcohol, benzol, Freon.


Toxicity, Oral to Mammals:
- Acute: M.L.D. 50 for rats 11500 mg/kg (Lehman)
- Chronic: 10,000 ppm tolerated by rats, 3 successive generations, with moderate toxicity. 25,000 ppm fatal to rats 4 to 68 weeks.
- Symptoms: Depression from excessive amounts.
- First Aid: Vomiting will result.

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Skin Absorption and other: Poorly absorbed.
Use Precautions: Only for oil used as carrier.

Residues:
Levels: No hazards from residues.
Prevention-practices and precautions: Used with pyrethrum to prevent insects.

Uses (types of pests): Grains stored, about foods on cereal bags in homes, on animals, and other places where more hazardous materials may not be used.
Formulations (and compatibility): Compatible with other toxicants. Used in oil solutions, aerosols, dusts, wettable powders, fogs, and slurries on paper and seeds and no auxiliary solvent needed.
Application:
Directions, rate and number: Saves about 75% pyrethrins through its synergistic action. Maintains knock down properties of pyrethrins and results in a more stable formulation.
Precautions, Man, animals, plants: None, except for diluents used.
Equipment-cleaning, disposal: Rinse

Storage & Shipping Directions: No special handling.

Common Name: PIPERONYL CYCLONENE
Chemical Name: 3-isoamyl-5-(methylenedioxyphenyl)-2-cyclohexenone and its 6 carbethoxy derivative, and related compounds.

Chemical & Physical Properties:
Inflammability - 290-300°F. Odorless
Density - 1.09 - 1.20 20°C. Color - Gardner Holt 164
Stability - Good Corrosive action - None,
Solubility - Slight in oils pH 7.0

Toxicity, Oral to Mammals:
Acute: Approximate LD 50 - 5200 mg/kg.
Chronic: 16 weeks, good weight gains when fed 5000 ppm in all food.
Symptoms: Toxic only when fed 5 ml/kg in stomach tube.
First Aid: Vomiting easily induced, often voluntary.
Skin Absorption and other: Poorly absorbed.
Use Precautions: Only for oil in which it is used.

Residues:
Levels: No hazards from residues.
Prevention-practices and precautions: Not needed.
Removal Methods: Washing with water.

Uses (types of pests): Garden pests, flowering plants, Roach dusts, fly sprays for DDT resistant flies.
Formulations (and compatibility): Dusts with synergism on rotenone and pyrethrum. Compatible with sulphur and most fungicides.
Application:
Directions, rate and number: Same as for rotenone and pyrethrum.
Precautions:
Man, animals, plants: None needed
Equipment-cleaning, disposal: Rinse
Phytotoxicity: No. Is a plant growth stimulant.

Common Name: POTASSIUM CYANATE
Chemical Name: Potassium cyanate
Empirical Formula: KOCN Mol. wt. 81.11
Definition: Shall contain not less than 95% KOCN.
Chemical & Physical Properties: Crystalline form, needles.
- Melting point - 315°C. Taste - salty
- Non-flammable Odorless
- Density 2.048 at 16°C; 2.056 at 20°C. Colorless
Soluble in water 63 g/100 ml. at 10°C. and anhydrous ammonia; insol. in alcohol.
Analytical Methods: A.O.A.C.
Toxicity, Oral to Mammals: Harmful if taken internally. LD-50 on mice lies between 0.500 and 1.452 g/kg-probable value 0.841 g/kg.
- Symptoms: Labored respiration, loss of coordination of rear legs and head, prostrations, convulsions, based on laboratory animals.
- Antidote: General.
- Skin Absorption and others: None
Use Precautions: Harmful if swallowed.
Uses (types of pests): Herbicide, specifically toxic to crabgrass; selective weed killer on small onions; pre-emergence use on some veg. crops; cotton defoliate.
Formulations (and compatibility): Marketed usually in mixtures cont. 50-90% KOCN; also in combination with fertilizers or other inert fillers to be applied as powder.
Application:
- Precautions (food): Do not contaminate food.
- Equipment-cleaning, disposal: Rinse with water.
Phytotoxicity: Do not use on dormant or stunted grass under drought conditions.
Accumulation in Soil: None
Storage and Shipping Directions: Keep container tightly sealed when not in use.

Common Name: PYRETHRINS FROM PYRETHRUM FLOWERS
Chemical Name: Active components: Pyrethrins I and II. Cinerins I and II.
Empirical Formula: Pyrethrin I, C_{21}H_{28}O_{5}; Pyrethrin II C_{22}H_{28}O_{5}.
Definition: Dried fresh flowers contain approximately 0.9% total pyrethrins. Kerosene extracts are standardized to contain 2 grs. total pyrethrins per 100 ml.
Analytical Methods: AOAC 7th Ed. 5.110. Peet-Grady Biological Evaluation.
Toxicity, Oral to Mammals:
- Acute: MDL for pyrethrins 200 mg/kg.
- Chronic: Lowest level in foods with gross effects 5000 ppm.
Symptoms: Tremors, respiration paralyses from ingestion of large amounts.
Skin Absorption and other: Poorly absorbed.
Hazards to Wildlife: No hazard except from solvent or diluent.
Residues:
Levels: No problem because of low toxicity.
Removal Methods: Washing.
Uses (types of pests): Livestock, household, horticultural fruits and flowers. A contact poison with rapid action.
Formulations (and compatibility): Extracted concentrates as dusts, sprays and aerosols, and used with synergists such as piperonyl.
Accumulation in soil: None
Storage & Shipping Directions: Ground pyrethrum loses a part of its activity in storage. Synergistic extracts and bases stable. Avoid long exposure to direct sunlight.

QUARTERNARIES

Chemical Name: Alkyl dimethyl ethylbenzyl ammonium chloride
Alkyl groups: C₈H₁₇ - C₁₈H₃₇
Formula, structural:
\[ C₂Hₙ₂₉ + 1 \overset{N}{(CH₃)}₂ C₆H₄C₂H₅01 \]
Analytical Methods: See Benzalkonium chloride.
Toxicity:
LD₅₀ for rats orally 300 mg/kg
LD₁₀₀ for rats orally 500 mg/kg
LD₅₀ for rats orally 100 mg/kg
Evidence of chronic toxicity not found on continued feeding of 100 mg/kg daily for two weeks.
Caution: See Benzalkonium chloride for a general pattern of precautionary labeling.
Uses: Tests by conventional methods for germicides indicate that this material is more active than alkyl (C₈H₁₇-C₁₈H₃₇) dimethyl benzyl ammonium chloride. It is recommended for the same uses, but available evidence on the maximum safe use-dilutions is not conclusive.

Chemical Name: (Alkyl trimethyl ammonium chloride), Alkyl groups, various: mixed alkyls, as occurring in soy-bean, cocoanut, tallow, and palmityl amines, cetyl compounds, lauryl-compounds.
Formula, structural:
\[ CₙH₂₉ + 1 \overset{N}{(CH₃)}₃ Cl \]
Properties: Water dispersible. Surface tension of 0.1% solution at 25°C: 33 to 37 dynes/cm.
Analytical Methods: See Benzalkonium chloride.
Toxicity: Varies widely with alkyl groups. In general 2.0% solutions or less are non-irritating to the skin. Solutions of 10% and above may be seriously irritating to the eyes.
Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.

Formulations: Available in water solution and isopropanol solution.

Uses: Emulsifying agent, textile softener, germicide, sanitizer and deodorant. Active as germicides at high dilutional test methods, the exact dilution varying with the nature of the alkyl groups present. Authorities differ on effective use-dilutions for disinfecting previously cleaned surfaces or for sanitizing.

Trade Name: ALLROSEPT MM
Chemical Name: 1-Tridecyl 2-methyl-2-hydroxyethylimidazolium chloride.
Formula, structural:

\[
\begin{align*}
\text{HN} & \quad \text{C} \quad \text{CH}_2 \quad \text{CH}_2 \quad \text{OH} \\
\text{HC} & \quad \text{C} \quad \text{N} \quad (\text{CH}_2)_{12} \quad \text{CH}_3 \quad \text{Cl} \\
\text{H} & \quad \text{H}
\end{align*}
\]

Analytical methods: See Benzalkonium chloride.

Toxicity (Allrose Chemical Co.)

LD\textsubscript{50} Rats orally 500 mg/kg

Caution: See Benzalkonium chloride for a general pattern of precautionary labeling.

Uses: Germicide, deodorant, fabric softener, and for slime control in water cooling systems.
As a germicide at dilutions up to 1-5000 to disinfect previously cleaned surfaces.

Trade Name: ALROSEPT MBC
Chemical Name: 1-tridecyl-2-benzyl-2-hydroxyethylimidazolium chloride.
Formula, structural:

\[
\begin{align*}
\text{HN} & \quad \text{C} \quad \text{CH}_2 \quad \text{CH}_2 \quad \text{OH} \\
\text{HC} & \quad \text{C} \quad \text{N} \quad (\text{CH}_2)_{12} \quad \text{CH}_3 \quad \text{Cl} \\
\text{H} & \quad \text{H}
\end{align*}
\]

Analytical Methods: See Benzalkonium chloride.

Caution: See Benzalkonium chloride for a general pattern of precautionary labeling.

Uses: Germicide, deodorant, fabric softener, and for slime control in water cooling systems.
As a germicide at dilutions up to 1-5000 to disinfect previously cleaned surfaces.
Common Name: **ARALKONIUM CHLORIDE**
Trade Name: Dynium chloride, Tetrasan, Dynaltone
Chemical Name: Alkyl dimethyl 3,4-dichlorobenzyl ammonium chloride Alkyl C8H17 to C18H37
Formula, structural: \[
\text{\( \text{C_n H_{2n}} \neq 1 \text{ N (CH}_3\text{)}_2 \text{ CH}_2 \text{ C}_6 \text{ H}_3 \text{ Cl}_2 \text{ Cl} \)}
\]

**Analytical Methods:** See Benzalkonium chloride.

**Toxicity:** (Shelanski, H.A., Soap & Sanitary Chem. Feb., 1949).
- **LD\(_{50}\)** white rats orally 730 mg/kg
- **LD\(_{50}\)** Guinea pigs orally 316 mg/kg
- **LD\(_{100}\)** white rats orally 1000 mg/kg
- **LD\(_{100}\)** Guinea pigs orally 500 mg/kg

Dogs took 1:5000 in drinking water daily for 6 months without serious disturbance.

**Caution:** See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.

**Uses:** Antiseptic, germicide, sanitizer, algaeicide, and deodorant. Reported to be effective as a germicide at higher dilutions than alkyl dimethyl benzyl ammonium chlorides having the same alkyl groups. However, the degree of superiority in actual use has not been established. Employed at a dilution of 1:1000 for disinfecting previously cleaned surgical and dental equipment and recommended at dilutions to 1:5000 as a germicidal rinse for previously cleaned equipment in food plants, dairies and restaurants.

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Common Name: **BENZALKONIUM CHLORIDE, USP** (See Chemical Name)
Trade Names: Roccal, Zephiran chloride, BTC, many others.
Chemical Name: Alkyl benzyl dimethyl ammonium chloride.
Alkyl: Various, usually C\(_8\)H\(_17\) - C\(_{18}\)H\(_37\). Benzalkonium chloride USP has the alkyl groups in this range. Products with a single alkyl group, such as lauryl or cetyl, are made.
Formula, structural: \[
\text{\( \text{C_n H_{2n}} \neq 1 \text{ N (CH}_3\text{)}_2 \text{ CH}_2 \text{ C}_6 \text{ H}_5 \text{ Cl} \)}
\]

**Properties (Benzalkonium chloride):** A white or yellowish white amorphous powder, or gelatinous particles. It has an aromatic odor and a very bitter taste. Its solution is slightly alkaline and strongly foams on shaking. It is very soluble in water, alcohol and acetone, almost insoluble in ether, and is slightly soluble in benzene. Usually supplied in aqueous concentrates 25 to 50 percent.

**References:** USP XIII, p 68 (1947); Journal Amer. Med. Assoc. 120, 289 (1942).
**Ferricyanide method:** Methods of Analysis of the A.O.A.C.,
7th Ed., p. 463 (1950); Method 321.0 (Clearing house).

<table>
<thead>
<tr>
<th></th>
<th>White Rats</th>
<th>Orally</th>
<th></th>
<th>Guinea Pigs</th>
<th>Orally</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50</td>
<td></td>
<td></td>
<td>445 mg/kg</td>
<td></td>
<td>200 mg/kg</td>
</tr>
<tr>
<td>LD50</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Chronic Toxicity: 25 mg/kg per day orally to rats for two years causes some loss in weight after 15 months. No other gross pathological changes over controls. 25 mg/kg per day orally to guinea pigs for one year: Not gross pathological changes over controls.

Caution: Solutions 2% up to 20%. CAUTION: Avoid contamination of food.

Concentrates: Containing 20% or more:

CAUTION: This material is a concentrate and must be handled with care. It is irritating to human and animal tissue. Do not siphon with mouth. Wash contaminated skin immediately with soap and water. To remove from eyes wash with milk. If accidentally taken internally drink several glasses of milk or the white of eggs.

Uses: Antiseptic, germicide, sanitizer, algacide and deodorant. As an antiseptic for external body use usually offered or recommended at a dilution of 1:1000 in aqueous solution or tinctures. Although active at very high dilutions preparations do not usually give sharp end-points in conventional test methods for disinfectants. Thus, authorities differ as to the maximum safe use-dilutions for disinfecting inanimate objects and surfaces. Commonly recommended at dilutions up to 1:5000 as a germicidal rinse for previously cleaned surfaces. Also, employed in Detergent-Sanitizer formulations along with organic nonionic detergents, inorganic detergents, and various sequestering agents offered to clean and sanitize in one application. Reported as useful for treating water in fish hatcheries to control bacterial diseases of fingerlings and in treating water systems to control the growth of algae.

Common Name: BENZETHIONIUM CHLORIDE
Trade Names: Hyamine 1522, Polymine D, Disilyl, Phemoral chloride.

Chemical Names: Paradiisobutyl phenoxyethoxyethyl dimethyl benzyl ammonium chloride. Para tertiary octyl phenoxy -- -- Usually supplied as the monohydrate.

Chemical abstracts name: Benzyldimethyl (2- 2-(p-1,1,3,3-tetramethyl butylphenoxy) ethoxy ethyl) ammonium chloride

Formula, structural:

\[
\text{CH}_3 \quad \text{CH}_3 \quad \text{CH}_3 \quad \text{CH}_2 \quad \text{OCH}_2 \quad \text{OCH}_2 \quad \text{OCH}_2 \quad \text{OCH}_2 \quad \text{OCH}_2 \quad \text{N} \quad (\text{CH}_3)_2 \quad \text{CH}_2 \quad \text{C} \quad \text{H}_5 \quad \text{Cl}
\]


Analytical Methods: See Benzalkonium chloride.

Toxicity: (Rohm and Haas Company Bulletin)
LD₅₀  Mice orally  500 mg/kg  
Mice subcutaneous 310 mg/kg  
Rats orally  765 mg/kg  
Rats subcutaneous 1040 mg/kg  
LD₁₀₀ Guinea pigs intraperitoneal 40 mg/kg  
Rabbits intravenous 17.5 mg/kg  
Dogs intravenous 37.5 mg/kg  

Mice and guinea pigs tolerated 1:1000 dilution in drinking water for 3 weeks with no apparent effects.

Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.

Uses: Antiseptic, disinfectant, sanitizer, bacteriostat, algaeicide, deodorant. Commonly recommended as a germicidal rinse for previously cleaned surfaces at dilutions up to 1:4000 as a sanitizer for poultry drinking water at dilutions up to 1:10,000. Extensively employed in detergent sanitizer formulations along with organic non-ionic detergents, inorganic salts, and various sequestering agents distributed for cleaning machines and other dairy equipment. Widely used to treat laundry to impart bacteriostatic properties, especially diapers in baby service laundries. Authorities differ as to maximum safe use-dilutions for sanitizing and disinfecting.

Trade Name: CEEPYN  
Chemical Name: Cetyl pyridinium chloride or Hexadecyl pyridinium chloride.
Formula, structural: $\text{C}_{16} \text{H}_{33} \text{N}_5 \text{C}_{5} \text{H}_{5} \text{Cl}$

Properties: White powder MP 77-83°C. Soluble in water, alcohol, chloroform.
Analytical Methods: See Benzalkonium chloride.

LD₅₀ Rabbits orally  400 - 500 mg/kg  
LD₅₀ Rabbits intravenous  35 mg/kg  

Chronic: 100 mg/kg daily tolerated in oral administration for 6 weeks with no gross pathological disturbances.

Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.

Uses: Antiseptic, germicide. 
Recommended primarily as an antiseptic for body use in aqueous solution and tinctures at 1-1000; also for the disinfection of previously cleaned instruments at the same dilution as well as the sterile storage of heat sterilized instruments.

Trade Name: CETAB, BROMAL, CETAVLON, CEE DEE  
Chemical Name: Cetyl trimethyl ammonium bromide or Hexadecyl trimethyl ammonium bromide.
Formula, structural: $\text{C}_{16} \text{H}_{33} \text{N}_5 (\text{CH}_3)_3 \text{Br}$
Properties: White crystalline salt, solubility in water 0.5% at 20°C, soluble in alcohol and chloroform, slightly soluble in acetone.

Analytical Methods: See Benzalkonium chloride.

Toxicity: Wm. S. Merrell Co., (private communication)

<table>
<thead>
<tr>
<th>LD₅₀</th>
<th>Guinea</th>
<th>subcutaneous</th>
<th>100-125 mg/kg</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LD₅₀</td>
<td>Rabbit</td>
<td>subcutaneous</td>
<td>125 mg/kg</td>
<td></td>
</tr>
<tr>
<td>LD₅₀</td>
<td>Rabbit</td>
<td>intraperitoneal</td>
<td>125 mg/kg</td>
<td></td>
</tr>
</tbody>
</table>

Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.

Uses: Antiseptic, germicide.

Recommended for use in antiseptic pectin paste, and carbowax ointments at a 1.0% level. Employed with other quaternary ammonium salts in formulations offered for the disinfection of previously cleaned surfaces.

Trade Names: CETYLCLIDE, ETHYL CETAB

Chemical Name: Cetyl dimethyl ethyl ammonium bromide

Formula, structural:

\[ \text{C}_{16}\text{H}_{33}\text{N(CH}_3\text{)}_2\text{CH}_2\text{CH}_3\text{Br} \]

Analytical Methods: See Benzalkonium chloride.


<table>
<thead>
<tr>
<th>LD₅₀</th>
<th>Guinea rats</th>
<th>orally</th>
<th>500 mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD₅₀</td>
<td>Guinea pigs</td>
<td>orally</td>
<td>158 mg/kg</td>
</tr>
<tr>
<td>LD₁₀₀</td>
<td>Guinea rats</td>
<td>orally</td>
<td>795 mg/kg</td>
</tr>
<tr>
<td>LD₁₀₀</td>
<td>Guinea pigs</td>
<td>orally</td>
<td>316 mg/kg</td>
</tr>
</tbody>
</table>

Chronic: Guinea pigs were fed 25 mg/kg via tube daily for one year without gross pathological symptoms.

Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.

Uses: Antiseptic, germicide, sanitizer, and deodorant.

Chemical Name: Dialkyl dimethyl ammonium chloride. Alkyl groups derived from secondary coconut amines.

Formula, structural:

\[ (\text{C}_n\text{H}_{2n+1})_2\text{N(CH}_3\text{)}_2\text{Cl} \]

Properties: Soluble in organic solvents, isopropanol-water mixture.

Analytical Methods: See Benzalkonium chloride.

Toxicity: Varies widely depending on the alkyl groups. In general, 2.0% solutions or less are non-irritating to the skin. Solutions of 10% and above are irritating to the eyes.

Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.

Uses: Industrial germicide sanitizer, emulsifier, deodorant.
Chemical Name: Dilauryl dimethyl ammonium bromide.
Formula, structural:
$$\text{C}_{12} \text{H}_{25} \text{N} (\text{CH}_3)_2 \text{Cl}$$

Properties: Soluble in oils.
Analytical Methods: See Benzalkonium chloride.
Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.
Uses: Moth-proofing, preserving oils, use in emulsion germicides.

Trade Name: EMCOL 888
Chemical Name: Alkyl naphthyl methyl pyridinium chloride.
Alkyl C_{6}H_{13} - C_{12}H_{25}
Formula, structural:
$$\text{C}_n \text{H}_{2n+1} \text{Cl}$$

Analytical Methods: See Benzalkonium chloride.
Toxicity: Reported to have a LD_{50}, intraperitoneal, for rats: less than 15 mg/kg.
Caution: See Benzalkonium chloride for a general pattern of precautionary labeling.
Uses: Antiseptic, germicide, sanitizer.
Recommended for disinfection of previously cleaned surfaces at dilutions up to 1:5000.

Trade Name: EMULSEPT E607 SPECIAL (Emulsol Corp.)
STERILEX (Pittsburgh Chem. Laboratories)
Chemical Name: N-(Lauroyl ester of colaminio formyl methyl) pyridinium chloride or 1-(Lauroyl ester of colaminio formyl methyl) pyridinium chloride.
General Type Name: N-(acyl ester of colaminio formyl methyl) pyridinium chloride.
Formula, structural:
$$\text{CH}_3 (\text{CH}_2)_{10} \text{COOCH}_2 \text{CH}_2 \text{NHCOCH}_2 \text{N} \text{C}_5 \text{H}_5 \text{Cl}$$

Properties: Surface Tension 25°C
1:10 35.7 dynes/cm
1:100 37.1
1:1000 37.1
1:10000 51.5
Water 72.75

Formulations: 10% aqueous solution.
Analytical Methods: See Benzalkonium chloride.
Toxicity: Emulsol Corporation (Technical Bulletin)
Tolerated single doses:
Mice subcutaneous 200 mg/kg
Rats intraperitoneal 100 mg/kg
Rabbits " 125 mg/kg

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Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.

Uses: Sanitizer-detergent, germicide, antiseptic and deodorant. Commonly recommended as a germicidal detergent for washing hands and other body surfaces. Also, as a sanitizing rinse and a germicidal rinse for previously cleaned inanimate objects. Authorities differ as to the effective concentrations for these uses, but the manufacturers recommendations call for use at concentrations ranging from 1 to 4 percent as a sanitizing-detergent for hands, at a dilution of 1-2500 as a sanitizing detergent for inanimate objects, and at dilutions up to 1-5000 as a germicidal rinse for previously cleaned surfaces.

Trade Names: HYAMINE 2389, MULTISEPT, WINROC
Chemical Name: Alkyl \((C_{9}H_{19}-C_{15}H_{31})\) tolyl methyl trimethyl ammonium chloride. Molecular weight (average) 331. Methyl dodecyl benzyl trimethyl ammonium chloride. Methyl alkyl \((C_{12}H_{25}-C_{15}H_{31})\) benzyl trimethyl ammonium chloride.

Formula, structural: 
\[
\text{C}_n\text{H}_{2n} \neq \text{C}_6\text{H}_3 (\text{CH}_3) \text{CH}_2 \text{N} (\text{CH}_3)_3 \text{Cl}
\]

Properties: Viscous amber-colored liquid.

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Surface Tension (dynes/cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>30.2</td>
</tr>
<tr>
<td>0.1%</td>
<td>32.2</td>
</tr>
<tr>
<td>0.01%</td>
<td>42.8</td>
</tr>
<tr>
<td>0.001%</td>
<td>60.1</td>
</tr>
<tr>
<td>Water</td>
<td>72</td>
</tr>
</tbody>
</table>

Available as a 50% aqueous solution.

Analytical Methods: See Benzalkonium chloride.

Toxicity: (Rohm & Haas)

<table>
<thead>
<tr>
<th>LD(_{50})</th>
<th>Oral Use</th>
<th>White Rats</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD(_{50})</td>
<td>Intraperitoneal Use</td>
<td>White Rats</td>
</tr>
<tr>
<td>LD(_{50})</td>
<td>Intravenously Use</td>
<td>White Rats</td>
</tr>
</tbody>
</table>

Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.

Uses: Disinfectant, sanitizer, algicide, deodorant. Authorities differ on the maximum safe use-dilution for disinfecting. Recommended for use as a disinfectant for previously cleaned surfaces at dilutions up to 1-5000, especially in restaurants, dairies, and food plants. Employed as an algicide in water cooling systems and swimming pools and in the formulation of detergent-sanitizers. Sprays at a dilution of 1-1000 reported to be effective deodorants.

Trade Name: ISOTHAN Q-15
Chemical Name: Lauryl isoquinolinium bromide

Formula, structural: 
\[
\text{C}_9\text{H}_7 \text{N} \neq \text{C}_{12}\text{H}_{25} \text{Br}
\]

Analytical Methods: See Benzalkonium chloride.

LD50 Rats orally 230 mg/kg
LD50 Guinea pigs orally 200 mg/kg
LD100 Rats orally 504 mg/kg
LD100 Guinea pigs orally 400 mg/kg

Chronic: Fed at 25 mg/kg daily, white rats (fed 2 years) and guinea pigs (fed 1 year) with no gross pathological symptoms over controls.

Caution: See Benzalkonium chloride for a general pattern of precautionary labeling.

Uses: Agricultural fungicide recommended for control and prevention of apple scab at a dilution of 1-40,000. Available in 20% aqueous solution.

Trade Name: KLENEG, SANEG

Chemical Name: Trimethyl-9-octadecenyl ammonium chloride.
Trimethyl-9,11-octadecadienyl ammonium chloride

Formulas,结构: 

\[
\begin{align*}
\text{CH}_3 (\text{CH}_2)_5 \text{CH} &= \text{CH CH} = \text{CH (DH}_2)_7 \text{N (CH}_3)_3 \text{Cl} \\
9, 11-octadecadienyl \\
\text{CH}_3 (\text{CH}_2)_5 \text{CH}_2 \text{CH}_2 \text{CH} &= \text{CH (CH}_2)_7 \text{N (CH}_3)_3 \text{Cl} \\
9-octadecenyl
\end{align*}
\]

Analytical Methods: See Benzalkonium chloride.

Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.

Uses: Recommended in aqueous solution as a germicidal rinse for shell eggs, egg breaking and poultry packing equipment after cleaning and in formulations with inorganic salts and nonionic detergents as a sanitizing detergent. Solutions containing 250 ppm of these salts are specified for disinfecting previously cleaned surfaces. The detergent sanitizers are recommended specifically for washing dirty eggs.

Formulation: A 25% aqueous concentrate.

Common Name: METHYL BENZETHIONIUM CHLORIDE
Trade Name: Hyamine 10X, Diaparene chloride

Chemical Name: Paradiisobutylcresoxyethoxyethyl dimethyl benzyl ammonium chloride, or Paratertiary octyl cresol (2-[2-(p-1,1,3,3-tetramethyl butyltoloxy) ethoxy]ethyl) ammonium chloride.

Usually supplied as a monohydrate.

Formula (Structural): 

\[
\begin{align*}
\text{CH}_3 \text{CH} &\text{CH}_3 \\
\text{CH}_3 \text{C CH}_2 \text{C} &\text{H}_3 \text{OCH}_2 \text{CH}_2 \text{OCH}_2 \text{CH}_2 \text{N(CH}_3)_2 \text{CH}_2 \text{C} &\text{H}_5 \text{Cl}
\end{align*}
\]
Properties: White crystals, soluble in water, alcohol, chloroform.
Analytical Methods: See Benzalkonium chloride.
Toxicity:
Acute:
\[ \text{LD}_{50} \text{ Rats orally} \quad 800 \text{ mg/kg} \]
\[ \text{LD}_{50} \text{ Mice orally} \quad 750 \text{ mg/kg} \]
0.1% aqueous solutions reported as non-irritating to cornea but 0.13% solutions as irritating.
Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.
Uses: See Benzalkonium chloride.

Trade Name: NOPCO DBC
Chemical Name: Dodecylacetamido dimethyl benzyl ammonium chloride.
Formula, Structural:
\[ \text{C}_{12}\text{H}_{25}\text{NHCOC}_{2}\text{H}_{2}\text{C}_{6}\text{H}_{5} \text{ Cl} \]

Analytical Methods: See Benzalkonium chloride.
Toxicity: (Nopco Chemical Company)
\[ \text{LD}_{50} \text{ Animal not specified orally} \quad 2000 \text{ mg/kg} \]
\[ \text{LD}_{50} \text{ " subcutaneous} \quad 2500 \text{ mg/kg} \]
\[ \text{LD}_{50} \text{ " intraperitoneal} \quad 250 \text{ mg/kg} \]
Caution: See Benzalkonium chloride for a general pattern of precautionary labeling.
Uses: Disinfection of previously cleaned surfaces at dilutions up to 1-5000.

Trade Name: UROLOCIDE
Chemical Name: Benzyl (dodecyl carbamylmethyl) dimethyl ammonium chloride.
Formula, structural:
\[ \text{C}_{6}\text{H}_{5}\text{CH}_{2}\text{NCH}_{2}\text{CONHC}_{12}\text{H}_{25} \text{ Cl} \]

Analytical Methods: See Benzalkonium chloride.
Toxicity:
\[ \text{LD}_{50} \text{ for rats orally} \quad 1000 \text{ mg/kg} \]
\[ \text{LD}_{50} \text{ for rats orally} \quad 500 \text{ mg/kg} \]
5% solution reported non-irritating to human skin in patch test.
Properties: Colorless, odorless, bitter crystalline material M.P. 147 - 148°, pH 5.5 in 1% solution soluble in water and alcohol; insoluble in ether, acetone and benzene. Surface tension of 0.1% aqueous solution 37.0 dynes/cm at 25° C.
Caution: See Benzalkonium chloride for a general pattern of appropriate precautionary labeling.
Uses: Antiseptic, disinfectant. Recommended for use primarily in cold disinfection of clinical and surgical instruments which do not stand heat sterilization at a dilution of 1-1000.

Common Name: RED SQUILL OR SIMPLY "SQUILL"
Definition: Dark red powder, formed by grining scales Uriginea maritima.
Chemical & Physical Properties: Ground material, hygroscopic, becomes lumpy when exposed to moisture.
   Stability - Usually stable, occasionally Color - dark red loses toxicity in few mos.
   Solubility - Hygroscopic, becoming lumpy. Keep in metal or glass containers.
Analytical Methods: No chemical method. Bioassay using male rats.
Toxicity, Oral to Mammals: Varies from 200 to 3,000 mg/kg. Expressed as LD 50 for male, This concentration will probably kill most, or all, females.
   Symptoms: Rats become lethargic, after 4-1/4 hrs. exhibit tremors and paralysis of hind legs, then progressive paralysis trunk and fore legs. Any stimulus starts convulsive fits of rolling. Respiration labored and rate increased.
First Aid: Use stomach siphon, tannin, demulcents, opiates, stimulants.
Antidote: Contains emetic principle which prevents retention by animals other than rats.
Skin Absorption and other: Scales and juice irritating to skin.

Uses (types of pests): As a rat poison.
Formulations (and compatibility): Usually mixed as a 10% bait with cereal products or meat. Cats and dogs usually refuse 10% baits. Chickens and pigeons will not eat enough to affect them seriously.

Common Name: ROTENONE
Chemical Name: Rotenone (active ingredient of Derris Barbasco and certain other roots).
Empirical Formula: C_{21}H_{22}O_6  Mol. wt. 394.41
Definition: Hexagonal plates or needles.
Chemical & Physical Properties:
   Melting point - 163°C. Odorless
   Color - white crystals
   Solubility - insoluble in water, soluble in alcohol 0.20
   gm/100 mL.; 0.4 either, 8.5 benzene; 0.6 CCl_4; and 7.34 chloroform.
Analytical Methods: A.O.A.C. 7th Ed. 5.106.
Toxicity, Oral to Mammals: Practically none except that due to solvent or diluent.
   Acute: Mean lethal dose 50 to 1500 mg/kg to warm blooded animals.
   Chronic: Lowest level in food with gross effects upon rats 50 ppm.
   Symptoms: Respiration impaired following ingestion of large
amounts.
Skin Absorption and other: Poorly absorbed.
Hazards to Wildlife: Emulsions toxic to fish.
Use Precautions: Avoid ingestion of appreciable amounts.
Residues:
Levels: Little residue hazard on foods in most formulation.
Removal Methods: Washing.
Uses (types of pests): Insects that attack garden crops, flowers and for livestock pests such as lice, fleas and grubs.
Formulations (and compatibility): 0.5% to 1.0% dusts or equivalent in sprays for garden crops. Often mixed with Pyrethrins, DDT or fungicides. Compatible but avoid lime.
Application: Dusts and powders for cattle grubs and lice.
Directions, rate and number: Cattle grubs spray 7 1/2 lbs. 5% rotenone in 10 gal. water.
Precautions:
- Man, animals, plants: Avoid breathing any insecticidal dusts. Cover fish bowls.

Common Name: SABADILLA
Chemical Name: of active ingredients - Cevadine and veratri-dine (complex alkaloids)
Definition: Active ingredients are 0.3 to 0.5% alkaloids.
Toxicity, Oral to Mammals:
Acute: Low order. (Purified cevadine is approximately 10 times as toxic as DDT to housefly.)
Chronic: Exposure to excessive quantities over long periods has not caused any ill effects in laboratory animals.
Use Precautions: Cause sneezing - respirator recommended for application or prolonged mixing operations to avoid discomfort.
Formulations (and compatibility): Dusts containing 5 to 10% sabadilla seeds, often combined with sulfur or fungicides. Seeds are heat or alkali treated to increase insecticidal properties.

Common Name: SCHRADAN
Chemical Name: Octamethylpyrophosphoramide
Empirical Formula: C₈H₂₈N₄O₂P₂
Definition: Colorless liquid; phosphorus content 21.65%.
Chemical & Physical Properties:
Molecular weight - 286
Boiling point - 135-137° at 1.0 mm. Colorless.
Non-flammable
Density - 1.109 at 25°/4°C. Corrosive action - non corrosive on metals.
Refractive Index - n D 1.4612
Hydrolysis rate - Rapid in strong acid solution and very slow in neutral and alkaline solutions.
Solubility - In water completely miscible. Soluble in ethanol, acetone, chloroform, benzene and others. Insol. heptane, pet. ether.
Stability - Fairly stable in water, less in alkalies,
decomposed by acids.


Toxicity: Oral to Mammals:
Acute: 1% aq. soln LD50 oral to albino rats @ 8-10 mg/kg. rabbits @ 25 mg/kg. Dermally 10% soln. not fatal at 10-50 mg/kg.
Chronic: Ingestion. Hematological studies show normal at dietary levels of 5., 10, and 25. ppm.
First Aid: Call a physician. Induce vomiting. Eyes-flush excessively with water. Skin-remove clothes and shower, with soap.
Uses (types of pests): Aphids, mealybugs, scale insects, spider mites and white flies.
Formulations: Compatible with most pesticides.
Applications:
Precautions (food): Prevent food contamination.
Equipment-cleaning, disposal: Containers should not be used for any other product.
Phytotoxicity: At over 4 lb./A injury has been noted on some crops.

Common Name: SODIUM ARSENATE
Chemical Name: Sodium Arsenate (Monacid Ortho)
Empirical Formula: Na₂HA₃O₃
Definition: Shall contain at least 41% arsenic, expressed as metallic, equivalent to 55% arsenic trioxide.
Analytical Methods: Arsenic AOAC Method #6.3 or #6.6, 7th Edition AOAC Methods.
Toxicity, Oral to Mammals:
Antidote: Give a tbsp. of salt in a glass of warm water and repeat until vomit fluid is clear. Then two tbsp. of epsom salt or milk of magnesia in water and force fluids. Have patient lie down and keep warm. Call a physician.
Use Precautions: Avoid excessive skin contact and wash off thoroughly after exposure. If on clothing, remove them and wash. Avoid inhalation of dust or spray mist. Keep away from children, domestic animals, and food-stuffs.
Rating: Over 5% - Requires word "Poison" etc.
Less 5% - "Poison" if taken internally.
Uses: Insecticide - Herbicide - Rodenticide.

Common Name: SODIUM ARSENATE
Chemical Name: Sodium Arsenate (Meta).
Empirical Formula: Na₃A₅O₇ (sodium meta-arsenate).
Definition: Shall contain at least 50% arsenic, expressed as metallic, equivalent to 66% arsenic trioxide.
Analytical Methods: Arsenic #6.3 or #6.6, 7th Edition A.O.A. C. Methods.
Toxicity, Oral to Mammals:
Antidotes: Give a tbsp. of salt in a glass of warm water and repeat until vomit fluid is clear. Then two tbsp. of epsom salt or milk of magnesia in water and force fluids. Have patient lie down and keep warm. Call a physician.
Use Precautions: Avoid excessive skin contact and wash off thoroughly after exposure. If on clothing, remove them and wash. Avoid inhalation of dust or spray mist. Keep away from children, domestic animals and foodstuffs.

Rating:
Over 5% - Requires word "Poison" etc.
Less 5% - "Poison if taken internally".

Uses: Insecticides - Herbicide - Rodenticide.

Common Name: SODIUM ARSENITE
Chemical Name: Sodium meta-arsenite
Empirical Formula: Na₂HAsO₃
Chemical & Physical Properties: Grayish-white powder, absorbs carbon dioxide from the air. Generally sold as solution with 4 lbs. equivalent As 203/gal.
Density - 1.87

Analytical Methods: A.O.A.C.
Toxicity, Oral to Mammals:
Acute: LD - 10 to 50 mg/kg
Symptoms: Same as with other arsenicals. Pains in abdomen, nausea, headache, itching, followed by lethargy, vomiting, dysentery, loss of weight and appetite. Sores and cuts fail to heal when exposed and remain irritated.
Antidote: Emetic. Warm salt water until vomit is clear followed by olive oil or epsom salts. Keep quiet. Call a physician.
Skin Absorption and others: Slight. Wash with mild soap and water. Keep out of cuts and open sores.
Use Precautions: Use approved dust mask. Do not leave on the skin or in eyes. Wash thoroughly with mild soap and water.

Residues:
Removal Methods: Wash with soap and water.
Uses (types of pests): In solution with bait for certain ants, termites, rodents and as a weed killer, and soil sterilizer.
Formulations (and compatibility): Maximum 3% solution in sugar or honey for ants. 3% solution on baits for rodents. In water solution as a contact weed killer and soil sterilizer.
Applications: For ants and rodents, place baited solution on trails. For weed killer, spray directly on plants and wet thoroughly all areas to be cleared. Weeds killed by contact only. Keep all animals away from treated areas for at least three months in dry weather or at least four heavy rains.
Shipping & Storage Directions: I.C.C. Regulations for Class B Poison.

Common Name: COMPOUND 1080
Chemical Name: Sodium Fluoroacetate, sodium monofluoroacetate
Empirical Formula: NaOOCCH₂F
Mol. wt. 100.033
Definition: Commercial material commonly colored with 0.5% pure nigrosine dye. Fluffy powder.
Melting point - decomposes at 200°C. Taste - mild, salty, sour
Stability - should not be heated over 110° in preparing bait. Odor - none
Solubility - Very sol. in water; Corrosive Action - none
picks up moisture when exposed to air; relatively insol. in organic solvents or in animal and veg. fats and oils
Analytical Methods: QM USA method based on Parr bomb fusion and ppt ion as lead chloro-fluoride. Cal. Dept. Ag. use Willard & Winter distillation of ash and AOAC method for spray residue on distillate. F.D.A. method Clifford et al.
Toxicity, Oral to Mammals: (Wildlife Research Lab., Denver, Colo.).
Acute: Rats lethal dose range from 1.0 to 4.0 mg/kg.
Dog, one of most sensitive, succumb to 0.1 mg/kg. Birds tested were more resistant but succumbed to 5-10 mg/kg.
Estimated lethal dose for humans 2 mg/kg. or less. No cumulative effects shown on rats.
Antidote: There is no certain antidote. Action is on myocardium and central nervous system. Glycerol mono-acetate has shown some promise.
First Aid: Patient should be kept quiet as possible. Vomiting should be induced, followed by dose of Epsom salts, or other cathartic as a purge. Call a physician immediately. Barbiturates for control of convulsions. I.V. if necessary. Electrocardiogram should be watched. If ventricular fibrillation occurs intracardiac injection of 5 cc. of 1% sol. procaine HCl may be tried to prevent death. Symptoms usually subside in 10-24 hrs. but if any heart signs bed rest for 3 days.
Skin Absorption and other: May be absorbed through unbroken skin.
Use Precautions: Available only to qualified users. May be absorbed through skin. Inhalation of powder dangerous. Danger of contam. drinking water. Uneaten bait and dead rodents should be destroyed. Should never be allowed to contaminate plants that might be eaten by domestic animals.
Residues: Not applied to food. Food contamination should be avoided completely.
Uses (Types of pests): Rodenticide for control of rats and mice in and around structures by experts. Some official use by federal and state agencies in control of field and predatory rodents.
Formulations (and compatibility): Commonly marketed in compound cont. 90% or more of sod. fluoroacetate, colored black. Poison baits by mixing 1 oz. with 28 pounds food - or by poisoning drinking water, 1/2 oz. in 1 gal. in small containers indoors. In field rodent control - 1 oz. 1080 in 50 or 100 lbs. grain, depending on feed habits of rodents to be controlled.
Precautions (foods): Material should be kept under lock and key to avoid accidental contamination of foods and feeds.
(Equipment): All containers and utensils should be kept segregated to avoid accidental contamination of foods and feeds.
Storage & Shipping Directions: Should be kept locked in
custody of trained persons. Some states have regulations restricting possession and use. Manufacturer has a statement and agreement of purchase to restrict sales.

Common Name: SODIUM FLUORIDE
Chemical Name: Sodium fluoride
Empirical Formula: NaF  Mol. wt. 42
Definition: Crystals or white powder min. 95-96% NaF.
Chemical & Physical Properties:
- Melting point: 992°C
- Boiling point: 1700°C
- Density: 2.79
- Odorless
- White commercial product
- Colored blue by law
- Corrosive action - Aqueous sol. if acid corrodes glass

Solubility: 4.22/100 mg at 18°C. Soluble in HF, and very slightly in alcohol.
Analytical Methods: Commercial formulations-A.O.A.C. 5. 17
Toxicity, Oral to Mammals:
- Acute: Lethal dose for man 75-150 mg/kg.
- Chronic: Possible dental fluorosis.
Antidote: Call physician immediately. Drink large volumes of lime water or weak sol. of CaCl₂. Strong coffee & aromatic ammonia as stimulant. Artificial respiration. Keep warm. Give digitalis hypo & 10 gr. calcium gluconate I.V.
Use Precautions: May be fatal if swallowed. Avoid breathing dust. Keep away from children and domestic animals.
Uses (types of pests): Control of roaches, silver fish & ants; sol. as wood preservatives. Dust form for biting lice on poultry and cattle.
Formulations (and compatibility): Insect dusting powders; poison baits; "crayons" of wet NaF; solutions (3%). Required to be colored to avoid mistaking for foods. Not generally used in combination with other insecticides.
Precautions: Avoid contamination of food or feed.
Phytotoxicity: Too dangerous to use on foliage, liable to injure plant life.
Storage & Shipping Directions: Store away from food and feed.

Common Name: SODIUM FLUOSILICATE
Chemical Name: Sodium fluosilicate, sodium silicofluoride
Empirical Formula: Na₂SiF₆  Mol. wt. 188.05
Standard: White granular amorphous powder.
Chemical & Physical Properties:
- Melting point - Decomposes before melting at red heat.
- Solubility - 1 part in 150 parts cold water, 1 part in 40 parts boiling water.
Analytical Methods: Commercial formulations, A.O.A.C. #5.17
Toxicity, Oral to Mammals:
Acute: Lethal dose for rabbits, 150-200 mg/kg.; goats 136-143 mg/kg.
Symptoms: Salivation, gastroenteritis, organs congested, epithelium destroyed. Fall of blood pressure, urine retention, convulsions, heart & resp. stopped.
First Aid and Antidote: Call physician immediately. Drink large vol. lime water or weak sol. of calcium chloride. Use strong coffee or aromatic ammonia as stimulant. Keep patient warm; artificial respiration. Digitalis by hypo and 10 gr. of calcium gluconate I.V.
Use Precautions: Harmful if swallowed; avoid prolonged breathing of dust or spray mist. Keep away from children and domestic animals.
Uses (types of pests): Dusts used against cucumber beetle, flea beetle, blister beetle, tobacco horn worm, bean beetle. Poison bran 1:10 against grasshopper and cut worm.
Formulations (and compatibility): Dusts in 1:2 form diluted with inert; poison bran bait, 3% sol. used as spray or dips against clothes moths. Required to be colored to avoid mistaking for food. Not compatible with lead or calcium arsenate, Bordeaux mixture, lime sulfur and lime in smaller ratios than 1:9.
Applications:
Precautions (food): Avoid contamination of food and feed. Phytotoxicity: Most fluosilicates liable to injure plant life but under some conditions can be used in dry form. Accumulation in soil: No deleterious effects in soil from amounts used and no cumulative effect from continued use.

Common Name: STRYCHNINE, ALKALOID
Chemical Name: Strychnine
Empirical Formula: \(C_{21}H_{22}O_2N_2\)  Mol. wt. 334.19
Definition: Rhombic crystals or powder, 99-% strychnine.
Chemical & Physical Properties:
- Melting point - on slow heating 268°C, Taste - bitter
  no decomp.  Odorless
- Boiling point - 270°C at 5 mm Hg  Color - white
  pressure
- Density - 1.359 cryst. from alcohol
- Solubility - 1 gm. in 6400 ml. cold water, 3100 boil. water
  150 alcohol, 35 boil. alc. 5 chloroform, 320 glycerine,
  180 benz. very sl. in ether.
Analytical Methods: J.A.O.A.C. 9 (1926)p; 224; A.O.A.C.
Official Meth. of Anal. 7th Ed. 1950, p. 572.
Toxicity, Oral to Mammals: Human lethal dose 30-60 mg authorities vary; tolerance only slightly developed, children tolerate better than adults. Rats lethal dose 1-30 mg/kg; rabbits 4.24 mg/kg.
Symptoms: May appear in 10-15 min. or be delayed for an hr. or longer. Tightness in chest, violent spasm, weak & rapid pulse. Convulsive pattern followed by depression, sequence followed several times before death from respiratory paralysis.
Antidote and First Aid: Some recommend emetics, others
not. KMnO₄ has been recommended, also charcoal, tannic acid. Sedative are important, barbiturates, nembutal or sodium amytal, chloral hydrate, orally or KBr by rectum or inhalation of ether or chloroform.

Skin Absorption and other: Some inhalation absorption a hazard to processors from concentrated powders. Use Precautions: Potent poison and should be handled with all precautions to avoid swallowing or inhaling or permitting to contaminate food.

Uses (types of pests): Control of pocket gophers, mice, ground squirrels, prairie dogs, porcupines, rabbits, other predatory animals & birds. Rats avoid bait. Formulations (and compatibility): Strychnine alkaloid sold for prep. of poisoned baits. Prepared baits ready for use containing 0.2% to 0.8%. Not used with other pesticides.

Applications:

Precautions (food): Do not allow to contaminate any food or feed. Small amounts sometimes included in livestock or poultry "tonics".

Storage & Shipping Directions: Should be kept labeled and stored in a manner not to be mistaken for food or feed or to become mixed with it.

Common Name: STRYCHNINE SULFATE
Chemical Name: Strychnine sulfate
Empirical Formula: \((\text{C}_2\text{H}_{22}\text{O}_2\text{N}_2)\text{SO}_4\cdot\text{H}_2\text{O}\)  Mol. wt. 856.53

Chemical & Physical Properties: Effloresces and loses all water of cryst. at 100°C.
Melting point (anhydrous) 200°C with Taste - bitter decomp.
Solubility - 1 gm. dissolves in 35 ml. Corrosive action - cold water, 26 ml. alcohol at 60°C., pH of 1:100 sol.is 220 ml. chloroform, 6 ml. glycerine. 5.5
Insol. in ether.

Toxicity, Oral to Mammals: Toxicity is proportional to strychnine alkaloid percentage of the molecule, so is about 80% as toxic as alkaloid. See under strychnine alkaloid for LD and symptoms and all other headings.
Storage & Shipping Directions: "Protect from Light".

Common Name: SUCCINCHLORIMIDE
Chemical Name: Succinchlorimide
Empirical Formula: \(\text{C}_4\text{H}_6\text{O}_2\text{NCl}\)  Mol. wt. 133.34
Definition: White crystâls or powder containing 25-27% Cl

Chemical & Physical Properties:
Melting point - 148°C
Stability - Decomposed by light.
Solubility - Soluble in water, 1 gram in 50 ml. benzene, 150 ml. ethanol, slight in \((\text{C}_2\text{H}_5)\text{O})_2\text{O}, \text{CHCl}_3\) and \text{CCl}_4.

Toxicity, Oral to Mammals: Relatively non-toxic.
Acute: 92% rats died when 2.7 gm/kg were given to rats. Min. lethal dose I.V. for rats is 0.4 gm/kg.
Chronic: 0.2 gm/kg daily for a period gave no toxic symptoms or post mortem evidence. Same dose (rabbits) 20-29 days, loss of wt. & appetites are marked reduction in hemoglobin.

Uses (types of pests): Water decontaminant - kills Eberthella typhi, Shigella dysenteriae, Escherichia coli, Endamoeba hystolytica.
Application: For disinfecting water 12 mg/qt. sufficient for intestinal pathogenic bacteria and 60 mg/qt. for cysticidal action. Twenty mins. required for killing.

Storage & Shipping Directions: Preserve in tight, light-resistant containers.

Common Name: SULFOTEPP
Chemical Name: Tetraethyl dithiopyrophosphate
Empirical Formula: C₆H₂₀O₅P₂S₂
Definition: Yellow to colorless oil; phosphorus content 19.25%.

Chemical & Physical Properties:
- Molecular weight - 322.25
- Boiling point - 131-135°C. at 0.2 mm.
- Density - 1.196 at 25°C/4°C.
- Refractive index - nD 1.4753
- Hydrolysis rate - Very stable
- Insoluble in water. Soluble in ethanol, acetone, ether, carbon tetrachloride, benzene and others.

Toxicity, Oral to Mammals:
Acute: Very poisonous

Use Precautions: Great care. Failure to observe proper precautions may result in serious illness or death.

Uses (types of pests): Various greenhouse spider mites as aerosol. Not recommended for livestock, household or industrial premises.

Common Name: E-1059 Trade Name: Systox
Chemical Name: O,O-Diethyl-O-(2-Ethylmercapto-Ethyl)-Thiophosphate
Empirical Formula: C₁₉H₁₉O₃S₂P

Chemical and Physical Properties:
- Molecular Weight: 258
- Refractive Index: 20°/d
- Boiling point: 134°C.(2 mm.) 1.4875
- Vapor Pressure: 0.001 mm.@33°C. Color: Pale yellow to lt. brown
- Density: 20°/4° 1.1183
- Stability: Unstable to alkali. Corrosive Action: Little or Hydrolyzes in boiling water, none acid, or alkaline solutions.

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Solubility: Soluble in most organic solvents. Soluble in water only to approximately 0.01%.


Toxicity, Oral to Mammals: Approximate LD₅₀ 6-12 mg/kg (rats)

Acute: High toxicity through dermal absorption and inhalation.

Chronic: Chronic sub-lethal doses will continue to lower cholinesterase level. Normalcy returns upon removal of subject from further exposure.

Symptoms: Headache, dizziness, nausea, cramps, constriction of pupil of eye, tightness in chest, diarrhea, labor breathing, convulsions, coma following.

Antidote: Atropine in maximal tolerable doses, repeatedly if necessary. Oxygen helpful.

First Aid: Internal: Give a tbsp. of salt in a glass of warm water and repeat until vomit fluid is clear. Have patient lie down and keep quiet. Call physician at once.

External: Wash skin immediately with soap and warm water. Keep subject under close observation for several hours following any extensive exposure. Call physician upon evidence of symptoms.

To Physician: Compound exerts muscarine-like effect, i.e., stimulation of the parasympathetic nervous system. A parasympathetic depressant, such as atropine, is indicated to relieve symptoms. The administration of oxygen is helpful.

Skin Absorption and Others: Poisonous if swallowed, inhaled, or absorbed through skin. Highly toxic through the eye.

Use Precautions: Do not breath vapor or spray mist. Wear a dust or mist respirator of a type approved by the U.S. Dept. of Agriculture. Do not get on eyes, skin, or clothing. Do not take into the mouth. Protect eyes with goggles. Wear protective rubber clothing. Change clothing immediately if contaminated and launder before re-use.

Wash with soap and warm water before eating or smoking.

Residues: Generally reduced to less than 1 ppm. in 15-30 days at normal dosage treatments. Residues may persist longer in extremely waxy or oily materials or fruits having a waxy or oily skin.

Prevention Practices & Precautions: Do not harvest crop for 15-21 days following final application.

Removal Methods: None required since persistence is not a problem.

Uses (types of pests): Recommended generally for contact and systemic control of sucking insects, such as aphids and mites.

Formulations and Compatibility: Emulsifiable concentrate, 50% or less. Forms clear colloidal solutions in all proportions with water.

Compatible with: Lead Arsenate, Rotenone, Pyrethrum, Nicotine Sulfate, Summer Oils, Dormant Oils, DDT, Dieldrin, Benzene, Hexachloride, Chlordane, toxaphene, Quinanes, Fixed Coppers, Wettable Sulfur, Aldrin, Dithiocarbamates.

Doubtful Compatibility with: Zinc Arsenate, Calcium Arsenate, Paris Green, Cryolite, Organic Mercury Compounds.

Incompatible with: Bordeaux, Lime, Lime Sulfur.

Applications: Treatment of seedlings before transplanting,
or direct application to soil, for systemic control. Spray or dust application for contact, systemic, and fumigant control. Use at recommended dosages of approximately 0.5 oz. to 6.0 oz. active ingredient per acre.

Precautions (food): Keep away from feed or food products.

Equipment-Cleaning, Disposal: Wash with hot caustic soda solution and rinse several times. Never re-use drums, decontaminate, perforated, and discard. Burn bags.

Phytotoxicity: Little danger when used at recommended dosages.

Accumulation in Soil: Residue level usually drops rapidly in soil, falling to below 1 ppm. in 4-6 weeks.

Storage & Shipping Directions: Store in a well ventilated area. In case of spillage, decontaminate area with hot caustic soda solution and rinse several times. Mark with Poison label. Cannot be mailed. Limited quantities by Air Express. Ship via Railroad Express.

Common Name: TETRAETHYL PYROPHOSPHATE (TEPP)
Chemical Name: Tetraethyl pyrophosphate
Empirical Formula: \((\text{C}_2\text{H}_5\text{O})_2(\text{PO})_2\text{C}(\text{C}_2\text{H}_5\text{O})_2\)
Mol. wt. 290.16

Standard: Commercial product cont. 30-40% pure compound.

Chemical & Physical Properties: Liquid
- Boiling point 104-110°C, at 0.08 mm
- Odor - aromatic
- Density - at 25°C 1.1810
- Color - amber
- Stability - Hydrolysis, half life of 6.8 hrs. at 25°C at pH 7; 3.3 hrs. at 38°C.
- Corrosive to aluminum and in time to copper & brass, zinc & tin.
- Solubility - Completely miscible with water; soluble in most organic solvents except kerosene of low aromatic content. Very hygroscopic.


Toxicity, Oral to Mammals: Rapidly absorbed and has very high toxicity by oral, dermal & respiratory routes. Most acutely toxic insect, in use today LD/50 for rats 1.2-2.0 mg/kg; inhalation LD/50 0.8-1.0 mg/kg.

Chronic: Rapidly destroyed in body; not stored. Decomposition products of hydrolysis are relatively non-toxic.

Symptoms: Headache, dizziness, nausea, cramps, constriction of eye pupil, followed by tightness in chest, diarrhea, labored breathing, convulsions, coma follows.

First Aid: Induce vomiting if ingested; for contact remove contam. clothing wash skin with soap & warm water; keep patient warm. Call physician immediately.

Antidote: 1-2 mg atropine/hr. till fully atropinized, orally for mild, IV for severe cases. Oxygen & artificial respiration. Parenteral MgSO4 carefully.

Skin Absorption & other: Single skin absorption of 10 mg/kg estimated dangerous to man. Single drop in eye probably fatal. Flush with water immediately for at least 15 min.

Use Precautions: Wear protective equipment and approved mask or respirator. Avoid contact with skin or eyes. Wash thoroughly at end of job.
Residues: Level-Prevent food and feed contamination. Do not eat or smoke during use. Follow directions explicitly.

Prevention: None required due to rapid decomposition.

Uses (types of pests): Some aphids, spiders, mites, mealy bugs, leaf hoppers and thrips.

Formulations; incompatibilities: Aerosols 5% and 10% for use in hot houses only; dusts 0.66 -1%, 1-1.2%; sprays 10%, 16%, 20%, 35%, 40%. Incompatible with alkali or materials containing more than traces of water. Incompatible with calcium arsenate, Paris green, lime sulfur, lime and Bordeaux; questioned with lead arsenate, cryolite, rotenone, pyrethrum, nicotine, dinitro compounds, and dithiocarbamates.

Applications: Generally 35-50 lbs. 1% dust/acre; 1/2 to 3/4 pint 20% liquid/100 gal. or 1 lb. of 2% aerosol/100,000 cu.ft. or greenhouse. Other conc. necessary.

Equipment cleaning & disposal: Never store without thorough washing with water or better, water, detergent, and lime. Burn bags and decontaminated drums.

Phytotoxicity: Encountered only on certain varieties of tomato and chrysanthemum.

Accumulation in soil: None due to rapid decomposition.

Shipping & Storage: Class B poison label required. Not mailable; max. amount by railway express 55 gal. lacquer-lined drum, non-returnable, or same in 5-gal. drums. If spilled, bury sweepings & decontaminate area. Store in moisture-proof containers in cool, well-ventilated place. Never reuse drums for any other material.

Common Name: THALLIUM SULFATE
Chemical Name: Thallium sulfate
Empirical Formula: Tl₂SO₄ Mol. wt. 504.85

Definition: Dense powder or rhomboid prisms containing 99 plus % thallium sulfate.

Chemical & Physical Properties:
- Melting point - 632°C. Decomposes before boiling point.
- Odorless. Colorless
- Vapor tension - no appreciable
- Density - 6.77
- Solubility - 2.70 gms. dissolve in 100 gm. water at 0°C., 18.45 gm. in 100 g. water at 100°C. 4.87 gms. in 100 gms. water at 20°C.


Toxicity: Human, fatal dose less than 500 mg. Rat, lethal dose 25-31 mg/kg. Lethal doses for many kinds livestock have been determined. Sub-acute poisoning causes short period of gastrointestinal pains, vomiting, colic, diarrhea changing to constipation, inflammation of eyes, loss of hair.

Symptoms: Humans - pains in calves of legs and in peripheral nervous system, foul breath, abdominal pains, purple line along gum line. Loss of hair after two weeks. Rat & dog paralysis legs.

First Aid: Give 5 drops tincture of iodine in glass of
water - then tbsp. salt in glass of water till vomit fluid clear. Keep patient prone and warm. For physician: give KI or NaCl by stomach tube and gastric lavage.

Use Precautions: Avoid skin contacts and inhalation of dusts. Do not expose baits where useful animals can eat.

Uses (types of pests): In poisoned baits for control of ants, rats, mice and ground squirrels.

Formulations (and compatibility): Syrups and jellies containing thallous sulfate 0.5% or 1% for control of sweet-eating ants; grain baits containing 1.0% to 1.5% for control of ground squirrels and prairie dogs.

Application: Precautions (food) Baits are often brilliantly colored to avoid confusion of poisoned material with food or feed.

Accumulation in Soil: Toxic to soil; 30 lbs. will sterilize an acre inch of average soil. Customary use for ground squirrel control presents no signif. hazard to crops.

Storage & Shipping Directions: Containers should be adequately labeled at all times. Cal.Agr. Code prohibits sale or possession of thallium salts with certain exceptions. Permits sale of ant poison cont. not more than 1% thallium.

Common Name: ALIPHATIC THIOCYANATES MIXTURE (THANITE)
Chemical Name: (of chief ingredient) Isobornyl thiocyanatoacetate (82%).
Empirical Formula: C₁₀H₁₇COOCH₂SCN  Mol. wt. 253
Definition: Contains minimum of 82% of above ingredient and max. of 18% of other insecticidally active terpenes.

Chemical & Physical Properties:
   Vapor tension - 0.06 mm Hg. at 95°C.  Color - clear, amber
   Inflammability - flash point 180°F.  liquid
   Density - 1.102 at 15.6
   Solubility - Sol. in most organic solvents, oils and fats.
   Insol. in water and physiol. fluids.

Analytical Methods: Nitrogen by AOAC Methods when other N comps. not present. Method No. 2.24 using Hg or HgO (1950 Ed.): JAOAC May 1945, pp.363-71. Separation of above comp. from others Samuel 1950 AOAC meeting.

Toxicity, Oral to Mammals:
   Acute: LD₀ for single oral dose undiluted Thanite varies from 0.2 to 1.0 ml/kg.
   Chronic: White rats tolerated up to 0.6 ml/kg Thanite daily for 6 months feeding.
   Symptoms: Acute poisoning in animals produced lethargy, loss of appetite, ruffling of hair or coat and death from respiratory failure.
   Skin Absorption and other: Irritation and thickening of skin and ocular membranes recover without permanent damage. Disappears for most humans at 5% dilution in oil. No irritation by 5% Thanite in inert powder.
   Inhalation: 5% Thanite in kerosene 30 min. daily for 10 days exp. to heavy mist showed no bad effects to humans. Animals tolerated 8 hr. daily exposure for 6 months with only minor effects.
Use Precautions: Inhalation, skin absorption, and ingestion due to accidental application to food to be avoided.

Residues:
Levels: Volatile; no data concerning presence of compound in milk.
Uses (types of pests): Oil base livestock, and space type household sprays. Water base livestock sprays and water base lotions for control of human pediculosis.
Formulations: Up to 10% Thanite in oil and up to 5% in water base emulsions.

Common Name: THIRAM
Chemical Name: Tetramethyl thiuram disulfide.
Empirical Formula: \((\text{CH}_3)_2(\text{NCSS})_2\text{N}(\text{CH}_3)_2\)

Chemical & Physical Properties:
Melting point - 155-60°C. Odorless
Vapor tension - Negligible, de-
Density - 1.29 20/4 No corrosion, pink; Tersan, green
Color - white (Arasan comp.prod.flam. formulations are colored
Stability - Relatively stable to normal storage conditions;
Solubility - Essentially insoluble in water; slightly in alcohol & ether; soluble in chloroform and acetone.

Analytical Methods: May be analyzed by methods similar to those used for dithiocarbamates. (See Ferbam).
Toxicity, Oral to Mammals:
Acute: Rats dry powder MFD 350 mg/kg; rabbits LD50 200 mg/kg.
Chronic: FDA feeding rats diets with 0,250,500,1000 and 2000 ppm levels, some died at 1000 & 2000; 65 weeks on smaller levels, no sign. growth difference. No microscopic changes attrib. to thiuram at 500 ppm level.
Symptoms: No cases of acute poisoning encountered which could be studied.
First Aid: In cases of contact flush with plenty of water; for eyes get medical attention.
Skin Absorption and other: May cause irritation of nose, throat and skin.
Use Precautions: May be harmful if inhaled or swallowed.
Do not breathe dust, avoid contact. Do not handle with bare hands. Dry filter dust mask recommended. Label treated seed: "Use of this seed for food, feed or oil not recommended."

Residues: Used as seed disinfectant, no residue problem; all recommended foliage fungicide applications are no nonfood plants; therefore no residue data. No indications of translocation into edible portions of plants.
Uses (types of pests): Seed disinfectant, onions for smut, gladiolas for rot, seed borne and soil borne organisms affecting corn, legumes, etc.
Formulations: "Arasan" seed disinfectant for application as dry dust; contains 56% thiuram; "Arasan" SF Seed disinfectant for wet appl.-75% thiuram; "Tersan" 75 Fungicide for golf greens & lawns wettable powder for spray-75% thir.
Applications: Compatible with most Insect. & fungicides; less effective with Cu, Hg, or 1 to 8 oz./100 lb. seed Arasan or
1 to 2 lbs./100 gal. Arasan SF (lime).
Phytotoxicity: Low in toxicity to seeds and seedlings even lettuce seed at recommend. rate of 4 oz./100 pounds seed of Arasan or Arasan SF with no adverse effects.
Accumulation in soil: No observable injury to foliage or grasses or fruit or veg. crops. Apparent dissipation of compound by weathering in soil prevents hazard from soil build-up.
Storage & Shipping Directions: No precautions or regulations.

Common Name: TOXAPHENE
Chemical Name: Chlorinated Camphene
Empirical Formula: C10H10Cl8
Definition: Mixture of chlorinated terpenes containing 67-69% chlorine.

Chemical & Physical Properties: Waxy solid.
Melting point - 70-95°C. Taste - not determined
Vapor tension - non volatile Odor - mild chlorine-
Density - 1.66 gm/ml at 20°C. camphor
Stability - Dehydrophalogenation Color - amber
at high temp. Slowly evolves Corrosive action - at
HCl on heating. high temp.
Solubility - More sol. in aromatic than in aliphatic hydro-
carbons. Not sol. in 95% alcohol or in water. 38 lb/gal at
80°F. in acetone, benzene, carbon tetrachloride, ethylene
dichloride.

30, 64 & 319 (1947); Ibid:31, 73 & 368 (1948); 32, 81 (1935)
33, 73 (1950).
Toxicity, Oral to Mammals:
Acute: Rats 5% tox. in corn oil LD 100, 145 mg/kg, LD/0
73 mg/kg 1% in peanut oil LD 100, 75 mg/kg, LD 50 40 mg/kg
LD 0-25 mg/kg.
Chronic: 5% tox. in kerosene, 800 ppm. in diet for 6 mos.
no sig. change in wt., blood, mortality, or tissue patho-

Symptoms: Convulsions and death due to respiratory fail-
ure in rat, dog, mouse and rabbit.
Antidotes: Phenobarbital before onset of convulsions or
pentobarbital after. A full anesthetic dose is advanta-
geous.
First Aid: Stomach should be emptied at once by emetic.
Skin Absorption: Readily absorbed through skin. Can cause
toxic effect on nervous system by ingestion, inhalation or
absorption thru skin.
Hazards to Wildlife: Toxic to fish at 1 part in 200
million. Very little toxicity to honeybees.
Use Precautions: Avoid prolonged breathing of dust or
spray mist. Do not leave in eyes, on skin, or clothing.
Wash thoroughly.
Residues: Levels - Can be limited to 15 ppm (Bull.461,
Hercules Powder Co.)
Uses (types of pests): Field and forage crops, cotton, live-
stock, fruits, soil insects and certain vegetable pests.
Formulations: 10-20% dusts; 40% wettable powder; and dust,
solutions and emulsions: 4, 6, 8 lbs/gal. concentrates. Avoid alkaline conditions.

Application:
Directions: In general about 1 1/2 to 2 lbs. of technical per acre for most insect control.
Precautions (food): Avoid contamination of food or feeds. No information on absorption.
Equipment: Corrosion at high temp. Brass or copper best but can use iron, steel or stainless steel.
Phytotoxicity: None apparent at recommended levels but causes injury to cucurbits. Also may cause off color in cured tobacco in some cases.
Accumulation in Soil: Same.
Storage & Shipping Directions: Store dust concentrates in dry cool warehouses. Liquid concentrates should be in containers coated with resins to protect from iron contamination.

Common Name: 2,4-D
Chemical Name: 2,4-dichlorophenoxyacetic acid.
Empirical Formula: C₆H₃Cl₂OCH₂COOH
Definition: Shall cont. at least 98% 2,4-dichlorophenoxyacetic acid.
Toxicity, Oral to Mammals. Relatively harmless to animals & man as normally used.
Use Precautions: Avoid inhaling dust; contact with skin, eyes or clothing when using 20% or over.
Formulations (and compatibility): Marketed usually as sodium salt, amine liquid, ester including low volatile ester formulations or in conc. from 10% to 100%.
Application: Combinations with other herbicides.
Directions, rate and number: 1/2 to 2 lb. of acid per acre for selective weeding.
Precautions: Use separate sprayer whenever possible.
Equipment-cleaning: Thoroughly clean all spray equipment with 1% household ammonia left for 12-24 hrs.; with strong soap sol. or trisodium phosphate.
Phytotoxicity: Will kill many flowers, fruits & veg. & injure others inc. some grasses. Use coarse sprays, avoid drift to susceptible plants. Do not use planes.
Accumulation in Soil: Sprayed on ground it persists for from 2-3 weeks to 3-4 months depending on climatic conditions. Permanent soil contamination unlikely.
Storage & Shipping Directions: Do not store near fertilizers,
seeds, insecticides or fungicides.

Common Name:  WARFARIN (FORMERLY COMPOUND 42)
Chemical Name:  3-(alpha-acetonylbenzyl)-4-hydroxycoumarin
Empirical Formula:  C_{19}H_{16}O_{4}  Mol.wt. 308.32
Definition:  Crystalline solid, racemic mixture DL form.
Chemical & Physical Properties:
Melting point - 159-161°C.  Taste - aq.sol.bland salt-
Solubility - Enolic form sol. like
in acetone & dioxane; mod.sol,Odor - barely noticeable
in methanol,ethanol & 2-prop- Color - white
anol.rel.insol. in water,ben-
zene,cyclohexane & Skelly solvents.
Analytical Methods:  Ultraviolet absorption method applicable
only to mixtures with cereal grains at 0.025%; 0.5%; and
100% to conc.
Toxicity, Oral to Mammals:  Can kill any mammal by causing
hemorrhage if ingested at right level over period of days.
Rats killed by 1mg/kg daily for 4-5 days; cats by single
dose of 35 mg or less, or by daily doses of 3 mg/kg for 5
days.  Single lethal dose varies considerably.  One dog killed
by 3 mg/kg for 5 days; swine by 25 mg/kg or 1 mg/kg for 5
days.  Chicken relatively resistant.
Symptoms:  Animals, no pains or violent reactions, remain
quiet.  Autopsy shows hemorrhage, hematomas, internal organs
pale from oxygen lack.
Antidote:  Give tbsp. salt in glass warm water, repeat till
vomit fluid clear. and Physicians, blood transfusions with
I.V. injections & oral doses of Vit. K are indicated as in
hemorrhage due to overdose of Dicumarol.
Skin Absorption and others:  No known hazard.
Hazard to "Wildlife:  Same as for mammals.  Fowl relatively
resistant.
Use Precautions:  Baits should be exposed only in protected
bait stations which prevent access to larger animals.  Keep
adequately labeled.  Protective dyes have been used in baits.
Residues:
Levels:  Not applied to foods except as baits.
Uses (types of pests):  Control of Norway & roof rats and
house mice; repeated acceptance not usual by other similar
pests.
Formulations (and compatibility):  Ready to use bait cont.
0.025% warfarin; concentrate containing 0.5% in cornstarch to
be mixed with 19 parts of cornmeal, etc. to give 0.025%.  Not
used with any other pesticide or with foods as baits cont.
much Vit. K.
Storage & Shipping Directions:  Keep containers adequately
labeled & stored where cannot be mistaken for foods or feeds
& where children, pets or livestock do not have access.  Post-
al Reg. can be shipped in cartons cont. max. of 12 1-lb.
containers of bait or 8 oz. of concentrate.
Common Name: ZINC ARSENATE (BASIC)
Chemical Name: Zinc Arsenate
Empirical Formula: Zn₃(AsO₄)₂
Definition: Shall contain not less than 30% arsenic, as metallic, not more than 0.75% arsenic in water-soluble form, and the percentage of zinc shall be expressed in terms of metallic zinc.
Toxicity, Oral to Mammals:
Antidote: Give a tbsp. of salt in a glass of warm water and repeat until vomit fluid is clear. Then two tbsp. of epsom salt or milk of magnesia in water and force fluids. Have patient lie down and keep warm. Call a physician.
Use Precautions: Avoid excessive skin contact and wash off thoroughly after exposure. If on clothing, remove them and wash. Avoid inhalation of dust or spray mist. Keep away from children, domestic animals and foodstuffs.
Rating: Requires word "Poison", skull and crossbones and antidote.

Common Name: ZINC ARSENITE
Chemical Name: Zinc Arsenite
Empirical Formula: Zn₃(AsO₃)₂
Definition: Shall contain at least 33% arsenic, expressed as metallic, not more than 0.75% arsenic, water-soluble form, and the percentage of zinc shall be expressed in the terms of metallic zinc.
Toxicity, Oral to Mammals:
Antidote: Give a tbsp. of salt in a glass of warm water and repeat until vomit fluid is clear. Then two tbsp. of epsom salt or milk of magnesia in water and force fluids. Have patient lie down and keep warm. Call a physician.
Use Precautions: Avoid excessive skin contact and wash off thoroughly after exposure. If on clothing, remove them and wash. Avoid inhalation of dust or spray mist. Keep away from children, domestic animals and foodstuffs.
Rating: Requires word "Poison", skull and crossbones and antidote.

Common Name: ZINC PHOSPHIDE
Chemical Name: Zinc phosphide
Empirical Formula: Zn₃P₂ Mol. wt. 258.09
Definition: Commercial material cont. 94% zinc phosphide, occurs as dark gray cubic crystals or powder.
Chemical & Physical Properties:
Melting point - above 420°C. Odor - faint, phosphine like.
Boiling point - 1100°C. Sublim- Color - gray black
es if heated without air.
Inflammability - Caution: Spontaneously flammable on contact.
with acids.
Density 4.55
Stable when kept dry.
Solubility - Insol. in water & alcohol. Strong mineral acids react violently with spontaneous combustion of evolved phosphine.

Pharmazie 3 (1948) p. 540; Veterinary J. 101 (1945) p. 108;

Toxicity, Oral to Mammals:
Acute: LD/50 rats, 46.7 mg/kg, also given as 40.5 ± 2.9 mg/kg; Chicken, min. lethal dose approx. 65 mg per bird. A non-fatal case in man who inhaled small quantities of dust had vomiting, diarrhea, became cyanotic, had fever, rapid pulse, recovered in 2 wks.

Symptoms: Profuse salivation, frothy foam around mouth, paralysis & labored breathing in animals which die of suffocation.

Antidote: Give tbsp. salt in glass warm water, repeat till vomit is clear. Follow with 8 tbsp. mineral oil. Keep patient prone & warm. Medical treatment includes gastric lavage, cathartics, enema. Oxidize any phosphide by using potassium permanganate sol. 1:1000 as a lavage.

Skin Absorption and others: Avoid contamination of skin especially in open wounds. Keep away from children, pets and livestock.

Use Precautions: Avoid inhaling dust, wear respirator; wash hands after handling and before smoking or eating; launder contaminated garments.

Uses (types of pests): As baits for control of rats, prairie dogs, mice and ground squirrels.

Formulations: Tech. materials cont. zinc phosphide approx. 80-90%. Pastes for prep. of baits approx. 5-10%; ready mixed baits, 0.5 or 1.0%.

Applications:
Precautions (food): Should not be used in any manner that might contaminate food directly or by absorption of odors.

Storage and Shipping Directions: Keep dry. Moisture or acid sol. may liberate phosphine. Store in isolated, well ventilated room. Do not triturate with heat or oxidizing agents.

Common Name:  ZINEB
Chemical Name: Zinc ethylene bis dithio carbamate
Empirical Formula: \((\text{CH}_2)_2(\text{NHSS})_2\text{Zn}\)

Chemical & Physical Properties:
- Melting point - Decomposes before melting. Odorless
- Flash point between 280-290°F. Color - white to off-white
- Vapor tension - Negligible

Inflammability-Combustible NYC Fire Dept.
Not-U.S.D.A.
Stability - somewhat unstable to light, heat and moisture; slight decomp. in 1 year.
Solubility - H\(_2\)O 10 ppm. Soluble in Pyridine

Analytical Methods: See Ferbam.
Toxicity, Oral to Mammals:
Acute: Rats MLD stomach tube greater than 5200 mg/kg oral MLD 5200 mg/kg no ill effects.
Chronic: After 2 years in the rat growth and mortality unaffected at 2500 ppm. in female and 5000 ppm. in male. 1/10 goitrogenic activity of nabam.
Symptoms: No cases of acute zineb poisoning encountered.
First Aid: In case of contact, flush with plenty of water. Skin Absorption and other: May cause irritation of nose, throat and skin. May be harmful if inhaled or swallowed. Avoid contact with eyes or clothing. Said to be safe as marketed.
Residues:
Levels: On 147 samples of 11 crops taken zero to 30 days after last application, and samples receiving 1 to 20 applications, only 7 samples over 5 ppm. residue. No samples taken more than 7 days after application had more than 5 ppm.
Removal Methods: Washing did not entirely remove residues.
Uses (types of pests): Effective against wide range of fungous diseases, blights, leaf spots and mildews in vegetables, fruits, tobacco, cereals.
Formulations (and compatibility): "Parzate" Dithane 278 and Zineb Fungicide contains 65% zineb and 35% inert. Can be diluted with water or mixed with extenders as dust.
Application: 1 to 2 lbs. per 100 gals. or 5 to 10% as a dust.
Directions, rate and number: Generally 4-10 day application intervals during period when disease threatens.
Phytotoxicity: Zinc-sensitive plants only, not those in some zn.-deficient areas. Can be used on tobacco and cucurbits not as high dosage as ferbam or ziram.
Storage & Shipping Directions: Never allow to become wet during storage. May lead to reduction effectiveness and possibly creation of flammable fumes. Keep closed when not in use. No ICC regulations.
Accumulation in Soil - No problem; degraded under weathering.

Common Name: ZIRAM
Chemical Name: Zinc dimethyl dithio carbamate
Empirical Formula: \(((\text{CH}_3)_2\text{NCS})_2\text{Zn}\)

Chemical & Physical Properties:
- Melting point - 246°C. uncorrect. Odorless
- Vapor tension - negligible Tasteless
- Inflammability - above 300°F. Color - White, solid
- Density - 2.00 20/4 Corrosive action - no problem
- Stability - most stable of the commercial metallic dithiocarbamate fungicides.
- Solubility - distilled water 65 ppm room temp.; essentially insol. in alcohol, ether. Soluble in chloroform.

Analytical Methods: See Ferbam
Toxicity, Oral to Mammals: Rats LD₅₀ 500 mg/kg; rabbits 400; rats S.C.785; mice I.P. 17.
Acute: Relatively low orally but fairly high I.P.
Symptoms: No cases of acute Ziram poisoning have been encountered that could be studied.

First Aid: In case of contact, flush with plenty of water; for eyes get medical attention.

Skin Absorption and others: May cause irritation of nose, throat and skin in some.

Use Precautions: May be harmful if inhaled or swallowed. Keep away from fire.

Residues: On 16 veg. samples only 2 had over 5ppm. On 31 samples with ferbam-ziram, 11 had over 5 ppm. zero to 30 days after application. No samples taken more than 7 days after final application had more than 5 ppm.

Removal Methods: Washing celery reduced residue from 50 to 77%.

Uses (types of pests): Anthracnose and early blight of tomatoes, leaf diseases of cucurbits and other veg. diseases. Also repellent for Jap. bettle & other insects.

Formulations (and compatibility): As "Zerlate" Ziram fungicide, wettable powder cont. 76% ziram and 24% inerts. Can be used with most insecticides or supplements. Best not used with Cu, Hg or lime compounds.

Application: 1 to 3 lbs. Zerlate/100 gal. throughout growing season at treatment intervals from 4-10 days.

Phytotoxicity: Similar to ferbam except for zinc sensitive plants; particularly useful for cucurbits.

Accumulation in Soil: No buildup; more or less rapidly decomposed by weathering. Even at relatively high soil concentrations not very phytotoxic.

Storage & Shipping Directions: Should be stored under dry, preferably cool conditions. No I.C.C. regulations governing shipment.
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REPORT

OF THE

ASSOCIATION OF ECONOMIC POISONS

CONTROL OFFICIALS

1951
ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS, INC.

Office of the Secretary
College Park, Md.

September 24, 1951

TO ALL ECONOMIC POISONS CONTROL OFFICIALS:

Gentlemen:

A brief summary of the activities of the Secretary's office during the year is presented here to conserve time on our rather full program.

Correspondence was normal for the year. Inquiries received were chiefly concerned with various state laws, requests for copies of the uniform state law, and miscellaneous information pertaining to the Association. State officials interested in developing new laws, regulations and uniform registration requirements were supplied with information as requested.

A resume of the Executive Committee meeting in Washington during April was distributed to control agencies, industry groups, and other closely associated organizations. Data on toxicity and uses of the newer poisons originating in Dr. Reed's office were assembled and circulated among control departments. This information, of a confidential nature, was sent to heads of departments for use in uniform administration of economic poisons regulations.

News releases under the heading of "Pest Controller" were continued again this year. It becomes increasingly difficult to prepare this material as so few members seem willing to contribute. Frequently items of interest requested for publication are never received.

Reports of deficient samples to all control departments were continued this year. These releases contain results from only a few states, and it is hoped that others will submit reports for the benefit of our membership. Perhaps it would be worthwhile if the Executive Committee had an expression of opinion as to the value derived from this service.

The annual report of the Association was prepared and distributed to all persons attending the 1950 convention in Washington. Each year more requests are received for copies of this publication and it is anticipated that with the inclusion of standards it will be of increasing value to all.

By the grace of the Recorder of Deeds of the District of Columbia, the Association of Economic Poisons Control Officials officially became a corporation on August 14. On that date, the executed original of the Certificate of Incorporation was filed. Dr. E. L. Griffin and E. G. Donovan, Insecticide Division, P.M.A., U. S. Department of Agriculture both residing in Washington, D. C. served as incorporators along with your Secretary.

*   *   *
The enclosed photo-offset print has been submitted to me for distribution by A. D. Cromartie, Chairman, Uniform Sampling Committee of the Association.

At the suggestion of the Executive Committee, Mr. Cromartie has developed specifications and descriptions of a uniform trier for sampling dry economic poisons in bulk. This type of trier is used by the Insecticide Division, Food and Drug Administration, and many state agencies.

Please direct any comments or suggestions to Mr. A. D. Cromartie, Chief Investigator, Insecticide Division, P.M.A., U. S. Department of Agriculture, Washington 25, D. C.

* * *

The agenda for the States Relations discussion scheduled for 7:30 p.m., Friday, October 5 is enclosed. The Shoreham management has requested us to move this meeting from the West Ballroom to the Louis Seize Room. It is hoped everyone will make an effort to be present for this session.

The Plant Food Council Dinner is set for the same evening and members attending this dinner are urged to come to this meeting as soon as possible. Again our Executive Committee will meet immediately following the States Relations discussion.

* * *

Attached hereto you will find a copy of the Treasurer's report covering receipts and disbursements up to September 30, 1951.

* * *
INTRODUCTION

This fourth annual report of the Association of Economic Poisons Control Officials includes general information, as well as the addresses covering the meeting held October 6, 1951, at the Shoreham Hotel, Washington, D.C.

Additions to the regulatory principles and definitions of terms, together with editorial corrections made since the last printing, are included in this publication.

Other data appearing in previous annual reports, and now brought up to date, include: The Constitution and By-Laws, roster of officers, committees, investigators, uniform bill, application for registration forms, and certificate of registration. The uniform sampling procedure, adopted as tentative, is covered in its entirety.

Attention is called, particularly, to the resolution appearing on Page 38; in this expression is contained the Association's stand on the important subject of insecticides in fertilizer materials.

The proposed bill recommended as a guide in formulating or revising state economic poisons legislation, as accepted by the Council of State Governments, is reprinted again this year for reference by any state officials interested in this phase of pesticide control.

The Secretary takes this opportunity to repeat the request for any comments or suggestions for improvement in the content of this annual report.
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ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

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<td>E. W. Constable</td>
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<td>Vice-President</td>
<td>R. C. Berry</td>
<td>Richmond, Virginia</td>
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<td>Sec.-Treas.</td>
<td>A. B. Hoagy</td>
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Executive Committee
President, Vice-President, Secretary-Treasurer and Retiring President, Ex Officio

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<td>G. H. Laramie (1952)</td>
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<tr>
<td>C. P. Osgood</td>
<td>Augusta, Maine</td>
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<td>W. B. Reed</td>
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<td>J. C. Krantz</td>
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<td>C. A. Bower, Chairman</td>
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<tr>
<td>W. C. Shaw</td>
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<td>E. A. Walker</td>
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<td>R. A. Moncrief</td>
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<td>H. J. Fisher</td>
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<td>W. C. Geagley</td>
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<td>J. F. Fudge</td>
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<td>D. W. Dean</td>
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<td>J. J. T. Graham</td>
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CONSTITUTION OF THE ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

Section 1. Name. The name of the association shall be The Association of Economic Poisons Control Officials.

Section 2. Object. The object of the association shall be to promote uniform and effective legislation, definitions, rulings, and enforcement of laws relating to the control of sale and distribution of insecticides, fungicides, and other economic poisons.

Section 3. Membership. The membership of the association shall consist of the officials charged by law with the active execution of the laws regulating the sale of economic poisons and such deputies as shall be duly designated by these officials, and research workers employed by state, territory, dominion or federal agencies who are engaged in the investigation of economic poisons and their component parts.

Section 4. Officers. The officers of the association shall be the president, the vice-president, the secretary-treasurer, and an executive committee.

Section 5. The executive committee. The executive committee shall consist of the president, the vice-president, the secretary-treasurer, the retiring president, and four elected members, two members of whom shall be elected at each annual meeting of the association, except at the 1947 meeting two shall be elected for a one-year term and two for a two-year term.

The executive committee shall have the control and management of the affairs of the association during the interim between regular meetings, and shall take action on majority vote of the committee and report its official activities to the association.

The executive committee shall report on such matters as may be referred to it by the association, and review and present to the association with recommendations all the recommendations of the investigators and special committees and such resolutions and regulations as pertain to economic poisons.

Section 6. Voting. Each state, territory, dominion and federal agency engaged in control of sale and distribution of economic poisons is entitled to a single vote. Voting by proxy shall be permitted.

Section 7. Amendments. The constitution or by-laws may be amended at any regular meeting by a two-thirds vote of the voting membership present. All proposed amendments to the constitution shall be submitted in writing to the secretary at least 30 days prior to the opening of the annual meeting, and the secretary shall distribute copies to the members at least 10 days prior to the meeting. All proposed amendments to the by-laws shall be submitted in writing prior to the opening of the annual meeting.
Section 8. Investigations and special committees. For the purpose of studying the subject of uniformity in legislation, definitions and rulings, and the enforcement of laws concerning economic poisons, the president may appoint investigators or committees. These investigators shall have the authority to appoint such assistants as may be necessary. Investigators shall be appointed for one year and may be reappointed. Special committees may be appointed by the president. No appointment shall be made for a period exceeding two years.

Section 9. Dues. Each state, territory, dominion, and federal agency engaged in the regulation or investigation of economic poisons shall pay dues of $15.00 for each year of its membership, and this shall entitle the members to the services and publications of the association.

BY-LAWS

Section 1. Regular meetings of the association shall be held at least once each year, except in the case of an emergency which would prevent an adequate representation of the membership. Special meetings may be called by the executive committee.

Section 2. Election of officers. All officers shall be elected by ballot, and shall hold office until the adjournment of the annual meeting next following their election, or until their successors are elected.

In the event of a vacancy occurring in any office, except that of president or vice-president, the president shall fill the vacancy by appointment and such appointment shall continue until the close of the next regular meeting of the association, at which meeting the unexpired term shall be filled by election in the usual way.

Section 3. Duties of officers. The president, vice-president, and secretary-treasurer shall perform the duties usual to such officers.

The secretary-treasurer shall keep a record of all proceedings of the association and attend to all necessary correspondence. He shall also receive all moneys due the association, and shall keep an accurate account of all receipts and disbursements, and report with proper vouchers at each annual meeting.

Resolutions, other than those of the resolution committee, shall be presented in writing to the executive committee, which shall provide a place for them on the program.

The following shall be the order of business unless changed at the time by the vote of the association:
1. Reading of the minutes of preceding meeting
2. Report of secretary-treasurer
3. Announcements and appointment of committees
4. President's address
5. Roll call by states
6. Special addresses
7. Reports of investigators and special committees
8. Reports of credentials committee
9. Special topics or executive session
10. Resolutions referring to economic poisons
11. Report of executive committee
12. Report of auditing committee
13. Report of resolutions committee
14. Unfinished business
PROPOSED UNIFORM STATE ECONOMIC POISONS BILL

(Title. It should conform to state requirements. The following is a suggestion; a more complete title should be used where necessary:

"An Act relating to the distribution, sale, or transportation of adulterated or misbranded insecticides, fungicides, rodenticides, and other economic poisons (and devices); regulating traffic therein; providing for registration and examination of such materials, imposing penalties, and for other purposes.")

(De it enacted, etc.)

Section 1. Title. This Act may be cited as the (State) Economic Poisons Act of (Date).

Section 2. Definitions. For the purpose of this Act—

(a) The term "economic poison" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, fungi, weeds, or other forms of plant or animal life or viruses, except viruses on or in living man or other animals, which the Commissioner shall declare to be a pest.

(b) The term "device" means any instrument or contrivance intended for trapping, destroying, repelling, or mitigating insects or rodents or destroying, repelling, or mitigating fungi or weeds, or such other pests as may be designated by the Commissioner, but not including equipment used for the application of economic poisons when sold separately therefrom.

(c) The term "insecticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects which may be present in any environment whatsoever.

(d) The term "fungicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any fungi.

(e) The term "rodenticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating rodents or any other vertebrate animal which the Commissioner shall declare to be a pest.

(f) The term "herbicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any weed.

(g) The term "insect" means any of the numerous small invertebrate animals generally having the body more or less obviously
segmented, for the most part belonging to the class Insecta, comprising six-legged, usually winged forms, as, for example, beetles, bugs, bees, flies, and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as, for example, spiders, mites, ticks, centipedes, and woodlice.

(h) The term "fungi" means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.

(i) The term "weed" means any plant which grows where not wanted.

(j) The term "ingredient statement" means a statement of the name and percentage of each active ingredient, together with the total percentage of the inert ingredients, in the economic poison; and, in case the economic poison contains arsenic in any form, a statement of the percentage of total and water soluble arsenic, each calculated as elemental arsenic.

(k) The term "active ingredient" means an ingredient which will prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds, or other pests.

(l) The term "inert ingredient" means an ingredient which is not an active ingredient.

(m) The term "antidote" means the most practical immediate treatment in case of poisoning and includes first aid treatment.

(n) The term "person" means any individual, partnership, association, corporation, or organized group of persons whether incorporated or not.

(o) The term "Commissioner" means the (Commissioner, Secretary or Director of Agriculture).

(p) The term "registrant" means the person registering any economic poison pursuant to the provisions of this Act.

(q) The term "label" means the written, printed, or graphic matter on, or attached to, the economic poison (or device), or the immediate container thereof, and the outside container or wrapper of the retail package, if any there be, of the economic poison (or device).

(r) The term "labeling" means all labels and other written, printed, or graphic matter.

(1) upon the economic poison (or device) or any of its containers or wrappers;

(2) accompanying the economic poison (or device) at any time;
(3) to which reference is made on the label or in literature accompanying the economic poison (or device), except when accurate, non-misleading reference is made to current official publications of the United States Departments of Agriculture or Interior, the United States Public Health Service, State Experiment Stations; State Agricultural Colleges, or other similar Federal institutions or official agencies of this State or other States authorized by law to conduct research in the field of economic poisons.

3. The term "adulterated" shall apply to any economic poison if its strength or purity falls below the professed standard or quality as expressed on labeling or under which it is sold, or if any substance has been substituted wholly or in part for the article, or if any valuable constituent of the article has been wholly or in part abstracted.

t. The term "misbranded" shall apply --

(1) to any economic poison (or device) if its labeling bears any statement, design, or graphic representation relative thereto or to its ingredients which is false or misleading in any particular;

(2) to any economic poison --

(a) if it is an imitation of or is offered for sale under the name of another economic poison;

(b) if its labeling bears any reference to registration under this Act;

(c) if the labeling accompanying it does not contain instructions for use which are necessary and, if complied with, adequate for the protection of the public;

(d) if the label does not contain a warning or caution statement which may be necessary and, if complied with, adequate to prevent injury to living man and other vertebrate animals;

(e) if the label does not bear an ingredient statement on that part of the immediate container and on the outside container or wrapper, if there be one, through which the ingredient statement on the immediate container cannot be clearly read, of the retail package which is presented or displayed under customary conditions of purchase;

(f) if any word, statement, or other information required by or under the authority of this Act to appear on the labeling is not prominently placed thereon with such conspicuousness (as compared with other words, statements, designs, or graphic matter in the labeling) and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use, or

( ) if in the case of an insecticide, fungicide, or herbicide, when used as directed or in accordance with commonly recognized
practice, it shall be injurious to living man or other vertebrate animals or vegetation, except weeds, to which it is applied, or to the person applying such economic poison.

Section 3. Prohibited Acts.

(a) It shall be unlawful for any person to distribute, sell, or offer for sale within this State or deliver for transportation or transport in intrastate commerce or between points within this State through any point outside this State any of the following:

(1) Any economic poison which has not been registered pursuant to the provisions of Section 4 of this Act, or any economic poison if any of the claims made for it or any of the directions for its use differ in substance from the representations made in connection with its registration or if the composition of an economic poison differs from its composition as represented in connection with its registration: Provided, That, in the discretion of the Commissioner a change in the labeling or formula of an economic poison may be made within a registration period without requiring reregistration of the product.

(2) Any economic poison unless it is in the registrant's or the manufacturer's unbroken immediate container, and there is affixed to such container, and to the outside container or wrapper of the retail package, if there be one through which the required information on the immediate container cannot be clearly read, a label bearing

(e) the name and address of the manufacturer, registrant, or person for whom manufactured;

(b) the name, brand, or trade mark under which said article is sold; and

(c) the net weight or measure of the content subject, however, to such reasonable variations as the Commissioner may permit

(3) Any economic poison which contains any substance or substances in quantities highly toxic to man, determined as provided in Section 5 of this Act, unless the label shall bear, in addition to any other matter required by this act,

(a) the skull and crossbones;

(b) the word "poison" prominently, in red, on a background of distinctly contrasting color; and

(c) a statement of an antidote for the economic poison.

(4) The economic poison commonly known as standard lead arsenate, basic lead arsenate, calcium arsenate, magnesium arsenate, zinc arsenate, zinc arsenite, sodium fluoride, sodium fluosilicate, and
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barium fluosilicate unless they have been distinctly colored or discolored as provided by regulations issued in accordance with this Act, or any other white powder economic poison which the Commissioner, after investigation of and after public hearing on the necessity for such action for the protection of the public health and the feasibility of such coloration or discoloration, shall, by regulation, require to be distinctly colored or discolored; unless it has been so colored or discolored: Provided, That the Commissioner may exempt any economic poison to the extent that it is intended for a particular use or uses from the coloring or discoloring required or authorized by this section if he determines that such coloring or discoloring for such use or uses is not necessary for the protection of the public health.

(5) any economic poison which is adulterated or misbranded, (or any device which is misbranded).

(b) It shall be unlawful --

(1) for any person to detach, alter, deface, or destroy, in whole or in part, any label or labeling provided for in this Act or regulations promulgated hereunder, or to add any substance to, or take any substance from, an economic poison in a manner that may defeat the purpose of this act;

(2) for any person to use for his own advantage or to reveal, other than to the Commissioner or proper officials or employees of the State or to the courts of this State in response to a subpoena, or to physicians, or in emergencies to pharmacists and other qualified persons, for use in the preparation of antidotes, any information relative to formulas of products acquired by authority of Section 4 of this Act.

Section 4. Registration.

(a) Every economic poison which is distributed, sold, or offered for sale within this State or delivered for transportation or transported in intrastate commerce or between points within this State through any point outside this State shall be registered in the office of the Commissioner, and such registration shall be renewed annually; Provided, That products which have the same formula, are manufactured by the same person, the labeling of which contains the same claims, and the labels of which bear a designation identifying the product as the same economic poison may be registered as a single economic poison; and additional names and labels shall be added by supplement statements during the current period of registration. The registrant shall file with the Commissioner a statement including:

(1) the name and address of the registrant and the name and address of the person whose name will appear on the label, if other than the registrant;

(2) the name of the economic poison;

(3) a complete copy of the labeling accompanying the economic
poison and a statement of all claims to be made for it including directions for use; and

(4) if requested by the Commissioner a full description of the tests made and the results thereof upon which the claims are based. In the case of renewal of registration, a statement shall be required only with respect to information which is different from that furnished when the economic poison was registered or last reregistered.

(b) The registrant shall pay an annual fee of $_______ for each economic poison registered, such fee to be deposited (in the Treasury of the State) (to the credit of a special fund to be used only for carrying out the provisions of this Act): Provided, however, that any registrant may register annually any number of brands after the payment of annual fees aggregating $_______.

(c) The Commissioner, whenever he deems it necessary in the administration of this Act, may require the submission of the complete formula of any economic poison. If it appears to the Commissioner that the composition of the article is such as to warrant the proposed claims for it and if the article and its labeling and other material required to be submitted comply with the requirements of Section 3 of this Act, he shall register the article.

(d) If it does not appear to the Commissioner that the article is such as to warrant the proposed claims for it or if the article and its labeling and other material required to be submitted do not comply with the provisions of this Act, he shall notify the applicant of the manner in which the article, labeling, or other material required to be submitted fail to comply with the Act so as to afford him an opportunity to make the necessary corrections. If, upon receipt of such notice, the applicant insists that such corrections are not necessary and requests in writing that the article be registered, the Commissioner shall provide him with opportunity for hearing before refusing to issue registration. In order to protect the public, the Commissioner, on his own motion, after hearing, may at any time, cancel the registration of an economic poison. In no event shall registration of an article, be construed as a defense for the commission of any offense prohibited under Section 3 of this Act.

(e) Notwithstanding any other provision of this Act, registration is not required in the case of an economic poison shipped from one plant within this State to another plant within this State operated by the same person.

Section 5. Determinations; Rules and Regulations; Uniformity.

(a) The Commissioner is authorized, after opportunity for a hearing,

(1) to declare as a pest any form of plant or animal life or virus which is injurious to plants, man, domestic animals, articles, or substances;

(2) to determine whether economic poisons are highly toxic to
(3) to determine standards of coloring or discoloring for economic poisons, and to subject economic poisons to the requirements of Section 3a (4) of this Act.

(b) The Commissioner is authorized, after due public hearing, to make appropriate rules and regulations for carrying out the provisions of this Act, including rules and regulations providing for the collection and examination of samples of economic poisons (or devices).

(c) In order to avoid confusion endangering the public health, resulting from diverse requirements, particularly as to the labeling and coloring of economic poisons, and to avoid increased costs to the people of this state due to the necessity of complying with such diverse requirements in the manufacture and sale of such poisons, it is desirable that there should be uniformity between the requirements of the several States and the Federal Government relating to such poisons. To this end the Commissioner is authorized, after due public hearing, to adopt by regulation such regulations, applicable to and in conformity with the primary standards established by this Act, as have been or may be prescribed in the United States Department of Agriculture with respect to economic poisons.

Section 6. Enforcement

(a) The examination of economic poisons (or devices) shall be made under the direction of the Commissioner for the purpose of determining whether they comply with the requirements of this Act. If it shall appear from such examination that an economic poison (or device) fails to comply with the provisions of this Act, and the Commissioner contemplates instituting criminal proceedings against any person, the Commissioner shall cause appropriate notice to be given to such person. Any person so notified shall be given an opportunity to present his views, either orally or in writing, with regard to such contemplated proceedings and if thereafter in the opinion of the Commissioner it shall appear that the provisions of the Act have been violated by such person, then the Commissioner shall refer the facts to the (District Attorney) for the county in which the violation shall have occurred with a copy of the results of the analysis or the examination of such article: Provided, however, That nothing in this Act shall be construed as requiring the Commissioner to report for prosecution or for the institution of libel proceedings minor violations of the Act whenever he believes that the public interests will be best served by a suitable notice of warning in writing.

(b) It shall be the duty of each (District Attorney) to whom any such violation is reported to cause appropriate proceedings to be instituted and prosecuted in the __________ Court without delay.

(c) The Commissioner shall, by publication in such manner as he may prescribe, give notice of all judgments entered in actions instituted under the authority of this Act.
Section 7. Exemptions

(a) The penalties provided for violations of Section 3a of this Act shall not apply to —

(1) any carrier while lawfully engaged in transporting an economic poison within this State, if such carrier shall, upon request, permit the Commissioner or his designated agent to copy all records showing the transactions in and movement of the articles;

(2) public officials of this State and the Federal Government engaged in the performance of their official duties;

(3) the manufacturer or shipper of an economic poison for experimental use only

   (a) by or under the supervision of an agency of this State or of the Federal Government authorized by law to conduct research in the field of economic poisons, or

   (b) by others if the economic poison is not sold and if the container thereof is plainly and conspicuously marked "For experimental use only - Not to be sold", together with the manufacturer's name and address: Provided, however, That if a written permit has been obtained from the Commissioner, economic poisons may be sold for experimental purposes subject to such restrictions and conditions as may be set forth in the permit.

(b) No article shall be deemed in violation of this Act when intended solely for export to a foreign country, and when prepared or packed according to the specifications or directions of the purchaser. If not so exported, all the provisions of this Act shall apply.

Section 8. Penalties

(a) any person violating Section 3a (1) of this Act shall be guilty of a misdemeanor and upon conviction shall be fined not more than $__________.

   (b) Any person violating any provision of this Act other than Section 3a (1) shall be guilty of a misdemeanor and upon conviction shall be fined not more than $____ for the first offence and upon conviction for a subsequent offense shall be fined not more than $____: Provided, That any offense committed more than five years after a previous conviction shall be considered a first offense.

   (c) Notwithstanding any other provisions of this section, in case any person, with intent to defraud, uses or reveals information relative to formulas of products acquired under authority of Section 4 of this Act, he shall be fined not more than $____ or imprisoned for not more than one year, or both.

Section 9. Seizures

(a) Any economic poison (or device) that is distributed, sold,
or offered for sale within this State or delivered for transportation or transported in interstate commerce or between points within this State through any point outside this State shall be liable to be proceeded against in any ______ Court in any county of the State where it may be found and seized for confiscation by process of libel for condemnation:

(1) in the case of an economic poison;

(a) if it is adulterated or misbranded;

(b) if it has not been registered under the provisions of Section 4 of this Act;

(c) if it fails to bear on its label the information required by this Act;

(d) if it is a white powder economic poison and is not colored as required under this Act.

((z) In the case of a device, if it is misbranded.)

(b) If the article is condemned, it shall, after entry of decree, be disposed of by destruction or sale as the court may direct and the proceeds, if such article is sold, less legal costs, shall be paid to the State Treasurer; Provided, That the article shall not be sold contrary to the provision of this Act; and Provided, further, That upon payment of costs and execution and delivery of a good and sufficient bond conditioned that the article shall not be disposed of unlawfully, the court may direct that said article be delivered to the owner thereof for relabeling or reprocessing as the case may be.

(c) When a decree of condemnation is entered against the article, court costs and fees and storage and other proper expenses shall be awarded against the person, if any, intervening as claimant of the article.

Section 10. Delegation of Duties. All authority vested in the Commissioner by virtue of the provisions of this Act may with like force and effect be executed by such employees of the (Department of Agriculture) as the Commissioner may from time to time designate for said purpose.

Section 11. Cooperation The Commissioner is authorized and empowered to cooperate with, and enter into agreements with, any other agency of this State, the United States Department of Agriculture, and any other State or agency thereof for the purpose of carrying out the provisions of this Act and securing uniformity of regulations.

Section 12. Separability. If any provision of this Act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, the constitutionality of the remainder of this Act and the applicability thereof to other persons and circumstances shall not be affected thereby.
Section 13. Effective Date. All provisions of this Act, except Section 3, "prohibited acts"; Section 8 "penalties"; and Section 9 "seizures", shall take effect upon enactment, and Sections, 3, 8, and 9, shall take effect as follows:

((1) as to devices, upon enactment;)

(2) as to rodenticides and herbicides, 6 months after and

(3) as to insecticides, fungicides, and all other economic poisons, one year after enactment.

Section 14. Repeals. Jurisdiction in all matters pertaining to the distribution, sale and transportation of economic poisons (and devices), is by this Act vested exclusively in the Commissioner, and all acts and parts of acts inconsistent with this Act are hereby expressly repealed.

Note: This bill was prepared by The Council of State Governments, and modified by the Association of Economic Poisons Control Officials, October 1943.
AN ACT RELATING TO CUSTOM APPLICATION OF INSECTICIDES, FUNGICIDES, AND HERBICIDES

Organizations which cooperated in the preparation of this Act:

Council of State Governments
Association of Economic Poisons Control Officials
National Association of State Aviation Officials
National Association of Commissioners, Secretaries, and Directors of Agriculture
Civil Aeronautics Administration
United States Public Health Service
United States Department of the Interior
United States Department of Agriculture

Interpretive Statement

Purpose

This bill has been prepared in order to assist States which find it necessary to adopt or revise legislation regulating the application of insecticides, fungicides, and herbicides (weed killers) for hire.

In view of widely differing conditions of agricultural production in different parts of the country, the provisions of the bill should be carefully considered and, when necessary, modified to meet local needs.

While this bill has been confined to custom application of insecticides, fungicides, and herbicides, it may be found in some States that regulation of other than custom application, particularly by aircraft, is necessary.

It should be noted that this bill deals only with the application and use of insecticides, fungicides, and herbicides. It thus covers an entirely different area than the State Insecticide, Fungicide, and Rodenticide Act, which deals with the sale of these economic poisons. The latter bill was first carried as suggested State legislation in the Program for 1947. The definitions of terms used in both bills, except for the definition of "person", are identical.

Problem

Section 1 of the bill points out that in recent years there has been very rapid advance in the discovery and synthesis of insecticides, fungicides, and herbicides. The most spectacular of these, in many ways, is 2,4-D (2,4-Dichlorophenoxyacetic acid), synthesized in 1941 and first used as a weed killer in 1941. This is a selective weed killer which, generally speaking, will kill broad-leaved plants but
not grasses when applied in proper quantities. It is extremely valuable in killing weeds in grains, including wheat, rice, and corn, and in grass used for hay or pasture. However, it drifts very easily and, in some cases, has been known to drift as far as twenty miles when applied in windy weather by aircraft. Considerable drift may occur even when 2,4-D is applied by means of ground equipment. Damage to broad-leaved crops, such as cotton, tomatoes, and other vegetables, has resulted from drift. 2,4-D in dust form is particularly likely to drift, and application in this form by aircraft is at present disapproved by the United States Department of Agriculture. While, 2,4-D may cause damage, it is, when properly applied, a valuable aid to agricultural production. Obviously, however, its use requires great care.

DDT (Dichloro-diphenyl-trichlorethane) is another synthetic compound which has been found to be extremely valuable for control of certain insects. Recently it has been learned that DDT applied to dairy cattle, in dairy barns, or to fodder intended to be fed to dairy cattle or animals being finished for slaughter may be absorbed into the fat of the cattle or may appear in milk, and, for this reason, the United States Department of Agriculture has recommended that DDT should not be used in these ways. Instead, the Department has recommended that methoxychlor, a still newer synthetic compound, be used. When DDT is used to spray forest areas or shade trees in cities to control insects, care must be taken to see that wildlife is not injured.

Among other new insecticides are benzene hexachloride, chlordane, toxaphene (chlorinated camphene), TDE, parathion, tetraethyl pyrophosphate, and lindane. Each of these has its proper uses and dangers. Many of these new materials have not been tested under all conditions and their effects are not fully known.

Concurrently with the discovery of new and highly potent insecticides, fungicides, and herbicides, the business of custom spraying and dusting, including spraying and dusting by airplane, has greatly expanded. As these chemicals and the practices for applying them properly become more numerous and complex, custom spraying and dusting will undoubtedly continue to increase because of the need for specialized training and equipment. Insecticides, fungicides, and herbicides, along with modern machinery, improved varieties and practices, hybridization, etc., are becoming increasingly important factors in greater agricultural production.

The growth of custom spraying and dusting, the rapidity of new discoveries, the possibility of injury to health and to plants and animals, including wildlife, on lands or in waters adjacent to those being sprayed or dusted, and the possibility of fraudulent practices make public regulation increasingly necessary.

One difficult problem in connection with application of insecticides, fungicides, and herbicides is the question of liability for damage to crops or animals resulting from drift of the materials. This problem is particularly serious in the case of 2,4-D where damage may be very substantial and, at the same time, difficult to prove. No provision relating to liability has been included in the bill. It is felt that
it is best to leave this question, at least until further experience accumulates, to existing laws relating to liability. However, the matter is under study.

The requirements for licensing after examination intended to show that the operator is qualified (section 4(b)) and for reports regarding particular applications of insecticides, fungicides, and herbicides (section 7) should help to minimize damage from improper application and to fix responsibility when damage does occur.

Provisions of the Bill

The bill requires that persons engaged in custom application of insecticides, fungicides, or herbicides be licensed. A license would be issued by the Commissioner of Agriculture after the applicant had shown, on examination, that he possessed adequate knowledge concerning the use and application of insecticides, fungicides, and herbicides and upon consideration of other pertinent information. The licenses may be restricted to the use of certain types of equipment or materials if he is found qualified to use only these types. For example, a custom operator might be found qualified to use ground equipment but not aircraft or to use insecticides and fungicides but no herbicides. The license may be revoked or modified for cause. The grant, denial, or revocation of a license is subject to court review on petition of the aggrieved person (Section 3).

Under Section 3(e) a bond may be required from custom operators to secure performance of obligations. The amount of the bond is not specified, as it may be found desirable to fix, by regulation, a larger amount for large operators than for small operators.

Section 4 authorizes inspection of equipment used for application of insecticides, fungicides, or herbicides.

Section 5 authorizes the Commissioner of Agriculture to prescribe materials or methods to be used and to prohibit the use of materials or methods in custom application of insecticides, fungicides, and herbicides. Alternative provisions regarding the scope of such regulations are included. In issuing such regulations, consideration is to be given to pertinent research findings and recommendations of State and Federal agencies, such as the State Agricultural Experiment Station and the United States Department of Agriculture.

Under Section 6 licensees may be required to maintain records and submit reports giving specific information with respect to particular spraying or dusting jobs and other information. Reports relating to the time of application, wind velocity, other weather conditions, kind of material applied, and so on, could be required under this provision. Such information may be especially needed in the case of 2,4-D and other materials likely to cause damage because of drift.

Section 7 authorizes the Commissioner of agriculture to make rules and regulations but provides that such regulations shall not be inconsistent with other regulations issued by the State or Federal Government with
respect to safety in air navigation or operation of aircraft. In general, the State official responsible for regulation of aircraft would continue to regulate flying from the standpoint of safety and other general aspects. This section also requires the Commissioner to consult with other officials of the State before issuing regulations relating to matters within the jurisdiction of these officials. Application of insecticides, fungicides, and herbicides may concern not only agriculture but also health, forestry, fish and wildlife, etc. as well as regulation of aircraft, and consultation among the officials concerned will frequently be desirable.

Section 8 authorizes the Commissioner of Agriculture, in cooperation with the State Agricultural College, to publish information regarding injury which may result from improper application or handling of insecticides, fungicides, or herbicides and precautions which will help prevent such injury. Much of the damage caused by 2,4-D and other materials results from lack of information as to the effects of the materials and the conditions under which they should be applied. While the act relates principally to custom application, this section will authorize the distribution of information to farmers generally.

Section 10 exempts pest control operators, that is, persons engaged in destroying insects or fungi in or under buildings or in vehicles of transportation, such as termite eradication, fumigation of buildings, ships, etc. Outdoor custom application of insecticides, fungicides, and herbicides in cities, e.g., to trees, gardens, lawns, etc., is not exempted. However, consideration should be given to avoiding dual licensing of operators by both the Commissioner of Agriculture and municipalities.

Sections 3(f) and 13 authorize cooperation with other agencies of the State and with agencies of other States and of the Federal Government.
AN ACT RELATING TO CUSTOM APPLICATION OF INSECTICIDES, FUNGICIDES, AND HERBICIDES

Title It should conform to State requirements. The following is a suggestion; a more complete title should be used where necessary;

"AN ACT relating to the application of insecticides, fungicides, and herbicides by aircraft or ground equipment."

(As it enacted, etc.)

Section 1. Declaration of Purpose. The purpose of this act is to regulate, in the public interest, the custom application of insecticides, fungicides, and herbicides. In recent years a great many new materials have been discovered or synthesized which are valuable for the control of insects, fungi, and weeds. However, such materials may seriously injure health, property, or wildlife if not properly used. Insecticides may injure man or animals, either by direct poisoning or by gradual accumulation of poisons in the tissues. Crops may also be injured by improper use of insecticides or fungicides. The drifting or washing of insecticides into streams or lakes can cause appreciable damage to aquatic life. A herbicide applied by aircraft or ground equipment for the purpose of killing weeds in a crop which is not itself injured by the herbicides may drift, sometimes for miles, and injure other crops with which it comes in contact. Therefore it is deemed necessary to provide for regulation of the custom application of insecticides, fungicides, and herbicides.

Section 2. Definitions. For the purposes of this act -- (a) The term "insecticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects which may be present in any environment whatsoever.

(b) The term "fungicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any fungi.

(c) The term "herbicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any weed.

(d) The term "insect" means any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class Insects, comprising six-legged, usually winged forms, as, for example, beetles, bugs, bees, and flies, and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as, for example, spiders, mites, ticks, centipedes, and wood lice.

(e) The term "fungi" means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.
(f) The term "weed" means any plant which grows where not wanted.

(g) The term "person" means any individual, firm partnership, association, corporation, company, joint stock association, or body politic, or any organized group of persons whether incorporated or not; and includes any trustee, receiver, assigned, or other similar representative thereof.

(h) The term "Commissioner" means the Secretary, Commissioner, or Director of Agriculture.

(i) The term "custom application of insecticides, fungicides, or herbicides" means any application of insecticides, fungicides, or herbicides by aircraft or ground equipment for hire.

(j) The term "aircraft" means any contrivance now known or hereafter invented, used or designed for navigation of, or flight in, the air.

(k) The term "ground equipment" means any machine or device (other than aircraft), for use on land or water, designed for, or adaptable to use in applying insecticides, fungicides, or herbicides as sprays, dusts, aerosols, or fogs, or in other forms.

Section 3. Licenses. (a) No person shall engage in custom application of insecticides, fungicides, or herbicides within this State at any time without a license issued by the Commissioner. Application for a license shall be made to the Commissioner. Each application for a license shall contain information regarding the applicant's qualifications and proposed operations and other relevant matters as required pursuant to regulations promulgated by the Commissioner.

(b) The Commissioner may require the applicant to show, upon examination, that he possesses adequate knowledge concerning the proper use and application of insecticides, fungicides, and herbicides, and the dangers involved and precautions to be taken in connection with their application. If the applicant is other than an individual, the applicant shall designate an officer, member, or technician of the organization to take the examination, such designee to be subject to the approval of the Commissioner. If the extent of the applicant's operations warrant it, the Commissioner may require more than one officer, member, or technician to take the examination.

1/ See section 10 for exemptions.

2/ In States where only certain areas are liable to be affected by the application of insecticides, fungicides, or herbicides, the following could be inserted: "in counties or areas designated by the Commissioner."
(c) If the Commissioner finds the applicant qualified and if the applicant files the bond required under paragraph (e) of this section, the Commissioner shall issue a license, for such period as he may by regulation prescribe, to perform custom application of insecticides, fungicides, and herbicides within this State. The license may restrict the applicant to the use of a certain type or types of equipment or materials if the Commissioner finds that the applicant is qualified to use only such type or types. If a license is not issued as applied for, the Commissioner shall inform the applicant in writing of the reasons therefor.

(d) The Commissioner may suspend, pending inquiry, for not longer than ten days, and, after opportunity for a hearing, may revoke or modify the provisions of any license issued under this section, if he finds that the licensee is no longer qualified, has engaged in fraudulent business practices in the custom application of insecticides, fungicides, or herbicides, or has made any custom application in a faulty, careless, or negligent manner, or has violated any of the provisions of this act or regulations made thereunder.

(e) The Commissioner shall require a reasonable bond, with surety satisfactory to the Commissioner, from each applicant, under such rules and regulations as he may prescribe, to secure the performance of contractual obligations of the licensee with respect to custom application of insecticides, fungicides, or herbicides. Any person injured by the breach of any such obligation shall be entitled to sue on the bond in his own name in any court of competent jurisdiction to recover the damages he may have sustained by such breach.

(f) The Commissioner may issue a license without examination to a non-resident who is licensed in another State substantially in accordance with the provisions of this act.

(g) Any person aggrieved by any action of the Commissioner may obtain a review thereof by filing in the court within 30 days of notice of the action a written petition praying that the action of the Commissioner be set aside. A copy of such petition shall forthwith be delivered to the Commissioner, and within days thereafter the Commissioner shall certify and file in the court a transcript of any record pertaining thereto, including a transcript of evidence received, whereupon the court shall have jurisdiction to affirm, set aside or modify the action of the Commissioner, except that the findings of the Commissioner as to the facts, if supported by substantial evidence, shall be conclusive.

Section 4. Inspection. The Commissioner may provide for inspection of any ground equipment or of any device or apparatus used for custom application of insecticides, fungicides, or herbicides by aircraft and may require proper repairs or other changes before its further use for custom application.

Section 5. Materials and Methods of Application. The Commissioner may, by regulation after public hearing, prescribe materials or methods to be used and prohibit the use of materials or methods in
custom application of insecticides, fungicides, and herbicides, to the extent necessary to protect health or property to prevent injury, by reason of the drifting, washing or application of such materials, to desired plants or animals (including pollinating insects and aquatic life) on property other than that owned or leased by the person for whom the materials are applied. In issuing such regulations, the Commissioner shall give consideration to pertinent research findings and recommendations of other agencies of this State or of the Federal Government.

Section 6. Reports. The Commissioner may by regulation require any licensee to maintain such records and furnish reports giving such information with respect to particular applications of insecticides, fungicides, or herbicides and such other relevant information as the Commissioner may deem necessary.

Section 7. Regulations. The Commissioner may, after public hearing, make regulations for carrying out the provisions of this act:
Provided, That the regulations shall not be inconsistent with regulations issued by this State or by the Federal Government respecting safety in air navigation or operation of aircraft. Before issuing regulations directly related to any matter within the jurisdiction of any other official of this State the Commissioner shall consult with that official with reference thereto.

Section 8. Information. The Commissioner may, in cooperation with the State Agricultural College, publish information regarding injury which may result from improper application or handling of insecticides, fungicides, or herbicides and methods and precautions designed to prevent such injury.

Section 9. Penalties. Any person violating the provision of this act or the regulations issued hereunder shall be guilty of a misdemeanor and, upon conviction, shall be fined not more than _______ dollars for the first offense, and not more than _______ dollars for each subsequent offense.

Section 10. Exemptions. This act shall not apply to custom application of insecticides, fungicides, or herbicides to prevent, destroy, repel, or mitigate insects or fungi within or under buildings (except farm buildings other than dwellings) or within vehicles, ships, aircraft, or other means of transporting persons or property by land, water, or air.

Section 11. Enforcement. For the purpose of carrying out the provisions of this act the Commissioner may enter upon any public or private premises at reasonable times in order to have access for the purpose of inspecting any aircraft or ground equipment subject to this act.

Section 12. Delegation of Duties. The functions vested in the Commissioner by this act may be delegated by him to such employees of the Department of Agriculture as the Commissioner may from time to time designate for such purposes.

Section 13. Cooperation. The Commissioner may cooperate with any other agency of this State or its subdivisions or with any agency of
any other State or of the Federal Government for the purpose of carrying out the provisions of this act and of securing uniformity of regulations.

Section 14. Separability. If any provision of this act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, by a court of competent jurisdiction, the constitutionality of the remainder of the act and the applicability thereof to other persons and circumstances shall not be affected thereby.

Section 16. Repeal. All acts and parts of acts inconsistent with this act are hereby expressly repealed.

Section 17. Effective Date. This act shall become effective
REGULATORY PRINCIPLES

1. Applicability of Principles: These principles are designed primarily for the guidance of State Economic Poisons Control Officials in those states which have adopted the Uniform State Insecticide, Fungicide and Rodenticide Act, but should be used by other state officials insofar as their statutes will permit.

2. Definitions and Standards: The definitions and standards established for this Association should be adopted by state officials insofar as their statutes will permit.

3. Methods of Analysis: The current methods of analysis of the Association of Official Agricultural Chemists of North America shall be adopted as the official methods insofar as they are applicable, and such other methods shall be used as may be necessary to determine whether the product complies with the law.

4. Registration of Products: Uniform application forms for registration should be used by State Officials. Two specimens or exact copies of the labeling of each proposed product should be submitted with the application. Also, there should be submitted the name and percentage of each active ingredient and the total percentage of inert ingredients in the product, the proposed directions for use, and a list of the specific pests for control of which it is to be sold, if such information is not contained in the labeling. Such other pertinent information concerning inert ingredients and physical properties of the product shall also be included on request.

5. Registration, General Application of: A registration of an economic poison is held to apply to the product even though manufactured at or shipped from other than the registered address. When a product has been registered by a manufacturer or a jobber, no registration shall be required of other sellers of the product so registered, provided shipments or deliveries thereof are in the manufacturer's or registrant's original, unopened, and properly labeled immediate containers.

6. Registration, Refusal or Cancellation of: Any of the following causes is sufficient to justify refusal or cancellation of registration of a product:

   (a) if the labeling bears any statement, design, or graphic representation relative thereto, or to its ingredients, which is false or misleading in any particular;

   (b) if found to be an imitation of or illegally offered for sale under the name of another economic poison;

   (c) if the labeling bears reference to registration procedure, or number;

   (d) if the labeling accompanying the economic poison does not contain directions for use which are adequate for the protection of the public under customary conditions of use;
(e) if the label does not contain a warning or caution statement which may be necessary to prevent injury to living man and other vertebrate animals, vegetation (except weeds), and useful invertebrate animals;

(f) if the label does not bear an ingredient statement on that part of the immediate container and on the outside container or wrapper, if there be one, through which the ingredient statement on the immediate container cannot be clearly read, of the retail package which is presented or displayed under customary conditions of purchase. Provided that the control official may permit the ingredient statement to appear prominently on some other part of the container, if the size or form of the container makes it impracticable to place it on the part of the retail package which is presented or displayed under customary conditions of purchase.

(g) if any word, statement, or other information required to appear on the label or labeling is omitted or not prominently placed thereon and in such terms as to render it likely to be read and understood under customary conditions of purchase and use;

(h) if an economic poison is found to be injurious to living man or other useful vertebrate animals, or to vegetation (except weeds), to which it is applied or to the person applying such economic poison when used as directed or in accordance with commonly recognized safe practice.

7. Changes in Labeling or Ingredient Statement: Changes in the substance in the labeling or ingredient statement of a registered economic poison shall be submitted in advance to the control official. The registrant must describe the exact change desired and proposed effective date and such other pertinent information that justify such changes. After the effective date of a change in labeling or ingredient statement the product shall be marketed only under the new claims or ingredient statement, except that a reasonable time may be allowed by the control official for disposal of properly labeled stocks of the old product. Changes in the composition shall not be allowed if such changes would result in a lowering of the product's value as an economic poison.

8. Label Requirements: Each package of economic poison sold separately shall bear a complete label. The label shall contain the name of the product; name and address of the manufacturer, registrant, or person for whom manufactured; directions for use when necessary; statement of net content; and an ingredient statement. The label of every economic poison, if necessary to prevent injury to man, other animals, and useful vegetation, must contain a warning or caution statement, in non-technical language based on the hazard involved in the use of the economic poison. In addition, any economic poison, highly toxic to man shall be labelled conspicuously with the word "poison" and the skull and cross-bones symbol all in red on a background of distinctly contrasting color, and the first-aid antidote for the poison shall be given.
9. Directions for Use - When Necessary: Directions for use are required whenever they are necessary for the protection of the public. The public includes not only users of economic poisons, but also those who handle them or may be affected by their use, handling, or storage. Directions for use are considered necessary in the case of most small retail containers which go into the hands of users, and in the case of larger containers with the following exceptions:

(a) Directions may be omitted where the economic poison is sold in containers of 50-pounds or more of a solid or 20 gallons or more of a liquid, Provided; The economic poison is a well-known substance or mixture of substances for economic poison purposes and is intended only for the use to which it is ordinarily applied, and it bears an ingredient statement giving the names and percentages of each of the active ingredients.

(b) Directions may be omitted if the economic poison is to be used by manufacturers in their regular manufacturing processes, Provided; The label clearly shows that the product is intended for use only in manufacturing processes, and bears an ingredient statement giving the name and percentages of each of the active ingredients.

(c) Directions may be omitted if the economic poison is sold only to physicians or veterinarians, Provided; The label bears an ingredient statement giving the name and percentages of each of the active ingredients.

(d) Directions may be omitted if the economic poison is sold to distributors for dilution or mixing with carriers to prepare economic poisons for sale to the public, Provided; The label bears an ingredient statement giving the name and percentages of each of the active ingredients, and the economic poison is a well-known substance or mixture of substances, and there is readily available general knowledge of the composition, methods of use, and effectiveness of the product for economic poison purposes.

10. Other Claims: No claim shall be made for products in any written, printed or graphic matter accompanying the product at any time which differ in substance from representations made in connection with registration.

11. Name of Product: The name of the product shall appear on the labeling so as not to emphasize any one ingredient, or otherwise be misleading. It shall not be arranged on the label in such a manner as to be confused with other terms, slogans or legends.

12. Brand Names. Duplication of, or Infringement on: A brand name is distinctive with reference to the material to which it applies, and the registration of economic poisons under the same brand name by two or more manufacturers or shippers should be discouraged. This principle applies also to the registration of brand names so similar in character as to be likely to be confused by the purchaser. In the event the same name, or a closely similar one is offered by another
manufa~c.,~r., the official should acquaint both parties with the fact, with the~ view of avoiding the confusion which follow the duplication of brand names.

13. **Ingredient Statement:** A label shall state; The name and percentage by weight of each active ingredient, together with the total percentage by weight of the inert ingredients. In the ingredient statement all names shall be printed in type of the same size, and in such terms as to render them likely to be read and understood under customary conditions of purchase.

14. **Name of Ingredients:** The well-known common name of the ingredient must be given or, if the ingredient has no common name, the correct chemical name. If there is no common name and the chemical composition is unknown or complex, the enforcement official may permit the use of a new or coined name which he finds to be appropriate for the information and protection of the user. If the use of a new or coined name is permitted, the enforcement official may prescribe the terms under which it may be used. A trademark or trade name may not be used as the name of an ingredient except when it has become a common name.

15. **Sliding Scale Percentages:** The "sliding scale" method of expressing percentages shall not be used. (Example: "phosphorus, 2-3%). This is not to be construed as forbidding the use of qualifying statements descriptive of the basic active material or materials, provided such statements do not constitute an integral part of the percentage of total active ingredients. (Example: "Technical Chlorinated Camphene XX% (Combined Chlorine 67% - 69%).")

16. **Net Contents:** Each package of an economic poison shall show the net weight or measure of content, either stenciled or printed on the package or container, or on a tag attached thereto. Indefinite statements or content such as "..... oz. when packed" shall not be used. Statements of liquid measure, or of specific gravity or density of liquid preparation, or expression of composition in terms of pounds per gallon, shall be made on the basis of 68°F (20°C) except when other basis has been established through trade custom.

17. **Coloration of Highly Toxic Materials:** The white economic poisons hereinafter named shall be colored or discolored in accordance with this section. Provided, however, that any such white economic poison which is intended solely for use by a textile manufacturer or commercial laundry, cleaner or dyer as a moth-proofing agent, which would not be suitable for such use if colored and which will not come into the hands of the public except when incorporated into a fabric, shall not be required to be so colored or discolored in accordance with this section. The hues values, and chromas specified are those contained in the Munsell Book of Color, Munsell Color Company, 10 East Franklin Street, Baltimore, Maryland.

(a) The coloring agent must produce a uniformly-colored product not subject to change in color beyond the minimum requirements during ordinary conditions of marketing and storage and must not cause the product to become less effective or cause damage when used as
directed or in accordance with commonly recognized safe
practice.

(b) Standard lead arsenate, basic lead arsenate, calcium
arsenate, magnesium arsenate, zinc arsenate, zinc
arsenite, and barium fluosilicate shall be colored any
hue, except the yellow-reds and yellows, having a value
of not more than 8 and a chroma of not less than 4, or
shall be discolored to a neutral lightness value not
over 7.

(c) Sodium fluoride and sodium fluosilicate shall be colored
blue or green having a value of not more than 8 and a chroma
of not less than 4, or shall be discolored to a neutral
lightness value not over 7.

(d) Others. Other white powder economic poisons may be required
to be colored or discolored, after investigation and public
hearing.

(e) The enforcement official may permit other hues to be used
for any particular purpose if the prescribed hues are not
feasible for such purposes, and if such action will not
be injurious to the public.

(f) The coloration requirements above shall apply to the
materials named therein, and not to non-highly toxic
mixtures consisting of other ingredients with highly
toxic materials.

18. Highly Toxic: An economic poison which falls within any of the
following categories when tested on laboratory animals (mice, rats and
rabbits) is highly toxic to man within the meaning of these principles:

(c) Oral toxicity. Those which produce death in half or more
than half the animals of any species at a dosage of 50
milligrams at a single dose, or less, per kilogram of
body weight when administered orally to ten or more such
animals of each species.

(b) Toxicity on inhalation: Those which produce death in half
or more than half of the animals of any species at a dosage
of 200 parts or less by volume of the gas or vapor per
million parts by volume of air when administered by
continuous inhalation for one hour or less to ten or more
animals of each species, provided such concentration is
likely to be encountered by man when the economic poison
is used in any reasonably foreseeable manner.

(c) Toxicity by skin absorption: Those which produce death in
half or more than half of the animals (rabbits only) tested
at a dosage of 200 milligrams or less per kilogram of body
weight when administered by continuous contact with the bare
skin for 24 hours or less to ten or more animals.
Provided, however, that an enforcement official may exempt any economic poison which meets the above standard but which is not in fact highly toxic to man, from these principles with respect to economic poisons highly toxic to man, and may after hearing designate as highly toxic to man any economic poison which experience has shown to be so in fact.

19. Sale or Possession of Sodium Fluoroacetate: No person shall sell or possess any sodium fluoroacetate except federal, state, county, municipal officers or their deputies for use in their official duties in pest control; research or chemical laboratories in their respective fields; regularly licensed pest control operators for use in their own service work; and wholesalers or jobbers of economic poisons for sale to the aforementioned persons, or for export.

20. Sale or Possession of Thallium: No person shall sell or possess any thallium or thallium compound except federal, state, county, municipal officers or their deputies for use in their official duties in pest control; research or chemical laboratories in their respective fields; regularly licensed pest control operators for use in their own service work; properly registered ant poisons containing thallium expressed as metallic not more than 1%; wholesalers or jobbers of economic poisons for sale to the aforementioned persons; or for export.

21. Labeling Sodium Arsenite Solution: An economic poison labeled or sold as sodium arsenite solution for control of weeds, termites, or wood-destroying fungi shall bear a statement of the percentage of arsenic trioxide contained therein as the active ingredient, and in addition shall bear a statement of the total arsenic in water-soluble form expressed as metallic, and the pounds of arsenic trioxide per gallon at 68°F. The weight of the solution in pounds per gallon at 68°F, may also be given.

22. Labeling Products Containing Arsenic: The label of any economic poison containing arsenic as an active ingredient in any form shall show the total amount of arsenic, expressed as metallic, and the amount of arsenic in water-soluble form, expressed as metallic, in addition to other required statements.

23. Labeling Products Containing Copper: If an economic poison contains a copper compound of uncertain composition, the ingredient statement may be given in terms of copper expressed as metallic providing the type of compound is also shown. For example, the name of active ingredient may be stated as "Copper expressed as metallic (derived from basic copper sulfate)."

24. Labeling Products Containing Alkaloids: Products compounded with tobacco, Ilex vomitoria, saffodila seed, or any other alkaloid-bearing material, shall be stated in terms of the alkaloid and not in terms of the plant material. Where accurate methods for determining alkaloid content are unknown, manufacturer and enforcement official should agree on an acceptable analytical procedure.

25. Labeling Products Containing Organic Thiocyanates: Materials containing organic thiocyanates under the general classification of esters,
ethers, and similar compounds, containing up to and including 18 carbon atoms shall be guaranteed according to the actual ester or other content, rather than the percentage of commercial material present. In addition, the application for registration should contain a qualifying statement showing the percentage by weight of the combined nitrogen in the finished product.

26. **Physical properties.** The physical properties of an economic poison shall be such that the economic poison is effective when used according to directions given in the labeling, or if no directions are given, when used in accordance with common practice. (This is Virginia Regulation 21, and in view of Mr. Eppes' recent inquiries on physical properties, may deserve special consideration.)

27. On products claiming "microfine", "micronized", "micron", "mike," "micron size", or similar terms implying the equivalent, the average particle size in microns should be stated. (This particularly applies to dusting sulfurs making such claims, or making claims for control which necessitate a certain micron size or smaller.)

28. **Numerals in names.** When numerals appear in the name of an economic poison, there should be a realistic correlation between the numerals and the percentages to which they refer, or which are inferred by them. If the numerals refer to the weight of active ingredient per gallon, the same correlation is required. Certain expressions universally accepted through long trade practice, such as "Rotenone 75" and "20-20-60 Dust", as well as numerals obviously having no reference to active ingredients, such as numbers of a formula, as "1080", may be accepted.
DEFINITIONS OF TERMS

Active Ingredients: An ingredient which will in itself, when present in sufficient quantity, prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds, or other pests; it must not be antagonistic to the activity of the principal active ingredient or ingredients.

Adhesive or Sticker: A substance which increases the firmness of attachment of finely-divided solids or other water-soluble materials to a solid surface, and may be measured in terms of resistance to time, wind, water, mechanical and chemical action.

Antidote: A practical immediate treatment, including first aid, in case of poisoning.

Antiseptic: A substance which opposes sepsis, putrefaction or decay; one that prevents or arrests the growth or action of micro-organisms, either by destroying them or by inhibiting their growth and activity; when used for short periods of time must be a disinfectant or germicide; but when used for long periods of time may act by preventing growth and development of disease germs; used especially of agents applied to living tissue.

Bactericide: Anything that destroys bacteria. The term is synonymous in large part with germicide, the chief difference being that the latter is somewhat broader, inasmuch as it may include micro-organisms other than bacteria. Bactericide is a precise term applying only to bacteria and to bacteria of all kinds. In practice, however, it is ordinarily regarded in the same light as germicide with respect to the resistance of different bacteria; that is, a substance, in order to be called a bactericide, is not necessarily required to be capable of destroying bacterial spores.

Brand: The name, number, trade-mark, or designation applied to an economic poison of any particular description by the manufacturer, distributor, importer, or vendor thereof. Each economic poison differing in the ingredient statement, analysis, manufacturer or distributor, name, number, or trade-mark shall be considered as a distinct and separate brand.

Disinfectant: A substance that frees from infection; usually, a chemical agent which destroys disease germs or other harmful micro-organisms, but not necessarily the resistant spore forms; commonly used of substances applied to inanimate objects.

The term disinfectant suggests the cleaning of sick rooms, clothing, bedding, lavatories, stables and in fact of any places or things that might harbor disease. By contrast, germicide is a precise, colorless word, conveying its literal meaning and little more. The two terms appear to have the same meaning when applied to substances used in fighting disease. If it is accepted that substances called disinfectants are germicides, and, in general, germicides may act as antiseptics but that
antiseptics are not necessarily germicides, then it follows that disinfectants may, theoretically at least, act as antiseptics, but that antiseptics may not necessarily act as disinfectants.

Detergent: A substance used in aqueous or other medium to facilitate removal of foreign matter from solid surfaces.

Deflocculating Agent: A substance which aids in the production or maintenance of a dispersion of a solid within a liquid.

Deposit Builder: A substance which increases the material adhering to the surface during a reasonable period of application; it decreases the affinity between the desirable material and water, resulting in a greater deposit of material and shedding of water with less run-off of desirable material.

Economic Poison: A substance or mixture of substances intended for use as an insecticide, rodenticide, herbicide, fumigant, pruning paint or wood preservative; also a substance or mixture of substances intended for use as a fungicide, disinfectant, germicide, or bactericide except when for use on or in living man or other animals, and any other product intended for use on other forms of undesirable plant, animal or virus, except viruses on or in living man or other animals.

Emulsifying Agent: A substance which aids in the production or maintenance of a dispersion of one liquid within another.

Fumigant: A substance or mixture of substances which produce gas, vapor, fume, or smoke intended to destroy insects, bacteria or rodents.

Fungicide: A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any fungus.

Fungi: All non-chlorophyll bearing thallophytes (that is, all non-chlorophyll bearing plants of a lower order than mosses and liver worts) as, for example, rusts, smuts, mildews, molds, yeasts and bacteria, except those on or in living man or other animals.

Germicide: A substance that destroys germs (microorganisms); applied especially to agents that kill disease germs. In practice it is assumed that a substance represented as a germicide, when used as directed, will kill all ordinary disease germs, but is not necessarily required to be capable of destroying bacterial spores.

Herbicide: A substance or mixture of substances intended to prevent, destroy, repel or mitigate any weed.

Insect: Any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class Insecta, comprising six-legged, usually winged forms, as for example, beetles, bugs, bees and flies; and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as for example, spiders,
mites, ticks, centipedes and woodlice, also nematodes and other worms, or any other invertebrates which are destructive, constitute a liability, and may be classed as pests.

**Insecticide:** A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any insects which may be present in any environment whatsoever.

**Label:** All written, printed, or graphic matter on, or attached to the economic poison, or the immediate container thereof, and the outside container or wrapper to the retail package of the economic poison.

**Labeling:** All information and other written, printed, or graphic matter upon the economic poison or any of its accompanying containers or wrappers to which reference is made on the label or in supplemental literature accompanying the economic poison.

**Larvicide:** A substance or mixture of substances intended to prevent, destroy, repel or mitigate larvae.

**Package:** The carton, box, barrel or other receptacle into which an economic poison is placed for use, handling, removal, shipment, or conveyance; a single container of such article or articles, or several containers packed together, including both the immediate container of the material and the box, carton, or other container (if any) in which it is enclosed or displayed.

**Package, Original Unbroken:** The unit retail package as ordinarily displayed on and sold from the shelves of the dealer, distributor, or other vendor.

**Package, Unbroken:** The package delivered by the shipper to the carrier at the initial point of shipment. It may contain one or more original unbroken packages as defined above.

**Rodent:** All animals of the order Rodentia, such as rats, mice, gophers, prairie dogs, or squirrels.

**Rodenticide:** A substance or mixture of substances intended to prevent, destroy, repel or mitigate rodents or any other undesirable vertebrate animal.

**Sanitizer:** A substance which reduces the number of casual bacterial contaminants to safe levels as judged by health requirements; commonly used of substances applied to inanimate objects.

**Selective Wetting Agent:** A substance which by affecting the surface, alters the relative ease of setting a solid by various fluids, for example, causes lead arsenate to be preferentially wetted by oil rather than by water.

**Spreader or Film Extender:** A substance which increases the area that a given volume of liquid will cover on a solid, or on another liquid.
Sterilize: To render sterile, that is, free from all living microorganisms. Heating for a sufficient time at a temperature at which microorganisms cannot live is recognized as a physical method of freeing inanimate objects and their surroundings from all living microorganisms. Usually understood as referring to the treatment of surgeons' instruments, gauze bandages, culture dishes, and other apparatus rather than the treatment of the sick room or of the human body.

Disinfect refers particularly to the destruction of disease germs, especially the vegetative forms, while sterilize denotes the freeing from all organic life. Sterilize is the more drastic, and it might easily happen that something is thoroughly disinfected without being completely sterilized.

Synergist: A substance which produces in combination with another a pharmacological effect in that the efficiency of one or more of the components may be greatly heightened or potentiated by the other.

Water Modifier: A substance which is used to change the pH or the chemical composition of dissolved or suspended material in the spray water in order to prevent undesirable behavior.

Weed: Any plant which grows where not wanted.

Wetting Agent: A substance which appreciably lowers the interfacial tension between a liquid and a solid, and increases the tendency of a liquid to make complete contact with the surface of a solid, so that no dry area may remain.
REPORT OF THE EXECUTIVE COMMITTEE

J. D. Patterson, Chairman

The Executive Committee has held two meetings since the adjournment of our convention of 1950. Following the annual meeting, a session was held at the Shoreham Hotel to assist the President to arrange a program and to select committee personnel.

The committee convened on April 23, 1951 for a week's discussion of the various phases of economic poisons control activities. This conference was held in the offices of the Insecticide Division, Production and Marketing Administration, U.S. Department of Agriculture. Coordination of enforcement work performed by federal and state agencies was considered both by the committee and at a meeting on April 25 with representatives of trade associations. A resume of these meetings was distributed through the medium of the June issue of the Pest Controller.

Information presented by federal insecticide personnel prompted the Executive Committee to secure capable speakers to discuss latest developments in the pesticide field.

The Secretary was instructed to obtain information concerning incorporation of the Association. This was done and the committee voted to proceed with details for incorporation which became effective August 14, 1951.

The committee met at 10:30 p.m. Friday evening, October 5, 1951 at the Shoreham Hotel, J.D. Patterson, presiding.

Reports of Committees to study Toxicity and Antidotes, Legislation, and Methods Clearing House were reviewed and approved. The committee expresses its appreciation to these groups and suggests this work be continued.

The committee recommends the adoption of the report on ingredients and further recommends the committee study more thoroughly the idea of a regulation covering solvents and emulsifiers.

Special commendation is recommended for the comprehensive report of the Uniform Sampling Committee. This committee moves the adoption of this procedure as tentative.

The report of the Standards Committee was reviewed and approved.

The report on the use of Insecticides in Fertilizers was approved.

Regulations and Definitions Committee report covering corrections in regulations and definitions approved. It is recommended that Regulations 26, 27, 28, 29 be adopted as tentative.

Uniform Registration Committee report was reviewed and approved.

The committee takes this opportunity to express sincere thanks and appreciation to the speakers on the program, and to the committee
members and investigators for their work during the past year on behalf of the Association.

Special thanks is extended to Mr. John Conner for his efforts in carrying out details concerned with the incorporation of the Association. In recognition of the excellent job being done by our secretary, Al Huagy, the Executive Committee voted him an honorarium of $100.00 as a token of our appreciation.
The fifth annual convention of the Association was held at the Shoreham Hotel, Washington, D.C., October 6, 1951.

One hundred and seventeen persons registered; 58 represented 32 states and Canada, 21 from 7 federal agencies, 38 from industries, and 5 pesticide trade associations sent delegates.

Papers presented on the program are reproduced in full in the following pages. Also, committee reports with exception of the "Uniform Regulations and Terms Committee" are included. The recommendations of this group have been incorporated in pages 25 thru 35 of this report. It should be noted that Regulations 26, 27, and 28 have been adopted as tentative.

The problem of the use of pesticides in fertilizers was reviewed, and upon recommendation of the investigator on this subject the following resolution was adopted:

In view of the immediate and possible long-lasting effects of the application or misapplication of pesticides,

"Be it resolved. that Economic Poisons Control Officials do not register. permit the sale or distribution of pesticide-fertilizer mixtures for field crop or horticultural use unless such mixtures have been formally approved by the officials of the agricultural experiment station or other officials vested with such responsibility by law in their state."
REPORT OF PRESIDENT

Allen B. Lomax
Chief, Bureau of Chemistry
State Department of Agriculture
Sacramento, California

It is a pleasure to see so many states represented at this meeting and to have this opportunity to discuss our problems with my many friends. I wish to take this opportunity to extend a welcome to all of you.

This is our fifth annual meeting and it seems time to take stock of what we have accomplished and to plan for the future. You will note that our Association name now shows "Incorporated" which is one advance in the last year. Those of you who were present at our first meeting will recall the strong recommendation made by our good friend Henry Leppe that we should incorporate. This has now been done.

In reviewing the year and comparing it with the past years, it seems to me that our problems generally fall into three classes: those having to do with registration and labeling of economic poisons, those having to do with application of economic poisons, and those having to do with residues or detrimental effects. At first we were more concerned with problems in the first class but the other two categories seem to be coming more to the front now.

We have our proposed uniform state economic poisons law, which is being adopted by more and more states each year. The report of our Legislative Committee will give you facts and figures concerning this phase so I will not dwell on them.

Uniform laws will not achieve uniformity unless we have uniform interpretations. This can be attained only by getting together and discussing our problems or exchanging viewpoints frequently. During the last year there have been several concrete examples of the value of uniform actions. The first example that comes to mind was the case of a firm selling what we call an agricultural mineral in California with many extravagant claims, including some for pest control. We took exception to the claims in the labeling and as the firm was from out of state it took some time for correspondence to clear. In the meantime, we had sent copies of the correspondence to North Dakota because the firm had mentioned this state in correspondence. We found that the regulatory actions in North Dakota had been similar to those in our state and when the applicant appeared in our office and started to explain how he had had no trouble anywhere else but in California, and couldn't understand why we were so unreasonable, we asked him why he had such difficulty in North Dakota. The expression on his face clearly indicated that he had no idea that control officials ever exchanged information that would be of help to each other. Matters were straightened out promptly.

In a second case which showed the value of exchanging copies of correspondence, a fly spray began to be advertised over the radio with extravagant claims. The product had not yet been registered in
California although the label appeared to be acceptable and we understood the product was in the process of Federal registration. At the time that we were taking action to have claims brought into line, copies of correspondence showed that the State of Virginia was also taking similar action. Discussions with the radio stations promptly stopped the false advertising. These two examples show how much can be accomplished by making an extra copy of some letters and sending it to another interested economic poisons control official.

No doubt you have noted that some states are sending to our Secretary copies of reports showing deficiencies and misbrandings of economic poisons. Your Executive Committee believes that the distribution of information with regard to misbranded and deficient samples should give aid to all officials in securing correction. In order to make this service of greatest help to all, we all must participate and supply the information that we uncover concerning unacceptable products in interstate distribution.

Our Secretary-Treasurer, Al Heagy, deserves a vote of thanks for his handling of the Pest Controller. We consider this phase of the Association work very important and I would like to take this opportunity to recommend most strongly that all of us cooperate to make this publication a source of real information and value. If you have taken action against a firm or a product in the national market, tell us about it. If you have a problem, send it in and ask for suggestions.

The scope of the uniform economic poisons law is quite broad but it may omit some new important types of materials that should be covered. It includes some products which may not commonly be considered economic poisons. For example, in California, ship bottom anti-fouling paints are regularly registered and handled just like other economic poisons. Of course this may not be of much interest to land-locked states. One of the items that is becoming of greater interest all the time is defoliants and materials intended for killing or accelerating the drying of plant tissues. A preharvest spray can kill or dry the foliage on cotton, rice, milo maize, potatoes, and greatly facilitate harvest. Many of these materials are also used as weed killers but some are specially prepared for defoliant purposes only. Some of these materials are just as toxic as other economic poisons and may cause as much difficulty or damage through drift when applied. Defoliants are specifically included as economic poisons in California law.

One of our most difficult problems is the proper handling of experimental materials. There seems to be two general categories of experimental materials; first, we are familiar with so-called custom mixtures made according to specification of a farmer or other customer who has a special idea for trial. This class of product should be registered in order that there be assurance that proper warnings and precautions appear on the labels. Custom mixtures will probably always be a headache to state enforcement officials and should not be permitted to develop into a method of distributing products without proper labeling and registration. Second, there are the materials that are truly new materials which show promise for pest control purposes, but concerning which inadequate information is available. As a matter of general policy,
we should not permit experiments to be carried on at the expense of the farmer as to do so would permit an unscrupulous manufacturer to sell useless or worthless products by misrepresenting them to his customers. On the other hand, we do not want to be in the position of stifling progress. If it is too difficult for a manufacturer to develop information with regard to the value of a new chemical, there will be no incentive to carry on this valuable development work.

As materials are developed that are of greater and greater toxicity, the importance of adequately controlling experimental work becomes greater and greater. When consideration is given to all the data that are necessary satisfactorily to market a new economic poison, it seems that we require more for pest control materials than is required for drugs used on humans. We need to know, first, if the product is satisfactory for the control of a pest; second, does it cause any injury to the host being treated; third, what are the hazards to persons applying the material, and fourth, what spray residues may remain on food products after it has been applied. In California, we prepared a list of about three dozen possible questions pertinent to new materials to assist registrants in preparing the necessary information. The list is rather formidable. To develop the answers to all of these questions may require more than two years' work and cost more than $50,000. Yet if the public is to be adequately protected the work must be done. If this much is to be demanded of the industry, it is only fair that we demand of ourselves that we keep in close contact and be familiar with the best available information concerning all pesticides. 

This brings me to consideration of uniform standards. Your Uniform Standards Committee has taken on a tremendous job in trying to set up uniform standards and labelling requirements for economic poisons. We need this basic information for practically all of our pest control materials. At present information is scattered through the literature and needs to be brought together into one handbook. It will not be possible to include information with regard to all the satisfactory formulations and these are perhaps of greatest importance in determining whether a product will do a satisfactory job. It is a tremendous task and it is going to take the closest cooperation between states to do our job effectively and economically.

The next general class of problems that we have seems to be those concerning application of pest control materials. With the development of widespread usage of the aircraft to apply pest control materials, problems of drift with resultant injury to persons, animals and crops of value have become of increasing interest. One might ask, how does this affect the economic poisons control official? It seems to me that he is affected in two ways; first, he must consider problems of aircraft application of pest control materials when he accepts a label of a new economic poison in connection with registration of the new material. In the second place, he may be charged with enforcement of a specific law governing application of pest control materials and have an added responsibility of informing pest control operators with regard to proper application of the new material. It is reported that at present about twenty-three states have specific laws of one type or another governing aerial application of pest control materials. About twelve of these states require specific job reports for each property treated by aircraft. In the whole country, it is estimated that probably twenty-five million acres received treatment of pest control materials applied
by aircraft. In California, our records show that over two million
acres received application of pest control materials by aircraft. More
than 150 different pesticidal chemicals and mixtures of chemicals were
applied in this one State to approximately 100 different crops. Although
the widespread increased use of aircraft applying pest control materials
has brought application problems to the attention of everyone, many of
the damages attributed to aircraft are actually due to power application
by ground-rig type of equipment. The airplane is easily seen, easily
heard, and whenever any trouble occurs, the finger points to it. We
have seen pictures that demonstrate that dust can drift great distances
when applied by powered ground equipment.

Economic poisons control officials must give attention to the
problem of spray and dust residues on treated foodstuffs and to detri-
mental effects of pesticides on the flavor or quality of crops. We have
always had to consider possibilities of spray residue on fruits and
vegetables or other food when we reviewed the directions for use on a
label. This is illustrated by label requirements instructing that a
product not be used within a specific time, such as thirty days of harvest
of a crop, or directions that dishes be covered before a fly spray is
applied. More recently the problem of adverse tastes remaining from use
of economic poisons has been forcibly brought to our attention. Now when
a new product is offered for registration, in addition to inquiring for
data with regard to possible toxic residues, we must inquire as to tests
that have been carried on to demonstrate that no adverse tastes will
appear. It must be realized that this all adds to the cost of developing
and marketing a new economic poison but by asking questions concerning
these important points, we can further research and actually help manu-
facturers to secure data. This will require cooperative effort between
Federal, state and commercial facilities in order to secure the necessary
data. Some firms may be able to carry on the whole expense themselves
while others that have ideas with regard to development of new materials
will best be able to do this through cooperation with other agencies.
The canning and processing industry has a decided stake in this
development work and has already shown its interest in cooperating to
develop information with regard to possible tastes that may develop
in canned produce. This type of work should be encouraged by us both
as an Association and individual.

During April the Executive Committee had an excellent meeting with
Dr. Reed's office in Washington, D.C. Our thanks are due to Dr. Reed
and his fine staff for the information that has developed and the
permission for it to be sent to all of us through our Secretary's
office. This afternoon you will hear reports from your committees
and investigators. I know you will agree that they have done a lot of
excellent work during the last year and we appreciate it. It has been
a pleasure to serve as your President and I wish to thank everyone for
all the help that I have received.
Many individuals and organizations have expressed concern over the effects of state and federal regulations on our progress in the field of economic poison development. We in industry are every alert to the possibility that restrictive legislation may curtail our activities to an extent where we can no longer conduct profitable research programs. Up to now, however, there is very little evidence indicating that economic poisons laws have been anything but helpful to our program, and those of us who believe in our system of government are not gravely concerned over the prospects of government regulation having disastrous effects on our progress.

We are, however, concerned over the ever increasing problem of high cost of research and product development, and the real effect it is having on the creation of new pesticides for agriculture.

The economic outlay involved in a sound research and development program, plus the cost of introducing new materials in the field of agriculture, has reached a level where only the largest corporations can afford to engage in such activity. This means that scores of smaller companies are forced to abandon research programs in agriculture. With ever increasing demands for world food and fiber production, plus the ever increasing complexity of the biological problems involved, it is obvious that more research work is needed, and the curtailment of this type of work by the smaller companies will retard our progress in the fields of agriculture and public health.

In order to give you some idea of the costs involved in putting a compound on the market, I have consulted with representatives of several large chemical companies, and have pooled their ideas in a composite estimate of just what it takes.

From the time the new material is discovered until the product is offered for sale on a commercial basis, there are at least seven major expenses involved, as follows:

1. Attorneys' Fees. The first step to be taken is the investigation of the material's legal status. Attorneys must determine if the material is covered by patents. If it is they must make arrangements with the patentee. If it is not covered by existing patents, then applications are prepared and filed. For this service you will be extremely fortunate if the attorneys' fees are not in excess of $5000.00.

2. The next step is to conduct field studies to determine if your compound has real economic value. This program will require a minimum of three years, and will include salaries of your own personnel, plus grants-in-aid, fellowships, gratis materials to various state and federal workers. A conservative estimate for this item is $50,000.00.

3. After it becomes obvious that the compound has value,
mammalian toxicological studies must be undertaken. It is well to start this phase of the program as soon as possible, since at least two full years will be required to complete it if no complications are encountered. The minimum requirement for this study includes acute oral, dermal and mucous membrane tests, plus two years of chronic feeding studies on rats, and possibly dogs, with appropriate histo-pathological studies. This work may be conducted by your own personnel, if your company is equipped with technicians for such work, or it can be farmed out to any one of several commercial laboratories. This work will cost from $20,000.00 to $30,000.00 for each compound.

4. Before you can get very far along in the introduction of a new compound, you must have an analytical method for detecting the compound in trace amounts. This is imperative if the material is used on food crops, or on animals or man. A good analytical method is also essential to determine such important characteristics of the material as its fate in the animal, plant or in soil, if it is used for soil-inhabiting pests.

The time and expense involved in developing a satisfactory analytical technique depends upon the nature and complexity of the compound. An expenditure of $10,000.00 would probably cover this cost, if no serious complications are encountered.

5. Another problem that has come to our attention with increasing forcefulness lately is the effect of the compound on the quality of the produce on which it is used.

The unfortunate indiscriminate use of benzene hexachloride and other compounds has made the public aware of poor quality and off-flavors in food products. Consumers are especially alert to the effect of chemicals on the quality of processed food.

Fortunately, canner organizations and various state and federal agencies have undertaken a thorough study of these problems, which relieves the manufacturer of a large share of this expense. Despite this assistance however, the manufacturer must be prepared to spend at least $2,500.00 on taste tests, brewing tests, etc., if the compound is to be used on food crops.

6. Now comes the really expensive part of the program. This consists of production studies, pilot plant and pilot plant operation deficits.

If the compound is new, the time and expense of developing a satisfactory production method may be tremendous. Furthermore, chemical equipment used in more pilot plant operations requires large outlays of funds. Unless the compound is very unusual, the pilot plant must be operated at a loss, even if the material is sold in rather large volume under experimental permit. One of the most promising new compounds now being tested on a commercial scale was sold at a loss of one dollar per pound for one or two years, and is still not out of the red.

The cost of this item may vary greatly, depending upon the compound. An outlay of $75,000.00 to $250,000.00 may be required for this item.

7. Administrative expenses are always added in on the development
of new compounds. An average for this item would be about $10,000.00.

At this point in the program a total of $250,000.00 to $350,000.00 will have been spent, and you are now ready to make the big decision on whether to construct a full commercial scale plant and start getting your money back. If you decide to go ahead you must be prepared to spend any where from one half million dollars on up on the plant, plus additional time and funds in obtaining permission from the NPA and other agencies to purchase the equipment and raw materials, if your compound requires scarce intermediates.

The above story of the development of a new compound is not an exaggeration. In fact, it is probably too conservative. In support of this we can cite an example of a compound that required the expenditure of $1,350,000.00 before large scale production and sale was achieved.

A sum of $400,000.00 has been spent on another compound, and it is still in the pilot plant stage. We know of another material which was abandoned after an expenditure of $150,000.00.

Of greatest concern to the chemical company is the life expectancy of the compound once it has cleared all of the hurdles. Company executives will risk funds on a material that promises to show a profit for five years, but any time less than this will not get their whole hearted support.

Unfortunately, the life of many new agricultural chemicals will probably be less than five years. Competition with new and existing chemicals is a factor affecting the longevity of compounds, but this problem is not limited to agricultural chemicals. Chemical company executives can understand such factors and properly evaluate them, but such biological road blocks as the development of resistance or upsetting the balance of nature completely throws them for a loss.

There have been cases where new insecticide materials have lasted only two years in the field because of the development of resistant insect strains. There are also other cases where the use of a material controls the pest against which it is used but other pests develop in this environment, causing a worse situation than existed before. There are several such cases, such as the development of mite problems where DDT and certain other chlorinated hydrocarbon insecticides are used on deciduous fruits and cotton, or the development of soft brown scale on Citrus treated with parathion, or the development of mealybug problems on Citrus treated with Ovotran or Aramite.

Unfortunately, there is just no way to predict what will happen when a large area is treated with a new chemical. The only logical procedure is to treat the area and find out. In the meantime, the chemical company may find itself holding a million dollar bag.

Despite the rather gloomy situation I have described the chemical industry is still in business and willing to gamble. This is evidenced by the fact that more new materials are being tested today than ever before and the acaricide field has received special attention in this regard.

During the 1950 season there were thirteen acaricides sold commercially, and at least ten new ones being tested in the field. The only explanation
for this interest is the ever increasing importance assumed by various species of mites on agricultural crops.

There are several promising organic phosphate acaricides being used and tested throughout the world, but I am leaving this group for Floyd Smith to discuss this afternoon.

The non-phosphate acaricides can be grouped in two classes: the phenolic and the non-phenolic types.

The phenolic acaricides were first tested several decades ago. The most simple types were the nitrophenols and cresols. In the thirties the Dow Chemical Company pioneered in the field of practical phenolic acaricides by the synthesis of 2,4-dinitro-6-cyclohexyl phenol. This was the first phenolic acaricide that could be used on a wide range of non-dormant living plants with any degree of safety.

The more recent phenolic acaricides such as Ovotran, Genite 923, and Aramite, have largely taken over the field. The following evaluations of these materials are based on our experience with them in the field, plus the published and unpublished reports of other workers.

Ovotran, p-chlorophenyl-p-chlorobenzene sulfonate, is the outstanding acaricide, to my knowledge, of all those being tested. It is the least specific of any and has long residual effectiveness on eggs and newly hatched nymphs. It is not effective on adult populations. Its greatest limitation is its phytotoxicity and possible taste imparting properties on certain agricultural crops.

Genite EM 923, the 2,4-dichlorophenyl ester of benzene sulfonic acid, is a closely related chemical to Ovotran, but is less effective and possesses certain phytotoxicity and taste imparting properties which limit its usage. Genite 923 is used exclusively in California, where it is relied upon by deciduous fruit growers for the control of orchard mites. This material is especially effective against the clover and the European red mite.

Aramite, 2-(p-tertiary-butyl phenoxy) isopropyl 2-chloroethyl sulfite, is the most effective acaricide of any in this group on the motile forms of mites, especially on those species closely related to the two-spotted mite group. Aramite is a poor ovicide in comparison with Ovotran, and is only fairly effective against the European red mite and poor against the clover mite at permissible concentrations. Aramite is very effective against the Citrus red mite and the Citrus bud mite. It also shows considerable promise for the Texas Citrus mite on cotton.

Of the non-phenolic acaricides, azobenzene is probably the oldest. It has been used in greenhouses for control of mites in Europe and in this country. It is too phytotoxic for general field use.

Dimite, or bis p-chlorophenyl ethanol, has been tested and used rather widely during the past five years. This is a very effective acaricide, but its high cost of manufacture has discouraged extensive usage.

Sulphenone, a p-chlorophenyl phenyl sulfone, is the most recent acaricide of this series to be used commercially. This compound has afforded good control of all mite species on deciduous fruits and is the safest
material for use on these crops from the standpoint of fruit and tree injury. Sulphenone also shows promise for the control of the six-spotted mite on avocados, the Lewis mite on Citrus and the Texas mite on cotton.

With the exception of azo benzene, all of the acaricides mentioned above appear to have a place in the production of agricultural crops. The farmers will rely upon them for their particular problems until more effective acaricides are made available by industry, or until the mites become resistant to them, or until some other problem comes up that we cannot, at this time, foresee.
STATEMENT OF JOHN D. CONNER

Before the
ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

I appreciate very much the opportunity to appear before this Association and to discuss the question of economic poisons legislation — a subject in which we have a mutual interest. When Mr. Heagy invited me to appear on your program, he did not suggest that I appear in an official capacity. Accordingly, I am taking this opportunity to appear in my capacity as an individual and to express my own personal opinion. While I assume that those whom I serve as counsel would concur to some degree in my opinions, I do not want to impute any official concurrence on their part in the opinions which I will express.

It has now been approximately five years since our present pattern of economic poisons control legislation was first officially launched in the form of the Uniform State Insecticide, Fungicide and Rodenticide Act and the concomitant Federal Act. The extent to which this pattern has been made effective, both by passage of this legislation in the various states and by the formulation and adoption of uniform enforcement policies between the Federal and the State officials, is an impressive achievement. During the past year laws substantially in accord with the uniform state act were enacted in seven states. In no state was there enacted legislation which differs substantially from the uniform act.

To a large measure the success of this movement is attributable to the officers and to the members of this Association, I know that I speak for the entire chemical industry when I state that the activities of this Association in support of the development of uniform legislative and enforcement policies have our enthusiastic and wholehearted support.

During the past few years our attention and activities have been focused chiefly on the primary phase of economic poisons control legislation represented by the Federal and the various State Insecticide, Fungicide and Rodenticide Acts. Recently, however, there has developed a renewed activity and interest in another phase of pesticide regulation which to some extent has been relatively dormant for the past several years — that of spray residues.

As you know, the Federal Security Administrator instituted a proceeding in 1949 for the purpose of establishing tolerance for the various pesticides used in the production of fresh fruits and fresh vegetables. More recently, public attention has been focused on this question as a result of the current hearings by the Select Committee to Investigate the Use of Chemicals in Food, commonly referred to as the Delaney Committee.

I would like to review briefly the issues presented by these hearings. I know that this is a question which is of vital interest to you as economic poisons control officials. I am sure that it is a question on which your guidance and recommendations will be valued by your Congressional Representatives. Some of you have already made your views a part of the record in this proceeding. It is hoped that
the views of all the state economic poisons control officials will be
solicited by the Committee as were the opinions of the state public
health officers. In this review I will limit my considerations to that
portion of the investigation which relates to pesticides.

It appears to me that insofar as pesticides are concerned, the
primary issue presented by this investigation is whether existing
federal laws are adequate to protect the public health from injury
casoned from residues of pesticides used in the production of food.

It is only in the event that this issue commands a negative answer
that a secondary issue of the type of legislation which should be re­
commanded, assumes importance. Unfortunately, there are some who,
in my opinion, have succumbed to the temptation to assume the answer
to the primary question and who have, therefore, addressed their
curiosity solely to the secondary question.

While this investigation officially is limited to federal law
and federal agencies, the outcome will, I believe, have a very strong
influence on the counterpart state legislation and agencies.

I believe that there is little disagreement among reasonable
people with the promise that it is the duty of any person who markets
a pesticide to first ascertain that the product can be used without
presenting an undue hazard to the public health. In the case of a
new product, this may necessitate extensive research. I believe that
it will be agreed as a further promise that it is a proper function of
governmental authority to assure, by the proper exercise of that
authority, before any product is marketed, that its safety has been
ascertained.

This premise, therefore, leads to an inquiry of whether additional
legislation is required to permit the adequate exercise of this
admittedly proper governmental function.

It is at this point of inquiry that the various witnesses before
the Dolemay Committee have gotten on their horses and ridden off in all
directions, many of them, I believe, jousting with windmills along the
way.

The answer to this inquiry obviously must turn upon an analysis
and an appraisal of existing legislative authority.

The answer to this inquiry would be simpler if it could be found
within the four corners of one law. This, however, is not the case.
In my opinion, the full extent of existing regulatory control over
pesticidal residues is found in an interdependent and cooperative
application of both the spray residue provisions of the Federal Food,
Drug and Cosmetic Act and the Federal Insecticide, Fungicide and
Rodenticide Act. I believe that it should be readily conceded that
neither act standing alone is sufficient to assure adequate regulatory
control of pesticidal residues. There has been, however, a noticeable
failure on the part of some to appreciate this fundamental fact. Instead
there has been a tendency to consider each of these primary federal laws
in a vacuum.

I would be "carrying coals to New Castle" were I to undertake to analyze for you the regulatory authority contained in the Federal and the various State Insecticide, Fungicide and Rodenticide Acts. I am sure that you are more aware than I of the full extent of that authority.

Possibly some of you are not as familiar with the extent of the authority over pesticidal residues presently contained in the Federal Food, Drug and Cosmetic Act and the counterpart state Uniform Food, Drug and Cosmetic Act. By risking the pitfalls of oversimplification, this authority may be briefly summarized as follows:

Section 406 (a) of this Act authorizes the Federal Security Administrator to establish, by regulation, the quantity of the various pesticidal materials, and other poisonous and deleterious materials, which may remain on any food. Other provisions of the Act specify that any food is adulterated if it contains any quantity of that substance in excess of that established by the regulation. Another provision of the law specifies that a food shall be deemed to be adulterated if it contains any quantity of such a material which may render it injurious to health. This provision is applicable regardless of whether a tolerance has been established for that substance.

The full extent of the authority inherent in these provisions has never been tested. This is due, I believe, primarily to the fact that the tolerance setting authority has never been exercised by the Federal Security Administrator, except to a very minor degree. In 1944, tolerance for fluorine on apples and pears were established by regulation but they were in effect subsequently invalidated by a decision of the United States Circuit Court of Appeals for the 9th Circuit. No other tolerances have been established under this authority.

As you know, hearings were held by the Food and Drug Administration last year for the purpose of taking evidence upon which to establish tolerances for all of the pesticidal materials which the Federal Security Administrator finds to be necessary in the production of fresh fruits and vegetables. For approximately one year, evidence on all phases of this question was presented. Although it has been over a year since these hearings were concluded it appears that it will be several more months before the proposed tolerances are issued. After the proposed tolerances are issued, an opportunity for filing exceptions and supporting briefs must be given to interested parties. After that, the evidence is again reviewed in the light of the proposed order and the exceptions and a final order setting forth the legal tolerance is ultimately issued. You may get some indication of the time element between the issuance of the proposed and the final order from the fact that in the bread hearing the exceptions to the proposed order were filed in October, 1950. The final order has not yet been issued. It appears, therefore, that no final order establishing tolerance for the various pesticidal materials used in the production of fresh fruits and vegetables will be promulgated for quite some time.

In the absence of the exercise of this authority its full extent must remain to some degree a matter of speculation. Nevertheless, it
is my interpretation that after tolerances are issued for the pesticides which the Administrator deems to be necessary in the production of any class of foods, the presence of any residue in excess of that amount, or of any residue at all of a material for which no tolerance is specified, will result in the adulteration of the food as a matter of law.

From a substantive standpoint, this would appear to me to afford very complete protection to the public health against any possible danger arising from the residues of either new or old pesticides. It would effectively preclude the use of any pesticide for which no tolerance is established.

From a procedural standpoint, the protection would appear to be equally complete. The tolerances can be enforced not only by seizure actions or criminal prosecution under the Federal Food, Drug and Cosmetic Act, but, in my opinion, they could also be implemented and enforced by the registration provisions of the Federal Insecticide, Fungicide, and Rodenticide Act.

It seems to me that the opinion of many of those who have stated that they believe that there is insufficient authority at the present time to protect the public health against injury from pesticidal residues has been premised upon either a lack of understanding of this reservoir of authority on the Federal Food, Drug and Cosmetic Act as implemented by the Federal Insecticide, Fungicide and Rodenticide Act, or by a willful disregard of the plain extent of this authority.

It is reasonable to speculate that an exercise of this tolerance setting authority during the past 13 years, together with the resultant tolerances which would now be in effect, would have to a large degree precluded the specter of inadequate control which has apparently haunted some of the witnesses who have appeared before the Committee.

It appears to me that this legislative authority which I have summarized, if it is properly enforced in a cooperative manner by the agencies concerned, should assure adequate protection to the public health against any hazard arising from pesticidal residues. It is possible that there may be latent weaknesses which might show up in the exercise of this authority although I do not foresee any such weaknesses that I would consider to be of a serious nature.

However, can we say that this authority is inadequate without ever having put it to the test? I think not.

Would it not be reasonable to establish tolerances for the various pesticidal materials which are required in the production of the various foods as a point of departure in the production of the public health? These tolerances then can and should be enforced by the authority contained in both the Federal Food, Drug and Cosmetic Act and the Federal Insecticide, Fungicide and Rodenticide Act.

If in the exercise of these present statutory provisions there is found to exist inadequate authority to protect the public health, new
legislation then could and should be considered. I would hesitate to urge even this degree of moderation if there appeared to be any possible danger to the public health, or if such danger does exist, if it cannot be dealt with under existing legislation. Do you as public officials know of any such danger? I do not, and it is upon the belief that no such inadequacy exists that I premise my opinion that there is no necessity for additional legislation.
WARFARIN

by
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Warfarin was released to the public on July 1, 1950 as a new economic poison for use in the control of rats and house mice. It is the latest addition to a long list of chemicals, each of which was hailed at one time or another as the answer to man's worst animal pest problem. Among these were preparations containing arsenic, phosphorus, strychine, barium carbonate and even concoctions, such as plaster of paris and ground glass. In fact, not so many years ago the tool kit of some pest control operators contained a wad of old rags and a wooden mallet. The rags were used to make smudge fires to smoke rats out of hiding places, and the wooden mallet came in handy to hit them over the head. Later came chemical products resulting from research, such as red squill, thallium, antu, and then compound 1080. Some of these had merit and a few are still employed today, but the use of most has decreased materially because of certain shortcomings.

The history of warfarin is still being written, but its place high on the list of effective rodenticides already appears assured. During the past fifteen months approximately 1,000,000 pounds of 0.5% concentrate have been sold in powder and finished bait form under about 300 different trade names. Thus, from the standpoint of both volume and number of products its public use has already surpassed other rodent control materials. There is now considerable experience data available from all parts of the country which can be examined along with research findings in evaluating warfarin's rodenticidal features. (1)

Data concerning the chemical falls into six different categories which are of interest to regulatory officials. These include: (1) its speed of kill; (2) the percentage concentration in bait; (3) the amount of bait required to do a job; (4) acceptability of baits; (5) hazards connected with warfarin usage; and (6) its degree of effectiveness. These will be discussed in detail.

The physiological action of this toxic agent is unlike that of previously developed rodent poisons which were based upon a single dose technique to produce kills. Warfarin is an anticoagulant compound, and it must be consumed over a period of several days to create lethal effects. The daily intake necessary to develop the fatal hemorrhagic condition is very small, provided feeding is extended over a period of several days. Speed of death is dependent upon location of lesion. On the other hand, large amounts consumed during a single feeding or over a short period of time do not produce any appreciable number of kills. The element of "time" thus becomes an important matter for consideration in any measurement of warfarin's rodenticidal features. In some cases, a period of two weeks may be necessary to attain satisfactory control of rats and up to thirty days may be required to materially reduce mouse populations.

The percentage of toxic ingredient in pesticide formulations is sometimes a clue to their effectiveness. However, this would be misleading in the case of warfarin. Several factors have to be considered in computing the most effective level for warfarin baits. These include: (1) the varied degrees of resistance exhibited by different species of animals and also by individuals within the same species; (2) the general lack of relationship between speed of kill and poison concentration above a certain critical level;
and (3) the increased hazard to pets and other animals resulting from use of higher concentrations. In view of these limiting factors a compromise figure has been determined, and the recommended level of warfarin in the finished bait is 0.025%. While satisfactory kills may be obtained at concentrations above or below this amount, studies by the Fish and Wildlife Service indicate that a sacrifice is made in overall effectiveness and safety and no advantage is gained by doing so.

The previously mentioned prolonged killing-time characteristics of the poison have created several new problems not encountered heretofore in the rodenticide when with single dose poisons. A rat must feed upon warfarin baits a minimum of about five days to develop the fatal hemorrhagic condition. Service investigations have determined that adult rats consume in average of from 3 to 5 ounces of bait each while undergoing multiple doses warfarin poisoning. (2) This amount is verified by other research studies which reveal the quantity of warfarin-treated oats eaten before death calculated as per cent of body weight averaged 36.3% of body weight for a mixed test group of 66 Norway and roof rats. (3) Since an adult animal weighs in the neighborhood of 3/4 pound, ½ ounces of bait would appear to be the approximate amount required to produce death. In addition to this quantity, allowance must be made for loss of some bait material due to waste and improper placement. Thus, under normal conditions fewer than a half dozen rats are likely to be killed per pound of bait exposed, although enough of the poison may be present for a theoretical kill of 50 or more animals.

While a few household infestations involve only one or two individual rodents, the vast majority comprise a colony consisting of at least two adults and 6 to 8 young in some stage of development. The adults consume approximately 10% of their body weight in food during each 24-hour period, and this figure approaches 14% in the case of half grown juveniles. The portion of their daily food requirement which may be taken in the form of a poisoned bait is dependent upon several variable conditions, such as attractiveness and location of the bait, number of rodents present, and also the degree of competition resulting from other foods in the area upon which the rodents are already feeding. Most warfarin bait is consumed during the first three days of feeding, and loss of appetite occurs two or three days prior to death. Experience data gained from numerous Service-sponsored rat poisoning campaigns indicate a minimum of one pound of bait is required for treatment of each household infestation. For example, in Florida "they have been distributing packaged bait for about two years and find that one pound quantities are the proper size for residential premises." (2) Similarly, Texas reports "a one pound package of prepared bait is barely enough to treat an infested building for one night when divided into four or five parts. If unopened baits are used to replenish those that are eaten, or if they are moved to other locations where rats will eat them, then the one pound package would be barely enough for a small infestation." (3) On the basis of such findings, the Service recommends not less than one pound of finished bait as the minimum package size for commercial products intended for household rat control. The only exception would be preparations marketed exclusively for the control of house mice. Because of their smaller food requirements, a 1/2 pound minimum would be adequate for treatment of ordinary mouse infestations in homes. These minimum package sizes are desirable to help insure intake of a lethal amount of warfarin by each rodent during the prolonged feeding period. Regulatory officials should place equal emphasis on minimum package size as well as poison concentration when considering applications for registration of warfarin products.

There is sometimes a tendency to place undue emphasis on the poison without considering the medium by which it is carried to the rodent. A toxic agent is no better than the bait or food material used as a vehicle to transport it into an animal's body system. There is no universal bait ideal
for all species and situations. In the case of warfarin, cereal-type foods, such as cornmeal and rolled oats generally provide a good basic food. Small amounts of other ingredients, including sugar or corn oil may be added to increase acceptability. Perishable foods, such as fresh meat, fruits and vegetables cannot be used because of spoilage during the prolonged exposure period. Even grain-type baits deteriorate and are subject to damage by insects, mold, and rancidity. When these changes occur, acceptability is materially reduced. The problem of prevention is under study, and it may eventually be possible to incorporate certain insecticides and inhibitors in formulations to improve keeping qualities so that at least six month shelf-life of products can be assured. However, since bait composition and keeping qualities both play a very important part in effectiveness, candidate products should be subjected to acceptance tests before registration is granted, and data should be provided on keeping qualities of the product.

It is axiomatic that any pesticide which is toxic to one form of warm-blooded mammal will also be dangerous to all other warm-blooded animals if consumed in sufficient quantity over a long enough period of time. Warfarin is no exception, and common sense precautions should be included in directions for its use. Fortunately, the chemical does possess a high degree of relative safety in comparison to other rodenticides, being about equal to red squill in this respect. The safety features are due to: (1) small amounts and low concentrations employed; (2) general necessity for multiple feedings over prolonged periods to produce lethal effects; (3) unattractiveness of most cereal-type foods to pets; (4) easily recognized symptoms of warfarin poisoning; and (5) availability of an effective antidote.

Laboratory and field data reveal a small degree of warfarin hazard to pets through both primary and secondary poisoning, particularly among house cats. Occasional female dogs and cats may be endangered after consuming large amounts of bait at one feeding, or by eating several warfarin-poisoned rodents daily over a period of a week or more. Among farm animals, it has been determined that hogs are quite susceptible and poultry highly resistant. One attempted suicide case confirms the belief that there is very little danger to humans. A person would have to consume the equivalent of a pound of bait daily for about five days to be endangered, and this possibility is quite remote. Although very few accidental poisoning cases have been reported, there is sufficient evidence to warrant prohibition against unqualified statements as to warfarin products being "harmless to pets."

Claims as to effectiveness of the rodenticide are difficult to judge because of the admittedly high degree of control possible when the chemical is properly employed. However, it should be recognized that extreme statements, such as "prevents infestation; most effective poison; 100% control; absolute satisfaction; unconditionally guaranteed;" etc., cannot be made without qualifications. Some of the remarks may be true when applied to one particular set of conditions, but they are not universally applicable to all situations. There are instances where warfarin has failed to do a satisfactory job of control, and sufficient grounds exist to insist upon reasonable claims. The April 13th release of the National Better Business Bureau (Chrysler Building, New York, 17, N.Y.) entitled, "Advertising Claims for Warfarin" is suggested as a reference on this subject.

The true measure as to value of a rodenticide lies in whether the users can apply it in a manner which will produce effective results. Warfarin has
met this test very well. Many of the relatively few cases of so-called failures can be attributed to lack of knowledge as to action of the poison and faulty application of baits. Correct labels containing true statements and clear directions for use help to overcome this situation. The regulatory functions of your agencies carried out to insure high quality products and proper methods for their application have contributed much towards warfarin's success as a valuable tool for combating two very destructive animal pests.

References cited:


Interior Duplicating Section, Washington, 25, D.C. 6317
Two years ago the Food and Drug Administration initiated a hearing on the use of poisonous or deleterious substances in the production of fresh fruits and vegetables. They fully recognized that existing regulatory devices are not suitable because of our recent technological developments in the field of pest control materials. It was deemed highly essential, in the best interests of public health, to bring control laws and the practices which have become standard through the use of our technical advancements into proper balance. For all practical purposes there are no legal restrictions, based on fact, to guide us in our present dilemma. The only reason we don't recommend the use of DDT, for example, for some crops under certain conditions is because the residue, whatever it may be, has not been shown to be harmless. In other words, we stop, not because we get the red light, but because we have not been given a green light.

It is quite evident that these conditions do not advance the frontiers of science, and should not be allowed to continue for long. There are a great many tentative findings which can be settled, one way or the other, only when all the facts have been submitted and evaluated. With this in mind, the Food and Drug Administration called for a hearing at which research personnel from industry and government could testify. The basic considerations were to obtain data pertaining to the need for applying poisonous or deleterious substances in food production as well as data on the amount, frequency, and time of application of such substances, their possible translocation, methods for the removal of their residues and the extent of removal, and some idea of the magnitude of the residue problem as it exists under what might be considered accepted, standard control practices. The purpose of the hearing was to promulgate regulations, on the basis of the evidence submitted, limiting the quantities of poisonous or deleterious substances which may legally be allowed on fresh fruits and vegetables.

A means for a solution to our problems was presented and its success seemed assured. The scientists, on the one hand, submitted over 25,000 pages of testimony and the Food and Drug Administration, on the other, had the necessary data to guide them in setting tolerance limits that were fair and applicable to the situation as it exists today. Not all the data were as complete and reassuring as they might have been, but at least there were enough for a crude beginning and the more controversial aspects could temporarily be set aside so as not to impede the general progress of the whole field.

The success of such a simple and practical approach to the problem was shortlived, however, because shortly after the termination of the Food and Drug Administration hearing here appeared a House Select Committee (commonly referred to as the Delaney Committee)
authorized by House Resolution 323 to investigate the use of chemicals in food products. To what extent this committee will disregard the evidence previously assembled and attempt to collect its own is not certain, but it does appear as though they plan to select only the data which will serve their purposes. Those conducting the hearing are not scientifically qualified to judge and the scientific integrity of some of the witnesses they have selected may be questioned. Testimony of a sensational character, such as Virus X and its relationship to DDT poisoning, is played up out of all proportion to its true value, and there appears to be little hope for improvement in the confused field of modern insecticides until the investigational stage is returned to the proper authorities.

This brief and somewhat pointed review of some of the recent attempts by industry, experiment stations and the Food and Drug Administration to put a rapidly expanding business on a basis which can be regulated is presented to show that in spite of all our technical "know-how", our problems have increased rather than decreased. In effect, what we have done is to substitute newer, more complicated problems in the place of those which originally confronted us. Perhaps we should qualify these statements to the extent that they are true as of this moment. Actually, we are in a period of transition, and the problems which face us are likewise transitory. They are real and very vital to us now, but for the most part they will exist only as long as our data remain incomplete owing to the lack of some official standard of measurement. Until something definite is advanced for the adequate supervision of poisonous substances in or on foods, and by that is meant specific tolerances for each material in use, ways must be found to circumvent the more debatable issues in order to give the farmer some assistance in his battle with insects.

The problem selected for discussion here, that of insecticide-fertilizer mixtures and their use for soil-pest control, is one of the most controversial problems we have to contend with today. Part of the controversy, without doubt, is due to the fact that the naturally long period of time required for a new practice of this type to become established was materially shortened by public demand with the result that the practice became almost universally accepted before all the facts were in. As is often the case with the premature acceptance of a promising idea, some individuals ran into unexpected trouble and the whole idea was condemned. It has often been said that if benzene hexachloride had not come along when it did, we would probably not be nearly so concerned about soil-insecticide problems. It should not be construed that materials following BHC were free from suspicion by any means, but our experiences with benzene hexachloride have definitely influenced adversely our thinking on soil-insecticides in general.

The feasibility and desirability of using insecticide-fertilizer mixtures for the control of wireworms, seed corn maggot, cabbage maggot, the southern corn rootworm and numerous other soil pests cannot be covered by one answer or discussed as one problem because there are a number of aspects to it. In the first place, we list it as a problem dealing with insecticide-fertilizer mixtures when it should rightfully, in the majority of cases, be considered on the merits of the insecticide
alone. In other words, if fertilizer-insecticide mixtures were never even heard of, we would still run into occasional trouble because of a faulty selection of insecticide. The only way fertilizer enters the picture is that, through mixing the two ingredients, there is a greater tendency to use the mixture as a fertilizer, per se, and thus encroach on the most dangerous way of applying it insecticidally, namely, in the row. Secondly, we often condemn its acceptance without attempting to be specific about what its intended use will be, whether on corn or an edible root crop such as potatoes. And thirdly, some importance should be attached to the fact that it will be used only occasionally and, in many cases, in a manner which has been found to be acceptable, as for example, a broadcast treatment of chlordane-fertilizer mixture for the control of wireworms on potatoes.

The practice of controlling soil pests with insecticides, whether applied alone or in a mixture with fertilizer, has had an interesting history during the last 6 or 7 years. A brief review of it might be very appropriate in order to bring into focus the problem as it exists today. Prior to the advent of synthetic organic compounds, we depended largely on cultural practices, effective in only specific cases, and soil fumigants which ranged anywhere from $25 an acre on up to $100 or more for adequate control of wireworms. DDT opened up new possibilities, but it was not the panacea we were looking for in wireworm control, which was and still is the most important soil pest. Then benzene hexachloride appeared and the results of our experiences with it are well known to everyone. A material had finally been found which provided excellent, inexpensive control of wireworms, but the attending secondary problems of phytotoxicity and off-flavor were dynamite. Our conceptions of an ideal soil insecticide were drastically altered then and there and a tremendous amount of work went into the efforts to purify the gamma isomer of BHC in order to eliminate off-flavor and smell. Lindane, a name coined for the essentially pure gamma isomer, in various formulations did not remove the undesirable features of BHC. Following this there appeared another chlorinated hydrocarbon, chlordane. This met with considerably greater success and, as far as most individuals are concerned, chlordane was accepted as the best available soil insecticide. However, off-flavor, but not a pronounced phytotoxicity, has been reported for potatoes treated with chlordane in Connecticut, New York and New Jersey. It was not a marked off-flavor in the sense of BHC, but it did occur under some conditions, especially when applied to the row. New York State officially recommended chlordane for wireworm control in potatoes in 1951 with the proviso that it not be applied in the row with fertilizer—a practice which has recently become very popular among growers. Due to the lack of a pronounced toxic action to seedlings and growing plants, chlordane soon became widely accepted for use on crops which involved no risk of off-flavor, such as corn, and as a public service, fertilizer concerns soon made available mixtures of fertilizers and chlordane. But the possibility of following corn with a susceptible edible root crop, as well as the possibility of misapplication of fertilizer-insecticide mixtures to potatoes and similar crops, caused concern in a number of states and the practice was either forbidden or regulated through special labelling or other restrictions. It is suspected that the concern which attends the application of insecticide-fertilizer mixtures is based more on possible
off-flavor than on any other single factor, but it remained for a resolution adopted by the Southern Feed and Fertilizer Control Officials, at a recent meeting at St. Petersburg, Florida, to point out the association of our present uncertainty and the longlasting nature of such materials in the soil. We have thus completed the cycle and return to the original contention, mentioned earlier, that we are unable to settle any issue based on residual insecticides until there is an official yardstick to go by. Up until now, the problem has been one of off-flavor, objectionable odor, or toxicity to growing plants. The possibility of contamination of edible root crops grown in insecticide-treated soils has now been advanced and it remains to be seen what disposition the Food and Drug Administration wishes to make of it.

Developments within the past two years have shown that aldrin and dieldrin are excellent soil insecticides. It is generally conceded that they will replace chlordane for wireworm and general soil pest control. Dieldrin is, for all practical purposes, a refined form of aldrin and because of the added cost of purification, it is more economical to use aldrin. In light of the fact that compounds of more recent origin eliminate, to some extent, many of the objectionable features of their predecessors and are generally backed up by more authentic data, the balance of this discussion will deal entirely with aldrin formulations for soil pest control.

It was stated earlier that the feasibility of insecticide-fertilizer mixtures for soil pest control should depend largely on the qualifications and properties of the insecticide element of the mixture. Most insecticides are compatible with most fertilizers and aldrin-fertilizer mixtures have shown no loss of potency during storage. The crux of the problem is what happens after the insecticide is mixed in the soil in which plants are to be grown. It is absolutely essential that the compound be studied with regard to (1) its toxicity to plants growing in treated soils, (2) its residual nature or its long-range effects upon crops which are likely to follow treatment by several years, (3) its effect on beneficial soil organisms, (4) its deleterious effects on edible plant parts - such as off-flavor or objectionable odor, (5) its possible translocation to other parts of plants and (6) the residues resulting from plants having grown in treated soils. It takes years of study to accumulate data on some of these points, but it is quite evident that certain ones of them are of more immediate concern to regulatory officials than others which quite clearly should be judged strictly from the farmer's point of view. In spite of any benefits gained by a grower using insecticide-fertilizer mixtures, if the crop grown is unfit for human consumption because of flavor impairment or toxic residues on the food produced, regulatory officials would be justified in curtailing the practice. If, however, food can be produced free from such objections, even though a slight loss of stand might result from an initial toxicity to the plants, that should be a matter for growers to decide. In a great many cases, soil treatment means the difference between success and a complete failure so that a partial loss in stand is nothing compared with the overall savings made. This may sound like hedging but it does seem only fair for final judgment to be confided to the proper fields of influence.

Aldrin has been tested extensively throughout this country and
elsewhere and there is considerable data to support the belief that it will ultimately replace chlordane as the insecticide most commonly used for soil pest control. The following briefs are based on a review of 38 references covering work done at 14 state experiment stations, Canada, Hawaii, Puerto Rico, a comprehensive report on investigations conducted by the Bureau of Entomology and Plant Quarantine and reports submitted to the Food and Drug Administration by the Julius Hyman Company, manufacturer of aldrin and dieldrin. A special appendix has been prepared to include data taken from the above references and frequent mention will be made to these tables. Much of this information is not for publication.

1. Toxicity to growing plants.

It should be clearly understood at the outset that the amount of aldrin required for the satisfactory control of soil insects is approximately half that of chlordane, or roughly 2 to 3 pounds per acre. On heavy, organic soils this is usually doubled but in most cases 3 lbs. per acre is considered a normal application. During the investigational phase of this work, most workers greatly exceeded the amounts normally required and the literature is full of such references.

It is only natural that one of the first soil pests against which aldrin should be studied is the wireworm, many species of which are economically important. Among the leaders in this field are the New York Experiment Station at Cornell, the Sub-Tropical Experiment Station in Homestead, Florida, the University of California at Davis and the Everglades Experiment Station in Belle Glade, Florida. Work at these places included tests on potatoes, sugar beets, lima beans, field corn, lettuce, broccoli, sweet corn and sugar cane with the dosage of insecticide ranging from 1 to 10 pounds. In no case was it reported that sprouting of tubers or germination of seed was adversely affected.

In Manhattan, Kansas, a field was divided into strips, one of which received 100 pounds of aldrin per acre, and 13 varieties of plants were grown. This dosage probably exceeds by 20 to 50 times the amount of aldrin required for practical insect control. Lettuce and bean plants were the only two of the 13 varieties tested to show any effect of aldrin at this extreme level of application. The germination of the lettuce seed was reduced slightly and the emergence of bean plants was delayed 2 days. The growth and development of these two varieties was likewise somewhat retarded. Tobacco plants were unaffected; in fact, development was increased somewhat.

In Virginia, peanuts grown in soils receiving from 2 to 5 pounds aldrin per acre for the control of diabrotica and strigoderma larvae showed no effects from treatment.

Perhaps the most extensive and intensive work done of this phase of the problem is that reported from the Iowa Agricultural Experiment Station. In determining to what extent soil insecticides either prevented or retarded germination and seedling growth, aldrin, at from 2 to 128 pounds per acre, together with fertilizer was added to the experimental flats, which were then seeded with the test plant varieties. This is a voluminous piece of work, and for the sake of
Brevity table 1 shows the number of plants emerging and the average weight (in parenthesis) in grams per plant for no aldrin, 2,4,6,4 RDd 128 pounds per acre respectively. This is conclusive proof of the general lack of phytotoxicity of aldrin at the levels normally used for pest control. Some plants are bound to be more sensitive than others, but there appears to be little cause for alarm in ever running into anything serious. These figures show the extreme sensitivity of honey sorghum to aldrin at concentrations slightly in excess of what is normally required and, as an "indicator" crop we may find this plant useful in future work.

This by no means exploits the field regarding the work done with aldrin on the many crops under test, but the general trend of safety to plants seems well established. One could comb the literature and observe dozens of references to work on onions, cabbage, radishes and others which are susceptible to maggot attack, but the story is just the same: Adequate insect control and no phytotoxicity at dosages within reason. The Washington Experiment Station at Puyallup, Washington, reports an interesting development on radishes grown in soils treated with various soil insecticides. The abnormal condition was described as an extra small radish growing on the root about 1/8 - 1/2 inch from the base of the normal radish. Aldrin in this case was used at 2 pound per acre for maggot control and a brief tabulation of abnormal radishes as they appeared in the various treatments was: Aldrin 1; chlordane 2; dieldrin 2; lindane 31; parathion 2; and untreated check - 1.

2. Residual Nature or Long-Range Effects.

Inasmuch as aldrin does not exhibit any marked initial toxicity to growing plants and since many of our most important soil pests require treatment only every 3, 4 or 5 years, it is doubtful if soil accumulations will ever be a source of anxiety. Possible soil accumulations, however, cannot be ignored. The data in support of the residual life of aldrin will undoubtedly be more abundant in the near future. It appears that aldrin does not possess anything like the long life of DDT.

In work being done at the Federal Japanese Beetle Laboratory, Moorestown, New Jersey, soils treated with 3 pounds of aldrin showed a loss of 2.07 pounds, or 69%, from the upper 3 inches of soil after a period of 7 months. The device used to measure this loss was to place a number of 3rd instar larvae in the soil samples and compare the mortality with that obtained from samples of known concentration. Aldrin at 3 pounds per acre in 29 different soil types, collected from 6 northeastern states, produced a predetermined mortality of 98% in 28 out of the 29 in 1½ weeks. Only one soil type required a longer period of time.

In one experiment at the University of California at Davis, aldrin was applied at 5 and 10 pounds per acre in the fall of 1948 to study the effect on wireworm survival and lima bean injury in the years to follow. Wireworm control was still 100% in June, 1950 for the 10 pounds per acre plots. It had dropped to 95.8% in June 1950 for the 5 lb. per acre plots. The wireworm damage to lima bean plants was 7%
for both treatments in 1950 and only 2% and 1% in 1951. At both
dosage levels the material was still effective two years after appli-
cation. In the laboratory, soils which had originally been treated with
1.3 and 5 pounds aldrin per acre were infested with wireworms 9 and
147 days following treatment. The data (see table 2) show the loss
in toxicity to wireworms following these intervals of weathering and
exposure. Counts on these plots are to be continued once a year until
the chemicals no longer affect wireworms.

At the Pineapple Research Institute of Hawaii, aldrin at 1/2,
21\s, 5 and 10 pounds per acre gave 97%, 100%, 100% and 100% control of
Anomala grubs at the end of 5 weeks. At the end of 12 months the
figures reported were 73%, 60%, 100% and 100% for the same soils. At
the Agricultural Experiment Station in Puerto Rico soils treated with
aldrin at 2 pounds per acre retained their toxicity to white grubs
into the second year.

3. Effect on Beneficial Organisms.

In a summary of tests with residual soil insecticides at the
Oregon Agricultural Experiment Station, it was reported that the
bacteriologists indicated no detrimental effect to soil organisms, or
earthworm populations, by the application of 10 pounds aldrin per
acre. At Manhattan, Kansas 51/2 pounds aldrin per acre caused no
adverse effects on nodule formation in soybeans which had previously
been inoculated and planted on treated soils.


When off-flavor in potatoes first came into prominence follow-
ing BHC soil treatments government inspectors were at a loss as to how
to handle the matter. There was nothing in the regulations which
covered flavor and a large volume of potatoes were sold in full know-
ledge of the fact that they were not edible. It soon became apparent,
however, that no amount of official sanction could sell off-flavor
potatoes and compounds which have since been developed for soil pest
control have been carefully scrutinized in this one respect more than
in any other.

Aldrin unlike BHC has an unusually clean slate as far as off-
flavor is concerned. It has been tested extensively over a wide area
and there have been no cases in which a crop grown in treated soils
has been adversely affected in this one, all-important factor. At
100 pounds per acre, no foreign taste or objectionable flavor could be
detected on any of the test crops in Kansas. In Oregon, food tech-
nologists observed no off-flavor in crops grown in 10 pounds aldrin
per acre. The only offensive materials were lindane and BHC.
Potatoes receiving 5 and 71/2 pounds aldrin per acre in Canada were free
of off-flavor. Peanuts in Virginia were free of foreign flavor at
aldrin dosages of from 2 to 5 pounds per acre. The same general report,
on a wide variety of test plants, has come from the Experiment Station
in Honolulu, Pennsylvania, New York, Florida, Washington, California
and elsewhere. These determinations, in most cases, are made by
official taste panels. One of the leaders in this particular field is
the Foods and Nutrition Department, College of Home Economics, Cornell University. They have been at it a long time and their opinions are as reliable as any in the country. Table 3, taken from their official records, shows the qualitative ratings of the test materials. The values are self-explanatory and the BHC formulations are included to show the absence of off-flavor in aldrin dosages. The natural variation in flavor of potatoes is clearly shown in the check (untreated) samples.

5. Translocation.

Translocation is usually associated with a group of compounds, referred to as systemic (octamethyl pyrophosphoramide and others), which are readily taken up by roots and leaves and transported and stored in other parts of the plant. Chemical and biological assays were made in Manhattan, Kansas (see table 4) on crops growing in aldrin treated soil and no aldrin was found in the edible portion.

In California tomatoes were grown in soils treated with 1,3 and 5 pounds per acre of aldrin and the fruit analyzed chemically 5 months after treatment. Table 5 shows that no aldrin was absorbed and translocated by the plants.

There seems to be no doubt but what aldrin, like DDT, Calorme, Toxaphene, BHC and many others is not taken up by plants growing in treated soils, even in cases of extreme and deliberate overapplication.

6. Residues.

This is, by far, the most important consideration from the standpoint of regulatory officials. The biggest stumbling block in the whole field of pest control has always been the uncertain importance ascribed to residues when they occurred. Fortunately, there has been some detailed work done with regard to residues occurring on crops grown in soils treated with aldrin and these data are shown in tables 6, 7 and 8. We have already observed the lack of aldrin in above ground plant parts.

In some very extensive tests on potatoes in 4 different soils types conducted by Cornell University, aldrin was applied at four different levels in two locations and at one level in two other locations, for wireworm control. The residue determinations were made by the Danish-Lidov Colorimetric Method. None was found in the peelings or pulp. (See table 6).

In California a study was made to determine the possible translocation or contamination of tomatoes and potatoes grown in aldrin-treated soils. No aldrin was detected in the fruit or tubers. (See table 7).

Extensive tests are likewise reported on peanuts in Virginia with negative results. The aldrin was applied to the soil and foliage. (See table 8.)

These findings indicate rather conclusively that there is little risk involved when aldrin applications are applied to the soil for soil pest control. The tolerance requested of the Food and Drug Administration
by Julius Hyman Company is 4.00 p.p.m.

In concluding this discussion, it is our belief that aldrin has abundant supporting evidence to warrant our faith in it. If growers feel it is to their advantage to incorporate aldrin with fertilizer, there is no evidence available which indicates that they shouldn't be allowed to do so. It appears to be a matter of choice. The Sub-Tropical Experiment Station has reported that, pound for pound, insecticide-fertilizer mixtures have been more effective when applied broadcast than when placed in the row, but it should be remembered that while this may be true for wireworms, it doesn't necessarily apply to maggots and other soil pests. There is nothing basically wrong with insecticide-fertilizer mixtures and all the data so far observed bears out our belief that aldrin will replace chlordane in soil pest control.

Table 1

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Corn</th>
<th>Soybeans</th>
<th>Barley</th>
<th>Oats</th>
<th>Rye</th>
<th>Wheat</th>
<th>Buckwheat</th>
<th>Flex</th>
<th>Sorghum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand and Fertilizer</td>
<td>99</td>
<td>20</td>
<td>89</td>
<td>99</td>
<td>88</td>
<td>74</td>
<td>87</td>
<td>84</td>
<td>98</td>
</tr>
<tr>
<td>Aldrin 2 lbs. per a.</td>
<td>98</td>
<td>20</td>
<td>96</td>
<td>98</td>
<td>82</td>
<td>87</td>
<td>94</td>
<td>83</td>
<td>96</td>
</tr>
<tr>
<td>Aldrin 4 lbs. per a.</td>
<td>98</td>
<td>19</td>
<td>93</td>
<td>79</td>
<td>85</td>
<td>82</td>
<td>93</td>
<td>83</td>
<td>96</td>
</tr>
<tr>
<td>Aldrin 64 lbs. per a.</td>
<td>94</td>
<td>9</td>
<td>90</td>
<td>31</td>
<td>54</td>
<td>72</td>
<td>62</td>
<td>85</td>
<td>0</td>
</tr>
<tr>
<td>Aldrin 128 lbs. per a.</td>
<td>97</td>
<td>16</td>
<td>61</td>
<td>17</td>
<td>53</td>
<td>80</td>
<td>47</td>
<td>83</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th>Material</th>
<th>% Mortality 9 days</th>
<th>% Mortality 147 days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 weeks</td>
<td>12 weeks</td>
</tr>
<tr>
<td>Aldrin 1 lbs. per a.</td>
<td>16.7</td>
<td>83.3</td>
</tr>
<tr>
<td>Aldrin 3 lbs. per a.</td>
<td>75.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Aldrin 5 lbs. per a.</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Untreated</td>
<td>8.3</td>
<td>8.3</td>
</tr>
</tbody>
</table>
Table 3

<table>
<thead>
<tr>
<th></th>
<th>Check</th>
<th>Aldrin 4 lbs.</th>
<th>Aldrin 6 lbs.</th>
<th>BHC 2 lbs.</th>
<th>Lindane 1 lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor</td>
<td>9.17</td>
<td>9.10</td>
<td>9.58</td>
<td>8.77</td>
<td>7.11</td>
</tr>
<tr>
<td>Flavor</td>
<td>8.71</td>
<td>8.84</td>
<td>9.26</td>
<td>7.76</td>
<td>4.86</td>
</tr>
</tbody>
</table>

These figures are determined by arbitrary values assigned to certain factors: 10 - natural; 8 - off-flavor or odor (weak); 6 - off-flavor or odor (moderate); 4 - off-flavor or odor (strong); 2 points deducted for each "objectionable".

Table 4

<table>
<thead>
<tr>
<th>Plant</th>
<th>Part Analyzed</th>
<th>Biological</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabbage</td>
<td>Inner head</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sweet Corn</td>
<td>Kernels</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Onion</td>
<td>Inner bulb</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Soybean</td>
<td>Leaves and stem</td>
<td>-</td>
<td>T*</td>
</tr>
<tr>
<td>Tomato</td>
<td>Fruit</td>
<td>-</td>
<td>T*</td>
</tr>
</tbody>
</table>

*Trace, which in this case was always less than 0.2 p.p.m.

It was pointed out in the discussion of the analytical findings that the dosage of 100 lbs. of aldrin per acre was far in excess of that normally required and that the sensitivity of the chemical test indicated that the Trace reports could not be considered as reliable owing to the fact that analytical values in this range (0.2 p.p.m.) are subject to considerable question.

Table 5

<table>
<thead>
<tr>
<th>Crop</th>
<th>Lbs. Aldrin /A.</th>
<th>Aldrin Residue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canned</td>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>None</td>
</tr>
</tbody>
</table>
Table 6

<table>
<thead>
<tr>
<th>Soil type</th>
<th>Lbs. Adrin /a.</th>
<th>Months between application and harvest</th>
<th>Residue (p.p.m.) Peel Washings Fulp and Washed Peel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Sandy Loan</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Silt Loam</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Gravelly Loam</td>
<td>4</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Loamy Sand</td>
<td>8</td>
<td>11</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 7

<table>
<thead>
<tr>
<th>Crop</th>
<th>Lbs. Adrin /a.</th>
<th>Months from soil treatment to harvest</th>
<th>Aldrin Residue (p.p.m.) Peel Washings Fulp and Washed Peel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potatoes</td>
<td>1</td>
<td>5</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
<td>0.007</td>
</tr>
</tbody>
</table>

*Danish-Lidov Colorometric Method.

Table 8

<table>
<thead>
<tr>
<th>Lbs. Adrin /a.</th>
<th>Type Treatment</th>
<th>Treated Date</th>
<th>Harvested Date</th>
<th>P.P.M.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Soil**</td>
<td>6/6/50</td>
<td>11/7/50</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Soil**</td>
<td>6/6/50</td>
<td>11/7/50</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Soil**</td>
<td>6/6/50</td>
<td>11/7/50</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Soil</td>
<td>6/6/50</td>
<td>11/9/50</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Soil</td>
<td>6/6/50</td>
<td>11/9/50</td>
<td>0</td>
</tr>
<tr>
<td>3.2</td>
<td>Foliage</td>
<td>Varied (4)</td>
<td>11/9/50</td>
<td>0</td>
</tr>
<tr>
<td>0.8</td>
<td>Foliage</td>
<td>Varied (4)</td>
<td>11/9/50</td>
<td>0</td>
</tr>
<tr>
<td>2/4</td>
<td>Foliage</td>
<td>Varied (3)</td>
<td>11/9/50</td>
<td>0</td>
</tr>
</tbody>
</table>

*Sensitivity of analytical method = 0.3 p.p.m.

**Fertilizer added.
SYSTEMIC PESTICIDES
(Abstract)

Floyd F. Smith, U.S. Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

A systemic insecticide is absorbed by the plant and translocated in the sap so that parts of the plant other than those treated become toxic to sucking insects.

In 1936 sodium selenate was found to be absorbed by roots of barley and other cereals from treated soil and killed aphids and spider mites feeding on the foliage. This was the first toxicogenic chemical to be introduced into the sap stream of a plant without injuring it. Sodium selenate has since been used to a limited extent on ornamentals against aphids, mites, thrips and foliar nematodes, but not on food crops, except in citrus in California.

Sodium fluoroacetate, occurring naturally in the South African plant Dichapetalum cymosum, is a systemic poison against aphids at extreme dilutions of 1 mg. per kilo of plant tissue. This material is too poisonous for use even on ornamentals.

Several organic phosphorus compounds including OMPA (octamethyl pyrophosphoramide), were synthesized by Schrader, in Germany, who demonstrated that they were systemic in action. Investigations in England and the United States have shown that OMPA is absorbed by roots from soil applications and moves in the sap stream to the leaves, flower parts, and seeds; little remains in the stems or roots. From foliage applications a portion of the material remains in the treated leaf, but more of it moves down the petiole to the main stem thence up the stem to younger leaves, flower parts, and seeds. It has not accumulated in beet roots or potatoes from treated foliage.

Absorption of OMPA by young leaves is rapid — one third of the measured application in 4 hours and nine-tenths in 24 hours. Plants take up toxic dosages of the chemical from solutions through cut-off stems more rapidly than through roots in treated soil. Foliage applications of 1 to 2 pounds per acre in sprays or aerosols render foliage insecticidal for 2 weeks or more. Soil applications of 8 to 16 pounds per acre protected cotton for 25 days. Dosages of 20 and 40 pounds per acre in ground beds of greenhouse roses have been only partially effective.

Cotton, broad beans, and peas grown from seed soaked in solutions of OMPA were protected from aphids and mites for 3 to 7 weeks. Green peas on plants from treated seed contained 0.5 p.p.m. or less of OMPA.

The concentration of OMPA in broad beans necessary to kill aphids was 60 to 100 p.p.m., but in rose it was 42 p.p.m. or less when mites were killed.

Fast-growing plants lose their toxicity more rapidly than slow-growing ones. Strawberry plants treated in the fall may not translocate
the material until spring.

The toxicity of OMPA to animals is about equal to that of parathion but the action of OMPA may be delayed several days, during which time the chemical converted. Resistant insects, such as thrips, whiteflies, leafhoppers and mealybugs, are assumed to be unable to convert OMPA to a more potent anticholinesterase, although this is accomplished by aphids and mites susceptible to it.

Investigations on systemic pesticides are being conducted (1) by biological methods using aphids and mites to determine absorption and translocation (2) by use of the Geiger counter to trace movement and concentration of radioactive phosphorus in OMPA; (3) and by chemical analyses.

In England OMPA is useful for the control of spider mites and aphids as direct feeders on hops, cabbage, strawberry, sugar beet, and tobacco. Aphid vectors of viruses in strawberry and sugar beet have also been controlled. In the United States OMPA has been effective in extensive tests against resistant spider mites on greenhouse roses.

In this country there is immediate need for OMPA or a similar material to combat resistant spider mites on greenhouse roses and other ornamental crops, and for control of aphid vectors of several virus diseases of ornamentals. More research is needed before OMPA can be suggested for use on food crops.

In addition to OMPA, investigations are also being conducted on several other organic phosphorus compounds which differ in their persistence in plants and toxicity to various pests.

Promising systemic fungicides being investigated in this country include (a) antidotes to toxins produced by fungi, (b) relatives of growth regulators toxic to fungi and translocated in the plant, (c) readily translocated, highly soluble chemicals with low fungicidal action.
REPORT OF LEGISLATIVE COMMITTEE
Rodney C. Berry, Chairman

A formal meeting of the Legislative Committee has not been possible during the year, but correspondence has been exchanged, and informal discussions have been held between various members of the Committee.

Requests for information regarding new economic laws or amendments to existing laws brought replies from all but 7 states. These reports indicate that only 8 States do not have economic poison laws. These are indicated to be Delaware, Idaho, Indiana, Missouri, Nebraska, Nevada, Ohio (which does require Livestock Remedies Law registration of controls for external or internal parasites of livestock or poultry), and West Virginia.

The Alabama Economic Poisons Law was amended and became effective October 1, 1951. This is a new law following the Uniform Bill except for the fees.

Effective June 6, 1951, the Arkansas Plant Board was authorized to make regulations governing the sale and use of 2,4-D weed killer and other herbicides, pesticides or defoliants found injurious to persons, animals or vegetation other than the pest or vegetation intended to be affected.

California amended their Law to specifically include defoliants as economic poisons.

Idaho has no economic poisons law, but does have a Commercial Sprayer's and/or Duster's Law, approved March 20, 1951.

The 1951 session of the Kansas legislature amended the Law to permit reduction of fee when more revenue is collected than is necessary for the enforcement of the law. A uniform Economic Poisons Law became effective in Maine on August 20, 1951.

The New Mexico economic poisons law, patterned after the Uniform Bill, became effective June 14, 1951.

The Oklahoma law was amended, but only as to the fee, which is now $5 per brand, without the former $25 maximum fees.

On June 1, 1952, the new Rhode Island economic poisons law will become effective. A surprising innovation in this Law is noted in Section 3 on Registrations, which permits the director, in his discretion, to exempt from State registration economic poisons imported into the State which are subject to the provisions of the Federal Act and registered under the Federal Act, and which are sold or distributed in the unbroken immediate container in which it was shipped.

The new Tennessee economic poisons law and the new New Jersey law, which follow the Uniform Bill, became effective June 1, 1951 and January 1, 1952, respectively.
On July 1, 1951, the new Utah economic poisons law became effective. This seems to follow the Uniform Bill in principle. On the same date, the Utah Economic Poison Application Act of 1951 also became effective.

An amended Wisconsin act which requires registration of economic poisons will become effective about January 1952.

It is noted that the following States' economic poison laws do not cover household economic poisons: Arizona, Florida, Illinois, Louisiana, Maryland, Massachusetts (except DDT), South Carolina and Texas. Thus 8 out of the 40 States having economic poisons laws do not cover household products, which at times tends to confuse the picture, particularly when wholesalers, with little detailed knowledge of the laws' requirements, ship economic poisons into a number of States without the knowledge of the manufacturer. It would be most helpful if all the laws covered household economic poisons as well as agricultural economic poisons.

The following questionnaire was sent to various associations and several agencies for their opinions, which are summarized after each of the three questions:

**Question 1.** Do you feel that uniform label requirements on highly toxic products are desirable, advantageous, or essential? (Please indicate which.)

Of the 10 answers, 9 regarded uniform label requirements on highly toxic products as essential. One report from an individual in a Federal agency, who emphasized that this was his personal feeling and not necessarily an official statement, considered such uniformity advantageous.

**Question 2.** Do you feel that the labels which meet the requirements of the Federal Insecticide, Fungicide and Rodenticide Act for highly toxic products contain sufficient information for the guidance and protection of the user, the general public, and the physician?

Eight of the 10 considered such labels adequate. It is interesting to note that one medical association considered that in some cases more details as to antidote should be given, and another medical association was evenly divided in their opinions, one half holding that more details would be useless, since they would not be read, and the other half holding that more details were necessary. This divergence from the other answers was probably due to the physicians' consciousness of the possible hazards involved, and their feeling of responsibility in case of being called upon to treat the victim of an accident involving an economic poison.

**Question 3.** In the case of highly toxic products, do you feel that the name and percentage of each active ingredient should be shown on the label?

The 10 reports were unanimous in agreeing that the name and percentage of each active ingredient should be shown on the label of highly toxic
REPORT OF THE COMMITTEE ON TOXICITY AND ANTIDOTES

J. C. Ward, Chairman

The year began with a luncheon meeting at the Shoreham Hotel on Saturday, October 7, 1950, at which time the plans for the ensuing year were discussed and suggestions for improvements in the program were requested.

The project of working with Pharmacology Departments in the Medical Schools of the country, announced at the last meeting has been continued with varied results. There has been a gratifying continuation of interest in some institutions and unknown reactions in others. A follow-up contact with each school is planned.

The Committee was asked to comment on several toxicity problems, among which were the following:

1. The need for so-called "innocent by-stander" warnings to keep unprotected persons and beneficial animals out of areas being treated with organic phosphates. The Committee voted to approve such warnings on labels.

2. Acceptable uses of chlordane insecticides in the home. The Committee did not respond fully to this inquiry, since comments were received from none of the commercial representatives. A majority of those members voting recommended that limited "spot treatment" be permitted for the control of crawling insects. Two members stated that chlordane formulations were unsafe for use in the home.

3. The need for a revision of Interpretation 18. The opinions which were obtained at the annual meeting disclosed the need for such a revision and action has been started on it.

The Committee has continued its survey of accidents from economic poisons, and has built up a closer cooperation with the American Medical Association Committee on Pesticides to aid that program.

The Committee has made an effort to aid wide-spread distribution of mononacitin as a Compound 1080 (sodium fluoroacetate) antidote. The Quarantine Service of the Public Health Service is considering the feasibility of stocking supplies of the drug at all quarantine stations, since personnel of that agency are using 1080 regularly and in considerable quantity.

An investigation was started through the Committee to check the possibility of developing techniques whereby chronic injury below a clinical level could be detected. Value of functional studies with such instruments as electroencephalographs and electrocardiographs to detect changes in nervous system or heart action was raised. Members of the Committee expressed the feeling that such studies might tend to create undue apprehension about poisons, since they would be primarily of academic rather than practical importance.
products. Several also added that should an inert ingredient be highly toxic, its name and percentage should also be shown.

The associations reporting were the American Medical Association, the American Veterinary Medical Association, the Chemical Specialties Manufacturers Association, the Manufacturing Chemists' Association, the National Agricultural Chemicals Association, the National Association of Retail Druggists, the Virginia State Pest Control Association, and the Washington Pest Control Association. Opinions were also obtained from individuals in the Bureau of Entomology and Plant Quarantine and the Division of Industrial Hygiene of the Public Health Service.

The Committee wishes to stress again the importance of the Uniform Bill as a guide for all States preparing new economic poison laws or amending existing laws.
REPORT OF COMMITTEE ON ACTIVE AND INERT INGREDIENTS

Clyde A. Bower, Chairman

The work of this committee has necessarily been carried out through correspondence. By letter each member of our organization was requested to review the 1950 committee report and offer suggestions of a better definition for an active ingredient or submit other comments pertinent to any change which might be needed in the present method of listing ingredient statements.

The replies were constructive in that most all officials stated further study was definitely needed on the subject which indicates that probably no one is completely satisfied with our present procedure but possibly willing to let well enough alone until better methods can be established to correct present difficulties. Our committee feels we should strive for uniformity among the states as well as with the Federal interpretation and no state should be too hasty to radically divert from our present practices without due consideration and agreement among us in so far as is possible, and by all means we feel industry should be consulted and given ample notice of any proposed changes in our regulations or the interpretation of them.

It appears that the greatest problem is the correct classification of solvents and emulsifiers. This has been mentioned in previous reports of this committee but to date, no actual changes have been made in the established procedures of several years’ standing. The States and the Federal Enforcement Agency seem to be fairly agreed that an active ingredient is one that will kill or repel the pest when used in the same manner and for the same purpose as those in which the product is intended. As control officials, this matter should be considered in relationship to the consumer. Have we been too lenient in accepting practically anything as an active ingredient if it showed any effectiveness at all in the material even though the manufacturer used it with the sole thought in mind of improving the physical characteristic of his formulation and possibly secondarily to gain a selling advantage over a similar product by merely having a higher percentage of active ingredients shown on the label?

It would take years to change the definition of an active ingredient in all our laws. If it is desirable, we believe a satisfactory change can possibly be made by the appropriate interpretation of our existing definition to exclude materials utilized solely to improve the physical characteristics of the economic poison. Our association may not be ready for this change but we believe it would be the next constructive one concerning active ingredients. If this could be agreed by our organization and ample notice given to manufacturers of the effective date of the proposed new construction of the regulations, many questions which now arise, not only to harass the control official, but to confuse the consumer, could be settled satisfactorily. For instance, it would correct the practice of selling 4 pound Toxaphene and 2 pound DDT per gallon under a label which states 94 per cent active ingredients. The consumer whom we are trying to protect has usually never heard of the solvents and emulsifiers as means of insect control. Consequently we believe the consumer feels it a little absurd to list a solvent as active even though it might have slight activity if the solvent has never been recommended for control of the pest.
The Committee had opportunity to review proposed first aid suggestions to be used by the New England District of the U.S. Fish and Wildlife Service and to confer on treatments given to a victim of warfarin poisoning when the poison had been taken with suicidal intent.

The Committee has been asked to make distribution of test amounts of a proposed new antidote for parathion. This has been done.

Cooperation with other agencies has been continued.

The Committee has had a change in membership during the year when Dr. C. H. Hines, Assistant Professor of Pharmacology, University of California Medical School, San Francisco, was appointed to take the place of Dr. W. A. Simonton who resigned.

The membership now included:


The suggestions of the Executive Committee would be appreciated.
UNIFORM REGISTRATION PROCEDURE

John L. Mouaghan, Chairman

Each member of the committee was written to have them express their views as to uniform registration.

Again this year, we suggest that those states that have not adopted the uniform registration procedure, give it their earnest consideration. As more states adopt laws, the burden of registration increases upon the industry. The more uniform and universal the procedure the better for all.

It is again suggested that in applying for registration the applicant supply new labels only when a change has been made in labeling or composition. This procedure saves time for the industry and the control official in checking labels he has already scrutinized. Suitable notations can be used to signify new or amended labeling.

Your committee recommends that the Uniform Registration Form be amended to include the statement, "and a statement of all claims made and to be made for the above listed economic poisons". This proposed additional emphasis appears to be desirable in view of recent experiences encountered by States of misleading radio advertising of nationally advertised products.
APPLICATION FOR REGISTRATION OF ECONOMIC POISONS

Application is hereby made for the registration of the following (number) Economic Poisons for a period beginning with the actual date of registration and continuing until December 31, 19___. There is submitted as part of this application individual data sheets (8½ X 11) to which is attached a copy of the label for each product. (See instructions on reverse side).

Remittance payable to the State of ____________ in an amount of $ _____ is enclosed herewith to cover annual inspection fees for the following products.

BRANDS

I hereby certify that the information appearing on the attached data sheets is true and correct in every respect; that, each and every package of the above named materials will be labeled as described (and in addition that net weight and manufacturer's name and address will be shown); that the attached declarations are the guarantees of the applicant as to the chemical composition of the material above named for and on behalf of:

Address correspondence to: Submitted by:
Firm __________________________ Firm __________________________
Attention ______________________ By _______________________
Street & No. _____________________ Title _______________________
City & State ______________________ Date ______________________

(Certificate of registration)

This certifies that the above named applicant is hereby licensed to sell the above brands of economic poisons in the State of _____ for a period beginning with the actual date of registration and ending December 31, 19___ when sold, offered or exposed for sale under the brand name and guarantees as described.

Date __________________________ State Chemist _______________
Comptroller ____________________
CERTIFICATE OF REGISTRATION OF ECONOMIC POISONS

TO:

On the basis of the information furnished by the registrant, and the receipt of the registration fee, the following named economic poisons are hereby registered under the provisions of the _______ State Economic Poisons Act of ________, and the sale of said economic poisons is hereby authorized in the State of _________ when offered and exposed for sale, or sold under a label showing the information required by law and otherwise in compliance therewith, for the calendar year 19____, unless said registrations, or any of them, are canceled for cause:

Claims or directions for use which differ in substance from the representations made in connection with the application or changes in the name or formula of the economic poison covered by this notice should not be made prior to their submission to the Secretary of the _______ Board of Agriculture, and receipt of notice that they have been accepted.

Registration of a product is in no way to be construed as an endorsement of approval by this department or any claims made for it. The labeling must not bear any reference to registration under the Economic Poisons Act of _______. In order to protect the public, the Secretary may at any time cancel the registration of an economic poison. Request for registration under a new formula or labeling may be submitted at any time.

Dated at ____________, this ______ day of ________, 19____

___________ State Board of Agriculture

Receipt No. ____________  ________., Secretary
STATE OF ____________         REGISTRATION NO. ____________

APPLICATION FOR REGISTRATION OF ECONOMIC POISONS

For the Calendar Year 19___

Application is hereby made to the Secretary of the State Board of Agriculture, __________ for registration, under the provisions of the __________ Economic Poisons Act of __________, of the following economic poisons:

There is submitted, herewith, a copy of the label (affixed to $\text{\$} \times 11$ sheet of paper) and all other written, printed, or graphic matter used on, or attached to, the containers of the above listed economic poisons. Ingredient statements are shown on label sheets when required under Section __________ of the Act.

I hereby certify that all labels submitted, herewith, are exact copies of labels that have been registered without protest with the U.S. Department of Agriculture, except those marked with an asterisk (*).

Remittance is enclosed to cover the registration fee for ____ products ( $______ for each product) in the amount of _________.

Address correspondence to: Submitted by:
Firm __________________________ Firm __________________________
Attention ______________________ By __________________________
Street & No. _____________________ Title _________________
City & State _________________ Date ________________, 19___
UNIFORM STANDARDS COMMITTEE

J. L. St. John, Chairman

In accord with the policies, procedures and format discussed in the reports for the previous two years, about twenty Investigators were requested to assemble the desired information on one or more basic pesticidal chemicals. The Investigators have responded generously, and tabulations on 45 compounds have been received from Investigators.

As they were progressively received the data were considered by the members of the Standards Committee. At its recent meeting, the Standards Committee recommended that the data be issued in preliminary mimeographed form and distributed to a group of scientists for consideration, suggestion and correction. It is anticipated that revised copy, with the necessary changes, may be made available for wider distribution in preliminary form before January 1, 1952. This early edition may be issued in loose leaf notebook form, permitting the revisions and additions as required.

A preliminary announcement regarding this Pesticide Compendium (Pesticopoeia) which was published in Chemical and Engineering News has resulted in the receipt of a number of requests for the compilation. This shows a distinct interest in a publication of this nature.

A project of this type requires the cooperation of a large number of scientists interested in regulatory and research work on pesticides. The generous assistance of those who were requested to cooperate is gratifying to the Committee.
REPORT OF INVESTIGATOR OF PESTICIDES IN FERTILIZERS

by

Allen B. Lemmon, Chief

Bureau of Chemistry, State Department of Agriculture
Sacramento, California

Your investigator of pesticides in fertilizers has received no complaints or suggestions from members of this Association with regard to particular problems involved in the use of pest control materials in fertilizers. There have been many requests for information and comments from chemical manufacturers pointing out the advantages to growers when pest control materials are combined in fertilizers. Quite often the problem involved in such mixtures are lightly passed over by fertilizer compounders and it is your investigator's opinion that these problems should be emphasized by all control officials.

In general, the type of handling and the equipment used for preparing mixed fertilizers is somewhat different from that used for insecticides. The whole problem of fertilizer placement requires re-examination if the mixtures are to serve two purposes. To a certain extent plant roots come and get a fertilizer if it is put nearby but pests are not so cooperative. In order to be drillable, fertilizers should not be too fine but, on the other hand, in order to be dustable, insecticides dusts usually must be exceedingly fine. Segregation of materials in mixed fertilizers is usually considered to be due to difference in particle size of the different materials. This problem is increased when attempt is made to mix a coarse fertilizer with a fine insecticide.

There are also problems of compatibility as many insecticides have decreased effectiveness in alkaline materials. Another important consideration is that of soil poisoning with reduction in growth of plants or taste factors that may occur in root crops when certain pest control materials are worked into the soil. The problem of contamination must be thoroughly considered whenever an insecticide is mixed with a fertilizer. If the same fertilizer mixing equipment is used to prepare a batch to which 2,4-D weed killer is added for control of dandelions in lawns, later batches of straight fertilizers may contain sufficient carryover of 2,4-D to kill sensitive plants. Grapevines, cotton and tomatoes are exceedingly sensitive to growth-regulating substances, such as 2,4-D, and it would take only a bare trace as a contaminant in a fertilizer to cause symptoms in these crops. Contamination of fertilizers may account for certain obscure injuries to these crops.

Your investigator wishes to call attention to the report of the Committee on Pesticides in Fertilizers of the Association of Southern Feed and Fertilizer Control Officials at its annual meeting on June 21, and 22, 1951, which is as follows:

1. In view of the long lasting effects of the misapplication of pesticides, it is recommended that fertilizer control officials of this Association not register, permit the sale or the custom mixing of fertilizers containing pesticides for field crop or horticultural use,
unless such mixtures have been formally approved by the Officials of the Agricultural Experiment Station or other officials vested with such responsibility by Law in their state.

2. It is believed that the use of mixtures of fertilizers and pesticides is generally based on the economics of the practice and that the danger of contaminating crops or soils or both by misapplication, by inappropriate levels and methods of application is real and does not warrant the savings in labor costs.

3. Mixtures of pesticides and fertilizers which are registered for sale should be properly labeled and meet all requirements of both the fertilizer and pesticide laws of the various states.

Your investigator concurs with these recommendations and recommends them to this Association.
REPORT ON METHODS OF ANALYSIS
CLEARING HOUSE

J.J.T. Graham, Chairman

Since the 1950 meeting, sets of the mimeographed methods have been furnished to officials of the following states:


They have also been furnished to the U.S. Public Health Service Communicable Disease Center at Savannah, Georgia, and to the U.S.D.A. Bureau of Entomology and Plant Quarantine at Washington, D.C.

Sets of methods have been furnished to the National Agricultural Chemicals Association, and to officials of the following industrial firms:

Naugatuck Chemicals
Mathieson Chemical Corporation
Geigy Company, Inc.

Partial lists have also been furnished to other industrial firms.

The following additional methods and revisions of methods previously distributed have been sent out during the year.

321.0 Ferricyanide Method for Quaternary Ammonium Compounds
369.0 Determination of Esters of 2,4-Dichlorophenoxyacetic Acid in presence of Soap, Acids, Alcohols and Oils
626.0 Determination of small quantities of the Gamma Isomer of Benzene Hexachloride in the presence of Mineral Oil, Methyl Naphthalenes and Phenols
652.2 Revised - Mercury in Soaps
652.6 Determination of Methyl Mercury Dicyandiamide in Pesticides
711.0 Determination of Water in Disinfectants containing Water, Isopropyl Alcohol, Essential Oils, Soap and Phenolic Compounds
711.1 Determination of Isopropyl Alcohol in Disinfectants containing Water, Chlorinated Phenols, Soap and Essential Oils
744.1 Determination of Parathion in Dust and Wettable Powder Preparations
368.0 2,4-Dichlorophenoxyacetic Acid
368.1 Salts of 2,4-Dichlorophenoxyacetic Acid
533.9 Small Quantities of Phenols and Coal Tar Neutral Oils in Dusts
708.1 Acetone in Solutions of DDT
741.11 Revised - Organic Thiocyanates in Spray Materials
741.13 Organic Thiocyanates in Spray Materials
753.1 Rotenone in Derris and Cube Powder in Presence of Sulfur
754.0 Revised - Preparation of Pure Rotenone Reagent
808.1 Revised - Spectrophotometric Estimation of Technical Chlordane in Petroleum Oil Solutions
812.0 Total Chlorine in Benzene Hexachloride
812.1 Total Chlorine in Dusting or Water Miscible Powders
    containing Benzene Hexachloride
812.2 Total Chlorine in Various Mineral Oil Sprays containing
    Benzene Hexachloride
821.0 Warfarin, in Concentrates
822.0 Warfarin, In Bait Materials

Dr. H. J. Fisher, Chief Chemist of the Connecticut Agricultural
Experiment Station has furnished a qualitative test for Compound 1080
(Sodium fluoroacetate) in its solutions, which will be included in
the next lot of methods that are distributed.
UNIFORM SAMPLING PROCEDURE FOR ECONOMIC POISONS

In the report of the Executive Committee submitted to the convention of 1950, it was suggested that the study of uniform sampling be continued. The purpose of this report is to advise you as to our progress in this direction. During the spring meeting of the Executive Committee, copies of our Investigators' Manual were distributed. This manual was prepared for the guidance of the investigators of the Insecticide Division and, wherever possible, the sections were prepared so that they would apply to activities under both Uniform State Laws and the Federal Act. We fully realize that the individual situations determine the sampling programs for the State Enforcement Agencies and for this reason it would be difficult to prepare a set of hard and fast procedures for some phases of sampling operations.

In our operating procedure we designate the frequency with which samples of the various classifications of economic poisons are to be collected. This is done so that we may make a complete and systematic coverage of all of our registered economic poisons. In addition to the routine flow of samples received for testing, we receive additional samples to check on previous violations, and we also request samples when new products are encountered.

We have studied our manual with the purpose in mind of preparing a uniform sampling procedure which would be applicable to both the State agencies and the Insecticide Division. It is important that the sampling procedure be uniform in the case of States working with the Department under the Co-operative Agreement, as they may refer samples to us for action under the Federal law, and at times we also may request them to collect samples for us. This evidence, which may be introduced into Federal court, must be in such a form that it can be supported. We believe the proposed uniform sampling procedure which we have outlined will satisfy all requirements of the Division by the courts and will also serve as a practical procedure for local operations. This proposed Uniform Sampling Procedure contains suggestions with respect to sampling operations and gives schedules for sampling specific insecticides and fungicides, as follows:

I. Where to locate samples.
II. How to collect the material sample.
III. Promotional literature and advertising.
IV. Types of products likely to deteriorate.
V. Types of products likely to be frauds.
VI. Schedule on quantity of insecticide and fungicide materials needed for testing.
VII. Schedule on quantity of herbicides needed for testing.
VIII. Schedule on quantity of disinfectants, sterilizers, sanitizers, etc., needed for testing.
IX. Schedule on quantities for rodenticides needed for testing.
X. Determination of net weights.
XI. Preparation of Collection Reports and sample records.
XII. Preparation for packing samples.

XI and XII apply only to samples which are collected for the Insecticide Division by States working with the Department under the Co-operative Agreement.
Agreement, but the methods of identifying the samples and maintaining the integrity thereof are of interest to all.

We welcome suggestions and comments on this proposed Uniform Sampling Procedure, all of which will help make it a workable tool.

A part of uniform sampling procedures would include uniform equipment. We have here the specifications on the type of dry bulk sampling trier that our investigators use. This has been found to be practical and enables the collection of a composite sample from a container.

When making net weight checks for smaller-sized containers, we use the Gurley Balance, which comes equipped with weights to weigh 9 pounds. We are arranging procurement of additional 5 pound standard weights for our investigators so that somewhat larger containers may be weighed.

Attached is a draft of the proposed Uniform Sampling Procedure which we believe will apply to the operating procedure of the States which have a uniform Economic Poisons Act and will also be of value to those operating under other such laws.

I. LOCATING SAMPLES

Efficient enforcement dictates that all possible sources of samples must be visited. Often inspectors or investigators will fall into a pattern of visiting a certain type of dealer only and thereby pass up possible violations which may be found in other types of dealers. Stocks of economic poisons will often be found in possession of the following types of dealers:

1. Barber and Beauty supply houses.
2. Grocery supply houses and grocers.
3. Drug supply houses and drug stores.
4. Chicken hatcheries.
5. Exterminators.
6. Hardware stores.
7. Paint stores.
8. Feed and fertilizers dealers.

Inspectors should be on the alert for new products, watch for advertisements, and make inquiries when visiting dealers.

II. HOW TO SAMPLE

The quantity needed will be found by referring to the sampling schedule.

A. Retail units

When more than one unit is required, take one from each of different cases, if possible. The shipping case and retail unit should be examined for code or batch numbers. If more than one code is found, each should be sampled — within a reasonable total. The shipment should also be checked for different labels which may possibly be found in it. Samples are always to be preferred from unopened shipping cases rather than from the retail shelf.
B. Sampling bulk dry products.

Whenever possible, previously unopened containers should be sampled. If this is not possible, the inspector should ascertain from the dealer that no changes have been made in the product since delivery and a written statement should be obtained stating that the composition of the product is unchanged. If there is any question of contamination or other change in composition, the sample should not be collected.

The container should be sampled by means of a trier long enough to reach the bottom. The trier should be inserted into the container at four equidistant points and probed diagonally toward the center of the bottom. The top inch of material should be discarded. The sample should be placed in glass containers, whenever possible, to avoid any metallic contamination which might occur. The trier should be thoroughly washed after each use.

The label should be copied or traced and particular attention given to the code or batch marks. As many different codes as are reasonable should be sampled.

C. Sampling bulk liquid products.

Since many of these products tend to separate, the containers should always be well agitated before the sample is drawn. The container should be inverted -- particularly in the case of emulsions, allowed to settle, and then rolled until it is certain the contents are well mixed. If possible, emulsions or other viscous substances which are stored in cold locations should be placed in a warm place before mixing, as in that way a more efficient job can be done. The sample may be drawn by means of glass, plastic, or rubber tubing. The use of rubber tubing has limitations and should not be resorted to for the drawing of creosote products or organic solvents, such as chloroform, acetone, and mineral oil. Samples should be placed in glass containers, preferable with glass lids or cork stoppers. Avoid the use of rubber jar rings in the case of jars containing oils, creosote and organic solvents. The label should be copied or traced and the container examined for code or batch marks. As many different codes as are reasonable should be sampled.

III. PROMOTIONAL MATERIAL

The dealer should be questioned regarding any advertising being done in behalf of the product. Copies of this and any promotional literature should be submitted with the sample. Frequently the claims found in advertising and in literature will differ from those submitted in connection with registration. The dealer should be asked to initial all promotional material submitted for identification purposes -- should this material be required at a later date.

IV. PRODUCTS WHICH DETERIORATE

Whenever lots of confiscable size of the following products are found which are six months of age or older, samples should be collected:

1. Nicotine dusts or other nicotine products in which the
nicotine content may be reduced by volatilization.

2. Bleaching powder, chlorinated lime or hypochlorite solutions.

3. Lice or flea powders containing naphthalene or paradichlorobenzene.

4. Carbon disulphide, carbon tetrachloride, or tetrachloroethylene capsules for bot fly treatments in horses.

5. Formaldehyde dusts for seed treatments.

V. FRAUDULENT PRODUCTS.

The following type of products may be considered possible frauds and should be sampled for label review:

1. Products for poultry drinking water to control external parasites.
2. Products represented as sterilizers.
3. Products represented as killing all germs.
4. Paradichlorobenzene or naphthalene products for use in a room to expel all insects or to disinfect toilets or similar equipment.
5. Cedar bark, leaves, or shavings represented as killing insects, repelling fleas, or having disinfectant properties.
### VI. Sampling Schedule for Insecticides and Fungicides for Use on Plants

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Title</th>
<th>Including</th>
<th>Size of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>Arsenicals</td>
<td>All compounds</td>
<td>One pound from bulk shipment or smallest retail package.</td>
</tr>
<tr>
<td>A-2</td>
<td>Copper Fungicides</td>
<td>Bordeaux mixture, insoluble coppers, ammoniacal copper solutions</td>
<td>Powders: Two pounds from bulk or two small retail units. Liquids: One pint from bulk or smallest retail unit.</td>
</tr>
<tr>
<td>A-3</td>
<td>Sulphur Fungicides</td>
<td>Sulphur, lime-sulphur dry and liquid preparations, etc.</td>
<td>Dusts: One retail unit or one pound from bulk. Dry Lime Sulphur: Same as dusts. Pastes: Two pounds from bulk container. Liquids: One quart from bulk or one retail unit.</td>
</tr>
<tr>
<td>A-4</td>
<td>Organic Fungicides</td>
<td>Ferbam, Ziram, Nabam, Zineb, Dithane and other dithiocarbamates either straight or in mixtures.</td>
<td>Dusts: Four pounds from bulk container or equivalent in retail units. Wettable Powders: Two or more retail units to make two pounds or equivalent amount from bulk container. Liquid: One quart from bulk or retail units to make one quart.</td>
</tr>
<tr>
<td>A-5</td>
<td>Arsenicals with Fungicides</td>
<td></td>
<td>One pound from bulk or one small retail unit.</td>
</tr>
<tr>
<td>A-6</td>
<td>Organic Phosphates</td>
<td>Parathion, tetraethyl pyrophosphate, thiodiep, tetraethyl thiophosphoroate, etc.</td>
<td>Dusts: One pound from bulk or equivalent retail units. Wettable Powders: One half pound from bulk or one retail unit. Liquids: One pint from bulk or one small retail unit.</td>
</tr>
</tbody>
</table>
### Plant Origin

- Nicotine, derris, pyrethrum, rotenone, ryania, sabadilla, cube, etc.

Nicotine Sulphate; Take 4 fluid ounces or one retail unit.

Sabadilla: For all preparations, take 5 pounds. All Others: Same as A-8.

### Oils and Oil Emulsions

Take one quart from bulk or one or more retail units for equivalent.

### Seed Protections and Soil Fumigants

- Formaldehyde, chloropicrin, methoxychlor, ethylene dibromide, ethyl mercury compounds, thiram, chlorinated hydrocarbons, etc.

Wettable Powders or Dusts: Take one pound from bulk or two small retail units equal to 8 ounces or more.

Envelopes: Usually 1/6 ounces; take twelve.

Liquid: Take one pint from bulk or one small retail unit.

### Miscellaneous Insecticides and Fungicides for Plant and Animal Products

- Dusts: Take one pound or one retail unit.

Dust Guns: Take 3 units.

### Wood Preservatives

- Liquids: For creosote, take one pint. For other products, one retail unit.

### Manufactured Plant Products


### Miscellaneous

- Submit copies of labeling and advertising literature to consideration as to sampling.

### Insecticides for Insects Infesting Livestock and Other Animals

- Products containing D.D.T., methoxychlor, or chlordane take one retail package. In bulk, take one pint if fluid or one pound of solid.

Other products: Take one gal., if ready for use or four lbs., if
| L-2 | Control of cattle grubs, screwworm and bots | Products for treating internal parasitic flies on cattle, sheep, horses and other animals | Products for bots: Retail pkg., usually contains 12 ampules or less. Take 1 pkg. Grubs and Screwworm: Wettable Powders: Take 1 retail container or two lbs. if in bulk. Smears: Take two retail containers or 1 pint if liquid. Sprays: Take one quart from bulk container or one or more equivalent retail units. |
| L-3 | Control of lice, ticks, fleas and poultry mites | Products for control of blue bugs, fleas, lice, ticks, mites and mange. Poultry roost paints, etc. | Wettable Powders: If for use on large animals, take two pounds. If for small animals and pets, take 1/2 lb. if in bulk; or equivalent retail container. Liquids: If concentrate take one small retail container or one pint if in bulk. If ready for use, two retail containers or one quart if in bulk. Roost Paints: Take one quart. |
| L-4 | Other products for livestock and other animals | Any preparation not classified above | Usually one retail pkg. In bulk, one pint or one pound. |

**OTHER INSECTS**

<p>| M-1 | Principally for fly control | Household fly sprays, products with word &quot;fly&quot; in brand name, exterior or interior paints for fly control. Does not include products in L-1 | Sprays: Take one retail container or one pint from bulk package. Paint: One quart. |
| M-2 | Principally for moth control | Products for moth-proofing clothing and house furnishings. Products with word &quot;moth&quot; in brand name. Dips, aerosols, etc. | Blocks: Take six retail units. Crystals: Take one pound from bulk or smallest retail container. Other solids: Take one pound from bulk or equivalent in retail units. Liquids: Take one pint from bulk or equivalent retail unit. |</p>
<table>
<thead>
<tr>
<th>M-3</th>
<th>Principally for Roach control</th>
<th>Products for roach control, products with word &quot;roach&quot; in brand name, Interior paints, etc.</th>
<th>Tablets: Take one retail package.</th>
<th>Bait: Take sufficient retail packages to make 1/2 pound.</th>
<th>Other Solids: Take 1/2 pound from bulk container or equivalent amounts in retail units.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-4</td>
<td>Principally for Ant control</td>
<td>Products for control of all types of ants, Products with word &quot;ant&quot; in brand name.</td>
<td>Syrups: Take 2 retail units.</td>
<td>Traps: Take one dozen.</td>
<td>Dusts: Take enough retail packages or bulk to make one pound.</td>
</tr>
<tr>
<td>M-5</td>
<td>Control of Insects infesting Stored Food</td>
<td>Mill fumigants, seed and grain treatments, residual mill sprays, etc.</td>
<td>Liquids: Take retail packages to make 1 qt. or same amount from bulk container.</td>
<td>Solids: One pound</td>
<td>Gas Cylinders: Submit copy of label and advertising to for sampling recommendations. This does not apply to aerosol containers which may be sampled according to M-7.</td>
</tr>
<tr>
<td>M-6</td>
<td>Control of Wood-destroying insects</td>
<td>Products for treatment of wood, and insects destroying wood. Soil poisons for wood-destroying insects</td>
<td>Liquids: Creosote—take one pint.</td>
<td>Pentachlorophenol: 5% and over</td>
<td>Zinc naphthanate -2% metallic copper or over Ortho dichloro benzene solution - 25% or over Other Fluids: Take one pint if bulk or one retail unit. If concentration below the percentages given, 5 gallons are required. Solids: Arsenicals or other metallic products take 1/2 lb. from bulk containers or one retail unit.</td>
</tr>
<tr>
<td>M-7</td>
<td>General or other</td>
<td>General insecticides for household or industrial use. Products where word &quot;insect&quot; occurs in brand name. Aerosols or</td>
<td>Liquids: Take one pint from bulk or one equivalent retail unit.</td>
<td>Solids: Take 1/2 lb. from bulk or one or more</td>
<td></td>
</tr>
</tbody>
</table>
products not classified elsewhere: retail units to make 1/2 pound.

Aerosols: Take at least four household units of one-pound size or two units if larger.

Smoke Dispensers: Take four household units.

### M-8 Devices
Specimens of labelling and advertising literature should be submitted to determination as to sampling.

### VII. SAMPLING SCHEDULE FOR HERBICIDES

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Title</th>
<th>Including</th>
<th>Size of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-1</td>
<td>2,4-D</td>
<td>All salts and esters of di- or tri-chloro-phenoxyaetic acid.</td>
<td>Tablets: Usually 24 in pkg. take 1 pkg. or equivalent. Powders: If 3 or 8 grams per pkg., take 12 pkg. or equivalent.</td>
</tr>
<tr>
<td></td>
<td>2,4,5-T</td>
<td>CAUTION: From time of sampling until shipment, do not allow samples in this group to come in contact with other products -- including other samples in the group. Ship each sample separately.</td>
<td></td>
</tr>
<tr>
<td>H-2</td>
<td>T.C.A.</td>
<td>Trichloracetic acid, pentachlorophenol and their salts</td>
<td>Powders: Take 3-5 lbs. Solutions: Take at least 1 qt. but no more, including bulk container.</td>
</tr>
<tr>
<td></td>
<td>P.C.P.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H-3</td>
<td>P.M.A.</td>
<td>Phenyl mercuric acetate and derivatives</td>
<td>If half-pints, take 12. If pints, take 6. (\text{If bulk, take 1 pint} )</td>
</tr>
<tr>
<td>H-4</td>
<td>Metallic Salts</td>
<td>Arsenicals, or metallic borates, chlorates, chlorides, etc.</td>
<td>Powders: one or more retail pkgs. to make one lb. If bulk, one pound. Solutions: One retail container if pint or quart. If bulk, one pint.</td>
</tr>
<tr>
<td>H-5</td>
<td>Oils</td>
<td>Petroleum derivatives Stoddard solvent with or without aromatics</td>
<td>One gallon required — retail or bulk packages</td>
</tr>
<tr>
<td>H-6</td>
<td>Fertilizers</td>
<td>Products for soil improvement or similar materials with herbicide claims and containing 2,4-D Potassium cyanate or P.M.A.</td>
<td>Retail pkgs.: Take one if less than 12 pounds. Bulk: Take 10 lbs.</td>
</tr>
<tr>
<td>H-7</td>
<td>Defoliants</td>
<td>Any product with herbicide claims</td>
<td>One pint or one pound</td>
</tr>
<tr>
<td>H-8</td>
<td>Others</td>
<td>Any product not classified above</td>
<td>Usually one pint or 1 pound</td>
</tr>
</tbody>
</table>
VIII. SAMPLING SCHEDULE FOR GERMICIDES, DISINFECTANTS, ANTISEPTICS, STERILIZERS AND SANITIZERS

Any of the following terms appearing on a label may serve to place a product in this section:

1. Antiseptic (when used in a sense that it prevents decay or putrefaction)
2. Bactericide, Bactericidal, Bacteriostat, Bacteriostatic
3. Controls bacteria, Germs, or Infections
4. Destroys Bacteria (or Germs)
5. Disinfectant, Disinfects, Disinfecting
6. Germicide - Germicidal
7. Inhibits bacteria (or germs)
8. Kills bacteria (or germs)
9. Prevents bacteria (or germs) slimes, infection, putrefaction
10. Preservative
11. Reduces bacteria (or germs)
12. Treatment of bacteria (or germs)
13. Sanitize, Sanitizer, Sanitizing
14. Sterilize, Sterilizer, Sterilizing

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Title</th>
<th>Including</th>
<th>Size of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-1</td>
<td>Coal Tar Disinfectants</td>
<td>Liquor creosolis saponatus, cresol and cresylic acid disinfectants, cressote emulsions, Phenols and derivatives</td>
<td>2 retail pkgs. if pint size or less, If bulk, then one pint is sufficient.</td>
</tr>
<tr>
<td>D-2</td>
<td>Pine Oil, Pine Type or Pine Odor Disinfectants, Mixtures and derivatives including Terpineols</td>
<td></td>
<td>As above</td>
</tr>
<tr>
<td>D-3</td>
<td>Chlorine-type germicides</td>
<td>Sodium or calcium hypochlorite, chlorine-T., and other chloramides or chlorimides</td>
<td>3 pint bottles or 2 quarts or 1 gallon - according to size. Each unit to be taken from different containers. If shipment over 3 months old, triple size of sample if seizable quantity on hand.</td>
</tr>
<tr>
<td>D-4</td>
<td>Quaternaries or substituted phenolic disinfectants</td>
<td>Chloride or bromide salts of complex amines, pyridinium or imidacolinium. Salts and emulsions of the various synthetic phenols.</td>
<td>Ampoules 2 retail containers if 5 or less ampules per pkg. If more than 6, take one pkg. tablets, - 2 smallest retail pkgs. If 50 tablets or over per pkg., take 1 pkg. Powders: 2 retail pkgs..if each 8 ozs. or less. If 1 lb. pkg., take one. If over 1 lb. pkg. this is bulk container - and take 1/2 lb. Solutions - 2 pts. if in pints and concentration is 25% or less. If concentration</td>
</tr>
</tbody>
</table>
### D-5
**Detergent Sanitizers**
- Washing compounds and cleaning agents other than pine oil and hypochlorites represented for both cleaning and preventing, destroying or mitigating bacteria

### D-6
**Air Sanitizers**
- Glycols and other products represented as sanitizing the air, reducing bacteria in air, etc.

### D-7
**All others**
- Lye, toilet bowl cleaners, formaldehyde preparations, mercurial compounds, poultry drinking water products, iodine preparations, etc.

### D-8
**Devices**
- Ozonizers, ultraviolet lamps, sterilizers for home use and other except laboratory autoclaves

### IX. SAMPLING SCHEDULE FOR RODENTICIDES

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R-1</strong></td>
<td>Strychnine</td>
<td>All compounds</td>
</tr>
<tr>
<td><strong>R-2</strong></td>
<td>Rod Squill</td>
<td>All preparations</td>
</tr>
<tr>
<td><strong>R-3</strong></td>
<td>Arta</td>
<td>All preparations</td>
</tr>
<tr>
<td><strong>R-4</strong></td>
<td>Thallium</td>
<td>All compounds</td>
</tr>
<tr>
<td><strong>R-5</strong></td>
<td>Warfarin</td>
<td>&quot;1080&quot;, arsenic, barium, phosphorus- zinc compounds and miscellaneous</td>
</tr>
<tr>
<td><strong>R-6</strong></td>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

| **R-7** | Fumigants | Chloropicrin, cyanide preparations, methyl bromide, carbon disulphide and other fumigants |

| **R-8** | Devices | Other than ordinary traps which are encountered should be reported to  | All available advertising literature and labeling should be submitted in order that sampling can be considered. |

---

Over 25%, take 1 pt bottle.
If in quarts, take one bottle.

Powders - Two retail units one pound or less. If over, take one unit. If bulk pkg., take 1 lb.

Liquids - In pints or less, take two; if larger containers, take one, if not over one gallon, if bulk, take 2 pints.

At least two retail containers and more if required to have a minimum sample of one pint.

Usually 2 retail pkgs. if one pint or one pound of less. Pint or pound if in bulk containers.

Report such products to with samples of labeling and advertising literature, especially if new manufacturer or new device in order that determination as to sampling can be made.
X. DETERMINATION OF NET WEIGHTS

Every product of each manufacturer should be periodically weighed. A minimum of 10 units should be weighed as a preliminary, and if it appears the product is full weight, no more need be weighed. If a weight shortage is indicated, more weighings should be made as indicated by the chart. The units submitted to the laboratory should be identified on the weight sheet.

If it is not possible to make the weighings on a Gurley Balance, the scale and weights which will be used should be checked by using a standard weight which is within the weight range of the item to be weighed.

<table>
<thead>
<tr>
<th>UNIT IN SHIPMENT</th>
<th>MINIMUM UNITS TO BE WEIGHED</th>
<th>MINIMUM NO. OF TARE WEIGHTS TO BE MADE BY INSPECTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 50</td>
<td>all</td>
<td>2</td>
</tr>
<tr>
<td>51 to 200</td>
<td>50</td>
<td>3</td>
</tr>
<tr>
<td>201 to 400</td>
<td>75</td>
<td>4</td>
</tr>
<tr>
<td>401 to 800</td>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td>801 to 1600</td>
<td>120</td>
<td>6</td>
</tr>
<tr>
<td>1601 or more</td>
<td>3 times the square root of total number of units</td>
<td>1/5 the square root of total number of units</td>
</tr>
</tbody>
</table>

The units to be weighed should be selected so that they will represent as many cases, batches, code, or lot numbers as possible.
ECONOMIC POISONS WEIGHT SHEET

Date ___________ No. ___________ Product ___________

Name & Address of Shipper

Weighings Made At

Declared Weight Remarks (Evidence of Leakage, etc.)

GROSS WEIGHTS
(To nearest hundredth of an ounce)

<table>
<thead>
<tr>
<th>No.</th>
<th>Weight</th>
<th>No.</th>
<th>Weight</th>
<th>No.</th>
<th>Weight</th>
<th>No.</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>21</td>
<td>31</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>22</td>
<td>32</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>13</td>
<td>23</td>
<td>33</td>
<td>43</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>14</td>
<td>24</td>
<td>34</td>
<td>44</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>15</td>
<td>25</td>
<td>35</td>
<td>45</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td>16</td>
<td>26</td>
<td>36</td>
<td>46</td>
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<td></td>
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<tr>
<td>7</td>
<td>17</td>
<td>27</td>
<td>37</td>
<td>47</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8</td>
<td>18</td>
<td>28</td>
<td>38</td>
<td>48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>19</td>
<td>29</td>
<td>39</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TARE WEIGHTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Weight</th>
<th>No.</th>
<th>Weight</th>
<th>No.</th>
<th>Weight</th>
<th>No.</th>
<th>Weight</th>
</tr>
</thead>
</table>

Total Gross Weight _______ Total Tare _________ Average Tare _________

No. Units Weighed _________ Average Gross Weight _________

Average Tare Weight _________ Average Net Weight _________

Investigator ___________
XI. Preparation of Collection Reports and Sample Records.

Records Required - When a sample is submitted to a laboratory it is necessary that the following records be forwarded:

a. Collection report
b. Copy of invoice (if available)
c. Record of interstate shipment
d. Dealer's statement
e. Record of container markings if any
f. Copy of any accompanying advertising

A description of these various records and their preparation follows:

Collection Report - This form, shown below, with numbering on each line for explanatory purposes, is prepared in sets of four colors. The white or original is sent to the laboratory receiving the sample, the second or pink copy is sent to Washington, the third or green copy is sent to the station from which the shipment originated, and the fourth is retained by the collecting inspector.

---

**COLLECTION REPORT**

Date (1) Sample No. ______________

Identification (2) Name of product, brand, etc.

Collected from lot of (3) Consistd of (4) Amt. T. before sampling No. of subdivisions

and no. and size of units from which taken

Prepared in the following manner (5)

Sample delivered to (6) on (7) for (8) station, with orig. records (9) station, with cc Coll. Rept.

Reasons for collection (10) Documentary reference and suspected violation

Manufacturer ______________________

Shipper ______________________ Date of Shipment (13)

Dealer ______________________

Remarks ______________________

Other samples same shipment (16)

Cost of sample (17) cash voucher (18) to be billed (19) Investigator

Station ______________________

---
The following information is given as an aid in preparing the collection report:

1. Date - Insert date of collection of sample.
2. Identification - Quota name of product as given on the label with any other descriptive term given and quote the quantity of contents as given on the unit submitted in whole or part as the sample. When no quantity is given on bulk containers, it should be so stated. If batch numbers or other marks appear on shipping containers, quote these and state where found. The identification should be as complete as the space allows as the pink copy is checked for registration before analysis is completed. Incomplete description does not permit accurate identification. The purpose is to expedite the seizure of unregistered products.
3. Collected from lot of - State the amount of the stock from which the sample was taken. If the lot consists of 50 cases of 12 quarts each and 100 cases of 24 pints each, it should be so stated. If taken from shelf stock, it should be stated, for example, as 23 8-ounce cartons from shelf stock. The description should be clear enough so that reviewing officers will "see" the lot which was sampled.
4. Consisted of - Describe the amount taken and how it was taken. As an example, "One pint bottle from each of three unopened shipping cartons," or "A pint taken with glass siphon from middle of each of two barrels after mixing by rolling."
5. Prepared in following manner - State how sample was identified and sealed. as "Placed in pint glass bottle, labeled and sealed, labels and seals identified 'I.D. 976, 8-15-50, Albert D. Cass.'"
6. Sample delivered to - Insert name of transportation company, with bill of lading number, or name of laboratory if delivered in person.
7. On - Insert date delivery was made to transportation company or laboratory.
8. ________ Station with original records - Insert name of laboratory to which sample was sent.
9. ________ Station, with cc Coll. Report - Insert the station where green copy of collection report is sent, which is the territory where the shipment originated.
10. Reasons for collection - State why sample was collected. If a routine sample, a statement referring to the appropriate section of project schedule may be given as "Routine Rodenticide - R-2" or if a request from another territory a statement such as "Request from W. R. Tiedt 10-20-50."
11. Manufacturer - Enter the name when known, if the label states "Distributor" or "Distributed by" enter this and the firm name and cross out manufacturer.
12. Shipper - If this is the same as the manufacturer or distributor, the entry may be "same." If otherwise, enter the appropriate name of firm or individual making the shipment.
13. Date of shipment - Enter the date as found on the shipping record.

14. Dealer - Enter the name and address of the firm or individual from whom the sample is obtained.

15. Remarks - Enter anything thought necessary to give a clear picture of the shipment, its condition, accessory advertising, method of sampling, or shipment of sample. Do not write on the reverse of the report, but add any details on a separate sheet which may then be attached to the records.

16. Other samples same shipment - If other samples were taken from the same shipment, they should be listed here.

17. Cost of sample - Insert cost of the sample and indicate how payment is made.

18. ______ Inspector. Sign first name, initial, and last name.

19. ______ Station. Enter the name of station of the collecting inspector.

COPY OF INVOICE

When the firm having the merchandise which is to be sampled supplies the inspector with an invoice covering the shipment it should be copied on the form provided for that purpose. In some instances an extra copy of the invoice is received by the buyer who will gladly give this to the inspector. This is quite acceptable. However, there have been instances where the firm having only one copy gave this to the inspector and later complained that the inspector removed their records.

A copy of the form to be used is shown below with numbers typed on the lines for explanatory purposes.

Investigator (1) Sample No. (2)

(4) (3) 19

(5) Shipments via (6)

Invoice No. (8)

Sold To (9)

Guarantee (10)

(11)

The following information is given as an aid in preparing copies of invoice.

1. Investigator. Enter name of investigator collecting samples.

2. Sample No. Enter number given to sample.

3. ______ Enter date appearing on the invoice.

4. ______ Enter name of company issuing invoice.

5. ______ Enter address of company issuing invoice.

6. Shipments via ______ Enter shipment routing if given.

7. Date of shipment. Enter date appearing on invoice as date of shipment if given.
5. Invoice No. Enter invoice number if one is given.
9. Sold to ______. Enter name of person or firm being billed for the goods.
10. ______. Enter address of the buyer as shown on the invoice.
11. ______. Enter the information shown on the invoice relating to the sample to be taken. If there are five items and two are sampled, the information on the three unsampled may be omitted and the statement made "Three other items."

Record of Interstate Shipment.

The ordinary sample is valueless unless there is accompanying proof of interstate shipment. This proof can be documented by:

1. Copy of freight bill
2. Copy of express waybill or receipt
3. Copy of trucking company bill
4. Copy of trucking bill
5. Parcel post wrapper or affidavit
6. Affidavit of person transporting the goods interstate

There are various official forms for the first four items none of which require explanation in order to make copies from original documents. Caution should be taken that the documents are properly identified and that the information is correctly copied.

In the event that there are no available documents to prove interstate transportation as in the case where a buyer hauls the goods from one state to another to his place of business, or where the merchandise was shipped by parcel post and the wrapper was destroyed, an affidavit is required. The "Dealers Affidavit" may be used in this last case for a parcel post shipment. The two lines in the upper left corner should be filled in. The top line having "State of ______" and the second line should have "County of ______."

A similar form should be prepared for a person rendering an affidavit that he transported goods from one State to another. This affidavit should give all facts as to loading and unloading points, date of transportation, identification and ownership of vehicle.

Dealer's Statement.

The purpose of this form is to provide an acknowledgement by a responsible member of a firm that a sample was taken and that the invoice and shipping records supplied by the firm cover the goods sampled.

The form to be used is shown below with numbers in appropriate spaces for explanatory purposes.
PREPARATION OF COLLECTION REPORTS AND SAMPLE RECORDS (cont.)

Sample No. (3)

DEALER'S STATEMENT

This is certifies that the sample consisting of ______ collected by Inspector (5) on (6) was from shipment(s) received by us from_______ on_______ and was identified to the inspector by ______ of this firm;

That the (copy of) invoice(s) dated (10) and copy of shipping record(s) ______ No. (12) dated (13) issued by ______ which were identified by ______ and furnished the inspector, cover this(these) shipment(s).

Remarks: ________________________________________________

Price paid ______ (Cash)(Bill)(Voucher) ______ Dealer firm.

Per ______ Title ______

1. Town and State where sample was collected.
2. Date when "Dealer's Statement" signed. Generally date when sample collected.
3. Sample number given sample. (From collection report)
4. Name of product sampled. Give brand name, product, and net weight or volume.
5. First name, middle initial, and last name of inspector collecting sample.
6. Date when sample collected.
7. Name and address of firm or individual making shipment.
8. Date when shipment received by consignee.
9. Name of individual that identifies shipment as that covered by records obtained.
10. Date of invoice. Copy of the invoice should be obtained when it is available. If it is not available, it should so be stated in this space.
11. Name of shipping record obtained, such as freight bill, bill of lading, delivery record, or whichever is available. Copy should be made at time of sample collection. If not available, effort should be made to obtain one from carrier.
12. Shipping record number.
13. Shipping record date.
14. Name of carrier. May be railroad, steamship line, trucking firm, an individual, or any other type of carrier.
15. Name of individual furnishing records covering shipment.
16. Any pertinent remarks concerning the collection of the sample should be filled in here.
17. Price paid for sample. Indicate how payment made.
18. Name of firm or individual from whom sample obtained. Is filled in by dealer when he signs Dealer's Statement.
19. Name of person signing statement. When possible, it should be one of the individuals identifying sample (9) or furnishing the records (15).

20. Title of individual signing statement.

Record of Container Markings.

Tracings should be submitted of any markings appearing on shipping containers, such as outside carton, barrels or bags in order to identify lot or batch numbers in the product sampled. When no markings appear or the quantity of contents does not appear on bulk containers it should be so stated. If the samples taken are from different batch numbers they should be identified, with the particular number from which taken. Any tracing of labels or other marks should be identified with the sample number, date, the investigator's name and a statement as to where the information was found.

Record of Accompanying Advertising.

Copies of any advertising material accompanying the shipment, preceding the shipment or following the shipment to be used in connection with the product sampled should be submitted. The material should be identified only with the inspector's name, sample number and date. A separate sheet of paper should be used describing how the advertising matter was shipped, when it was shipped, where it was found and how it was intended to be used.

XII. PREPARATION AND PACKING OF SAMPLES

Identification: Samples should be identified on all labels of retail units. On samples taken from bulk containers, a label should be placed giving the name of the product and the manufacturer. Identification should then be made on this label. Each unit in a sample should be identified -- preferably with a hard pencil. Labels are often soaked off containers in the laboratory and washable inks and indelible pencil marks may disappear or become unreadable.

The identification should consist of the sample number, date (of collection), and the first name, middle initial, and the last name of the inspector.

Sealing: All units must be sealed, but under no condition should the seal cover a label. When it is not possible to seal a unit without covering part of the label, the unit should be wrapped in paper and then sealed. It is desirable when there are two or more units in a sample to make at least two such wrapped packages.

When units are wrapped and then sealed, the wrappers should also be identified so that on arrival at the laboratory the analysts can tell what product is in the wrapper without opening it. This wrapper identification therefore would show the brand name of the product, the name and address of the shipper, distinguishing marks or code numbers found on the original shipping container, the sample number, date of collection, and the first name, middle initial, and last name of the inspector.
Seals should be placed so that the product of the container can in no way be removed without destruction or removal of the seal.

Occasionally containers are found where seals will not stick and the practice has been to apply scotch tape. This should be done in such a way that the tape does not cover any writing on the label or seal. The removal of the tape by the analyst often removes the writing on the seal or label if the tape is not properly applied.

The seals are also to be identified with the sample number, the date of collection, and the collecting inspector's first name, middle initial, and last name.
Report of the States Relations Committee
A.B. Haagy, Chairman

The States Relations Committee met at the Shoreham Hotel, Friday, October 5, 1951 at 8:00 P.M. Approximately 60 persons were present from Federal and State agencies and the pesticide industry.

Eight questions were on the main agenda, but additional subjects were discussed. The problem of radio advertising and sales was thoroughly reviewed.

The main function of this committee is to afford an opportunity to the membership and industry groups to discuss problems of mutual interest. No decisions are reached, but recommendations are forwarded to the Executive Committee for action in controversial matters.

Topics discussed were:

1. Is a registration valid for more than one year when no additional shipments to retail dealers have been made after the close of the year in which registration was consummated?
2. Should manufacturers of insecticide base products (intended for mixing purposes only) be required to register such materials?
3. What is the reaction toward establishing a mid-year date for renewal of all insecticide registrations?
4. Should registrants of more than ___ products be permitted to submit their annual applications divided into new, revised, and renewal materials?
5. Should the use of numbers be prohibited in the brand names of economic poisons?
6. Should registration be required for a product, the actual physical label of which carries no pesticide claims, although such claims are made in other phases of the labeling, i.e., newspaper and radio advertising?
7. Should the number of pesticide formulations intended for specific purposes (for example, control of the cotton boll weevil) be restricted to those recommended by experiment stations?
8. Should the physical properties (particle size, wettability, emulsifiability, etc.) of economic poisons be subject to regulation?
PERSONS IN ATTENDANCE AT FIFTH ANNUAL MEETING
OF THE
ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

Representing States and Canada

Alabama
P. R. Bidox, Chemist
Dept. of Agriculture
George H. Marsh, Director
Div. Agricultural Chemistry

California
Allen B. Lenimon, Chief
Bureau of Chemistry

Colorado
F. Herbert Gates, Chief
Div. Plant Industry

Connecticut
H. J. Fisher, Chief Chemist
Agricultural Exp. Station

Delaware
R. Earle Dickey, State Chemist
State Board of Agriculture

Florida
E. R. Winterle,
Dept. Agriculture
J. J. Taylor, State Chemist
Dept. of Agriculture
Harold H. Hoffman
Dept. Agriculture

Georgia
R. A. Moncrief, Asst. State Chemist
Dept. of Agriculture

Kansas
Robert H. Gunert, Entomologist
Board of Agriculture
John L. Monaghan, Director,
Control Div., Board of Agri.

Louisiana
Ernest A. Epps, Jr., Chief Chemist
Dept., Agriculture

Maine
E. R. Tobey, Chemist
Div. of Inspection, Agri. Exp. Sta.

Maryland
L. E. Bopst, State Chemist
J. E. Schuler, Chemist
A. B. Heagy, Chemist
R. W. Neal, Jr.
Inspection & Regulatory Serv.
George S. Langford, Spec. Insect Con.
Dept. of Entomology

Michigan
W. C. Geagley, Chief Chemist
Dept., Agriculture

Minnesota
Henry J. Hoffmann, Chief Chemist
Dept., Agriculture

Mississippi
O. T. Ginse, Jr., Gen. Inspector
State Plant Board
M. P. Etheredge, State Chemist
Department of Chemistry
Clay Lyle, Dean & Director
Division of Agriculture
Ross E. Hutchins, State Entomologist
State Plant Board

North Carolina
E. W. Constable,
Dept., Agriculture
Harry A. Miller, Asst. State Chem.
Department of Agriculture

North Dakota
L. A. Koehler, Chemist,
State Laboratory Dept.
Floyd Roberts, Chief Chemist
State Laboratory Dept.
J. A. Munro, Entomologist
Agricultural College
New Jersey
Stacy B. Randle, State Chemist
Agricultural Exp. Station
R. L. Willis,
Agricultural Exp. Station

New Hampshire
George H. Laramie,
Department of Agriculture
H. A. Davis, Asst. Chemist
Agricultural Exp. Station

New Mexico
R. W. Ludwick, Deputy in Charge
Economic Poison Control Office

New York
H. B. Little,
Dept. of Agri. & Markets

Oklahoma
Park A. Yeats, Head
Seed Feed & Fertilizer
Department of Agriculture
Willis Richerson, Chief Chemist
Department of Agriculture
Clyde A. Bower, Director
Division of Entomology & Plant
Industry
Board of Agriculture

Oregon
J. D. Patterson, Chief Chemist
Department of Agriculture

Pennsylvania
Harold Y. Fisher
Department of Agriculture

Rhode Island
John B. Smith, Head
Dept. of Agri. Chemistry

South Carolina
M. D. Farrar, Head
Dept. of Entomology & Zoology

Utah
Elmer Christensen, State Chemist

South Dakota
D. J. Mitchell, State Chemist
Chemical Laboratory
Frank Tietge
Div. Plant Industry

Texas
J. F. Fudgo, State Chemist
Agricultural Exp. Station

Virginia
Rodney C. Berry, State Chemist
Division of Chemistry
J. Claggett Jones, Chemist-Executive
Div. of Chemistry
V. A. Tiedjens, Director
Truck Experiment Station

West Virginia
C. Harold Amick, Director
Food & Dairy Division
Marvin H. Snyder, Chief Chemist
Dept., Agriculture
Edgar G. Shanholtzer, Chemist
Dept., Agriculture

Wisconsin
W. B. Grimm, Chemist
Department of Agriculture

Canada
C. V. Marshall, Supt. of Laboratory
Dept., Agriculture
C. H. Jefferson, Adm. Officer
Dept., Agriculture
Representing Federal Government:

Insecticide Division
Production & Marketing Administration:

W. G. Reed, Chief
E. L. Griffin, Asst. Chief
A. D. Baskin, Plant Path.
S. C. Billings, Entomologist
Edward L. Bunch, Entomologist
E. F. Carter
A. D. Cromartie, Adm. Officer
C. G. Donovan, Chemist
George M. Downard, Adm. Officer

R. Edens, Engelm Gilbert, Entomologist
J. J. T. Graham, Chief Chemist
F. B. McAuliffe, Adm. Assistant
L. S. Stuart, Bacteriologist
R. O. White, Entomologist
F. F. Smith, Entomologist
Harold H. Shepard, Entomologist
Justus C. Ward, Pharmacologist

F. C. Bishop, Asst. Chief, Bur. of Entomology & Plant Quarantine
W. W. Dykstra, Asst. to Chief, Fish & Wildlife Service
John C. Jobes, Supervisor Mammal Control, Fish & Wildlife Service
J. L. St. John, National Research Council

Representing Industry:

William O. Buettner
National Pest Control Assoc.

D. E. Campbell,
M.C.A.

Ralph L. Cherry
Oil, Paint & Drug Reporter

John D. Connor, Attorney

Merrill M. Darley
Allied Chemical & Dye Corp.

H. C. Doellingen
C. M. Scott & Sons, Co.

Frank H. Emerson,
Steuffer Chemical Co.

George W. Fiero
Esso Standard Oil Co.

John H. Foulger
DuPont Co.

Louis J. Gemmell
Geigy Co., Inc.

E. E. Gilbert
DuPont Co.

Henry M. Glasgow
Roanoke Exterminating Co.

H. W. Hamilton
C.S.M.A.

L. W. Hazleton,
Hazleton Laboratories

Sanford J. Hill
Du Pont Co.

L. S. Hitchner
Nat. Agri. Chemicals Assoc.

C. C. Jennings
Allied Chemical & Drug Corp.

F. R. Johnson
Mathieson Chemical Corp.

G. A. Joequera
Mathieson Chemical Corp.

W. A. Knapp
Allied Chemical & Dye Corp.

Kenneth K. Krausche
Penn, Salt Mfg. Co.

Mortimer D. Leonard
Julius Hyman & Co.

L. A. Long,
Agricultural Chemicals

Charles H. Mahony
National Canners Assoc.
J. R. Mays, Jr.  
Barrow-Agee Labs., Inc.

C. C. McDonnell,  
Chemist - Consultant

George T. McGrew  
Miller Chem. & Fert. Corp.

E. W. Milan,  

R. D. Minteer  
Monsanto Chemical Co.

D. F. Murphy  
Rohm & Haas Co.

Joseph A. Noone  
Nat. Agri. Chemicals Assoc.

W. O. Persing  
Stauffer Chemical Co.

P. D. Paterson,  
Stauffer Chemical Co.

W. W. Sunderland,  
The Dow Chemical Co.

Chris. P. Segard  
Wisconsin Alumni Research Foundation

F. D. Sparre  
DePonl Co.

H. J. Tubbesing  
Monsanto Chem. Co.

Nicholas M. Walker  

Shreve S. Woltz,  
Baugh Chemical Co.
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519 Dexter Ave., Montgomery 1

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Feed, Fertilizer Laboratories
Tucson

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P.H. Miller, Chief Inspector
Plant Board, War Memorial Bldg.,
Little Rock

CALIFORNIA
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Bureau of Chemistry
Department of Agriculture
Sacramento 14

COLORADO
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20 State Museum
Denver

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P.O. Box 1106, New Haven 4

DELAWARE - No law

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Production & Marketing Admr.,
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Washington, 25

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IDAHO - No law

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State Chemist
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Des Moines, 19

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Board of Agriculture, Topeka

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C.P. Osgood, Chief
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Augusta

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Inspection & Regulatory Service
College Park

A.B. Heagy, Chemist
Inspection & Regulatory Service
College Park

MASSACHUSETTS
Director
Food & Drug Div., Dept. Health
State House, Boston 33
<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>Title</th>
<th>Details</th>
</tr>
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<tbody>
<tr>
<td>Massachusetts</td>
<td>Director</td>
<td>Food &amp; Drug Div., Dept. Health</td>
<td>State House, Boston, 33</td>
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<tr>
<td>Michigan</td>
<td>W.C. Geagley</td>
<td>Chief Chemist</td>
<td>Bureau of Chemical Laboratories Department of Agriculture Lansing</td>
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<tr>
<td>Minnesota</td>
<td>H.J. Hoffmann</td>
<td>Chief Chemist</td>
<td>Dept., Agriculture, 552 State Office Bldg., St. Paul</td>
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<tr>
<td>Mississippi</td>
<td>M.P. Etheredge</td>
<td>Chief Chemist</td>
<td>Department of Chemistry State College</td>
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<td></td>
<td>Ross Hutchins</td>
<td>State Entomologist</td>
<td>State College</td>
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<tr>
<td>Missouri</td>
<td>- No law</td>
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<td>Montana</td>
<td>L.R. Anderson</td>
<td>Commissioner</td>
<td>Dept., Agr., Labor &amp; Industry Helena</td>
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<tr>
<td>New Hampshire</td>
<td>G.H. Laramie</td>
<td>Control Supervisor</td>
<td>Department of Agriculture State House, Concord</td>
</tr>
<tr>
<td>New Jersey</td>
<td>S.B. Randle</td>
<td>State Chemist</td>
<td>Agricultural Experiment Sta., New Brunswick</td>
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<tr>
<td>New Mexico</td>
<td>- No law</td>
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<tr>
<td>New York</td>
<td>H.B. Little</td>
<td>Director</td>
<td>Plant Industry Bureau Department of Agriculture Alabany</td>
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<td>North Carolina</td>
<td>E.W. Constable</td>
<td>State Chemist</td>
<td>Department of Agriculture Raleigh</td>
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<tr>
<td>Ohio</td>
<td>J.W. Baringer</td>
<td>Chief</td>
<td>Div. of Plant Industry Department of Agriculture Columbus, 15</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>Clyde Bower</td>
<td>Director</td>
<td>Entomology &amp; Plant Control Div., Department of Agriculture Capitol Bldg., Oklahoma City</td>
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<td>Oregon</td>
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<tr>
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</tr>
<tr>
<td>Rhode Island</td>
<td>F.S. Leaver</td>
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<td>Dept. Agr. &amp; Conservation State House, Providence</td>
</tr>
<tr>
<td>South Carolina</td>
<td>J.L. Berly</td>
<td>Assoc. State Entomologist</td>
<td>Crop Pest Commission Clemson</td>
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<tr>
<td>South Dakota</td>
<td>D.J. Mitchell</td>
<td>State Chemist</td>
<td>Chemical Laboratories Department of Agriculture Vermillion</td>
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<tr>
<td></td>
<td>Frank M. Tietge</td>
<td>Deputy in Charge</td>
<td>Division Plant Industry Dept. of Agriculture Pierre, South Dakota</td>
</tr>
</tbody>
</table>
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O.C. Haworth
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Salt Lake City

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Department of Agriculture
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Division of Chemistry
Agricultural Experiment Station
Pullman

WEST VIRGINIA - No law

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WYOMING
C.B. Harston, State Entomologist
Department of Agriculture
Powell

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Plant Products Division
Dept. of Agriculture
79 Essex Street, Ottawa

C.H. Jefferson, Admr. Officer
Pesticides, Plant Prod. Div.,
Department of Agriculture
79 Essex Street, Ottawa

TERRITORY OF HAWAII
Alan Thistle; Director
Division of Marketing
Board of Commissioners
Agriculture & Forestry
Honolulu, 1
REPORT

OF THE

ASSOCIATION OF ECONOMIC POISONS

CONTROL OFFICIALS

1950
TO ALL ECONOMIC POISONS CONTROL OFFICIALS:

Gentlemen:

The enclosed material covers toxicity of certain economic poisons and acceptable recommendations for those materials as discussed at the annual meeting of the Executive Committee in Washington during April. It was necessary to revise and rewrite much of this information to bring it up to the present date. It is regretted that it has taken so long to prepare it for distribution.

The transmission of these statements on a confidential basis is limited to state officials concerned with the control of economic poisons.

It must be clearly understood that many of the uses listed herein are acceptable for federal registration, but are not necessarily recommended, by the Insecticide Division, Production and Marketing Administration of the U.S. Department of Agriculture.

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Also, there is enclosed the report of the Secretary sent prior to the Washington meeting, to help speed up the morning procedure. A brief summary of the activities of this office during the year follows:

General correspondence showed a slight increase over the preceding year. Inquiries were received regarding various state laws, requests for copies of the uniform state law adopted at the 1948 convention, and information relative to the precautionary and antidote statements required for certain poisons. Preparatory surveys of existing legislation were prepared for those states planning to revise or introduce new economic poisons laws.

A brief summary of the meeting of the Executive Committee held in Washington was sent to all control officials and industry representatives. The enclosed data on toxicity and uses of certain poisons originated in the office of Dr. W. G. Reed, Chief, Insecticide Division, P.M.A. Preparation of stencils is credited to Dr. J. F. Fudge, State Chemist, Texas and President of our Association.

News releases including resumes of the federal residue hearings were distributed through the medium of the Pest Controller. Complete summaries of these hearings have been furnished this office through the courtesy of Mr. L. S. Hitchner, Executive Secretary, National Agricultural Chemicals Association. It should be noted that the time-lapse is unavoidable in getting these reports into the hands of control officials. The large amount
of editorial and clerical work involved, with limited assistance, necessarily slows the procedure. Interest has developed among other departments in these bulletins. Requests were received from health departments and extension workers for copies of the Pest Controller.

At the Executive Committee meeting in Washington during April, it was suggested that state officials submit copies of reports of deficient products to the Secretary for transmittal to member states. Under this program four separate reports describing approximately 40 products have been sent out.

The report of the Association was prepared and distributed to all persons attending the 1949 convention in Washington. It is hoped that by next year the report can be expanded to contain standards and precautionary statements for the various chemicals under surveillance of control officials.

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The agenda for the States Relations discussion scheduled for 7 P.M., Friday, October 6 is included for your information. A number of these subjects carry considerable significance, and it is anticipated that we will devote a major portion of the allotted time to them.

The Plant Food Dinner is set for the same evening and it is hoped that those of our members who are interested in the subject matter will come to our meeting as soon as possible after this dinner.

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Attached hereto you will find a copy of the Treasurer's report covering receipts and disbursements up to September 30, 1950.

Respectfully submitted,

Albert B. Heagy
Secretary-Treasurer
INTRODUCTION

Information and addresses covering the meeting held October 7, 1950, at the Shoreham Hotel, Washington, D.C., are presented in this third report of the Association of Economic Poisons Control Officials.

At this meeting the regulatory principles and definitions of terms, previously in temporary status, were adopted as official. These are published herein, with such minor changes as were found necessary during a year of trial operation.

Other data, appearing in previous annual reports, and now brought up to date, include: The Constitution and By-laws, roster of officers, committees, investigators, suggested sampling procedure, uniform bill, application for registration forms, and certificate of registration.

For those states which may be interested in adopting or modifying legislation covering custom application of insecticides, fungicides, and herbicides, the proposed bill accepted by the Council of State Governments is reprinted at this time.

One phase of Association work, greatly expanded during the past year is worthy of mention here. This is the exchange of information covering deficient samples as reported periodically. It is planned to continue this activity in 1951.

Suggestions for future improvement in the scope of this annual report are always welcomed by the Secretary.
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OFFICERS, COMMITTEES AND INVESTIGATORS OF
ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

President  A.B. Loomis  -  Sacramento, California
Vice-Pres.  E.H. Constable  -  Raleigh, North Carolina
Sec.-Treas.  A.B. Neary  -  College Park, Maryland

Executive Committee
President, Vice-President, Secretary-Treasurer
and Retiring President, Ex Officio

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<thead>
<tr>
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<tr>
<td>J.D. Patterson,</td>
<td>1951</td>
<td>Chairman, Salem, Oregon</td>
</tr>
<tr>
<td>W.G. Reed</td>
<td>1951</td>
<td>Washington, D.C.</td>
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<tr>
<td>J.F. Fudge</td>
<td>1951</td>
<td>College Station, Texas</td>
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<td>R.C. Berry</td>
<td>1952</td>
<td>Richmond, Virginia</td>
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<tr>
<td>Floyd Roberts</td>
<td>1952</td>
<td>Bismarck, North Dakota</td>
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Committees
Legislative

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<td>J.P. Osgood</td>
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<td>W.G. Reed</td>
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Toxicity & Antidotes

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<tr>
<td>J.C. Ward,</td>
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<td>A.B. Loomis</td>
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<tr>
<td>C.G. Frary</td>
<td>Vermillion, South Dakota</td>
</tr>
<tr>
<td>J.A. Noone</td>
<td>Washington, D.C.</td>
</tr>
<tr>
<td>J.H. Foulger</td>
<td>Wilmington, Delaware</td>
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<tr>
<td>E.G. Klaimen</td>
<td>Bloomfield, New Jersey</td>
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<tr>
<td>C.H. Hines</td>
<td>San Francisco, California</td>
</tr>
<tr>
<td>S.D. Silver</td>
<td>Ridgewood, Maryland</td>
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<tr>
<td>J.C. Kreutz</td>
<td>Baltimore, Maryland</td>
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Ingredients

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<tr>
<td>C.A. Bowser,</td>
<td>Oklahoma City, Oklahoma</td>
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<td>H.C. Goldsworthy</td>
<td>Boltsville, Maryland</td>
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<td>F.H. Gates</td>
<td>Denver, Colorado</td>
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<td>E.A. Walker</td>
<td>Washington, D.C.</td>
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<td>R.A. Moncrief</td>
<td>Atlanta, Georgia</td>
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</table>
Assistation Procedure

J.L. Monaghan, Chairman
C.H. Marsh
S.C. Billings
G.H. Laramie
H.J. Hoffmann

Topeka, Kansas
Montgomery, Alabama
Washington, D.C.
Concord, New Hampshire
St. Paul, Minnesota

Uniform Standards

J.L. St. John, Chairman
C.V. Marshall
H.J. Fisher
E.L. Griffin
D.E.H. Frear

Washington, D.C.
Ottawa, Canada
New Haven, Connecticut
Washington, D.C.
State College, Pennsylvania

Uniform Regulations & Terms

J.C. Jones, Chairman
E.A. Epps
H.J. Fisher
G.H. Laramie
W.C. Geegley

Richmond, Virginia
Baton Rouge, Mississippi
New Haven, Connecticut
Concord, New Hampshire
Lansing, Michigan

States Relations

A.B. Haegy, Chairman
H.L. Bailey
E.A. Epps
Floyd Roberts
F.H. Gates
J.J. Taylor
H.J. Hoffmann
S.B. Randle

College Park, Maryland
Montpelier, Vermont
Baton Rouge, Mississippi
Bismarck, North Dakota
Denver, Colorado
Tallahassee, Florida
St. Paul, Minnesota
New Brunswick, New Jersey

Investigators

Methods Clearing House

J.J.T. Graham

Washington, D.C.

Uniform Sampling

A.D. Cromartie

Washington, D.C.

Use of Economic Poisons in Fertilizers

A.B. Lemmon

Sacramento, California
CONSTITUTION OF THE ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

Section 1. Name. The name of the association shall be The Association of Economic Poisons Control Officials.

Section 2. Object. The object of the association shall be to promote uniform and effective legislation, definitions, rulings, and enforcement of laws relating to the control of sale and distribution of insecticides, fungicides, and other economic poisons.

Section 3. Membership. The membership of the association shall consist of the officials charged by law with the active execution of the laws regulating the sale of economic poisons and such deputies as shall be duly designated by these officials, and research workers employed by state, territory, dominion or federal agencies who are engaged in the investigation of economic poisons and their component parts.

Section 4. Officers. The officers of the association shall be the president, the vice-president, the secretary-treasurer, and an executive committee.

Section 5. The executive committee. The executive committee shall consist of the president, the vice-president, the secretary-treasurer, the retiring president, and four elected members, two members of whom shall be elected at each annual meeting of the association, except at the 1947 meeting two shall be elected for a one-year term and two for a two-year term.

The executive committee shall have the control and management of the affairs of the association during the interim between regular meetings, and shall take action on majority vote of the committee and report its official activities to the association.

The executive committee shall report on such matters as may be referred to it by the association, and review and present to the association with recommendations all the recommendations of the investigators and special committees and such resolutions and regulations as pertain to economic poisons.

Section 6. Voting. Each state, territory, dominion and federal agency engaged in control of sale and distribution of economic poisons is entitled to a single vote. Voting by proxy shall be permitted.

Section 7. Amendments. The constitution or by-laws may be amended at any regular meeting by a two-thirds vote of the voting membership present. All proposed amendments to the constitution shall be submitted in writing to the secretary at least 30 days prior to the opening of the annual meeting, and the secretary shall distribute copies to the members at least 10 days prior to the meeting. All proposed amendments to the by-laws shall be submitted in writing prior to the opening of the annual meeting.
Section 8. Investigations and special committees. For the purpose of studying the subject of uniformity in legislation, definitions and rulings, and the enforcement of laws concerning economic poisons, the president may appoint investigators or committees. These investigators shall have the authority to appoint such assistants as may be necessary. Investigators shall be appointed for one year and may be reappointed. Special committees may be appointed by the president. No appointment shall be made for a period exceeding two years.

Section 9. Dues. Each state, territory, dominion, and federal agency engaged in the regulation or investigation of economic poisons shall pay dues of $15.00 for each year of its membership, and this shall entitle the members to the services and publications of the association.

BY-LAWS

Section 1. Regular meetings of the association shall be held at least once each year, except in the case of an emergency which would prevent an adequate representation of the membership. Special meetings may be called by the executive committee.

Section 2. Election of officers. All officers shall be elected by ballot, and shall hold office until the adjournment of the annual meeting next following their election, or until their successors are elected.

In the event of a vacancy occurring in any office, except that of president or vice-president, the president shall fill the vacancy by appointment and such appointment shall continue until the close of the next regular meeting of the association, at which meeting the unexpired term shall be filled by election in the usual way.

Section 3. Duties of officers. The president, vice-president, and secretary-treasurer shall perform the duties usual to such officers.

The secretary-treasurer shall keep a record of all proceedings of the association and attend to all necessary correspondence. He shall also receive all moneys due the association, and shall keep an accurate account of all receipts and disbursements, and report with proper vouchers at each annual meeting.

Resolutions, other than those of the resolution committee, shall be presented in writing to the executive committee, which shall provide a place for them on the program.

The following shall be the order of business unless changed at the time by the vote of the association:
1. Reading of the minutes of preceding meeting
2. Report of secretary-treasurer
3. Announcements and appointment of committees
4. President's address
5. Roll call by states
6. Special addresses
7. Reports of investigators and special committees
8. Reports of credentials committee
9. Special topics or executive session
10. Resolutions referring to economic poisons
11. Report of executive committee
12. Report of auditing committee
13. Report of resolutions committee
14. Unfinished business

10/19/47
PROPOSED UNIFORM STATE ECONOMIC POISONS BILL

(Title. It should conform to state requirements. The following is a suggestion; a more complete title should be used where necessary:

"An Act relating to the distribution, sale, or transportation of adulterated or misbranded insecticides, fungicides, rodenticides, and other economic poisons (and devices); regulating traffic therein; providing for registration and examination of such materials, imposing penalties, and for other purposes.")

(Be it enacted, etc.)

Section 1. Title. This Act may be cited as the Economic Poisons Act of .

Section 2. Definitions. For the purpose of this Act --

(a) The term "economic poison" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, fungi, weeds, or other forms of plant or animal life or viruses, except viruses on or in living man or other animals, which the Commissioner shall declare to be a pest.

(b) The term "device" means any instrument or contrivance intended for trapping, destroying, repelling, or mitigating insects or rodents or destroying, repelling, or mitigating fungi or weeds, or such other pests as may be designated by the Commissioner, but not including equipment used for the application of economic poisons when sold separately therefrom.

(c) The term "insecticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects which may be present in any environment whatsoever.

(d) The term "fungicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any fungi.

(e) The term "rodenticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating rodents or any other vertebrate animal which the Commissioner shall declare to be a pest.

(f) The term "herbicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any weed.

(g) The term "insect" means any of the numerous small invertebrate animals generally having the body more or less obviously
segmented, for the most part belonging to the class Insecta, comprising six-legged, usually winged forms, as, for example, beetles, bugs, bees, flies, and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as, for example, spiders, mites, ticks, centipedes, and wood lice.

(h) The term "fungi" means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.

(i) The term "weed" means any plant which grows where not wanted.

(j) The term "ingredient statement" means a statement of the name and percentage of each active ingredient, together with the total percentage of the inert ingredients, in the economic poison; and, in case the economic poison contains arsenic in any form, a statement of the percentage of total and water soluble arsenic, each calculated as elemental arsenic.

(k) The term "active ingredient" means an ingredient which will prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds, or other pests.

(l) The term "inert ingredient" means an ingredient which is not an active ingredient.

(m) The term "antidote" means the most practical immediate treatment in case of poisoning and includes first aid treatment.

(n) The term "person" means any individual, partnership, association, corporation, or organized group of persons whether incorporated or not.

(o) The term "Commissioner" means the (Commissioner, Secretary or Director of Agriculture).

(p) The term "registrant" means the person registering any economic poison pursuant to the provisions of this Act.

(q) The term "label" means the written, printed, or graphic matter on, or attached to, the economic poison (or device), or the immediate container thereof, and the outside container or wrapper of the retail package, if any there be, of the economic poison (or device).

(r) The term "labeling" means all labels and other written, printed, or graphic matter.

(1) upon the economic poison (or device) or any of its containers or wrappers;

(2) accompanying the economic poison (or device) at any time;
(3) to which reference is made on the label or in literature accompanying the economic poison (or device), except when accurate, non-misleading reference is made to current official publications of the United States Departments of Agriculture or Interior, the United States Public Health Service, State Experiment Stations; State Agricultural Colleges, or other similar Federal institutions or official agencies of this State or other States authorized by law to conduct research in the field of economic poisons.

s. The term "adulterated" shall apply to any economic poison if its strength or purity falls below the professed standard or quality as expressed on labeling or under which it is sold, or if any substance has been substituted wholly or in part for the article, or if any valuable constituent of the article has been wholly or in part abstracted.

t. The term "misbranded" shall apply —

(1) to any economic poison (or device) if its labeling bears any statement, design, or graphic representation relative thereto or to its ingredients which is false or misleading in any particular;

(2) to any economic poison —

(a) if it is an imitation of or is offered for sale under the name of another economic poison;

(b) if its labeling bears any reference to registration under this Act;

(c) if the labeling accompanying it does not contain instructions for use which are necessary and, if complied with, adequate for the protection of the public;

(d) if the label does not contain a warning or caution statement which may be necessary and, if complied with, adequate to prevent injury to living man and other vertebrate animals;

(e) if the label does not bear an ingredient statement on that part of the immediate container and on the outside container or wrapper, if there be one, through which the ingredient statement on the immediate container cannot be clearly read, of the retail package which is presented or displayed under customary conditions of purchase;

(f) if any word, statement, or other information required by or under the authority of this Act to appear on the labeling is not prominently placed thereon with such conspicuousness (as compared with other words, statements, designs, or graphic matter in the labeling) and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use, or

(g) if in the case of an insecticide, fungicide, or herbicide, when used as directed or in accordance with commonly recognized
practice, it shall be injurious to living man or other vertebrate animals or vegetation, except weeds, to which it is applied, or to the person applying such economic poison.

Section 3. Prohibited Acts.

(a) It shall be unlawful for any person to distribute, sell, or offer for sale within this State or deliver for transportation or transport in intrastate commerce or between points within this State through any point outside this State any of the following:

(1) Any economic poison which has not been registered pursuant to the provisions of Section 4 of this Act, or any economic poison if any of the claims made for it or any of the directions for its use differ in substance from the representations made in connection with its registration or if the composition of an economic poison differs from its composition as represented in connection with its registration: Provided, That, in the discretion of the Commissioner a change in the labeling or formula of an economic poison may be made within a registration period without requiring reregistration of the product.

(2) Any economic poison unless it is in the registrant's or the manufacturer's unbroken immediate container, and there is affixed to such container, and to the outside container or wrapper of the retail package, if there be one through which the required information on the immediate container cannot be clearly read, a label bearing

(a) the name and address of the manufacturer, registrant, or person for whom manufactured;

(b) the name, brand, or trade mark under which said article is sold; and

(c) the net weight or measure of the content subject, however, to such reasonable variations as the Commissioner may permit.

(3) Any economic poison which contains any substance or substances in quantities highly toxic to man, determined as provided in Section 5 of this Act, unless the label shall bear, in addition to any other matter required by this Act,

(a) the skull and crossbones;

(b) the word "poison" prominently, in red, on a background of distinctly contrasting color; and

(c) a statement of an antidote for the economic poison.

(4) The economic poison commonly known as standard lead arsenate, basic lead arsenate, calcium arsenate, magnesium arsenate, zinc arsenate, zinc arsenite, sodium fluoride, sodium fluosilicate, and
barium fluosilicate unless they have been distinctly colored or discolored as provided by regulations issued in accordance with this Act, or any other white powder economic poison which the Commissioner, after investigation of and after public hearing on the necessity for such action for the protection of the public health and the feasibility of such coloration or discoloration, shall, by regulation, require to be distinctly colored or discolored; unless it has been so colored or discolored: Provided, That the Commissioner may exempt any economic poison to the extent that it is intended for a particular use or uses from the coloring or discoloring required or authorized by this section if he determines that such coloring or discoloring for such use or uses is not necessary for the protection of the public health.

(5) Any economic poison which is adulterated or misbranded, (or any device which is misbranded).

(b) It shall be unlawful --

(1) for any person to detach, alter, deface, or destroy, in whole or in part, any label or labeling provided for in this Act or regulations promulgated hereunder, or to add any substance to, or take any substance from, an economic poison in a manner that may defeat the purpose of this Act;

(2) for any person to use for his own advantage or to reveal, other than to the Commissioner or proper officials or employees of the State or to the courts of this State in response to a subpoena, or to physicians, or in emergencies to pharmacists and other qualified persons, for use in the preparation of antidotes, any information relative to formulas of products acquired by authority of Section 4 of this Act.

Section 4. Registration.

(a) Every economic poison which is distributed, sold, or offered for sale within this State or delivered for transportation or transported in intrastate commerce or between points within this State through any point outside this State shall be registered in the office of the Commissioner, and such registration shall be renewed annually; Provided, That products which have the same formula, are manufactured by the same person, the labeling of which contains the same claims, and the labels of which bear a designation identifying the product as the same economic poison may be registered as a single economic poison; and additional names and labels shall be added by supplement statements during the current period of registration. The registrant shall file with the Commissioner a statement including:

(1) the name and address of the registrant and the name and address of the person whose name will appear on the label, if other than the registrant;

(2) the name of the economic poison;

(3) a complete copy of the labeling accompanying the economic
poison and a statement of all claims to be made for it including directions for use; and

(4) if requested by the Commissioner a full description of the tests made and the results thereof upon which the claims are based. In the case of renewal of registration, a statement shall be required only with respect to information which is different from that furnished when the economic poison was registered or last reregistered.

(b) The registrant shall pay an annual fee of $_______ for each economic poison registered, such fee to be deposited (in the Treasury of the State)(to the credit of a special fund to be used only for carrying out the provisions of this Act): Provided, however, That any registrant may register annually any number of brands after the payment of annual fees aggregating $_______.

(c) The Commissioner, whenever he deems it necessary in the administration of this Act, may require the submission of the complete formula of any economic poison. If it appears to the Commissioner that the composition of the article is such as to warrant the proposed claims for it and if the article and its labeling and other material required to be submitted comply with the requirements of Section 3 of this Act, he shall register the article.

(d) If it does not appear to the Commissioner that the article is such as to warrant the proposed claims for it or if the article and its labeling and other material required to be submitted do not comply with the provisions of this Act, he shall notify the applicant of the manner in which the article, labeling, or other material required to be submitted fail to comply with the Act so as to afford him an opportunity to make the necessary corrections. If, upon receipt of such notice, the applicant insists that such corrections are not necessary and requests in writing that the article be registered, the Commissioner shall provide him with opportunity for hearing before refusing to issue registration. In order to protect the public, the Commissioner, on his own motion, after hearing, may at any time, cancel the registration of an economic poison. In no event shall registration of an article be construed as a defense for the commission of any offense prohibited under Section 3 of this Act.

(e) Notwithstanding any other provision of this Act, registration is not required in the case of an economic poison shipped from one plant within this State to another plant within this State operated by the same person.

Section 5. Determinations; Rules and Regulations; Uniformity.

(a) The Commissioner is authorized, after opportunity for a hearing.

(1) to declare as a pest any form of plant or animal life or virus which is injurious to plants, man, domestic animals, articles, or substances;

(2) to determine whether economic poisons are highly toxic to
man; and

(3) to determine standards of coloring or discoloring for economic poisons, and to subject economic poisons to the requirements of Section 3a (4) of this Act.

(b) The Commissioner is authorized, after due public hearing, to make appropriate rules and regulations for carrying out the provisions of this Act, including rules and regulations providing for the collection and examination of samples of economic poisons (or devices).

(c) In order to avoid confusion endangering the public health, resulting from diverse requirements, particularly as to the labeling and coloring of economic poisons, and to avoid increased costs to the people of this state due to the necessity of complying with such diverse requirements in the manufacture and sale of such poisons, it is desirable that there should be uniformity between the requirements of the several States and the Federal Government relating to such poisons. To this end the Commissioner is authorized, after due public hearing, to adopt by regulation such regulations, applicable to and in conformity with the primary standards established by this Act, as have been or may be prescribed in the United States Department of Agriculture with respect to economic poisons.

Section 6. Enforcement

(a) The examination of economic poisons (or devices) shall be made under the direction of the Commissioner for the purpose of determining whether they comply with the requirements of this Act. If it shall appear from such examination that an economic poison (or device) fails to comply with the provisions of this Act, and the Commissioner contemplates instituting criminal proceedings against any person, the Commissioner shall cause appropriate notice to be given to such person. Any person so notified shall be given an opportunity to present his views, either orally or in writing, with regard to such contemplated proceedings and if thereafter in the opinion of the Commissioner it shall appear that the provisions of the Act have been violated by such person, then the Commissioner shall refer the facts to the (District Attorney) for the county in which the violation shall have occurred with a copy of the results of the analysis or the examination of such article: Provided, however, That nothing in this Act shall be construed as requiring the Commissioner to report for prosecution or for the institution of libel proceedings minor violations of the Act whenever he believes that the public interests will be best served by a suitable notice of warning in writing.

(b) It shall be the duty of each (District Attorney) to whom any such violation is reported to cause appropriate proceedings to be instituted and prosecuted in the ______________ Court without delay.

(c) The Commissioner shall, by publication in such manner as he may prescribe, give notice of all judgments entered in actions instituted under the authority of this Act.
Section 7  Exemptions

(a) The penalties provided for violations of Section 3a of this Act shall not apply to --

(1) any carrier while lawfully engaged in transporting an economic poison within this State, if such carrier shall, upon request, permit the Commissioner or his designated agent to copy all records showing the transactions in and movement of the articles;

(2) public officials of this State and the Federal Government engaged in the performance of their official duties;

(3) the manufacturer or shipper of an economic poison for experimental use only

(a) by or under the supervision of an agency of this State or of the Federal Government authorized by law to conduct research in the field of economic poisons, or

(b) by others if the economic poison is not sold and if the container thereof is plainly and conspicuously marked "For experimental use only - Not to be sold", together with the manufacturer's name and address: Provided, however, That if a written permit has been obtained from the Commissioner, economic poisons may be sold for experimental purposes subject to such restrictions and conditions as may be set forth in the permit.

(b) No article shall be deemed in violation of this Act when intended solely for export to a foreign country, and when prepared or packed according to the specifications or directions of the purchaser. If not so exported, all the provisions of this Act shall apply.

Section 8. Penalties

(a) Any person violating Section 3a (1) of this Act shall be guilty of a misdemeanor and upon conviction shall be fined not more than $__________.

(b) Any person violating any provision of this Act other than Section 3a (1) shall be guilty of a misdemeanor and upon conviction shall be fined not more than $_____ for the first offense and upon conviction for a subsequent offense shall be fined not more than $______: Provided, That any offense committed more than five years after a previous conviction shall be considered a first offense.

(c) Notwithstanding any other provisions of this section, in case any person, with intent to defraud, uses or reveals information relative to formulas of products acquired under authority of Section 4 of this Act, he shall be fined not more than $______ or imprisoned for not more than one year, or both.

Section 9. Seizures

(a) Any economic poison (or device) that is distributed, sold,
or offered for sale within this State or delivered for transportation or transported in intrastate commerce or between points within this State through any point outside this State shall be liable to be proceeded against in any Court in any county of the State where it may be found and seized for confiscation by process of libel for condemnation:

(1) in the case of an economic poison;

(a) if it is adulterated or misbranded;

(b) if it has not been registered under the provisions of Section 4 of this Act;

(c) if it fails to bear on its label the information required by this Act;

(d) if it is a white powder economic poison and is not colored as required under this Act.

(2) In the case of a device, if it is misbranded.)

(b) If the article is condemned, it shall, after entry of decree, be disposed of by destruction or sale as the court may direct and the proceeds, if such article is sold, less legal costs, shall be paid to the State Treasurer; Provided, That the article shall not be sold contrary to the provision of this Act; and Provided, further, That upon payment of costs and execution and delivery of a good and sufficient bond conditioned that the article shall not be disposed of unlawfully, the court may direct that said article be delivered to the owner thereof for relabeling or reprocessing as the case may be.

(c) When a decree of condemnation is entered against the article, court costs and fees and storage and other proper expenses shall be awarded against the person, if any, intervening as claimant of the article.

Section 10. Delegation of Duties. All authority vested in the Commissioner by virtue of the provisions of this Act may with like force and effect be executed by such employees of the Department of Agriculture as the Commissioner may from time to time designate for said purpose.

Section 11. Cooperation The Commissioner is authorized and empowered to cooperate with, and enter into agreements with, any other agency of this State, the United States Department of Agriculture, and any other State or agency thereof for the purpose of carrying out the provisions of this Act and securing uniformity of regulations.

Section 12. Separability. If any provision of this Act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, the constitutionality of the remainder of this Act and the applicability thereof to other persons and circumstances shall not be affected thereby.
Section 13. Effective Date. All provisions of this Act, except Section 3, "prohibited acts"; Section 8 "penalties"; and Section 9 "seizures", shall take effect upon enactment, and Sections 3, 8, and 9, shall take effect as follows:

(1) as to devices, upon enactment;

(2) as to rodenticides and herbicides, 6 months after and

(3) as to insecticides, fungicides, and all other economic poisons, one year after enactment.

Section 14. Repeals. Jurisdiction in all matters pertaining to the distribution, sale and transportation of economic poisons (and devices), is by this Act vested exclusively in the Commissioner, and all acts and parts of acts inconsistent with this Act are hereby expressly repealed.

Note: This bill was prepared by The Council of State Governments, and modified by the Association of Economic Poisons Control Officials, October 1948.
1. **Applicability of Principles:** These principles are designed primarily for the guidance of State Economic Poisons Control Officials in those states which have adopted the Uniform State Insecticide, Fungicide and Rodenticide Act, but should be used by other state officials insofar as their statutes will permit.

2. **Definitions and Standards:** The definitions and standards established for this Association should be adopted by state officials insofar as their statutes will permit.

3. **Methods of Analysis:** The current methods of analysis of the Association of Official Agricultural Chemists of North America shall be adopted as the official methods insofar as they are applicable, and such other methods shall be used as may be necessary to determine whether the product complies with the law.

4. **Registration of Products:** Uniform application forms for registration should be used by State Officials. Two specimens or exact copies of the labeling of each proposed product should be submitted with the application. Also, there should be submitted the name and percentage of each active ingredient and the total percentage of inert ingredients in the product, the proposed directions for use, and a list of the specific pests for control of which it is to be sold, if such information is not contained in the labeling. Such other pertinent information concerning inert ingredients and physical properties of the product shall also be included on request.

5. **Registration, General Application of:** A registration of an economic poison is held to apply to the product even though manufactured at or shipped from other than the registered address. When a product has been registered by a manufacturer or a jobber, no registration shall be required of other sellers of the product so registered, provided shipments or deliveries thereof are in the manufacturer's or registrant's original, unopened, and properly labeled immediate containers.

6. **Registration, Refusal or Cancellation of:** Any of the following causes is sufficient to justify refusal or cancellation of registration of a product:

   (a) if the labeling bears any statement, design, or graphic representation relative thereto, or to its ingredients, which is false or misleading in any particular;

   (b) if found to be an imitation or offered for sale under the name of another economic poison;

   (c) if the labeling bears reference to registration procedure, or number;

   (d) if the labeling accompanying the economic poison does not contain directions for use which are adequate for the protection of the public under customary conditions of use;

   (e) if the label does not contain a warning or caution statement
which may be necessary to prevent injury to living man
and other vertebrate animals, vegetation (except weeds),
and useful invertebrate animals;

(f) if the label does not bear an ingredient statement on that
part of the immediate container and on the outside container
or wrapper, if there be one, through which the ingredient
statement on the immediate container cannot be clearly read,
of the retail package which is presented or displayed under
customary conditions of purchase. Provided that the control
official may permit the ingredient statement to appear pro-
minently on some other part of the container, if the size
or form of the container makes it impracticable to place it
on the part of the retail package which is presented or
displayed under customary conditions of purchase.

(g) if any word, statement, or other information required to
appear on the label or labeling is omitted or not prominent-
ly placed thereon and in such terms as to render it likely
to be read and understood under customary conditions of
purchase and use;

(h) if an economic poison is found to be injurious to living
man or other useful vertebrate animals, vegetation (except
weeds), to which it is applied, or to the person applying such
economic poison when used as directed, or in accordance with
commonly recognized safe practice;

7. Changes in Labeling or Ingredient Statement: Changes in the sub-
stance in the labeling or ingredient statement of a registered economic
poison shall be submitted in advance to the control official. The
registrant must describe the exact change desired and proposed effec-
tive date and such other pertinent information that justify such changes.
After the effective date of a change in labeling or ingredient state-
ment the product shall be marketed only under the new claims or ingre-
dient statement, except that a reasonable time may be allowed by the
control official for disposal of properly labeled stocks of the old
product. Changes in the composition shall not be allowed if such
changes would result in a lowering of the product's value as an economic
poison.

8. Label Requirements: Each package of economic poison sold separate-
ly shall bear a complete label. The label shall contain the name of
the product; name and address of the manufacturer, registrant, or
person for whom manufactured; directions for use when necessary; state-
ment of net content; and an ingredient statement. The label of every
economic poison, if necessary to prevent injury to man, other animals,
and useful vegetation, must contain a warning or caution statement, in
non-technical language based on the hazard involved in the use of the
economic poison. In addition, any economic poison, highly toxic to
man shall be labelled conspicuously with the word "poison" and the
skull and cross-bones symbol all in red on a background of distinctly
contrasting color, and the first-aid antidote for the poison shall be
given.

9. Directions for Use - When Necessary: Directions for use are re-
quired whenever they are necessary for the protection of the public.
The public includes not only users of economic poisons, but also those
who handle them or may be affected by their use, handling, or storage. Directions for use are considered necessary in the case of most small retail containers which go into the hands of users, and in the case of larger containers with the following exceptions:

(a) Directions may be omitted where the economic poison is sold in containers of 50-pounds or more of a solid or 20 gallons or more of a liquid, Provided; The economic poison is a well-known substance or mixture of substances for economic poison purposes and is intended only for the use to which it is ordinarily applied, and it bears an ingredient statement giving the names and percentages of each of the active ingredients.

(b) Directions may be omitted if the economic poison is to be used by manufacturers in their regular manufacturing processes, Provided; The label clearly shows that the product is intended for use only in manufacturing processes, and bears an ingredient statement giving the name and percentages of each of the active ingredients.

(c) Directions may be omitted if the economic poison is sold only to physicians or veterinarians, Provided; The label bears an ingredient statement giving the name and percentages of each of the active ingredients.

(d) Directions may be omitted if the economic poison is sold to distributors for dilution or mixing with carriers to prepare economic poisons for sale to the public, Provided; The label bears an ingredient statement giving the name and percentages of each of the active ingredients, and the economic poison is a well-known substance or mixture of substances, and there is readily available general knowledge of the composition, methods of use, and effectiveness of the product for economic poison purposes.

10. Other Claims: No claim shall be made for products in any written, printed or graphic matter accompanying the product at any time which differ in substance from representations made in connection with registration.

11. Name of Product: The name of the product shall appear on the labeling so as not to emphasize any one ingredient, or otherwise be misleading. It shall not be arranged on the label in such a manner as to be confused with other terms, slogans or legends.

12. Brand Names, Duplication of, or Infringement on: A brand name is distinctive with reference to the material to which it applies, and the registration of economic poisons under the same brand name by two or more manufacturers or shippers should be discouraged. This principle applies also to the registration of brand names so similar in character as to be likely to be confused by the purchaser. In the event the same name, or a closely similar one is offered by another manufacturer, the official should acquaint both parties with the fact, with the view of avoiding the confusion which follow the duplication of brand names.
13. **Ingredient Statement:** A label shall state: The name and percentage by weight of each active ingredient, together with the total percentage by weight of the inert ingredients. In the ingredient statement all names shall be printed in type of the same size, and in such terms as to render them likely to be read and understood under customary conditions of purchase.

14. **Name of Ingredients:** The well-known common name of the ingredient must be given or, if the ingredient has no common name, the correct chemical. If there is no common name and the chemical composition is unknown or complex, the enforcement official may permit the use of a new or coined name which he finds to be appropriate for the information and protection of the user. If the use of a new or coined name is permitted, the enforcement official may prescribe the terms under which it may be used. A trademark or trade name may not be used as the name of an ingredient except when it has become a common name.

15. **Sliding Scale Percentages:** The "sliding scale" method of expressing percentages shall not be used. (Example: "phosphorus, 2-3%). This is not to be construed as forbidding the use of qualifying statements descriptive of the basic active material or materials, provided such statements do not constitute an integral part of the percentage of total active ingredients. (Example: "Technical Chlorinated Camphene XX% (Combined Chlorine 67% - 69%)")

16. **Net Contents:** Each package of an economic poison shall show the net weight or measure of content, either stenciled or printed on the package or container, or on a tag attached thereto. Indefinite statements or content such as "... oz. when packed" shall not be used. Statements of liquid measure, or of specific gravity or density of liquid preparations, or expression of composition in terms of pounds per gallon, shall be made on the basis of 68°F. (20°C) except when other basis has been established through trade custom.

17. **Coloration of Highly Toxic Materials:** The white economic poisons hereinafter named shall be colored or discolored in accordance with this section. Provided, however, that any such white economic poison which is intended solely for use by a textile manufacturer or commercial laundry, cleaner or dyer as a moth proofing agent, which would not be suitable for such use if colored and which will not come into the hands of the public except when incorporated into a fabric, shall not be required to be so colored or discolored in accordance with this section. The hues values, and chromas specified are those contained in the Munsell Book of Color, Munsell Color Company, 10 East Franklin Street, Baltimore, Maryland.

(a) The coloring agent must produce a uniformly-colored product not subject to change in color beyond the minimum requirements during ordinary conditions of marketing and storage, cause the product to become less effective or cause damage when used as directed, or in accordance with commonly recognized safe practices.

(b) Standard lead arsenate, basic lead arsenate, calcium arsenate, magnesium arsenate, zinc arsenate, zinc arsenite, and barium fluosilicate shall be colored any hue, except the yellow-reds and yellows, having a
value of not more than 8 and a chroma of not less than 4, or shall be discolored to a neutral lightness value not over 7.

(c) Sodium fluoride and sodium fluosilicate shall be colored blue or green having a value of not more than 8 and a chroma of not less than 4, or shall be discolored to a neutral lightness value not over 7.

(2) Other. Other what powdered economic poisons may be required to be colored or discolored, after investigation and public hearing.

(2) The enforcement official may permit other hues to be used for any particular purpose, if the prescribed hues are not feasible for such purposes, and if such action will not be injurious to the public.

The coloration requirements above shall apply to the materials named therein and not to non-highly toxic mixtures consisting of other ingredients.

18. Highly Toxic: An economic poison which falls within any of the following categories when tested on laboratory animals (mice, rats and rabbits) is highly toxic to man within the meaning of these principles:

(a) Oral toxicity. Those which produce death in half or more than half the animals of any species at a dosage of 50 milligrams at a single dose, or less, per kilogram of body weight when administered orally to ten or more such animals of each species.

(b) Toxicity on inhalation: Those which produce death in half or more than half of the animals of any species at a dosage of 200 parts or less by volume of the gas or vapor in million parts by volume of air when administered by continuous inhalation for one hour or less to ten or more animals of each species, provided such concentration is likely to be encountered by man when the economic poison is used in any reasonably foreseeable manner.

(c) Toxicity by skin absorption: Those which produce death in half or more than half of the animals (rabbits only) tested at a dosage of 200 milligrams or less per kilogram of body weight when administered by continuous contact with the bare skin for 24 hours or less to ten or more animals.

Provided, however, that an enforcement official may exempt any economic poison which meets the above standard but which is not in fact highly toxic to man, from these principles with respect to economic poisons highly toxic to man, and may after hearing designate as highly toxic to man any economic poison which experience has shown to be so in fact.

19. Sale or Possession of Sodium Fluoroacetate: No person shall sell or possess any sodium fluoroacetate except federal, state, county, municipal officers or their deputies for use in their official duties in pest control; research or chemical laboratories in their respective fields; properly registered ant poisons containing thallium expressed as

20. Sale or Possession of Thallium: No person shall sell or possess any thallium or thallium compound except federal, state, county, municipal officers or their deputies for use in their official duties in pest control; research or chemical laboratories in their respective fields; regularly licensed pest control operators for use in their own service work; and wholesalers or jobbers of economic poisons for sale to the aforementioned persons, or for export.
metallic not more than 1%; wholesalers or jobbers of economic poisons for sale to the aforementioned persons; or for export.

21. **Labeling Sodium Arsenite Solution:** An economic poison labeled or sold as sodium arsenite solution for control of weeds, termites, or wood-destroying fungi shall bear a statement of the percentage of arsenic trioxide contained therein as the active ingredient, and in addition shall bear a statement of the total arsenic in water-soluble form expressed as metallic, and the pounds of arsenic trioxide per gallon at 68°F. The weight of the solution in pounds per gallon at 68°F may also be given.

22. **Labeling Products Containing Arsenic:** The label of any economic poison containing arsenic as an active ingredient in any form shall show the total amount of arsenic, expressed as metallic, and the amount of arsenic in water-soluble form, expressed as metallic, in addition to other required statements.

23. **Labeling Products Containing Copper:** If an economic poison contains a copper compound of uncertain composition, the ingredient statement may be given in terms of copper expressed as metallic providing the type of compound is also shown. For example, the name of active ingredient may be stated as "Copper expressed as metallic (derived from basic copper sulfate)."

24. **Labeling Products Containing Alkaloids:** Products compounded with tobacco, nux vomica, sabadilla seed, or any other alkaloid-bearing material, shall be stated in terms of the alkaloid and not in terms of the plant material. Where accurate methods for determining alkaloid content are unknown, manufacturer and enforcement official should agree on an acceptable analytical procedure.

25. **Labeling Products Containing Organic Thiocyanates:** Materials containing organic thiocyanates under the general classification of esters, ethers, and similar compounds, containing up to and including 18 carbon atoms shall be guaranteed according to the actual ester or other content, rather than the percentage of commercial material present. In addition, the application for registration should contain a qualifying statement showing the percentage by weight of the combined nitrogen in the finished product.
DEFINITIONS OF TERMS

Active Ingredient: An ingredient which will in itself, when present in sufficient quantity, prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds, or other pests; it must not be antagonistic to the activity of the principal active ingredient or ingredients.

Adhesive or Sticker: A substance which increases the firmness of attachment of finely-divided solids or other water-insoluble materials to a solid surface, and may be measured in terms of resistance to time, wind, water, mechanical and chemical action.

Antidote: A practical immediate treatment, including first aid, in case of poisoning.

Antiseptic: A substance which opposes sepsis, putrefaction or decay; one that prevents or arrests the growth or action of microorganisms, either by destroying them or by inhibiting their growth and activity; when used for short periods of time must be a disinfectant or germicide; but when used for long periods of time may act by preventing growth and development of disease germs; used especially of agents applied to living tissue.

Bactericide: Anything that destroys bacteria. The term is synonymous in large part with germicide, the chief difference being that the latter is somewhat broader, inasmuch as it may include microorganisms other than bacteria. Bactericide is a precise term applying only to bacteria and to bacteria of all kinds. In practice, however, it is ordinarily regarded in the same light as germicide with respect to the resistance of different bacteria; that is, a substance, in order to be called a bactericide, is not necessarily required to be capable of destroying bacterial spores.

Brand: The name, number, trade-mark, or designation applied to an economic poison of any particular description by the manufacturer, distributor, importer, or vender thereof. Each economic poison differing in the ingredient statement, analysis, name, number, or trade-mark shall be considered as a distinct and separate brand.

Disinfectant: A substance that frees from infection; usually, a chemical agent which destroys disease germs or other harmful microorganisms, but not necessarily the resistant spore forms; commonly used of substances applied to inanimate objects.

The term disinfectant suggests the cleaning of sick rooms, clothing, bedding, lavatories, stables and in fact of any places or things that might harbor disease. By contrast, germicide is a precise, colorless word, conveying its literal meaning and little more. The two terms appear to have the same meaning when applied to substances used in fighting disease. If it is accepted that substances called disinfectants are germicides, and, in general, germicides may act as antiseptics but that antiseptics are not necessarily germicides, then it follows that disinfectants may, theoretically at least, act as antiseptics, but that antiseptics may not necessarily act as disinfectants.
Detergent: A substance used in aqueous or other medium to facilitate removal of foreign matter from solid surfaces.

Deflocculating Agent: A substance which aids in the production or maintenance of a dispersion of a solid within a liquid.

Deposit Builder: A substance which increases the material adhering to the surface during a reasonable period of application; it decreases the affinity between the desirable material and water, resulting in a greater deposit of material and shedding of water with less run-off of desirable material.

Economic Poison: A substance or mixture of substances intended for use as an insecticide, rodenticide, herbicide, fumigant, pruning paint or wood preservative; also a substance or mixture of substances intended for use as a fungicide, disinfectant, germicide, or bactericide except when for use on or in living man or other animals, and any other product intended for use on other forms of undesirable plant, animal or virus, except viruses on or in living man or other animals.

Emulsifying Agent: A substance which aids in the production or maintenance of a dispersion of one liquid within another.

Fumigant: A substance or mixture of substances which produce gas, vapor, fume, or smoke intended to destroy insects, bacteria or rodents.

Fungicide: A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any fungi.

Fungi: All non-chlorophyll bearing thallophytes (that is, all non-chlorophyll bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts and bacteria, except those on or in living man or other animals.

Germicide: A substance that destroys germs (microorganisms); applied especially to agents that kill disease germs. In practice it is assumed that a substance represented as a germicide, when used as directed, will kill all ordinary disease germs, but is not necessarily required to be capable of destroying bacterial spores.

Herbicide: A substance or mixture of substances intended to prevent, destroy, repel or mitigate any weed.

Insect: Any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class insecta, comprising six-legged, usually winged forms, as for example, beetles, bugs, bees and flies; and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as for example, spiders, mites, ticks, centipedes and wood lice, also nematodes and other worms, or any other invertebrates which are destructive, constitute a liability.

Insecticide: A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any insects which may be present in any environment whatever.

Label: All written, printed, or graphic matter on, or attached to the economic poison, or the immediate container thereof, and the
outside container or wrapper to the retail package of the economic poison.

**Labeling:** All information and other written, printed, or graphic matter upon the economic poison or any of its accompanying containers or wrappers to which reference is made on the label or in supplemental literature accompanying the economic poison.

**Larvacide:** A substance or mixture of substances intended to prevent, destroy, repel or mitigate larva.

**Package:** The carton, box, barrel or other receptacle into which an economic poison is placed for use, handling, removal, shipment, or conveyance; a single container of such article or articles, or several containers packed together, including both the immediate container of the material and the box, carton, or other container (if any) in which it is enclosed or displayed.

**Package, Original Unbroken:** The unit retail package as ordinarily displayed on and sold from the shelves of the dealer, distributor, or other vendor.

**Package, Unbroken:** The package delivered by the shipper to the carrier at the initial point of shipment. It may contain one or more original unbroken packages as defined above.

**Rodent:** All animals of the order Rodentia, such as rats, mice, gophers, prairie dogs, or squirrels.

**Rodenticide:** A substance or mixture of substances intended to prevent, destroy, repel or mitigate rodents or any other undesirable vertebrate animal.

**Sanitizer:** A substance which reduces the number of casual bacterial contaminants to safe levels as judged by health requirements; commonly used of substances applied to inanimate objects.

**Selective Wetting Agent:** A substance which by affecting the surface, alters the relative ease of wetting a solid by various fluids, for example, causes lead arsenate to be preferentially wetted by oil rather than by water.

**Spreader or Film Extender:** A substance which increases the area that a given volume of liquid will cover on a solid, or on another liquid.

**Sterilize:** To render sterile, that is, free from all living microorganisms. Heating for a sufficient time at a temperature at which microorganisms cannot live is recognized as a physical method of freeing inanimate objects and their surroundings from all living microorganisms. Usually understood as referring to the treatment of surgeons' instruments, gauze bandages, culture dishes, and other apparatus rather than the treatment of the sick room or of the human body.

Disinfect refers particularly to the destruction of disease germs, especially the vegetative forms, while sterilize denotes the freeing from all organic life. Sterilize is the more drastic,
and it might easily happen that something is thoroughly disinfected without being completely sterilized.

**Synergist:** A substance which produces in combination with another a pharmacological effect in that the efficiency of one or more of the components may be greatly heightened or potentiated by the other.

**Water Modifier:** A substance which is used to change the pH or the chemical composition of dissolved or suspended material in the spray water in order to prevent undesirable behavior.

**Weed:** Any plant which grows where not wanted.

**Wetting Agent:** A substance which appreciably lowers the interfacial tension between water and a solid, and increases the tendency of a liquid to make complete contact with the surface of a solid, so that no dry area may remain.

\[ \text{a liquid} \]
AN ACT RELATING TO CUSTOM APPLICATION OF
INSECTICIDES, FUNGICIDES, AND HERBICIDES

Organizations which cooperated in the preparation of this Act:

Council of State Governments
Association of Economic Poisons Control Officials
National Association of State Aviation Officials
National Association of Commissioners, Secretaries, and
Directors of Agriculture
Civil Aeronautics Administration
United States Public Health Service
United States Department of the Interior
United States Department of Agriculture

Interpretive Statement

Purpose

This bill has been prepared in order to assist States which find it
necessary to adopt or revise legislation regulating the application
of insecticides, fungicides, and herbicides (weed killers) for hire.

In view of widely differing conditions of agricultural production in
different parts of the country, the provisions of the bill should be
carefully considered and, when necessary, modified to meet local needs.

While this bill has been confined to custom application of insecti-
cides, fungicides, and herbicides, it may be found in some States
that regulation of other than custom application, particularly by
aircraft, is necessary.

It should be noted that this bill deals only with the application and
use of insecticides, fungicides, and herbicides. It thus covers an
entirely different area than the State Insecticide, Fungicide, and
Rodenticide Act, which deals with the sale of these economic poisons.
The latter bill was first carried as suggested State legislation in
the Program for 1947. The definitions of terms used in both bills,
except for the definition of "person", are identical.

Problem

Section 1 of the bill points out that in recent years there has been
very rapid advance in the discovery and synthesis of insecticides,
fungicides, and herbicides. The most spectacular of these, in many
ways, is 2,4-D (2,4-Dichlorophenoxyacetate acid), synthesized in 1941
and first used as a weed killer in 1941. This is a selective weed
killer which, generally speaking, will kill broad-leaved plants but
not grasses when applied in proper quantities. It is extremely valuable in killing weeds in grains, including wheat, rice, and corn, and in grass used for hay or pasture. However, it drifts very easily and, in some cases, has been known to drift as far as twenty miles when applied in windy weather by aircraft. Considerable drift may occur even when 2,4-D is applied by means of ground equipment. Damage to broad-leaved crops, such as cotton, tomatoes, and other vegetables, has resulted from drift. 2,4-D in dust form is particularly likely to drift, and application in this form by aircraft is at present disapproved by the United States Department of Agriculture. While, 2,4-D may cause damage, it is, when properly applied, a valuable aid to agricultural production. Obviously, however, its use requires great care.

DDT (Dichloro-diphenyl-trichlorethane) is another synthetic compound which has been found to be extremely valuable for control of certain insects. Recently it has been learned that DDT applied to dairy cattle, in dairy barns, or to fodder intended to be fed to dairy cattle or animals being finished for slaughter may be absorbed into the fat of the cattle or may appear in milk, and, for this reason, the United States Department of Agriculture has recommended that DDT should not be used in these ways. Instead, the Department has recommended that methoxychlor, a still newer synthetic compound, be used. When DDT is used to spray forest areas or shade trees in cities to control insects, care must be taken to see that wildlife is not injured.

Among other new insecticides are benzene hexachloride, chlordane, toxaphene (chlorinated camphene), TDE, parathion, tetraethyl pyrophosphates, and lindane. Each of these has its proper uses and dangers. Many of these new materials have not been tested under all conditions and their effects are not fully known.

Concurrently with the discovery of new and highly potent insecticides, fungicides, and herbicides, the business of custom spraying and dusting, including spraying and dusting by airplane, has greatly expanded. As these chemicals and the practices for applying them properly become more numerous and complex, custom spraying and dusting will undoubtedly continue to increase because of the need for specialized training and equipment. Insecticides, fungicides, and herbicides, along with modern machinery, improved varieties and practices, hybridization, etc., are becoming increasingly important factors in greater agricultural production.

The growth of custom spraying and dusting, the rapidity of new discoveries, the possibility of injury to health and to plants and animals, including wildlife, on lands or in waters adjacent to those being sprayed or dusted, and the possibility of fraudulent practices make public regulation increasingly necessary.

One difficult problem in connection with application of insecticides, fungicides, and herbicides is the question of liability for damage to crops or animals resulting from drift of the materials. This problem is particularly serious in the case of 2,4-D where damage may be very substantial and, at the same time, difficult to prove. No provision relating to liability has been included in the bill. It is felt that
it is best to leave this question, at least until further experience accumulates, to existing laws relating to liability. However, the matter is under study.

The requirements for licensing after examination intended to show that the operator is qualified (section 4(b)) and for reports regarding particular applications of insecticides, fungicides, and herbicides (section 7) should help to minimize damage from improper application and to fix responsibility when damage does occur.

Provisions of the Bill

The bill requires that persons engaged in custom application of insecticides, fungicides, or herbicides be licensed. A license would be issued by the Commissioner of Agriculture after the applicant had shown, on examination, that he possessed adequate knowledge concerning the use and application of insecticides, fungicides, and herbicides and upon consideration of other pertinent information. The licenses may be restricted to the use of certain types of equipment or materials if he is found qualified to use only these types. For example, a custom operator might be found qualified to use ground equipment but not aircraft or to use insecticides and fungicides but no herbicides. The license may be revoked or modified for cause. The grant, denial, or revocation of a license is subject to court review on petition of the aggrieved person (Section 3).

Under Section 3(e) a bond may be required from custom operators to secure performance of obligations. The amount of the bond is not specified, as it may be found desirable to fix, by regulation, a larger amount for large operators than for small operators.

Section 4 authorizes inspection of equipment used for application of insecticides, fungicides, or herbicides.

Section 5 authorizes the Commissioner of Agriculture to prescribe materials or methods to be used and to prohibit the use of materials or methods in custom application of insecticides, fungicides, and herbicides. Alternative provisions regarding the scope of such regulations are included. In issuing such regulations, consideration is to be given to pertinent research findings and recommendations of State and Federal agencies, such as the State Agricultural Experiment Station and the United States Department of Agriculture.

Under Section 6 licensees may be required to maintain records and submit reports giving specific information with respect to particular spraying or dusting jobs and other information. Reports relating to the time of application, wind velocity, other weather conditions, kind of material applied, and so on, could be required under this provision. Such information may be especially needed in the case of 2,4-D and other materials likely to cause damage because of drift.

Section 7 authorizes the Commissioner of Agriculture to make rules and regulations but provides that such regulations shall not be inconsistent with other regulations issued by the State or Federal Government with
respect to safety in air navigation or operation of aircraft. In
general, the State official responsible for regulation of aircraft
would continue to regulate flying from the standpoint of safety and
other general aspects. This section also requires the Commissioner
to consult with other officials of the State before issuing regula-
tions relating to matters within the jurisdiction of these officials.
Application of insecticides, fungicides, and herbicides may concern
not only agriculture but also health, forestry, fish and wildlife, etc.
as well as regulation of aircraft, and consultation among the officials
concerned will frequently be desirable.

Section 8 authorizes the Commissioner of Agriculture, in cooperation
with the State Agricultural College, to publish information regarding
injury which may result from improper application or handling of in-
secticides, fungicides, or herbicides and precautions which will help
prevent such injury. Much of the damage caused by 2,4-D and other
materials results from lack of information as to the effects of the
materials and the conditions under which they should be applied. While
the act relates principally to custom application, this section will
authorize the distribution of information to farmers generally.

Section 10 exempts pest control operators, that is, persons engaged in
destroying insects or fungi in or under buildings or in vehicles of
transportation, such as termite eradication, fumigation of buildings,
ships, etc. Outdoor custom application of insecticides, fungicides,
and herbicides in cities, e.g., to trees, gardens, lawns, etc., is not
exempted. However, consideration should be given to avoiding dual
licensing of operators by both the Commissioner of Agriculture and
municipalities.

Sections 3(f) and 13 authorize cooperation with other agencies of the
State and with agencies of other States and of the Federal Government.
Title  It should conform to State requirements. The following is a suggestion; a more complete title should be used where necessary;

"AN ACT relating to the application of insecticides, fungicides, and herbicides by aircraft or ground equipment."

(Be it enacted, etc.)

Section 1. Declaration of Purpose. The purpose of this act is to regulate, in the public interest, the custom application of insecticides, fungicides, and herbicides. In recent years a great many new materials have been discovered or synthesized which are valuable for the control of insects, fungi, and weeds. However, such materials may seriously injure health, property, or wildlife if not properly used. Insecticides may injure man or animals, either by direct poisoning or by gradual accumulation of poisons in the tissues. Crops may also be injured by improper use of insecticides or fungicides. The drifting or washing of insecticides into streams or lakes can cause appreciable damage to aquatic life. A herbicide applied by aircraft or ground equipment for the purpose of killing weeds in a crop which is not itself injured by the herbicides may drift, sometimes for miles, and injure other crops with which it comes in contact. Therefore it is deemed necessary to provide for regulation of the custom application of insecticides, fungicides, and herbicides.

Section 2. Definitions. For the purposes of this act -- (a) The term "insecticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects which may be present in any environment whatsoever.

(b) The term "fungicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any fungi.

(c) The term "herbicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any weed.

(d) The term "insect" means any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class Insecta, comprising six-legged, usually winged forms, as, for example, beetles, bugs, bees, and flies, and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as, for example, spiders, mites, ticks, centipedes, and wood lice.

(e) The term "fungi" means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.
(f) The term "weed" means any plant which grows where not wanted.

(g) The term "person" means any individual, firm, partnership, association, corporation, company, joint stock association, or body politic, or any organized group of persons whether incorporated or not; and includes any trustee, receiver, assignee, or other similar representative thereof.

(h) The term "Commissioner" means the Secretary, Commissioner, or Director of Agriculture. /\n
(i) The term "custom application of insecticides, fungicides, or herbicides" means any application of insecticides, fungicides, or herbicides by aircraft or ground equipment for hire. /\n
(j) The term "aircraft" means any contrivance now known or hereafter invented, used or designed for navigation of, or flight in, the air.

(k) The term "ground equipment" means any machine or device (other than aircraft), for use on land or water, designed for, or adaptable to use in applying insecticides, fungicides, or herbicides as sprays, dusts, aerosols, or fogs, or in other forms.

Section 3. Licenses. (a) No person shall engage in custom application of insecticides, fungicides, or herbicides within this State at any time without a license issued by the Commissioner. Application for a license shall be made to the Commissioner. Each application for a license shall contain information regarding the applicant's qualifications and proposed operations and other relevant matters as required pursuant to regulations promulgated by the Commissioner.

(b) The Commissioner may require the applicant to show, upon examination, that he possesses adequate knowledge concerning the proper use and application of insecticides, fungicides, and herbicides, and the dangers involved and precautions to be taken in connection with their application. If the applicant is other than an individual, the applicant shall designate an officer, member, or technician of the organization to take the examination, such designee to be subject to the approval of the Commissioner. If the extent of the applicant's operations warrant it, the Commissioner may require more than one officer, member, or technician to take the examination.

\1/ See section 10 for exemptions.

\2/ In States where only certain areas are liable to be affected by the application of insecticides, fungicides, or herbicides, the following could be inserted: "in counties or areas designated by the Commissioner."
(c) If the Commissioner finds the applicant qualified and if the applicant files the bond required under paragraph (e) of this section, the Commissioner shall issue a license, for such period as he may by regulation prescribe, to perform custom application of insecticides, fungicides, and herbicides within this State. The license may restrict the applicant to the use of a certain type or types of equipment or materials if the Commissioner finds that the applicant is qualified to use only such type or types. If a license is not issued as applied for, the Commissioner shall inform the applicant in writing of the reasons therefor.

(d) The Commissioner may suspend, pending inquiry, for not longer than ten days; and, after opportunity for a hearing, may revoke or modify the provisions of any license issued under this section, if he finds that the licensee is no longer qualified, has engaged in fraudulent business practices in the custom application of insecticides, fungicides, or herbicides, or has made any custom application in a faulty, careless, or negligent manner, or has violated any of the provisions of this act or regulations made thereunder.

(e) The Commissioner shall require a reasonable bond, with surety satisfactory to the Commissioner, from each applicant, under such rules and regulations as he may prescribe, to secure the performance of contractual obligations of the licensee with respect to custom application of insecticides, fungicides, or herbicides. Any person injured by the breach of any such obligation shall be entitled to sue on the bond in his own name in any court of competent jurisdiction to recover the damages he may have sustained by such breach.

(f) The Commissioner may issue a license without examination to a non-resident who is licensed in another State substantially in accordance with the provisions of this act.

(g) Any person aggrieved by any action of the Commissioner may obtain a review thereof by filing in the court within 30 days of notice of the action a written petition praying that the action of the Commissioner be set aside. A copy of such petition shall forthwith be delivered to the Commissioner, and within days thereafter the Commissioner shall certify and file in the court a transcript of any record pertaining thereto, including a transcript of evidence received, whereupon the court shall have jurisdiction to affirm, set aside or modify the action of the Commissioner, except that the findings of the Commissioner as to the facts, if supported by substantial evidence, shall be conclusive.

Section 4. Inspection. The Commissioner may provide for inspection of any ground equipment or of any device or apparatus used for custom application of insecticides, fungicides, or herbicides by aircraft and may require proper repairs or other changes before its further use for custom application.

Section 5. Materials and Methods of Application. The Commissioner may, by regulation after public hearing, prescribe materials or methods to be used and prohibit the use of materials or methods in
custom application of insecticides, fungicides, and herbicides, to the extent necessary to protect health or property to protect health or to prevent injury, by reason of the drifting, washing or application of such materials, to desired plants or animals (including pollinating insects and aquatic life) on property other than that owned or leased by the person for whom the materials are applied. In issuing such regulations, the Commissioner shall give consideration to pertinent research findings and recommendations of other agencies of this State or of the Federal Government.

Section 6. Reports. The Commissioner may by regulation require any licensee to maintain such records and furnish reports giving such information with respect to particular applications of insecticides, fungicides, or herbicides and such other relevant information as the Commissioner may deem necessary.

Section 7. Regulations. The Commissioner may, after public hearing, make regulations for carrying out the provisions of this act: Provided, That the regulations shall not be inconsistent with regulations issued by this State or by the Federal Government respecting safety in air navigation or operation of aircraft. Before issuing regulations directly related to any matter within the jurisdiction of any other official of this State the Commissioner shall consult with that official with reference thereto.

Section 8. Information. The Commissioner may, in cooperation with the State Agricultural College publish information regarding injury which may result from improper application or handling of insecticides, fungicides, or herbicides and methods and precautions designed to prevent such injury.

Section 9. Penalties. Any person violating the provision of this act or the regulations issued hereunder shall be guilty of a misdemeanor and, upon conviction, shall be fined not more than ______ dollars for the first offense, and not more than ______ dollars for each subsequent offense.

Section 10. Exemptions. This act shall not apply to custom application of insecticides, fungicides, or herbicides to prevent, destroy, repel, or mitigate insects or fungi within or under buildings (except farm buildings other than dwellings) or within vehicles, ships, aircraft, or other means of transporting persons or property by land, water, or air.

Section 11. Enforcement. For the purpose of carrying out the provisions of this act the Commissioner may enter upon any public or private premises at reasonable times in order to have access for the purpose of inspecting any aircraft or ground equipment subject to this act.

Section 12. Delegation of Duties. The functions vested in the Commissioner by this act may be delegated by him to such employees of the Department of Agriculture as the Commissioner may from time to time designate for such purposes.

Section 13. Cooperation. The Commissioner may cooperate with any other agency of this State or its subdivisions or with any agency of
any other State or of the Federal Government for the purpose of carrying out the provisions of this act and of securing uniformity of regulations.

Section 14. Separability. If any provision of this act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, by a court of competent jurisdiction, the constitutionality of the remainder of the act and the applicability thereof to other persons and circumstances shall not be affected thereby.

Section 16. Repeal. All acts and parts of acts inconsistent with this act are hereby expressly repealed.

Section 17. Effective Date. This act shall become effective
REPORT OF THE EXECUTIVE COMMITTEE

J. D. Patterson, Chairman

During the past year, the Executive Committee has held several meetings. On October 11, 1949, following the annual convention, a session was held in the offices of Dr. W. G. Reed to draft a program for the year, and to assist the President in selecting committees and investigators.

The week of April 24, 1950, the committee met again in the offices of the Insecticide Division, Production & Marketing Administration, U. S. D. A., to discuss problems concerned with the control of economic poisons. The full membership of the committee was present.

The current status of required warnings on labels and permissible recommendations for the newer economic poisons was discussed in detail, to bring uniformity among state and federal agencies. Also, the question of whether wetting agents and emulsifiers should be declared as active or inert ingredients was examined. This topic is still being thoroughly studied by the industry in cooperation with state and federal authorities.

Consideration was given to procedure for furthering the coordinated program of federal and state agencies in inspection activities. One outgrowth of this discussion was the distribution of reports to the membership concerning deficient products found by state officials in various sections of the country.

The committee met at 10:00 P.M., Friday evening October 6, 1950 at the Shoreham Hotel, J. D. Patterson presiding.

Reports of Committees to study Ingredients, Toxicity and Antidotes, Legislation, and Methods Clearing House were reviewed and approved. It is recommended that these committees be continued. The committee accepts with regret the resignation of Dr. H. H. Shepard, Chairman of the Ingredient Committee.

It is suggested that the study of uniform sampling procedure be continued.

The committee recommends the adoption of the Regulatory Principles & Definitions of Terms as official, and further recommends the appointment of a standing committee to investigate this subject.

The Executive Committee further wishes to thank the National Agricultural Chemicals Association for their cooperation in furnishing our Secretary with reports on the current hearings regarding use of insecticides in production of food.

The committee takes this opportunity to express sincere thanks and appreciation to the speakers on the program, and to the committee members and investigators for their work during the past year on behalf of the Association.
RESUME OF 4TH ANNUAL CONVENTION
of the
ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

The fourth annual convention of the Association of Economic Poisons Control Officials was held at the Shoreham Hotel, Washington, D.C., October 7, 1950. A total of 108 registered; 56 represented 34 states and Canada, 16 from federal agencies, and 36 from the industry.

President J.F. Fudge, State Chemist, Texas opened his address by reviewing parts of the constitution dealing with the objects of the Association. He reviewed the many activities of the group, stressing particularly the importance of the Methods Clearing House, and Legislative Committee assignments. Dr. Fudge discussed the subject of use of coined names on labels without supplemental chemical information, and urged the membership to adopt a clear-cut attitude which could be adhered to throughout the group. The injudicious use, impatience of manufacturers, competitive influence, and other factors concerning some of the newer pesticides has, in a degree, overshadowed the benefits derived, and delayed full acceptance of these materials. He enumerated many of the valuable aspects of pesticides, and pointed out the double duty of control officials in adequately controlling sales and distribution, and emphasized the benefits derived from proper use of these materials.

Dr. J.G. Townsend, Medical Director, U.S. Public Health Service spoke on The Newer Insecticides - A Public Health Problem. Dr. Townsend mentioned the deaths and poisonings from misuse of insecticides, but felt that current fears could in time be allayed. He reviewed works in the field which had been pioneered by Dr. Paul Neal, and present activity centered in the Communicable Disease Center in Atlanta. The problem of the newer, more toxic insecticides is such that it is at once an industrial, agricultural and a public health problem, said Dr. Townsend. Coordinated effort among the Public Health Service, U.S.P.H.S., Bureau of Entomology and Plant Quarantine, and the industry has overcome many of the industrial hazards encountered in the early developmental stages of these new chemicals. In recognition of the numerous reports of accidents in the agricultural application field, and epidemiological study was arranged by the Health Service staff. Much progress has been made, and it is hoped that a cooperative undertaking with other governmental agencies and insecticide manufacturers can be arranged. Some state bodies have indicated a desire to ban the use of certain of these materials; it is believed that an answer can be found which will be more satisfactory than a blanket banning of all of these valuable tools. The great over-all need, of course, is for continued cooperative effort, both in the development and in the dissemination of information. We must reach every single farmer who uses insecticides to protect him from becoming another poisoning statistic. The two-fold research and educational job requires the cooperation of federal, state, and local officials, industry, and farmer alike.

Wm. O. Buettner, Executive Secretary, National Pest Control Operators, in his talk on Sound Regulatory Requirements as Viewed by the Pest Control Industry, brought out the fact that use experience is an excellent measuring stick for sound legislation. He appealed to the manufacturers to avoid the use of phraseology that will tend to confuse the user. Other factors, such as accumulative effects and spray areas where other chemical reactions may result, should be considered. The use of terms such "safe", "harmless", and "non-injurious"
should be avoided because they are likely to be misconstrued, and eventually become a source of false security. Mr. Buettnre reviewed the past history of poisonings and resulting legislation in the case of sodium fluoride. Also, he pointed out the extravagant claims appearing on labels of many products, and descriptive literature such as advertisements and new items in evidence daily. Such cases warrant deep study to overcome confusion by the public. He closed with a plea for more follow-through once pesticides are put on the market. A program of this nature goes beyond the law itself, since it involves the policing of industry by its own means. Moral obligation of industry follow-through is even more important than the law because it becomes one of honesty in intent, which cannot be incorporated in law.

Dr. Bernard E. Conley spoke on the Relationship of Health and Regulatory Agencies in the Control of Economic Poisons. He brought out the need for legislation to cover those few undesirables who by questionable practices constantly jeopardize the welfare of their associates. The A.M.A., Committee on Pesticides, has outlined a program on education and research as follows: (1) Promote safe standards for use of pesticides; (2) Foster the development of antidotal measures; (3) Stimulate voluntary control; (4) Assit in the standardization of nomenclature; (5) Accumulate and evaluate new information; and (6) Undertake an extensive educational program. Voluntary control is aimed primarily at encouraging manufacturers and users to act upon their own health problems. Judicious use of pesticides can be brought about by the development and promotion of safety standards. Precautionary labeling and legislative controls have done much to assure safe use; however their limitations must be recognized to devise a scheme of analysis of facts pertaining to safe use, two classes of persons who use or are exposed to these materials have been denoted. Formulators, industrial workers, applicators, food processors, and similar types of personnel have been classed by virtue of experience or training, in one group. The second category is reserved for the general public who come in contact with pesticides directly or indirectly. Also, this committee is striving to accumulate and analyze information regarding pesticide accident statistics. The primary object is to determine what constitutes sound basic principles for the various groups, and then encourage their employment according to the degree of hazard involved. Such standards must represent the consensus of all factors, of which your Association is an integral part.

Dr. F.C. Bishopp, Assistant Chief, Bureau of Entomology and Plant Quarantine in his talk on Insecticides, Food, and Health, traced the tremendous increase in the use of pesticides in recent years, both from the standpoint of quantity used and acreage covered. Also, he outlined the positive values resulting from such use. By means of exhibits he was able to emphasize the spectacular effects which have brought out when control areas are left untreated. By inference and actual comparison the listener could form his own opinions as to the increased food supply made available by the proper application of pesticides. Similarly, the damage possible from unwise use of these materials was demonstrated.

Dr. M.D. Farrar, Head of Entomology Department, Clemson College, made a few remarks concerning the use of insecticides in fertilizers. Demonstration work has shown outstanding results using certain pesticides, which made the difference between getting a good crop, or no crop at all. Success was particularly notable for combating the sand wireworm, and corn worm. As soon as word got around that crops, particularly corn, could be aided in this manner, farmers immediately sought out fertilizer concerns who would mix these materials for use under any crop. Experiment station demonstration work has not progressed to the point of using these materials under forage, but it is definitely needed. Pesticides used in the test were one pound of chlordane per acre, and a pound of the gamma isomer of benzene hexachloride per acre.
Dr. S.A. Rohwer, Assistant Chief, Bureau of Entomology and Plant Quarantine, spoke in rebuttal to Dr. Farrar's remarks on the subject of extensive use of pesticides in fertilizers. He called attention to his remarks at the 1945 convention in which he enumerated many pitfalls of too hasty action. He stressed some of the factors involved in this new use of pesticides; "shelf-life" materials mixed in fertilizers has been uninvestigated, and "land-life" effects on the soil, product, carry-over from year to year all should be thoroughly studied before too much enthusiasm is generated. Establishment of national recommendations may not be possible due to specific requirements in the various areas where atmosphere and other elements are a vital factor. He closed with the statement that we should move slowly in the general consideration of the subject.

The afternoon session was devoted to discussions of various committee reports, and other business matters of the Association. These reports are reproduced in full elsewhere in this publication.

With no further business to be considered, members heard the report of the nominating committee. Officers elected to serve for the year of 1950-51 are shown in the front of this report.
ADDRESS BY THE PRESIDENT

J. F. Fudge, College Station, Texas

Custom has decreed that, at about this time in the program of the annual convention of most groups, the current titular leader of the group be called upon to give a report of his stewardship, including a resume of where the group has been, progress made, and whither, in his opinion, the group should be heading. As President of your Association during the past year, I shall now attempt to discharge that duty.

First, however, I want to take this opportunity to welcome each and every one of you to this, the fourth annual meeting of our Association, and to thank you for your support. My only regret is that some who should be present are not here. Our Association can render maximum service only when all economic poison control officials take an active part in our deliberations, and insofar as possible, join with us in developing uniform, well considered principles and procedures for use in the discharge of our duties as control officials.

I wish to take a few minutes here to redirect your attention to the purposes of our Association as stated in the Constitution. Article 2 of that Constitution reads as follows:

Article 2. Object. The object of the association shall be to promote uniform and effective legislation, definitions, rulings, and enforcement of laws relating to the control of sale and distribution of insecticides, fungicides, and other economic poisons.

Two words in this statement of objectives need to be emphasized, and upon the degree of emphasis given to them depends the success and service of this Association. These two words are "uniform" and "effective". No one will argue that a law and the enforcement of the law, to have any value at all, must be effective. The situation with respect to "uniform" is much more complex, but upon final analysis, the effectiveness of control and the success of our Association will be conditioned very largely by the degree to which uniformity is promoted.

The word "uniform" carries with it a connotation of a group of individuals who behave in a similar manner in response to the same stimulus. Before we in our Association can be uniform, we must decide upon how we are going to behave in response to a given situation and then behave in that way. This does not mean a slavish following of some individual behavior, but rather a truly cooperative agreement decided upon after everyone has had a chance to express his opinion and the reason for it. It means that each and every one of you should take an active part in the discussion of the matter at hand, clearly stating your position after careful consideration of all factors.
involved. Then, after a course of action has been decided upon, that course of action should be supported to the best of your ability. For example: Last year this association voted to support the principles advanced in the proposed uniform state economic poisons or pesticide law, including definite statements concerning label requirements. In the interest of brevity and for other reasons to be discussed, I use the term pesticides as synonymous with economic poisons. In order to be uniform, all of us should vigorously support that action. If no voice is raised in support of our action, others may raise objections to the action with undesirable end results. It is up to each of you to assume your full responsibility as a member of this association; if you don't, neither you, your State, nor this association is going to derive benefit from your membership.

Detailed reports of the progress during the past year will be made later by the chairman of the several committees. The members of these committees have worked hard, and after hearing their reports, I believe that you will agree with me that much progress has been made. Our program for uniform, simplified registration of pesticides has been widely accepted. The Legislative Committee has devoted considerable time, thought and effort to possible improvements in the proposed uniform pesticide bills. One of the most important committees, that on Uniform Standards, has made considerable progress. State and Federal members of our Executive Committee have spent much time and effort in cooperative effort to promote uniformity and effectiveness of laws at State and Federal levels. Other committees have also performed their assignments well.

The Methods Clearing House, under the leadership of Mr. J. J. T. Graham, has continued and expanded its very valuable activities. While methodology is primarily within the purview of the A.O.A.C., it is also basic to the proper discharge of our duties as control officials. Methods for the determination of most single pesticides have usually been well developed, but the situation alters greatly when mixed goods are to be analyzed. We have no methods by means of which many mixtures can be accurately analyzed and broken down into actual determinations of the percentages of the several constituents guaranteed to be present in the mixture. In other cases, accurate methods have been developed but are so complex and time-consuming that they are not adaptable to the routine of the usual control laboratory. A very great deal of work on methodology is still urgently required. I wish to take this opportunity to urge that each of you cooperate to the utmost in furthering the work of the A.O.A.C. along this vitally important line, and to thank Mr. Graham and his group at Beltsville, and our Vice-President Lemmon and his group at Sacramento for their very important contributions to this phase of our work.

Dissemination of information concerning violations of the law is always highly desirable. During the past year, our able Secretary has undertaken to issue occasional statements containing information
concerning deficient and/or misbranded pesticides which may be moving in interstate commerce. Such movement would, of course, place the product under the Federal law, but it was the thought of your Executive Committee that such a procedure would also be of value to State officials. In order for this program to be effective, each State official should notify our Secretary of violations, sending the name of the Company, the brand and guarantee of the pesticide, the analysis of the official sample examined, and all other pertinent information. Your cooperation in this program is solicited.

During the past year, a question was raised as to whether the common coined names of a number of the newer pesticides had become sufficiently well known so that the chemical name could be omitted on future printing of labels. It was recognized that labels are primarily designed for the protection of the consumer, and that the consumer might develop a certain degree of familiarity with the common names, but probably would never do so with the chemical names. For many pesticides, common names are used almost exclusively by State and Federal entomologists. Mr. Rohwer and his associates have done excellent work in clearing and pre-empting common names for several of the new pesticides. Many technical or chemical names are entirely too complex for common acceptance, and sometimes even qualified chemists disagree as to the proper designation. This question was brought to the attention of officials of a number of groups concerned, including members of the Executive Committee of this Association. While there was some divergence, the general consensus of opinion was that the common name might be used in the statement of ingredients but that the chemical name should always be given in connection with the guaranteed analysis on the label; this could be done by means of a footnote on the label. This is the opinion of most of the members of your Executive Committee. This Association should carefully consider this matter and develop a definite, clear-cut statement of our position.

An item of interest to all of us, showing progress in a group closely allied to ours, has been the formation of the Subdivision on Pesticides, Division of Agricultural and Food Chemistry of the American Chemical Society. The first chairman of this subdivision is Dr. J. L. St. John, who was also the first president of our association. In this connection, it is of interest to note that the A.C.S. group, after careful consideration of a large number of different names, finally adopted the word "pesticide". I believe that this Association should consider the desirability of changing Section 1 of our constitution with a view to substituting the word "pesticide" for the words "economic poisons", and look forward to having all of our state laws modernized in this way eventually.

The imperative necessity to "haste slowly" in the introduction and wide-spread use of new pesticides has been emphasized by a number of persons who have appeared on our programs from time to time.
However, this question is just as "hot" as it was several years ago, and the needs for complete information and adequate control are greater today than ever before.

In this connection, I would like to recommend to each of you the rereading of the paper by S. A. Rohwer at the 1948 meeting. To quote Mr. Rohwer:

"The biggest problem associated with the newer insecticides is not the variety and complexity of questions that need to be answered but rather the general impatience and willingness to ignore the fundamental requirement for the orderly development of needed information. This is a real problem and unless it is solved incidents may occur which will so cloud the issue for some new materials that the benefits they can contribute to our economy through pest control will be lost. Impatience is greatly accentuated by (1) the general recognition by the public of the importance of pest control and the willingness to use chemicals and especially the newer ones for this purpose (2) the enthusiasm of technical workers to report results of tests with new materials, especially those which are highly effective (3) the eagerness with which research tests are examined and (4) the competitive influence on industry which results in making new insecticides generally available before adequate information is known on where, when, and how to use them safely."

The injudicious use of some of these pesticides has resulted in such incidents as buildings blowing up, cotton farmers out gunning for rice farmers, and workers, even experiment station workers, dying in extreme pain.

The use of some of the newer and more powerful pesticides, especially those in the organic phosphate group, has resulted in several deaths and many illnesses during the past year. Some difficulty has also arisen from improper use of the extremely poisonous sodium fluoracetate, commonly known as "1080". Public interest has been aroused and in a number of instances, demands for remedial or preventive legislation have followed. Many groups are concerned with finding satisfactory answers to the questions which arise. One of the most important of these is that of the control officials—in other words, this Association. It is absolutely imperative that this Association quickly take definite, well considered, and vigorous action relative to these dangers. We must consider the various factors and possibilities for improvement of our laws and regulations, particularly with respect to the labeling required on packages of pesticides which vary widely in degree of chronic or acute toxicity to humans and livestock. Control officials have a large degree of responsibility for the development of legislation to adequately regulate the distribution and use of pesticides which offer hazards to public health and property. If we do not take such action quickly and uniformly, pressure from other sources will certainly force
adoption of legislation widely divergent in type and desirability from that which may be secured by proper, effective guidance.

Pesticides of the hormone type are still causing widespread and increasing damage, in spite of attempts to develop legislation designed to control the detrimental use of these chemicals. A proposed uniform bill to accomplish this purpose, developed by a considerable number of groups, was considered by this Association last year. Bills already passed by some state legislatures are proving inadequate to properly control the use of these chemicals. Sufficient funds and personnel have not usually been provided. In nearly all cases, legislation applies only to custom operators, and a great deal of damage is being done by private operators who do not come under the provisions of the law. Pesticide manufacturers and custom operators are often careless in spite of the known dangers. Individuals who do not use these chemicals are becoming louder in their demands that their use be prohibited. Individuals who do use them are equally loud in their claims that they could not farm successfully without them. The outcome of this conflict is still in doubt.

The question of residues on human foods is still to be settled, in spite of the great mass of information accumulated at hearings held during the past year under authority of the Federal Food, Drug and Cosmetic Act. Several of our members have contributed to these hearings. Hearings by the Select Committee to Investigate the Use of Chemicals in Food Products are now in progress. It appears desirable that this Association prepare a statement of our position for presentation to this Committee, and that we give the Committee such cooperation as may be indicated and appropriate.

While the dangers of pesticides have been widely discussed, and properly so, we must not lose sight of their very great value in our agricultural economy. Many of these newer pesticides have provided means by which very considerable increases in yields of many crops have been obtained. Rice production is very largely dependent upon weed control by 2,4-D. The apple industry of the Pacific Northwest, with an annual value of a quarter billion dollars, is almost entirely dependent on the use of pesticides. Milk and meat production have been materially increased by the proper use of pesticides. In Utah, the yield of alfalfa hay has been doubled and the yield of seed increased by six times when pesticides have been properly used. Every dollar spent on pesticidal control of grasshoppers and greenbugs has meant many dollars worth of crops saved, and in many cases has meant the difference between good crops and no crops. Certain of the newer pesticides have been highly effective in protecting foods during storage and processing. Proper usage of effective pesticides is an absolutely necessary practice in our modern agriculture.

The point I am trying to emphasize is that we, as control officials, have a double duty along this line. We must adequately control
the sale and in some instances the use of these pesticides, and we must also emphasize the benefits to be derived from their proper use. This will often be a difficult task. For example, the rice farmer contends that he cannot produce rice without 2,4-D. The neighboring cotton farmer demands that the use of 2,4-D be strictly prohibited. Some middle ground must be found, and we as pesticide control officials have a large degree of responsibility in the search for such a compromise.

Numerous new products continue to appear on the market with labeling making claims which are false or misleading. An example of this is reported by Henry Hoffmann from Minnesota where manufacturers and distributors of mixtures of sodium carbonate and calcium carbonate have sold their products as mildew and mold deterrents. Claims for these products were not met by their performance. Vigorous and immediate action against such worthless products is constantly necessary. Our excellent Secretary should be notified of such cases so that he can include precautionary statements in his Pest Control News. This release performs a very real and useful service. Your cooperation in getting items of general interest along this and other lines to Mr. Hoagy will improve the News and broaden the scope of usefulness of our Association.

I wish to take this opportunity to express my appreciation of the opportunity to serve as your President during the past year and to thank all those members who have worked with me in furthering the service performed by your Association. Particular mention should be made of the fine work done by our Secretary, Mr. A. B. Hoagy. We are also indebted to Dr. W. G. Reed of our Executive Committee and to Mr. S. A. Rohwer and other Federal officials for the fine cooperation which has continued to characterize State-Federal contacts in pesticide control work. I hope that each and every one of you will continue to give full, active and effective support to your officers and your Association during the coming year.
THE NEWER INSECTICIDES -- A PUBLIC HEALTH PROBLEM

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The problem of the newer insecticides—which has prompted this kind invitation to speak to you today—cannot be overemphasized. That it is extremely serious has been borne out in the several deaths and numerous lesser forms of poisoning that have come to our attention, especially in the past year. Yet, while acknowledging the severity of this problem, I cannot help but feel that our fears, though now perfectly justified, can in time be allayed. That will happen, of course, only when parathion, its related organic phosphates, and other toxic insecticides are being used with complete safety.

In view of the difficulty in arriving at feasible control measures for the agricultural use of these chemicals, that may sound like an extravagant statement. But I should like to remind you of the splendid record of the people who are handling these chemicals in industry—that is, the manufacturers, mixers, blenders, and distributors. They have proved that dangerous substances may be handled safely, provided that proper precautions are observed. That is the premise of industrial hygiene, and in our work with industrial poisons in the past thirty years we have proved it over and over again. I believe there is no reason why it cannot be demonstrated with economic poisons as well.

The interest of the Public Health Service in insecticides, of course, antedates our work in industrial hygiene. It goes back to the days when we were using Paris green and other earlier insecticides in anopheline larval control in our fight against malaria. Extensive research has been carried on continuously by the Public Health Service, through its communicable disease control laboratories in Savannah, Georgia, to develop improved insecticides and insecticidal formulations for the control of arthropod vectors of disease. As each new insecticide has developed, it has been thoroughly investigated and toxicological studies have been made to determine any harmful effects on the health of human beings. Toxicological data have been especially important in the application of interior residual sprays—such as DDT water emulsions of DDT (dichloro-diphenyl-trichloroethane) applied to the insides of dwellings for the control of malaria mosquitoes and flies.

Some of the pioneering work in DDT was done by Dr. Paul Neal at the Public Health Service National Institute of Health. Dr. Neal and his colleagues determined the metabolite of DDT and also did the first work on human beings to determine what dosages, through inhalation and ingestion, human beings could withstand without any untoward effects.
At present, major activity in the insecticide field is centered in the Communicable Disease Center in Atlanta, which is now engaged in finding a chemical to control flies that have developed a resistance to DDT within the past two or three years. This resistance has reached such a degree that in many areas it is no longer practicable to use DDT for fly control. Among the substances that have been considered, BHC (benzene hexachloride) has shown some promise of being more effective, but it is considerably more volatile than DDT. Chlordane (octachloromethano-tetrahydroindane) also has been found to be effective in some instances in controlling DDT-resistant flies, but this material, too, presents vapor toxicity hazards. For this reason, it has not been approved for use as a residual spray in dwellings, pending the accumulation of more adequate information on its vapor toxicity for warm-blooded animals. A third material which has proved highly effective in controlling DDT-resistant flies is the recently developed dieldrin (1, 2, 3, 4, 10, 10-hexachloro-6, 7-epoxy-1, 4, 4a, 5, 6, 7, 8, 8a-octahydro-1, 4, 5, 6-dimethanonaphthlene). However, dieldrin is considerably more toxic to warm-blooded animals than is DDT and therefore is not yet licensed for general use. The possible promise of these chemicals, however, was largely nullified recently when it was demonstrated that flies may develop a high degree of resistance to dieldrin, as well as to chlordane, BHC, and various other chlorinated hydrocarbons. It therefore appears that it will be necessary to develop entirely new materials or techniques if we are to continue to use successfully residual spraying as a method of fly control.

Now, the work that I have just cited, which is directed toward suppression of diseases transmitted by insects and rodents, illustrates only one of the reasons why the Public Health Service is interested in economic poisons. A second major reason is that the Public Health Service is concerned with the health implications of the use of economic poisons. It is in this area that economic poisons cut into my own special field of activity—industrial hygiene.

The industrial hygienist has been traditionally concerned with the industrial environment, in which man has been most subject to occupational diseases. With the advent of the newer insecticides, however, the scope of our activity has gradually extended to the farm, where illness and death have resulted from the improper use of these potential poisons.

The problem of the newer, more toxic insecticides is such that it is at once an industrial, agricultural, and a public health problem. Fortunately, from the standpoint of the industrial worker, the situation seems to be pretty well under control. After several deaths in industrial plants last year, the industry took stringent precautions to avoid any more hazardous exposures, and, to my knowledge, no more cases of poisoning have resulted. This record, however, was achieved only by the sense of responsibility and cooperativeness of the industry, which
called a meeting in Washington on May 17, 1949, soon after the first fatalities had occurred. In addition to representatives of chemical companies, officials of the Public Health Service, the Food and Drug Administration, and the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture were invited to attend the conference. Following this meeting, industry and governmental agencies have been active in disseminating information on the hazards of the new organic phosphates, particularly parathion (o, o-diethyl o-p-nitrophenyl thiophosphate), and I believe that these joint educational efforts are responsible, in large part, for the health record of industrial workers handling the chemical.

At the same time that the industrial phase of insecticide poisoning has been brought under control, however, an alarming situation has developed in the agricultural application of these new chemicals and in their effect on the public health. Within the past two years, numerous cases of insecticide poisoning have been reported throughout the United States, particularly in the western part of the country. In 1949, the State of California alone had 183 officially reported cases of occupational poisoning among farmers. This year reports have come in from the states of Utah and Washington, and the health departments of these states have requested the Public Health Service's industrial hygiene field station at Salt Lake City to investigate the extent and severity of the problem.

In response to this request, our field staff arranged for an epidemiological study to be made; preliminary information reveals that 25 persons studied have shown some signs of poisoning, varying from mild to severe. In the meantime, our field staff has also checked medical reports of illness and has found several cases of parathion poisoning in Delta, Utah, and Wenatchee, Washington. It was learned that some of the affected persons had been directly exposed to the insecticide, as in spraying operations, or as in the case of a child who supposedly had licked the nozzle of a sprayer. Others affected were in families who did no spraying themselves but who lived in areas either surrounded by, or adjacent to, fields which were sprayed with organic phosphates.

The problem is of such a magnitude that the State Board of Health in Utah has threatened to stop the sale of this phosphate. In Wenatchee, Washington, concern of persons living adjacent to dusting and spraying areas and of motorists driving through the insecticide drifts has resulted in the issuance of an order discontinuing the use of parathion and TEPP (tetraethyl pyrophosphate) by aircraft dusting pending further investigation. The State of Idaho has reportedly prepared such an order but will hold it in abeyance so long as definite cases of human illness do not develop.

Since the State of Washington's order bans only aircraft dusting operations, the assumption in that area is that spraying is less
hazardous. However, that is only an assumption which will have to be either verified or disproved when our field staff undertakes a proposed study under predetermined conditions. It is hoped that this study will provide many of the answers which several western states are looking to the Salt Lake City field station to provide in time for their spring planting.

The proposed study, which we hope will be a cooperative undertaking with other governmental agencies and insecticide manufacturers, will seek to determine the actual concentrations of chemical to which people are exposed and to arrive at safe levels. It is recognized that the problem will prove more difficult than controlling the atmosphere inside industrial plants, but we do feel that an answer can be found that will be more satisfactory than recommending the blanket banning of those valuable insecticides. Surely, unless further study indicates that it is warranted, such a ban would be a disservice to American agriculture. The Public Health Service hopes to apply to this situation the same methods of scientific study and analysis that have solved countless health problems in the industrial environment.

Some progress in this direction has already been made in the Public Health Service industrial hygiene laboratories at Cincinnati. Here a study has been under way to determine better means of measuring the extent of exposure to parathion. By studying the inactivating effect of parathion on the cholinesterase enzymes of the blood, there has been developed a sensitive test for the metabolite (para nitrophenol) of parathion, an excellent analytical method for estimating the amount of this substance in tissues and body fluids. This test is now being applied to correlate degree of exposure, blood cholinesterase levels and rate of detoxication. The information developed should prove helpful in enabling us to establish a value for the maximum allowable concentration of the air-borne material to which workers may be exposed. This work will be published soon.

Once information is developed, a whole network of governmental agencies—tacry nothing of industry—is ready to cooperate in disseminating such information to users of these organic phosphates. For example, when a release on parathion, prepared jointly by the Public Health Service, the U. S. Department of Agriculture, the National Agricultural Chemicals Association, the Manufacturing Chemists' Association, and the parathion-producing industry, was issued last year, the U. S. Department of Agriculture, through its county agricultural agents, assured the distribution of this information, as well as other materials prepared by the manufacturers, to the farmers. The Division of Industrial Hygiene in the Public Health Service sent the release to industrial hygienists in the States and local areas, while industry, too, made its own distribution.
Recently, a parathion safety poster, warning pilots and ground crews engaged in spraying or dusting operations, was prepared by one large manufacturer and distributed by the Civil Aeronautics Administration after consultation with other interested Federal agencies. Supplementing a previous aviation safety release issued by the CAA, this poster gives full instructions on precautionary measures to be observed. Such information is much needed because, through conversations with aircraft and ground crews, our investigators have learned that, although pilots and ground men often do experience severe headaches and blurred vision, two possible symptoms of parathion poisoning, they have not realized the full implications of exposure to dangerous insecticides. It is particularly important that pilots observe the necessary precautions because aircraft crashes resulting from insecticide poisoning are not only a menace to their own lives but also endanger the lives and property of persons living near the spraying areas.

I believe that a statement made by a pilot who had "blacked out" from exposure to parathion is significant in that it reveals the treacherous action of this chemical. In the words of the pilot: "You don't realize any of the effects yourself before your actions make it apparent to others that the mental and physical processes are slowed down to a dangerous degree. As far as flight is concerned, this could very well be fatal."

In a further effort to combat insecticide poisoning of aircraft operators and agricultural workers, a release has been issued by the Department of Agriculture, following several conferences with other Federal agencies, notifying parathion users of respirators for field use for inhalation protection from dusts or mists of parathion insecticides.

I want to emphasize here that in all my long experience in Government, I have never seen better teamwork among Federal agencies than it has been my pleasure to experience in dealing with this problem.

In the case of some insecticides, however, attempts to achieve a widespread understanding of their hazards have been handicapped by the use of many trade names for one compound. Tetraethyl pyrophosphate, or TEPP, for example, is also found commercially designated as agrifum, bladex, fosvex, hexato, hexatone, hexacide, hexidust, killex, Niagara hexide--200, nifos-T, phosphofume, pyphos, tetra-chem, tetracide, tetra-tone, tetron, or vapatone. I realize, of course, that a trade designation has to be made, but if a generally accepted name were also used—even parenthetically—to identify the insecticide, there would undoubtedly be less confusion. As another case in point, parathion, as you know, is merely an abbreviated name for o, o-diethyl o-p-nitrophenyl thio-phosphate, selected by the Inter-Department Committee on Pest Control of the United States Government. This, too, has a variety of trade names, but the general use of the identifying word "parathion" has simplified the educational job. Much more work along this line is
needed, however, and I hope that you will be instrumental in bringing forth some uniformity of nomenclature.

The great, over-all need, of course, is for continued cooperative effort, both in the development and in the dissemination of information. This calls for immediate research leading to the establishment of definite toxicity levels for these insecticides. Implied in such work is the study of long-term, or chronic, as well as acute, effects of exposure to economic poisons—the gathering together of voluminous data. The pattern for comprehensive investigations of this type—as I have mentioned earlier—has already been developed and used successfully by the Public Health Service, and we need only your cooperation in seeing our proposed study through to a successful conclusion.

Equally vital is your continued cooperation in getting our information, as it is developed, to the people who may be exposed to para-thion and other hazardous insecticides. Educational efforts, which to date have been excellent, must now be intensified in the face of a worsening situation. More and more people are getting sick and dying from the effects of these and many other economic poisons. We can help them only through a comprehensive, serious educational program. It is not enough to confine our warnings to the men in the plant or to the county agents or the airplane pilots and ground crews. We must reach every single farmer who uses insecticides to protect him from becoming another poisoning statistic. And when we know more about the toxicity of drift dosages to which the general public living near spraying or dusting areas may be exposed, we must reach those people as well.

This two-fold research and educational job requires the cooperation of Federal, State, and local officials, industry, and the farmer alike. If it isn't done—not five years from now, but promptly—the State health officers, who have the power and responsibility to stop the use of these insecticides altogether, will surely act. The tenor of their present thinking calls for us to move quickly if we want to forestall any summary action. I am confident that we can do this job, for industrial hygiene has over a quarter of a century of experience in making it possible for men to work with toxic materials in the most healthful conditions. Through cooperative effort, which has proven so successful in controlling industrial poisons, we can likewise eliminate the hazards of virulent insecticides.
SOUND REGULATORY REQUIREMENTS AS VIEWED
BY THE PEST CONTROL INDUSTRY

by
William O. Buettner
Executive Secretary, National Pest Control Association

The Pest Control Industry, which many individuals generally think of as exterminators and fumigators, is probably the smallest segment of pesticide users, if the measuring stick is the quantity of insecticides and rodenticides distributed and dispersed. In the arborial, horticultural, and agricultural fields vast quantities are used but not so much on a "day-in and day-out" basis by the same personnel. The gallonage consumed is, undoubtedly, far in excess of the quantity used by the Pest Control Industry. Similarly, manufacturers of insecticides and rodenticides sell far greater quantities of these pesticides to every manner of ultimate consumer who applies these purchased pesticides than perhaps the sum total of insecticides and rodenticides that pest control operators apply in similar types of structures, institutions, and industrial and food processing plants. The principal difference between all others and the Pest Control Industry might be summarized by claiming that there is far more at stake as far as the Pest Control Industry is concerned because of the daily use of pesticides by the same personnel.

Others will insist, and rightly so, that the intent is to make certain that the use of any insecticide and rodenticide is to be done in a manner that will cause no bodily harm to the user; cause no discomfort or ill effects to persons living or working in the buildings that are treated; and likewise cause no contamination or poisoning of commodities. The big differential, however, continues to be the daily use factor of the pesticides by the same personnel; namely, pest control operators.

None of us wants to be a party to poisoning someone else. In fact, it would be resented if any such accusation were made. What then is the item of mutual interest? Specifically, there is the need of an unbiased policy of applied common sense in the matter of sound legislation. Sound legislation must avoid extremes. Sound legislation must avoid an over-zealous bureaucracy. Sound legislation will prevent apprehension regarding constant efforts to make changes. As for the Pest Control Industry, we accept the principle that reasonable responsibilities should rest with governmental agencies. Our interest is to aid in sound legislation which means that the public will become better informed and genuine cooperation will prevail between government and industry. We would not for one moment have industry, especially the manufacturers and suppliers of pesticides, feel that we would urge a program that would take sales' ideas from them. We oppose what appears to be an unfortunate trend to divide materials into categories which do not seem to be justified by fact. Every pesticide has to be handled and used correctly, the principal difference being that some pesticides have to be used with more restrictions. How to reduce this problem to sensible legislation is another story.

Sound legislation must, therefore, take into account laboratory evidence as evaluated by use experience. The laboratory gives valuable
hints as to expectancies but we should not conclude prematurely that there are going to be conditions leading to chronic poisoning and similarly should there be premature conclusions regarding non-toxic effects. It is a pity that council is not sought and that laziness, or "something", seems to be the reason for developing a routine or buck-passing. The trouble in some instances is that specialists and enthusiastic people do not seem to have a perspective which includes the practical.

We must admit therefore that government and industry need each other. At least, I like to feel that the very purpose of this meeting is for an exchange of thoughts which on the part of Economic Poisons Control Officials will culminate in better advice being given regarding legislation that is under discussion in different states. Frankness must prevail; fencing for opportunistie position must be stopped. Vexed words should be dealt with in a forthright manner. The basic approach as far as industry is concerned must be one of intellectual honesty. Similarly, any considerations that appear to come under the category of "Appropriations" of "Job Saving" or "Job Making" are bound to call for careful study as well as putting pressure groups to work. I may be off the beam, so to speak, but at times I feel that the extracurricula requirement should be that of giving more attention to matters that are not even written into law; namely, sincere self-policing and more genuine education regarding remarks made about the products being offered for sale.

Sound regulatory requirements make sense when efforts are directed toward a minimum amount of phraseology which usually results when the simple truth is told. The trouble is that too often such phrases as "Approved As Directed", "Safe If Used As Directed," "Harmless If Used As Directed" and "Non-injurious When Used As Directed" become the basis for indicating a product to be non-poisonous, harmless, and safe. It is unfortunate that this play on words makes for confusion. The assumption, and in our opinion an erroneous assumption, is that everyone will observe the precautions. The average person sees only or seems to be content if somewhere the words "safe", "harmless" and "non-injurious" appear on the label or in the sales promotional literature. For argument's sake, let us concede that if all precautions were followed, there would perhaps be comparative safety in the application of most pesticides regardless of the toxic ingredients in the formulation. Aren't there other factors such as possible accumulative effect if sufficient quantity is used, or the application in certain areas where other chemical reactions may be set up which should dictate the desirability of discontinuing words which are bound to be distorted even though regulatory officials have made a genuine effort to prevent distortion?

If there had been avoided what I consider an ill advised policy practiced by several who constantly try to emphasize "non-toxic," "non-injurious," "safe," "harmless", etc. effects, there would perhaps be a different attitude toward several of our post-World War II improved and effective pesticides. Let's remove the subterfuge by hiding behind "As Directed" where there is a possibility of it being misconstrued and merely emphasize adequate precautions for the so-called less poisonous insecticides and rodenticides. Prohibit such words as "safe," "harmless", "non-injurious", "non-poisonous", "non-toxic", etc. unless under all conditions under which the product may be used, it is in fact safe.
I well recall the situation back in 1925 to 1930 regarding legislation of the local-ordinances type regarding sodium fluoride and the strenuous efforts put forth to keep the word "poison" and the "cross and skull bones" off any label and at the same time, fighting to allow the phraseology to remain that sodium fluoride was harmless if used as directed. We won. And we kidded ourselves along by using the term "highly toxic"; no cross and skull bones on the label; and at the same time it was stressed that the chances of any ill effects to anyone were negligible because sodium fluoride was exceedingly palatable. The end use was a powder formulation. As far as the pest control operator was concerned, sodium fluoride "Used as Directed" caused no harm. The best proof of this contention is that in all of the time sodium fluoride was used by pest control operators, there is to this day no authenticated court case on record to show that a pest control operator ever caused death to anyone in his application of sodium fluoride or formulations containing sodium fluoride.

All of the emphasis on "Safe, If Used as Directed" did not prevent fourteen deaths in Pittsburgh, Pennsylvania, nor over fifty deaths in Salem, Oregon, as well as other unfortunate cases of illness and deaths due to sodium fluoride inadvertently being taken as bicarbonate of soda or used as baking powder in cases of small quantities mistaken for flour that went into pancake batter. The point is that a sufficient amount of any insecticide or rodenticide will produce ill effects no matter what situations may arise whereby excessive quantities become the factor that cause ill health, deaths or contamination.

Another major consideration as a sound regulatory requirement should be given to what I choose to call the problem of "claims". Many illustrations could be produced but I will confine myself to two cases which might be studied as a joint endeavor governmental agencies and industry with the objective being an ultimate answer or procedure that will eliminate such inconsistencies which some are inclined to view as "puffing" but which others consider to be double-talk and deliberate efforts to distort facts. Let's avoid any reference to the manufacturers involved but merely offer the illustrations that should be studied:

(A) -- PRODUCT A: -- The phraseology on the label is clear to any careful reader (who is careful?) The claims include "effective for months", "colorless coating", "invisible coating kills roaches, ants, waterbugs. Effective for months, coating is odorless, stainless, and water removable". If everything would stop at that point, we might even get along notwithstanding our desire to see a clearcut definition of what is meant by "effective for months". Our problem arises from newspaper clippings and advertisements which further careful reading and possible interpretation might even substantiate what is said on the label. On the other hand, let us quote the advertisement and news item, from different cities, and ask you to state whether the intent was to say the same as was said on the label:

"Brush (here was given the name of the product) on window sill, baseboard. It's invisible, odorless, contains no DDT, lasts months. Hurters roaches, ants and waterbugs."
"Why bother with messy sprays when (the name of the product) brushed around just where you want it, kills roaches, ants, and waterbugs, and is effective for months. Colorless, odorless and stainless -- (name of product) is a new scientific advancement."

Just what is odorless? Is it the coating? Does it sound reasonable to talk about an odorless coating or was the implication as far as the news stories are concerned that of saying that the chlordane product which it is, is odorless? Aren't we playing with weasel words to talk about "odorless coatings"? What is implied when the words "Contains no DDT" are used? Murder usually implies, does it not, a very rapid kill--- instantaneous?

(B) -- PRODUCT B: -- Again, the phraseology on the label is clear when it comes to giving the story about the ingredients, cautions, precautions, and directions. On the other hand, considerable confusion has resulted from the combination of the name which infers that its effectiveness will remain forever because there is further amplification of that thought which is played up in the lettering only second in size type to the name of the product. The words (Lasting Results" means what to the average purchaser? Should such claim be allowed?

It so happens that there are other ramifications regarding this product in that we have been given to understand that said registered product when received by some individuals engaged in pest control service work is given another name by the latter. If such is the case, the claims then include among others:

"No powder -- no DDT -- No poison"

"Unnecessary to remove food or clothing, nothing is stained or tarnished"

"Absolutely guarantee the total extermination of every last crawling insect in any kind of building, for one full year"

To come back to the original label on Product B, since the emphasis is on "Lasting Results", we are not certain that we fully understand what period of time is intended or perhaps the intention is to inform us that once an insect has been killed, there is in fact a "Lasting Result" in that there is hardly anything that can be deader than dead. What is intended to be left in the purchaser's mind when phraseology is as above quoted? A series of obvious questions can easily be asked.

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These illustrations are submitted not with the idea of finding fault with what may or may not have been permitted in connection with registration. These are illustrations of cases that warrant study because we feel that confusion thus brought about will lead to other confusion. No think nothing is to be gained by "Organized Confusion" if one wants to make facetious comment.
In conclusion, I will admit to prejudice, if one wants to call it such, but that prejudice is based on a sincere effort we are attempting to put forth to have pest control service establishments use more discretion regarding the statements and claims made about the insecticide and rodenticide formulations they are using. At times it is difficult to hold pest control operators back from saying some of the things that are said out in my opinion that is due largely to the way in which there are attached words to the "As Directed" emphasis as well as playing up - "puffing", to some - phraseology in sales" promotional literature which becomes even worse when salesmen exaggerate. My plea, therefore, if such should be considered a plea, is that more attention somehow should be given to the follow-through, once pesticides are put on the market for sale, but recognizing that there may be need at time of registration to avoid the use of phraseology which lends itself to opportunistic sales' promotion.

That program is not a one-way street. That program goes beyond the law itself in the sense that industry must assume a big part in self-policing. I would go so far as to say that the moral obligation of industry follow-through is even more important than the law because the issue becomes one of honesty in intent which can hardly be incorporated in any law. Maybe we should call this education but in any event, if such were taken on as being part and parcel of extra-curricula sound regulatory requirement much more would be accomplished to the outstanding job that for the most part is being done at federal and state regulatory levels.
THE RELATIONSHIP OF HEALTH AND REGULATORY AGENCIES IN THE CONTROL OF ECONOMIC POISONS

Bernard E. Conley, Secretary
Committee on Pesticides, American Medical Association

The relationship of health and regulatory agencies in the control of economic poisons was chosen, as the topic of my address today, because the control of these materials is a subject which is perhaps more feared and more misunderstood than any other aspect of pesticides. Control is popularly conceived to mean anything which involves a dominating or restraining influence by some agency far removed from the problems of the group to which it is applied. This is an obviously narrow and distorted conception of the term, although it explains why many persons rebel even at its mention.

In its broader and more accurate interpretation, control embraces those restrictions which are self-imposed as well as those which are legislated. Unfortunately in every industry, in every profession and in every class of society, there are a few undesirables who by questionable practices, constantly jeopardize the welfare of their associates. Laws are made for these asocial individuals who can't be otherwise controlled. It is manifestly impossible, however, to legislate the regulation of every form of human activity. Dependence must be placed on voluntary restraint in many instances. This type of management is difficult because it requires first, a common understanding between these elements of industry, government and health agencies which are involved in a given problem and second, it demands a policy of give and take on those matters in which honest differences of opinion exist. These difficulties are magnified at times by the reluctance of the participants to look upon the situation with objectivity sufficient to transcend their immediate interests. In spite of these shortcomings, however, it is felt that this method can meet the need for an early solution to many of the health problems of pesticides.

The present program of the Committee on Pesticides is basically an effort in this direction. It embraces a six-point education and research program whose major projects are as follows:

1. Promote safe standards for use of pesticides.
2. Foster the development of antidotal measures.
3. Stimulate voluntary control.
4. Assist in the standardization of nomenclature.
5. Accumulate and evaluate new information and,
6. Undertake an intensive educational program.

This program is being administered by the following persons:

Herbert K. Abrams, M. D., Chief, Bureau of Adult Health
California Department of Public Health
E. M. K. Geiling, M. D., Professor of Pharmacology, University of Chicago
Albert Hartzell, Ph.D., Head Entomologist, Boyce Thompson Institute for Plant Research
Culver S. Ladd, B.Sc., Council on Foods and Nutrition
Arnold J. Lehman, M. D., Chief, Division of Pharmacology, Food and Drug Administration
S. A. Rohwer, D.Sc., Assistant Chief, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture
S. W. Simmons, Ph.D., Chief, Technical Development Service, Communicable Disease Center, United States Public Health Service
Justus C. Ward, M.Sc., Chief, Pharmacology and Rodenticide Section, Insecticide Division, United States Department of Agriculture; Chairman, Committee on Toxicity and Antidotes, Association of Economic Poisons Control Officials.
Torald Sollmann, M.D., Professor Emeritus of Pharmacology and Materia Medica, Western Reserve University

The announced objective to stimulate voluntary control is one of the Committee's most significant projects. It is aimed primarily at encouraging manufacturers and users of pesticides to act upon their own health problems. To accomplish this purpose other activities such as the development and promotion of safety standards, the integration and evaluation of available information and the sponsorship of a public and professional education program have been undertaken.

Considerable attention is presently being given to the development and promotion of safety standards. It is becoming increasingly apparent that the lack of such standards is one of the weakest links in our chain of measures to encourage the judicious use of pesticides. The problem of assuring the safe use of such materials existed to some extent with many of the older poisons, although health hazards in many instances were kept to a minimum because custom and practice dictated their safe use. With the introduction of new chemicals and new methods of application, the present dangers are magnified because general users have neither the knowledge nor the experience to make provisions against the poisonous properties of these substances.

Precautionary labeling has done much to overcome this shortcoming by providing forceful and accurate directions for the safe use of pesticides. However, it labors under the handicap imposed by the very nature of labels and the products to which such labeling is applied. A somewhat similar limitation applies to legislated controls which cover malpractices at the interstate level or in the case of some states and larger municipalities at the local level.

Satisfactory control cannot be exercised over practices which are just outside the letter of the law, or which are not covered by law, or which are comparatively new because of the type of material
used. It must also be recognized that mere conformance with established regulations does not guarantee to insure what is currently recognized to be safe practice and reasonable exercise of discretion. This can come only from voluntary and universal acceptance of what is agreed to be the best method for safely handling and using pest control materials.

Unfortunately there is a singular lack of agreement on what constitutes safe practices in various situations for many of the newer synthetic poisons. Even investigators who have considered the problem for a single group of users reach divergent conclusions. This is largely the result of a lack of generally acceptable basic guiding principles adaptable to the peculiarities of various compounds and situations in which they are used. For no other reason than this, it would seem that a definite need exists for a broad and careful analysis of the situation by an impartial group or groups conversant with the overall problem.

With this thought in mind, the office of the Committee on Pesticides has been making a preliminary survey to determine what precautionary measures are available, to what extent they are being applied and what new measures appear to be needed. An attempt is being made to gather information on safety measures for persons who use or are exposed to pesticides. For the purpose of this study, such persons have been arbitrarily grouped into one of two classes; namely, those who, by virtue of training or experience, have some acquaintance with the newer economic poisons; and conversely, those with little or no familiarity with these chemicals. Under the first classification, formulators, industrial handlers, dusting and spraying pilots, food processors, florists, agricultural operators and similar types of agricultural, manufacturing and service personnel have been included.

The second category has been reserved for the general public which has contact with pesticides, directly, through the use of such preparations for household or garden purposes, or, indirectly, through the consumption of fresh fruits and vegetables. Miscellaneous workers such as itinerant fruit pickers have also been included under this heading as a separate group.

As might be expected we have found little published information on safe standards for use of pesticides and particularly as they might be applicable to specific groups of users. In view of this, it has become necessary to develop information from the literature on analogous compounds and from the experience of responsible persons engaged in the major occupations which use pesticides. The literature search phase of this operation has been in progress since the Committee was formed. More recently we have endeavored to collect safety manuals in use by industry and precautionary statements contained in manufacturers promotional literature and in government releases. Effort is also being made to compile information on specific items of equipment and on operating procedures which have protective value. Data
on common hazards generally associated with specific chemicals and specific groups of users is also being accumulated.

In addition to these activities consideration is being given to methods for collection and analysis of pesticide accident statistics and to development of comparative accident rates for different types of chemicals and different classes of users. To facilitate the reporting of this type of information, it will be necessary to encourage the adoption of uniform recording procedures for the reporting of pesticide accidents. This we are striving to do. We will also endeavor to stimulate the acceptance of standardized safety equipment and operating methods whenever this appears to be feasible.

The immediate purpose of our preliminary studies is to classify the recognized hazards associated with each chemical and for each group and to determine their relative degree of importance for their several uses. This developmental data can then be used to formulate broad basic protective measures which would be adaptable under most circumstances to the various health problems which are being encountered or which may be expected to be encountered. Since pesticides and even their uses are constantly subject to change, the basic principles which may ultimately be formulated must be flexible enough to provide for revisions in specific recommended procedures so that individual procedures will reflect current safety practice.

I should like to emphasize that the purpose of these studies is not to promote the acceptance of any particular concept of safety practice. Rather they are intended to determine what constitutes sound basic principles for such practice for the various groups which use or are exposed to economic poisons. Should these principals and their recommended applications prove acceptable, it will then be the intent to encourage their employment in such manner as each group feels is suited to their needs. It should also be stated that the ultimate development of any specific safety standards which may be needed will be undertaken only with the full cooperation and assistance of the group or groups to which they might apply. This approach is necessary since these standards will have no legal significance. Their acceptance and enforcement will be subject to the same limitations that exist for somewhat similar undertakings in other fields.

Such safe standards for use of pesticides must represent the consensus of all factors involved including manufacturers, health and regulatory officials and users. We hope that economic poison control officials will take an intimate part in the development of these measures. Your assistance in promoting their acceptance and application at the state and local level is also desired. Your Association has long campaigned for a greater emphasis on the health conditions surrounding the handling and application of economic poisons, and I am confident it will lend its support to any program which is directed towards this goal.
FOOD, INSECTICIDES AND HEALTH

by

F.C. Bishopp

Bureau of Entomology and Plant Quarantine

Food is essential to all productive effort, to health and to life. Insects are one of the main causes of food contamination, food deterioration, food shortages, human disease and death. Insecticides are essential to the production of a bountiful supply of food of high quality. Insecticides must be used to protect foods in transit and storage, and to provide for the comfort and health of man and livestock. Insecticides are essential to the protection of our forest resources, our homes and our clothing.

World food needs - Increase in the world population is far outstripping food production. Today the world population is 2.5 billion and on the basis of present population rates of increase we will have 25 million more people to feed in 25 years than at present. Are we even now producing enough food to prevent extensive malnutrition in many parts of the world and famines that will take hundreds of thousands of lives? The terrible famines of the past are probably mild as compared with those which will prevail under adverse crop conditions a quarter of a century hence.

War against insects must continue - Entomologists, medical men, and engineers, largely through the use of modern insecticides, are doing much to lower the death rate throughout the world. Scientists also have the challenge of keeping food production and population increases in approximate balance. It is claimed that 2.5 acres of arable land is needed to feed and clothe each inhabitant, yet only 1.77 acres is presently available; therefore, it is essential that the per-acre production be increased materially.

Our people, due to natural productiveness of our soils and scientific discoveries and their application, are surrounded by bountiful food supplies and little realize what those in other lands have to endure. Also, few of them appreciate the part that insecticides, fungicides, weed killers and fertilizers are playing in providing an abundance of the highest quality of food and fiber that the world has known.

Injurious insects are generally recognized as causing tremendous losses. The currently accepted loss-figure is $4,000,000,000 for an average year. This staggering figure is certainly a challenge for entomologists and other scientists to do all in their power to develop new, safe, and practical insecticides. Of the reputed 80,000 different kinds of insects in this country, 6,000 are injurious to crops, fabrics, stored products, forests, wildlife, livestock, and man. The species vary greatly in their habits and mode of attack. Usually several kinds join forces in attacking a crop in production, transport or storage. Therefore, the problem is not only that of developing suitable insecticidal formulations for the protection of all stages of the crop from seed to maturity but, also, during transit and stor-
age under a variety of conditions. Furthermore insects are well known vectors of serious diseases of many plants and animals, including man.

Factors that increase insect pests - The impact of insects on agriculture and human economy is difficult to comprehend and to evaluate completely because insects are so interwoven with all the activities of man. Their ravages have been intensified as a result of clearing the land and the growing of agricultural crops in large acreages in different parts of the country. These and other changing practices are inevitable, particularly in times of war, and we must be prepared to meet the insect problems intensified by them. The tendency toward developing a balanced agriculture has resulted in the shifting of cropping systems that have aggravated old insect problems or have created new ones of greater complexity. The failure to rotate crops may induce serious insect problems. The continuous use of land in pasture often fosters outbreaks of white grubs. Some flood control and soil erosion practices favor insect multiplication and their attack on crops. Leaving brush and weeds in fence rows, while favorable for birds and game, may provide breeding and overwintering places for certain pest insects. The impoundment of water frequently provides suitable breeding grounds for pest and malaria-carrying mosquitoes. Thus, the ways in which water or land are used or controlled will have a great effect upon the abundance and destructiveness of numerous insect pests. The role that native insects or imported pests may play under new and different ecological conditions in various parts of the country is unpredictable, so the best protection the entomologists can offer to the public is a diversified group of insecticides with which to meet the ever present insect horde.

Insects can follow crops to the consumer - Insects not only cause destruction in many ways while the producer is endeavoring to grow a crop but, also, by continued feeding or contamination during transit, in market channels, and in the home. The discriminating housewife will not permit worms or plant lice in vegetables nor weevils in the cereals. Hence, the product that finally reaches the consumer may be rejected and thrown away. The rigid grading standards in effect eliminate poor quality products and also food products with minor blemishes as a result of insect stings or feeding. Such injuries, however, offer a means of entry for disease pathogens that may cause deterioration of the product in storage. Losses from stored product insects are particularly serious because they involve all the cost of production, harvesting, packing, shipping, and storing. These losses are tremendous, for instance, insect damage to stored cereals alone is estimated at 5,000,000,000 annually in this country.

Carefully executed spray schedules with both insecticides and fungicides insure the public of food products that are not only of high quality but in sufficient abundance to provide a varied diet at a reasonable cost. Only the best reaches the American table, for fruits, vegetables, grains, and other foodstuffs must meet standards set by the Department of agriculture and the Food and Drug Administration relating to insects and insect debris.
Choice of insecticides required — There are a number of reasons why it is essential to have a number of insecticides from which to make a selection for a particular control effort. When a single pest is involved in a given crop the application of an insecticide that is highly effective against that particular insect will suffice. However, often more than one pest is present and the use of an insecticide, or an insecticidal mixture, that will be effective in killing, simultaneously, the several pests present is desirable. It is also well established that weather, cropping practices, and other factors operating in different parts of the country have a marked influence upon the effectiveness of a particular insecticide. Although plant tolerance is very good for many of the insecticides in current use, some plants can tolerate one material better than another. Therefore a choice of insecticides must be available.

Observations and studies made in different parts of the country have shown conclusively that certain insects, such as the citrus red scale, thrips, codling moth, house flies, spider mites, and mosquitoes have become resistant to certain insecticides. These discoveries are of tremendous importance, particularly when they occur following widespread acceptance and usage of an insecticide as important as DDT. To heed the warning means the further development of new insecticides and effective methods of applying them to control insects that threaten our health and food supply.

Some materials affect beneficial life more seriously than others. Although several new insecticides are quite toxic to fish, one TDC, at 1 part to 75,000,000 was used successfully to destroy the Clear Lake gnat in a large body of water in California without injury to fish. In other insect control activities care must be taken to protect honey bees if our crops are to be pollinated adequately. Fortunately only a part of the field bees are affected by certain new materials on legumes, and the control of the pest insects greatly increases the bloom and hence the available nectar supply.

Calcium arsenate, an insecticide of long-standing use, is definitely more destructive to honey bees than the synthetic organic hydrocarbon insecticides. Many of the new insecticides are quite persistent and are destructive to the parasites and predators of certain pest species. As a consequence, DDT and other insecticides used to control the codling moth sometimes result in the development of heavy infestations of the red-banded leaf roller, the apple aphid and two species of rod mites which heretofore were considered of minor importance. This situation therefore demands the use of other supplemental insecticides or modification of the spray schedule.

Farmers and entomologists recognize that insect populations are not static but show marked fluctuations in numbers, either seasonally or periodically, depending upon climate, weather, agricultural practices, and other factors. Insects are no respectors of boundaries as evidenced by the recent widespread spruce budworm outbreaks in Canada and in the United States, and the well known accounts of numerous "locust" or grasshopper outbreaks from biblical to modern times. These outbreaks often are unpredictable, arise suddenly, and therefore require tremendous quantities of insecticides that are not immediately available.
Locally and sometimes not even nationally. For these reasons, it is necessary to resort to any insect killer that will save the crops, even though it may not be the most effective or the most economical. A wide selection of old and new insecticides at such times is highly desirable.

Health protected by insecticides: — The availability of highly effective new insecticides has made it possible to control many different kinds of disease vectors and to consider the possibility of eradicating certain insect-borne diseases — such as malaria, plague, epidemic typhus, murine typhus and enteritis. In the United States the malaria rate is continually being reduced largely as a result of an intensive control program by the United States Public Health Service and cooperating States involving mainly the spraying of the interior of homes in malarious areas with DDT.

In other parts of the world — India, Central American South America, and Italy — reductions of from 30 to 90 percent in the incidence of malaria were obtained that were attributable to effective DDT spraying to control the mosquito vectors.

Another outstanding example of disease control was the stopping of an outbreak of flea-borne plague in Dakar during World War II as a result of the extensive use of DDT on persons, in habitations, and on premises. One of the greatest public health accomplishments recorded was the control of major epidemics of louse-borne typhus in heavily infested populations also during World War II. Most authorities agree that the use of DDT stopped the typhus epidemic in Naples, Italy, and prevented subsequent outbreaks elsewhere in the world.

The cooperative murine typhus control program between the United States Public Health Service and the States also based on the use of DDT, has resulted in an estimated 20 percent reduction of the tropical rat flea, the principle vector of this disease. This control program was started in 1945 and a total of 1413 tons of 10 percent DDT dust has been applied in 1,105,006 premises treatments in 156 counties of 10 States.

DDT has also been utilized to advantage in the control of diarrheal disease in towns in the lower Rio Grande Valley. It is reported that a significant reduction in the amount of infection, disease and death resulted from the good fly control obtained with this insecticide.

Crops saved by insecticides: — Insecticides, along with other scientific improvements in agriculture, have created a boom in agricultural production. Great increases in crop yields per acre have occurred within the last 20 years — corn is up 36%; cotton, 58%; potatoes, 63%; soybeans, 59%; and oats, 17%. Along with increased yields we have learned to grow better crops.

Insecticides in the form of dusts, sprays, baits, or fumigants have been used to good advantage to prevent, mitigate, or eradicate injurious pests. Improved methods of application, such as in the form of aerosols or spray concentrates from the ground or air, have had an important part in producing increased yields of higher quality crops. Let us consider, briefly, a few examples of outstanding results obtained with some of the potent insecticides developed during the past few years.
In Iowa there heavy infestations of the European corn borer occurred in 1949 corn treated with DDT produced 172 bushels per acre more than untreated corn.

Field tests in Utah with DDT for control of Lygus bugs on alfalfa grown for seed showed effective control of the insects and resulted in an increase of as high as 35 pounds of seed per acre.

Chlordane and toxaphene have proved highly effective for grasshopper control under a wide variety of conditions. Procedures have been developed that permit the use of these materials under most conditions without appreciable risk from the residues left on the crops. In view of our experience with these materials, there seems little doubt that they can be used effectively and without creating a health hazard if the minimum necessary doses are used, applications are properly timed, and full advantage is taken of opportunities to kill the pests before they become generally scattered over fields.

Aldrin has been found to be among the most promising of any preparations that have been tested for control of grasshoppers and is rapidly being accepted by the public for combating these pests. Something above three million acres of crop lands were treated during the 1950 season in the three provinces of Manitoba, Saskatchewan, and Alberta, Canada, and it was used extensively and successfully, in cooperative State-Federal control programs, and by many farmers in the United States. It has performed equally well on either crop or range-lands. Dosages of 1 to 2 ounces of the technical compound per acre, in one to two gallons of solvent, have generally been found to give excellent control. The total per acre cost for the treatment is on the order of seventy cents.

Parathion was successfully applied to over 500,000 acres of small grains heavily infested with greenbugs in 1950 in Oklahoma, Texas, and Kansas - thus saving the infested grains from nearly total destruction. There was no previously known practical control for this serious pest. Treatments were applied either by commercial operators using aircraft, or by the individual grower with ground equipment. In the 1950 greenbug outbreak alone, this development saved farmers millions of dollars and made available many millions of bushels of needed small grains.

In extensive experimental and commercial scale field tests ryania, which is the finely ground stems of a tropical plant, was found to be as satisfactory as cryolite for control of the sugarcane borer in Louisiana. It was first recommended for grower use for the 1950 crop season and gave good borer control on at least five thousand of the 62,000 acres of sugarcane treated for control of this pest during the progress of the State-supported control program.

The utility of new insecticides was demonstrated in two community-wide cotton insect control experiments conducted in Central Texas in 1949. Nineteen adjoining fields on 6 farms in one community were dusted or sprayed (mostly 20 per cent toxaphene or a dust mixture containing 3 percent gamma benzene hexachloride, 5% DDT, and 40% sulfur) for insect control for comparison with 14 fields on 4 farms in an adjoining community that received no insecticides. As a result of boll weevil
control, the yield in lint cotton was 415 pounds per acre from the treated cotton, as compared with only 178 pounds from the untreated fields. The net profit was about $54 per acre.

For many years the arsenicals, nicotine and rotenone insecticides were used against potato pests, with only reasonably satisfactory results. DDT, in one form or another, is now generally used on the potato crop in the United States, with the result that potato production on a per acre basis has increased materially. For example, 85% of the potato acreage in Maine was treated with DDT for insect control and the production of potatoes rose from 261 bushels per acre in 1945 to 350 in 1946. Since that time the production has been 350, 355, and 450 bushels per acre for 1947, 1948, and 1949, respectively.

Prior to the availability and use of DDT in 1946 annual apple losses due to codling moth amounted to about 15 percent of the value of the crop; now the average is around 3 or 5 percent. In spite of this advancement, losses due to the codling moth for the 5 years 1944-48, amounted to $9,175,000.

Factors that have led to insecticide problems: For a full century, chemical control of insects has been extensively practiced. Almost from the beginning entomologists have given consideration to side effects resulting from the application of insecticides for pest control.

The rapidly expanding agriculture of this country associated with the reclaiming of the wilderness and the multiplication of our population has been beset by ever increasing problems in insect control. One of the necessary and effective weapons employed against this ever-increasing army has been insecticides.

With the appearance of new crop or livestock pests, either native or accidentally introduced, the demand for more effective and economical insecticides has increased. The repeated assaults of foreign insect invaders have been halted or delayed and in most cases the effects of attacks have been minimized. In all of these campaigns insecticides have been one of the most dependable weapons. These weapons are recognized as imperfect and in some instances ineffective.

Evaluation and development of insecticides - Insecticide use has always been attended with problem aside from those directly concerned with the pest itself. These side problems have been more forcefully brought to the fore during the last five years with the appearance of a considerable number of new and effective chlorinated hydrocarbon and phosphate compounds and hundreds of formulations of them. In research and development work with these newer compounds an effort has been made, as has been the case with all insecticide development from earliest times, to evaluate these side effects and avoid or minimize those regarded as undesirable.

What are the factors that are considered in evaluating an insecticidal chemical?

1. How effective is the insecticide in killing or repelling pest insects?
2. Which insects are killed by it? Which ones are little affected by it?
3. Will it injure plants by direct application?
4. Will it injure plants through the soil?
5. Which plants are resistant and which ones are susceptible?
6. What is its acute toxicity to a variety of higher animals?
7. What is its chronic toxicity when applied in different ways and in different formulations?
8. What is the effect of the material on fish, wildlife, bees and other beneficial forms of life?
9. In what formulations can it be used and stored most effectually and most safely?
10. What is the extent and persistence of the material as a residual insecticide on various surfaces and under diverse conditions?
11. What types of equipment are most satisfactory for applying it in its many formulations to assure good kills of various pests on different crops, under diverse conditions, and at the same time avoid hazards to the operator, to people in the area and crop contamination?
12. Can the chemical be employed satisfactorily with other insecticidal or fungicidal materials?
13. Can the chemical be produced, formulated and applied at a cost consistent with increased yields and higher quality crops, resulting from its use?

Each of these points and others are considered and investigated during the evaluation and development of an insecticide. In evaluating and developing insecticides, in their packaging and labeling, and in their application by officials or custom operators, there is usually close cooperation between the various agencies and industries concerned.

We realize that all these questions are not fully answered before an insecticide is put on the market. As a matter of fact to get complete answers years would be required. We must, in my opinion, gather enough information regarding a new material to make sure of the major points regarding effectiveness and safety, then by proceeding on the conservative side gradually develop that complete and desirable picture.

It is recognized that officials charged with the protection of the public from hazards connected with the use of economic poisons have an important responsibility. So do those in industry and especially in Federal and State organizations who recommend such materials and procedures for their use. Another responsibility which government officials cannot ignore is the development and recommendation to the public of pesticides that will control insects to such a degree that adequate protection will be afforded to our forests, our food, and our health. There are many problems connected with this important field of activity and I am convinced that the only way to meet them, so that the greatest good for all will be realized is through cooperative effort.

Certain needs pointed out:— There is obviously need for accelerating research in all aspects of insect control by the use of insecticides. Toxicology of many insecticides from the standpoint of soils, plants, beneficial insects and higher animals requires more attention. Methods of analysis especially for the detection of minute quantities of such insecticides as chlordane and toxaphene should be developed. Improve-
ment of insecticide formulations and equipment for applying them so as to increase their efficiency and reduce hazards are recognized needs.

More attention is now being given to means of insect control without the use of insecticides. Modified agricultural practices, biological control, the use of mechanical devices and the development of insect resistant varieties are being investigated and their employment by the public is being stressed. Additional research along these lines is urgently needed. More educational work to inform the public as a whole on the need for insecticides, and on their effective and safe use is a necessity.

The passage of more effective and uniform State laws governing the labeling and application of insecticides appears to be desirable.

Some Conclusions - There is not a farmer, cattle raiser, dairymen or householder who would not like to avoid the use of insecticides. However, there are few crops which could be profitably grown year after year without the use of insect killing agents. Also there are few localities and few homes in which the use of insecticides or repellents are not desirable for comfort and/or the protection of food, fabrics or buildings.

The evidence seems to establish the following facts:

(1) In order to have an adequate supply of wholesome food we must have insecticides, proper equipment, and correct usage.

(2) That the control of insects such as mosquitoes, house flies, horse flies, sandflies, fleas and lice is essential if man is to avoid serious annoyance and such debilitating and deadly diseases as malaria, dysentery, typhus and plague.

(3) That the control of these pests demands the use of tremendous quantities of insecticides of many kinds.

(4) That the widespread use of insecticides is attended with distinct hazards.

(5) That these hazards have been and are being recognized.

(6) That despite the extensive use of insecticides there have been relatively few cases of human illness or death due to the insecticides per se.

(7) That there is need for more research on the chemistry and toxicology of insecticides.

(8) That there is great need for educational work relating to insect control and especially to insecticides and their safe use.

(9) That more attention should be given to methods of insect control other than by the use of insecticides.

(10) That great progress in the war against insects has been made especially during the last few years resulting in the protection of our
forests and food crops, as well as the saving of many lives.

(11) That close cooperation is essential between officials concerned with work on insecticides, including their development, manufacture, labeling, distribution, storage, application and control. This cooperative effort involves those charged with the enforcement of laws relating to every phase of the insecticide industry.

(12) Although there is evident need for more adequate and uniform State laws governing the manufacture, labeling and application of insecticides it appears that existing laws and cooperative efforts have given satisfactory protection to the manufacturer, the user, and the general public.

(13) And, finally, that despite the great gains in crop production, the improvement of health and saving of lives credited to insecticides, their improper use presents real hazards which all must recognize and guard against. However, there is no evidence of any serious condition which cannot be corrected with education and the application of the accepted and logical principles of insecticide use.
Chlorinated hydrocarbons as insecticides have introduced a new era for the control of insects that feed in the soil. Old methods of control proved only partially effective and necessitated many treatments.

DDT was the first to come to the attention of agricultural people, followed closely by BHC, toxaphene, chlordane, aldrin, dieldrin and also parathion. These materials apparently do not need to make direct contact with the insects.

The wireworm larvae which feeds on the roots of plants or decaying organic matter, spends most of its life in or near the soil. Losses from these insects on farms is severe to root or tuberous crops. Small amounts of these chlorinated products apparently destroy wireworm larvae.

Tests with the gamma isomer of benzene hexachloride showed that \( \frac{1}{2} \) pound per acre of the material and \( \frac{1}{3} \) pound of chlordane per acre were adequate for control. Other materials have been tested, but conclusive evidence is not available at this time.

The Southern corn rootworm has been known to completely destroy stands of corn, cotton, soybeans, peanuts, or truck crops. One pound of chlordane per acre in fertilizer has resulted in a 30 to 90 percent increase in corn crop.

Some insects which had resisted control by use of chemicals in fertilizers were mentioned. The tobacco wireworm, clover root-borers, root louse, and many others may eventually be controlled through fertilizer-insecticide treatment. Research men are encouraged with the success of using DDT and BHC for corn worm, and feel that further work will lead to a means of overcoming the menace of the more difficult species.

Many problems must be surmounted before the program is considered entirely successful. Difficulty in blending, stability of chemicals in fertilizers, vapor pressures of the materials, and effect of repeated application on residual toxicity in the soil were some of the problems mentioned.

News of the outstanding results travelled fast, and farmers made many requests for special mixes of fertilizers and insecticides for varying purposes. Existing laws and regulations prohibited this procedure, and consequently some states amended their statutes to permit the practice.
The value of insecticides applied to the soil to control insects has long been recognized and accepted. The use of newer materials has expanded this field and presented a number of important problems. The Bureau has long recommended the addition of chemicals to the soil for insect control, but in these recommendations it has given consideration to soil types, specific pests, specific crops, and also questions of management of the soil. Attention has been given to the possibility of adding these insecticides along with fertilizers. Interesting results have been secured. At this time, however, we consider it unwise to attempt to give general recommendations that fertilizers and insecticides be added together as a means for crop production and pest control. The effect of combinations is not well understood, and there is an absence of information on shelf life. There is indication that the effectiveness of the insecticides added to fertilizers decreases with storage and age.

Another matter is important from the over-all picture. Legislation regarding regulation of fertilizers is all at a State level; legislation regarding insecticides is at State level and the Federal level. This has an important relation to the distribution of combinations of insecticides and fertilizers. To add insecticidal chemicals to fertilizers and claim that the combination would be useful in pest control would present a finished product which would be under the control of two laws at State level—one law and numerous State laws if the product is to be marketed interstate.

It is well established that certain of the newer insecticidal materials produce off-flavor in certain kinds of crops. There is little, if anything, to be gained by controlling insects and increasing production if the finished product is not acceptable for use. Increased yield, therefore, or increased pest control is only a part of the question that needs to be considered in accepting combinations of insecticides and fertilizers for marketing interstate or intrastate.

Because of the uncertainties that are involved it is urged that you as Economic Poisons Control Officials go slow in accepting for registration for use within your State combinations of insecticides and fertilizers.

Certain of the new chemicals persist for a period of time, and what may be good and even safe on a crop for the current season may be detrimental and harmful to sound pest control with another crop the following season. We must not overlook land management, including rotation of crops, when we recommend uses or approve labels that provide for combinations of insecticides and fertilizers or the adding of insecticides by themselves directly to the soil.
The Legislative Committee was not able to hold a meeting during the year, although several of its members who are also on the Executive Committee, had opportunity to discuss legislative problems in connection with other matters.

Numerous requests were received from interested individuals for information regarding the proposed uniform state economic poisons act. There are thirty-eight states with laws governing the sale of economic poisons, in addition to those of the Federal government, Territory of Hawaii, and the Dominion of Canada. There are only ten states that have no law.

There is a decided trend in modifying state economic poisons laws to bring them in general agreement with the Federal Insecticide, Fungicide and Rodenticide Act and also the proposed model uniform law.

Several states reported injury from use of 2,4-D and other injurious herbicides and sent inquiries concerning types of legislation designed to prevent damage from application of injurious herbicides or other injurious agricultural chemicals. In reply to these requests for information, attention was directed to the act relating to custom application of insecticides, fungicides, and herbicides, prepared by the Council of State Governments and discussed at our 1949 Annual Meeting. It should be noted that this act was modified as a result of the discussion of members at our meeting and now appears to be in conformity with the suggestions made. This act does not cover all phases of application of agricultural chemicals as it applies only to custom applicators and several states have given consideration to legislation limiting use of highly toxic substances to those who are specially well qualified. In this regard attention is called to Section 1066.7 of the Agricultural Code of California and the regulations issued thereunder, concerning use of injurious herbicides, and also Section 1080 of the same Code concerning other injurious materials and the regulations issued thereunder.

It is suggested that this committee determine the number of states whose laws come under the following categories:

1. States which have new or amended laws conforming to the Uniform or Federal Insecticide Laws.
2. States which have old laws which do not conform to the Uniform or Federal Insecticide Laws.
3. States which have laws regulating agricultural pesticides only.
4. States which have no laws.
REPORT OF THE COMMITTEE ON TOXICITY AND ANTIDOTES

J.C. Ward, Chairman

During the year, the project of educating medical students as to economic poisons was activated in the following manner:

1. A list of pharmacology professors was obtained from Dr. Hoag, Secretary, Society for Pharmacology and Experimental Therapeutics.

2. Letters were written to some 60 pharmacology departments outlining the problem and asking for comments.

3. Replies were received from 42 heads of departments, 38 of whom expressed an interest in receiving samples and descriptive literature on typical economic poisons.

4. Arrangements were made with Monsanto Chemical Company and the Hercules Powder Company to supply parathion and sodium fluoroacetate, and toxaphene, respectively.

5. On confirmation of interest, 38 samples of toxaphene, 36 samples of parathion and 12 samples of "1080" (sodium fluoroacetate) together with all descriptive literature were sent out.

A few professors asked for outlines of appropriate experiments which were sent. Others indicated that any inclusion in the teaching program would have to be delayed until new curricula were approved by university authorities, and others thanked us for making successful arrangements for the samples. Just how much will be accomplished remains to be seen.

The Committee has contacted the National Research Council for detailed information on the effectiveness of glycerol monoacetate ("monacetin") as an antidote for 1080 poisoning in humans. No reply has been received from the subcommittee on Pharmacology and Physiology, which released the information on animal experiments with the chemical.

The Committee has retained its contacts with other groups with similar interests. An effort has been made to prevent duplication of projects which has reduced its own program.

Any recommendation which the Executive Committee may care to make as to a future program, would be appreciated.
In the course of economic poison registration under the Federal Insecticide, Fungicide, and Rodenticide Act considerable question has been raised as to the proper interpretation of the definition of an active ingredient which appears in the regulations for the enforcement of the law. This is a fundamental problem which needs to be solved before many of the more specific questions are answered.

No question arises regarding the activity of the essential toxicants in effective formulations. It is such ingredients as carriers, diluents, solvents, wetting and spreading agents, and emulsifiers which may have only a low degree of activity against pests or organisms about which there is doubt as to the propriety of calling them active.

The designation of wetting and emulsifying agents as active or inert has not been uniform throughout a single type of formulation, nor even for a given compound in such a formulation. That large group of preparations known as wettable powders is an exception. In these products the wetting agent has generally been included in the inert ingredients along with the carrier. The problem is not so easily generalized for emulsifiable concentrates where both the formulations and their uses are more varied. For instance, in some emulsifiable concentrates containing a toxicant such as DDT, chlordane or toxaphene, the emulsifier is named as active but in many others it is considered inert. Many manufacturers would rather not disclose the nature of the emulsifier and so wish to declare it as part of the inert ingredients. They may wish to change the surface active agent according to fluctuations in availability and cost. Furthermore, many such agents are ill defined mixtures not possible to name precisely. Those who do disclose the emulsifier and declare it as active may do so to obtain a sales advantage by virtue of the higher total content of declared active ingredients in their products.

Many different solvents are employed in the formulation of liquid preparations, most of them purely for their solvent properties with no idea of adding to the toxicant content of the preparation. Solvents range from water and water-miscible materials such as the lower alcohols to such materials as xylene and petroleum fractions. The petroleum content of a product for use on garden crops against such pests as aphids may be as high as 0.5 to 2 percent of the diluted material, the latter being applied at the rate of about 100 gallons per acre, amounting to as much as 2 gallons of oil per acre. On the other hand, emulsions such as those containing aldrin for use against grasshoppers, involve the application of only 1 or 2 pints of light petroleum, xylene or similar solvent per acre. Usually such solvents are relatively volatile and probably disappear rather rapidly during or after application. In such cases involving small quantities of solvent for solvent purposes alone, to call the solvent active may amount to an absurd situation.

To overcome these problems the definition of an active ingredient might be revised. It is now stated that such an ingredient is one which will kill or repel the pest "when used in the same manner and for the same purposes as those for which the product is intended." If this part of the definition can be revised or appropriately interpreted to exclude materials utilized solely to improve the physical characteristics of economic poisons, it is believed many questions regarding the activity of ingredients would be settled satisfactorily.
In my report as Chairman of this group last year, the projected plan was discussed in some detail. This year the committee has classified the various chemicals and prepared a suggested format comparable with existing publications as Merck's Index and the Pharmacopoeia.

A project of this magnitude will require the cooperation of a large number of those concerned with regulatory and research on pesticides and the active participation of all chemists and others directly interested. Your suggestions on both type and organization of information will be greatly appreciated. If you are in a position to supply data on particular types or classes of pesticides it would be especially useful to the committee.

We need to determine the material which will be most useful and should be included. This may well vary somewhat for different types of pesticides, and perhaps to some extent for different compounds. We need to determine the most useful type of general classification, and also the organization of the information to be included for each compound. The necessary information will come from many sources and assistance is needed in securing, tabulating, and organizing accurate information regarding the rather large number of compounds now utilized in one way or another as pesticides.

The book should eventually include all types of pesticides, those for household use, so-called functional chemicals, and all chemicals which are used in food production, storage, and processing. It will thus be directly helpful in the important problem of food protection. Although covering a much smaller number of chemicals, this compilation will give more extensive information with somewhat different objective than such books as Merck's Index, etc. Analytical methods and residue removal methods should be included only by literature references to suitable methods, and the book should not include descriptive methods, unless otherwise unavailable.

It would seem desirable to concentrate quite largely at present on the newer pesticides which have been developed, and on new compounds as they appear. It seems probable that this entire compilation may appear first as reports on certain groups of compounds and that these may be revised from time to time as required and that these various sections may, in the not distant future, be collected into a single publication.
REPORT ON METHODS OF ANALYSIS
CLEARING HOUSE
J.J.T. Graham, Chairman

Since the 1949 meeting, the State Laboratories of Alabama, Mississippi, New York, South Dakota, and Washington have been furnished with sets of the mimeographed methods of analysis, and their names were placed on the mailing list to receive future distributions of methods.

Methods have also been furnished to:
Naco Fertilizer Company
Charleston, South Carolina

Boyle-Midway, Incorporated
Jersey City, New Jersey
Mathieson Chemical Corporation
Niagara Falls, New York
Barrow-Agee Laboratories
Memphis, Tennessee

Seil, Putt & Rusby
New York, New York
Brunswick Chemical Company
Brunswick, Georgia
American Medical Association
Chicago, Illinois

The following methods have been distributed to the laboratories on the mailing list:

Reprint of Dr. T.H. Harris' paper entitled "Determination of Gamma-Benzene Hexachloride in Insecticide Products."

Abstract of a paper by Dr. Harris presented at the Atlantic City meeting of the American Chemical Society. This paper is entitled "The Application of Partition Chromatography to the Analysis of Insecticide Formulations."

328.0 Determination of Potassium Cyanate in Herbicides.
330.0 Determination of Sodium Chlorate in Herbicides.
495.0 Determination of Tetrastyl Pyrophosphate.
553.0 Method for Detection of Methylated Aromatic Petroleum Derivative Oils in Insecticidal and Herbicidal Oil Solutions.
744.0 Determination of Parathion by Total Nitrogen.
370.0 Determination of Total Chlorine in Liquid Herbicides Containing 2,4-D; 2,4,5-T, or mixtures of both in the presence of oils and emulsifiers by a Modified Parr Bomb procedure.
652.5 Determination of very Small Quantities of Mercury in Mixture with Organic Material.
725.0 Determination of Sabadilla Alkaloids.
725.1 Qualitative Method for Sabadilla Alkaloids in a Mixture of Alkaloids.
790.0 Method for Detection of Methoxychlor.
807.2 Analysis of Aerosol Insecticides.
808.1 The Colorimetric Determination of Chlordane.
809.0 The Determination of Total Chlorine in Chlordane.

251.21 Sulfur, Oxidation Method.

320.0 Chloride in Quaternary Ammonium Compounds in Absence of Other Halides, by Electrometric Titration.

320.1 Chloride in Quaternary Ammonium Compounds in Absence of Other Halides, Adsorption Indicator Method.

355.0 Determination of Propylene Glycol.

375.0 Detection of Trace Quantities of 2,4-D; 2,4,5-T and related Compounds in Insecticidal Mixtures.

767.0 Zinc in Zinc Ethylene Bis Dithiocarbamate Mixtures.

810.0 Revised Qualitative Method for Determination of Cyclonene (Piperonyl Cyclohexenone) in Insecticidal Powders.
REPORT OF THE STATES RELATIONS COMMITTEE

A.B. Heagy, Chairman

The States Relations Committee met at the Shoreham Hotel, Friday, October 6, 1950 at 7:30 p.m. Approximately 50 persons were in attendance representing industry, governmental agencies, state officials and Canada.

In all, eight questions were considered as follows:

1. Are warnings and cautions on hormone type weed killers adequate?

It was the consensus of opinion that in the majority of cases, manufacturers were following the recommendations drafted by federal and state authorities.

2. Are control officials obligated to accept registration and labeling which has been approved by Federal Agencies?

Acceptance of applications for registration by the various states is contingent on the local requirements and not dependent on federal acceptance. It is urged that state agencies strive for uniformity of requirements.

3. When an active ingredient is guaranteed as "impregnated", is it necessary that all of the ingredient be so incorporated rather than merely "mixed"?

The use of the term "impregnated" implies that the material is all in the same state and if found to be not so, it is misbranded.

4. When an extracted material is used as a carrier, should it be mandatory to declare any residual active principle in the ingredient statement?

In general, it was the feeling that it is not necessary.

5. What is the policy regarding re-registration of pesticides which are carried over and offered for sale in subsequent years?

Attention was called to the discussion on this question in 1949.

6. Should ground and air contract pest control operations be regulated by law?

Considered a local problem and should be determined by the need in the particular area.

7. Should the use of recognized common names be permitted in ingredient statements without supplemental chemical nomenclature?

Many opinions for and against the plan were expressed and no definite conclusions were reached.

8. Are the terms "safe" and/or "harmless" or similar designations justified for use on labeling and descriptive literature for any economic poison, whether or not employed in accord with directions for use?

Everyone was in general agreement that some manufacturers are too extravagant in their claims; but some of industry representatives were of the opinion that the use of these terms is justifiable in some cases.
UNIFORM REGISTRATION PROCEDURE

Paul Ijams, Chairman

The committee met at the Shoreham Hotel and all members of the group were present.

After discussion the committee makes the following recommendations:

Again this year, we suggest that those states that have not adopted the uniform registration procedure, give it their earnest consideration. As more states adopt laws the burden of registration increases upon industry. The more uniform and universal the procedure the better for all.

Last year it was suggested that in applying for registration that the applicant supply new labels only when a change had been made in labeling or composition. This procedure saves time for industry and control official alike in checking labels he has already scrutinized. Suitable notations can be used to signify new or amended labeling.
APPLICATION FOR REGISTRATION OF ECONOMIC POISONS

Control Office ________________________, 19__

Application is hereby made for the registration of the following (number) Economic Poisons for a period beginning with the actual date of registration and continuing until December 31, 19__. There is submitted as part of this application individual data sheets (8½ X 11) to which is attached a copy of the label for each product. (See instructions on reverse side).

Remittance payable to the State of ___________ in an amount of $____ is enclosed herewith to cover annual inspection fees for the following products.

BRANDS

I hereby certify that the information appearing on the attached data sheets is true and correct in every respect; that, each and every package of the above named materials will be labeled as described (and in addition that net weight and manufacturer's name and address will be shown); that the attached declarations are the guarantees of the applicant as to the chemical composition of the material above named for and on behalf of:

Address correspondence to: Submitted by:
Firm ______________________ Firm ______________________
Attention ______________________ By ______________________
Street & No. ______________________ Title ______________________
City & State ______________________ Date ______________________

(Applicant not to fill in below this line)

CERTIFICATE OF REGISTRATION

This certifies that the above named applicant is hereby licensed to sell the above brands of economic poisons in the State of _______ for a period beginning with the actual date of registration and ending December 31, 19__ when sold, offered or exposed for sale under the brand name and guarantees as described.

Date ______________________ State Chemist ________________
Comptroller ______________________
CERTIFICATE OF REGISTRATION OF ECONOMIC POISONS

TO:

On the basis of the information furnished by the registrant, and the receipt of the registration fee, the following named economic poisons are hereby registered under the provisions of the _______ State Economic Poisons Act of _______, and the sale of said economic poisons is hereby authorized in the State of _______ when offered and exposed for sale, or sold under a label showing the information required by law and otherwise in compliance therewith, for the calendar year 19____, unless said registrations, or any of them, are canceled for cause:

Claims or directions for use which differ in substance from the representations made in connection with the application or changes in the name or formula of the economic poison covered by this notice should not be made prior to their submission to the Secretary of the _______ Board of Agriculture, and receipt of notice that they have been accepted.

Registration of a product is in no way to be construed as an endorsement of approval by this department or any claims made for it. The labeling must not bear any reference to registration under the Economic Poisons Act of _______. In order to protect the public, the Secretary may at any time cancel the registration of an economic poison. Request for registration under a new formula or labeling may be submitted at any time.

Dated at ____________, this _____ day of ________, 19____

___________ State Board of Agriculture

Receipt No. ___________   ___________________ , Secretary
APPLICATION FOR REGISTRATION OF ECONOMIC POISONS

For the Calendar Year 19__

Application is hereby made to the Secretary of the State Board of Agriculture, for registration, under the provisions of the Economic Poisons Act of __, of the following economic poisons:

There is submitted, herewith, a copy of the label (affixed to 8½ X 11 sheet of paper) and all other written, printed, or graphic matter used on, or attached to, the containers of the above listed economic poisons. Ingredient statements are shown on label sheets when required under Section ___ of the Act.

I hereby certify that all labels submitted, herewith, are exact copies of labels that have been registered without protest with the U.S. Department of Agriculture, except those marked with an asterisk (*).

Remittance is enclosed to cover the registration fee for ___ products ( $ ___ for each product) in the amount of ________.

Address correspondence to: Submitted by:
Firm ______________________________ Firm ______________________________
Attention __________________________ By ____________________________
Street & No. __________________________ Title __________________________
City & State __________________________ Date ________________, 19 ___
UNIFORM SAMPLING

A.D. CROWARTIE, INVESTIGATOR

No work has been done on Uniform Sampling since the last meeting. Until we are in a position to prepare a manual with specific instructions covering sampling procedure, it appears little would be accomplished by revising the report previously submitted. The main reasons holding this up are the numerous new economic poisons being placed on the market and the amounts required for the types of tests to be run. In many instances, not only chemical analyses are being run but it has been found necessary to run tests under conditions for which the products are actually recommended for use. This has called for specific sampling instructions on a large number of items or groups of items.

UNIFORM SAMPLING PROCEDURE
(Presented at the 1948 meeting)

I. The purpose of routine sampling is to "spot check" the various products sold or offered for sale by different manufacturers or distributors. It would be impractical, and almost impossible, to give complete coverage to every product shipped or manufactured, so the next best procedure is to use the "spot check" method. Where violations are found, more complete coverage is given by collecting additional samples of these products. In this manner, the products found to be in violation are given more attention and the ones not found in violation are passed up until time for next sampling.

A list of types of economic poisons and suggested amounts for routine samples is attached to this report. Also included is a suggested procedure to be used in making net weight checks and a form for recording weighings.

II. Sampling Retail Units - Where possible, samples should be obtained from original unopened, shipping containers. The shipping containers should be checked for codes, batch numbers, or other distinguishing marks and, when found, the sample units should be identified with corresponding codes or batch numbers. The Collection Reports should also contain this information. When a sample consists of more than one container or unit, they should be taken from different shipping containers when they are available.

A thorough check should be made to see if there are any circulars, literature, placards, or other forms of advertising in which evidence is made to the product being sampled. If any are found, they should be submitted with the sample. They should contain a notation stating how they are used, such as - "came in same shipment, given out
over the counter", or "used as advertising poster, did not come in same shipment". If posters or other forms of advertising are used which are too large or bulky to submit as specimen advertising, copies of the wording should be made, with a statement of how they are used and the approximate size of the lettering.

III. Bulk Sampling

1. Dry Materials - A trier of sufficient length to obtain a representative sample should be used in sampling drums, barrels, large paper or burlap bags, or other containers used in shipping products of twenty-five pounds weight or larger. One commonly used is a two section trier, approximately thirty inches in length.

In drawing the sample, the trier should be inserted diagonally from different sections or corners of the containers. Ordinarily, four trierfuls will give a quantity sufficient for a sample. If not, then the others should be drawn in the same manner midway between the points from where the first four were drawn. The top inch or so of each trierful should not be used as part of the sample, but should be returned to the container from which the sample is being drawn.

Glass jars, friction top cans, and sometimes the round cardboard containers similar to those used for packing ice cream, are usually most suitable for handling samples of dry materials. Cardboard containers should be used only for products which will not be affected upon standing, such as sulfur and sodium fluoride. Air tight containers should be used for all others.

Complete copies of all labels on the containers should be made. A thorough check of the containers for batch numbers or other markings should be made. Any other essential information should also be included in the Collection Report. Copies of all circulars and other advertising should be submitted.

2. Liquid Materials - Before samples are drawn from containers such as cans, drums, or barrels, the contents should be thoroughly mixed by rolling, shaking, or stirring. When the product is of such a consistency that rolling or shaking is not practical, the contents should be stirred thoroughly with a clean rod of metal or wood. However, very few of this latter class are encountered.

Metal, plastic, or rubber tubings used as siphons are usually found to be convenient methods of drawing these samples. They should be inserted about midway down the container, at which point the sample should be drawn. Sometimes it is easier to pour samples of certain types of materials from containers of five gallons or less, which method would be satisfactory provided the contents have been thoroughly agitated. Heavy liquids will often require considerable agitation before the inspector can feel assured the contents are thoroughly mixed. However, there should be no doubt in his mind at the time the sample is drawn.
Glass jars, screw top glass bottles, or screw top cans are preferable for handling liquid samples. Certain types of economic poisons should not be placed in jars with rubber rings as the ingredients, upon standing, affect them. Examples of these are the mineral oil sprays or emulsions, coal-tar creosote dips and disinfectants, liquor cresolis sapogenis, creosote wood preservers and products containing chloroform or acetone.

Complete copies of labels, batch or code numbers, and specimens of circulars and other advertising should be obtained. Other essential information should be reported.

IV. Size of Samples - No set rule can be laid down for the size of samples which should be obtained. The type of tests to be run, the concentrations of the active ingredients in the products, the size of the retail containers, and the cost of samples are just a few of the factors. For routine samples, one pound or one pint samples are generally adequate.

A large percentage of products ordinarily sampled are put up in retail containers and the size of the sample depends on the size available. While one pound or one pint is sufficient for the ordinary sample, it would not be practical to pass up a product because the dealer had in stock four-pound bags or one quart or one gallon containers. Many products such as nicotine sulfate, require much smaller amounts for samples, so in these cases the purchase of quart or larger samples would not be justified.

In sampling bulk containers, the size of the sample can be controlled. In other cases, the sizes available are the determining factors.

V. Preparation of Samples

1. Retail Containers - When a sample consists of more than one unit, if possible, each unit should be identified and sealed separately. The labels should be identified with the sample number, date of collection, and the initials of the inspector collecting the sample. The container should then be sealed with the seal bearing the sample number, the date of collection, and the first name, middle initial, and the last name of the collecting inspector.

When the units are too small to seal without covering part of the label, the labels should be identified with the sample number, date of collection, and the initials of the inspector. They should then be divided into two parts, wrapped, and then sealed. The outside wrapper should also contain the sample number, date of collection, the initials of the inspector, the name of the product, the name and address of the shipper, and any distinguishing marks or codes found on the shipping cartons or containers.

2. Samples from Bulk Containers - The sample containers should be identified with a sticker containing the sample number, date of collection, the initials of the inspector, the name of the product, the name
and address of the shipper, and any distinguishing marks, such as batch
or code numbers, found on the shipping containers. The sample con-
tainers also should be sealed with seals bearing the sample number, date
of collection, and first name, middle initial, and last name of the in-
estigator.

3. Advertising, Circulars, Pamphlets, Displays, Etc. - Speci-
mens should be obtained of all advertising in any form in which refer-
ence is made to the product being sampled. That which is attached to
the retail unit or inside the retail carton should be replaced as it was
after it has been properly identified. All other, such as pamphlets
or circulars distributed over the counters, or placards used as displays,
should be submitted with the collection report. They all constitute
labeling of the product and are a main part of the sample. Each piece
submitted should be identified with the sample number, date of collection,
initials of the investigator, and a statement as to its source.
PERSONS IN ATTENDANCE AT FOURTH ANNUAL MEETING
OF THE
ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

Representing States and Canada

Alabama
George H. Marsh, Director
Div. Agricultural Chemistry

California
Allen B. Lemmon, Chief
Bureau of Chemistry

Canada
A. C. Haize
Dept., Agriculture

C. H. Jefferson
Administrative Officer
Dept., Agriculture

Charles V. Marshall
Supt. of Laboratory
Plant Products Division

G. W. Michael, Assoc. Chief
Div. Fertilizer Control

Colorado
F. Herbert Gates, Chief
Div. Plant Industry

Connecticut
H. J. Fisher, In Charge
Dept., Analytical Chemistry
Agricultural Exp. Station

Delaware
R. Earle Dickey, State Chemist
Board of Agriculture

John L. Clough, Director
State Laboratory
Board of Agriculture

Florida
J. J. Taylor, State Chemist
Department of Agriculture

E. R. Winterle, In Charge
Insecticides, Dept. Agr.

Georgia
C. Reynolds Clark, State Chem.
Department of Agriculture

Georgia
R. A. Moncrief, Asst. State Chemist
Department of Agriculture

Indiana
F. W. Quackenbush, State Chemist
Purdue University

Iowa
Mrs. E. M. Johnston, Acting State
Chemist, Dept. of Agriculture

Kansas
J. L. Monaghan, Director
Control Div., Board of Agr.

Paul Ijams, Asst. Secretary
Board of Agriculture

B. H. Hewett, Chairman
Control Committee
Board of Agriculture

Kentucky
Bruce Poundstone, State Chemist
Dept. of Agriculture

Louisiana
E. A. Epps, Jr., Chief Chemist
Dept., Agriculture & Immigration

Maryland
E. R. Tobey, Chemist
Div. of Inspection, Orono

Maryland
L. E. Bopst, State Chemist

A. B. Heagy, Chemist

J. E. Schueler, Chemist

R. W. Neal, Jr.
Inspection & Regulatory Ser.

Michigan
W. C. Geagley, State Chemist
Department of Agriculture
Minnesota
H. J. Hoffmann, Chief Chemist
Dept., Agr. Dairy & Food

Mississippi
M. P. Etheredge, State Chemist
Department of Chemistry

North Carolina
E. W. Constable, State Chemist
Department of Agriculture

North Dakota
Floyd Roberts, Chief Chemist
State Laboratories Dept.

L. A. Koehler, Chemist
State Laboratories Dept.

New Hampshire
G. H. Laremie, Cont. Supervisor
Department of Agriculture

New Jersey
S. B. Randle, State Chemist
Agricultural Exp. Station

R. L. Willis, Asst. Research
Chem., Agr. Exp. Station

New Mexico
A. W. Ludwick, Deputy in Charge
Feed, Fertilizer Control

New York
A. B. Buchholz, Director
Bureau Plant Industry

Oklahoma
Willis Richerson, Chief Chemist
Board of Agriculture

Parks A. Yeats, Head
Seed, Feed & Fertilizer

Oregon
J. D. Patterson, Chief Chemist
Dept. of Agriculture

O. K. Beals, Chief
Div., Foods & Dairies

Pennsylvania
D. A. H. Frear, Prof.
Penn. State College

Rhode Island
John B. Smith, Head
Dept. Agr. Chemistry

South Carolina
M. D. Farrar, Head
Dept. Entomology & Zoology

South Dakota
G. G. Frary, State Chemist
State Chemical Laboratory

D. J. Mitchell, Asst. Chemist
State Chemical Laboratory

Tennessee
E. H. Holeman, Supt. & State Chemist
Department of Agriculture

G. C. Mowery, Chief Chemist
Department of Agriculture

Texas
J. F. Fudge, State Chemist
Agricultural Exp. Station

Virginia
R. C. Berry, Director
Division of Chemistry

J. C. Jones, Chem.-Executive
Division of Chemistry

B. L. Samuel, Assoc. Chemist
Division of Chemistry

Washington
J. L. St. John, State Chemist
Experiment Station

West Virginia
M. H. Snyder, Chief Chemist
Department of Agriculture

C. H. Amick, Director
Food & Dairy Division

Department of Agriculture

Wisconsin
W. B. Griem, Chief Chemist
Department of Agriculture
### Representing Federal Government:

**Insecticide Division**

*Production & Marketing Administration:*

<table>
<thead>
<tr>
<th>Position</th>
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<tbody>
<tr>
<td>Entomologist</td>
<td>S. C. Billings</td>
</tr>
<tr>
<td>Chemist</td>
<td>R. L. Caswell</td>
</tr>
<tr>
<td>Chemist</td>
<td>C. G. Donovan</td>
</tr>
<tr>
<td>Admin. Asst.</td>
<td>R. Edens</td>
</tr>
<tr>
<td>Chief Chemist</td>
<td>J. J. T. Graham</td>
</tr>
<tr>
<td>Asst. Chief</td>
<td>E. L. Griffin</td>
</tr>
<tr>
<td>Dir. of Entomology &amp; Plant Quarantine</td>
<td>F. C. Bishopp</td>
</tr>
<tr>
<td>Asst. Chief</td>
<td>S. A. Rohwer</td>
</tr>
<tr>
<td>Surgeon, U.S. Public Health Service, Georgia</td>
<td>W. J. Hayes, Jr.</td>
</tr>
<tr>
<td>Medical Director, U.S. Public Health Service</td>
<td>J. G. Townsend</td>
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</table>

**Representing Industry:**

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<tr>
<td>Baird &amp; McGuire, Inc.</td>
<td>G. M. Baird</td>
</tr>
<tr>
<td>Shell Chem. Corp.</td>
<td>E. W. Bodine</td>
</tr>
<tr>
<td>Huntington Laboratories, Inc.</td>
<td>J. L. Brown</td>
</tr>
<tr>
<td>Nat'l. Pest Control Assoc.</td>
<td>W. O. Buettner</td>
</tr>
<tr>
<td>Walter Carter</td>
<td>W. R. Flach</td>
</tr>
<tr>
<td>P&amp;RI., Honolulu</td>
<td>J. H. Foulger</td>
</tr>
<tr>
<td>The A. A. C. Co.</td>
<td>E. I. duPont de Nemours Co.</td>
</tr>
<tr>
<td>Oil, Paint &amp; Drug Reporter</td>
<td>H. W. Hamilton</td>
</tr>
<tr>
<td>The A. A. C. Co.</td>
<td>R. C. Charlton</td>
</tr>
<tr>
<td>R. R. Cherry</td>
<td>R. R. Cherry</td>
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<tr>
<td>Mathieson Chemical Corp.</td>
<td>B. E. Conley</td>
</tr>
<tr>
<td>Northieson Chemical Corp.</td>
<td>H. Doellinger</td>
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<tr>
<td>L. S. Hitchner</td>
<td>G. M. Douthett</td>
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<tr>
<td>E. I. duPont de Nemours Co.</td>
<td>E. G. Klarmann</td>
</tr>
<tr>
<td>Tobacco By-Products &amp; Chem. Corp.</td>
<td>F. R. Johnson</td>
</tr>
<tr>
<td>Chemical Div.</td>
<td>W. A. Knapp</td>
</tr>
</tbody>
</table>
M. D. Leonard
Julius Hyman & Co.

Don Lerch
Nat'l. Agr. Chemicals

L. A. Long
Agricultural Chemicals

R. D. Minteer
Monsanto Chemical Co.

J. A. Noone
Nat'l. Agr. Chemicals

H. E. Peterson
Continental Filling Corp.

J. W. Purcell
Prentiss Drug & Chem., Inc.

C. A. Richards
Wisc. Alumni Research Foundation

Don Lerch
Nat'l. Agr. Chemicals

L. A. Long
Agricultural Chemicals

R. D. Minteer
Monsanto Chemical Co.

J. A. Noone
Nat'l. Agr. Chemicals

H. E. Peterson
Continental Filling Corp.

J. W. Purcell
Prentiss Drug & Chem., Inc.

N. M. Walker
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ALABAMA
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Feed, Fertilizer Laboratories
Tucson

ARKANSAS
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Plant Board, War Memorial Bldg.,
Little Rock

CALIFORNIA
A. E. Lemmon, Chief
Bureau of Chemistry
Department of Agriculture
Sacramento 14

COLORADO
F. H. Gates, State Entomologist
20 State Museum
Denver

CONNECTICUT
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Dept., Analytical Chemistry
P.O. Box 1108, New Haven 4

DELAWARE - No law

FEDERAL GOVERNMENT
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Production & Marketing Adm.,
U. S. Department of Agriculture
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Agricultural Dept., Chemical Div.,
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Department of Agriculture
254 Capitol Place, S. W.,
Atlanta 3

IDAHO - No law

ILLINOIS
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Division of Plant Industry
Department of Agriculture
Armory Office Bldg., Springfield

IOWA
R. W. Borgeson
State Chemist
Department of Agriculture
Des Moines 19

KANSAS
J. L. Monaghan, Director
Control Division
Board of Agriculture, Topeka

KENTUCKY
Mrs. F. C. Dugan, Director
Div. of Food, Drugs and Hotels
620 South 3rd Street, Louisville

LOUISIANA
M. S. Perkins, Asst. Commissioner
Dept., Agriculture & Immigration
P.O. Box 951, Baton Rouge 1

MAINE
C. P. Osgood, Chief
Division of Inspection
Department of Agriculture
Augusta

MARYLAND
L. E. Bopst, State Chemist
Inspection & Regulatory Service
College Park

MASSACHUSETTS
C. S. Ferguson, Director
Food & Drug Div., Dept. Health
State House, Boston 33
MICHIGAN
W. C. Geagley, Chief Chemist
Bur. of Chemical Laboratories
Department of Agriculture
Lansing

MINNESOTA
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Dept., Agriculture, Dairy & Food
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St. Paul

MISSISSIPPI
M. P. Etheredge, Chief Chemist
Department of Chemistry
State College

MISSOURI - No law

MONTANA
A. R. Anderson, Commissioner
Dept., Agr., Labor & Industry
Helena

NEVADA - No law

NEW HAMPSHIRE
C. H. Laramie, Control Supervisor
Department of Agriculture
State House, Concord

NEW JERSEY
S. B. Randle, State Chemist
Agricultural Experiment Sta.
New Brunswick

NEW MEXICO - No law

NEW YORK
A. B. Buchholz, Director
Plant Industry Bureau
Department of Agriculture
Albany

NORTH CAROLINA
E. W. Constable, State Chemist
Department of Agriculture
Raleigh

NORTH DAKOTA
R. C. Bird, State Food Commissioner
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Div. of Plant Industry
Department of Agriculture
Columbus 15

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Clyde Bower, Director
Entomology & Plant Control Div.,
Department of Agriculture
Capitol Bldg., Oklahoma City

OREGON
J. D. Patterson, Chief Chemist
Division of Foods & Dairies
Department of Agriculture, Salem

PENNSYLVANIA
W. S. Hagar, Director
Bureau of Foods & Chemistry
Department of Agriculture
Publication Bldg., Harrisburg

RHODE ISLAND - No law

SOUTH CAROLINA
J. A. Berly, Assoc. State Entom.
Crop Pest Commission
Clemson

SOUTH DAKOTA
G. G. Frary, State Chemist
Chemical Laboratories
Department of Agriculture
Vermillion

TENNESSEE
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Div. of Dairies, Foods & Drugs
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Nashville 3

TEXAS
J. F. Fudge, State Chemist
Agricultural Experiment Station
College Station

O. C. Haworth
Div. Plant Inspection & Quar.
Austin

UTAH
M. E. Christenson, State Chemist
Board of Agriculture
Salt Lake City
VERMONT
H. L. Bailey, Director
Division Plant Pest Control
Department of Agriculture
Montpelier

VIRGINIA
R. C. Berry, Director
Division of Chemistry
Dept. Agriculture & Immigration
1123 State Office Bldg.,
Richmond 19

WASHINGTON
J. L. St. John, State Chemist
Division of Chemistry
Agricultural Experiment Station
Pullman

WEST VIRGINIA — No law

WISCONSIN
E. L. Chambers, State Entomologist
Department of Agriculture
Capitol Annex, Madison 2

WYOMING
G. B. Harston, State Entomologist
Department of Agriculture
Powell

CANADA
C. V. Marshall, Sup't. Laboratories
Plant Products Division
Department of Agriculture
79 Essex Street, Ottawa

C. H. Jefferson, Admn. Officer
Pesticides, Plant Prod. Div.,
Department of Agriculture
79 Essex Street, Ottawa

Territory of Hawaii
Alan Thistle, Director
Division of Marketing
Board of Commissioners
Agriculture & Forestry
Honolulu 1
REPORT

OF THE

ASSOCIATION OF ECONOMIC POISONS

CONTROL OFFICIALS

1949
ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS
Office of Secretary
COLLEGE PARK, MD.

September 20, 1949

TO ALL ECONOMIC POISONS CONTROL OFFICIALS:

Subject: Program
Secretary's Report
Treasurer's Report

Gentlemen:

I am enclosing a copy of the program developed during the meeting of your Executive Committee in Washington last April. The policy of inviting representatives from two industry organizations is being continued this year. We are fortunate in securing Dr. Dunbar and Dr. Mahoney to discuss timely subjects of interest to our membership.

The arrangement of combining the identification and program as one is new, and has both advantages and disadvantages. Your expression of opinion is solicited.

Misunderstanding between the printer and your Secretary resulted in a material several shades darker than requested. I regret that this situation occurred and hope it will not occasion too much difficulty in reading the type.

Again this year, I am issuing the report of the Secretary prior to the Washington meeting, which will speed up the morning procedure. A brief summary of the activities of this office during the year follows:

General correspondence showed a slight increase over the preceding year. Inquiries were received regarding various state laws, requests for copies of the uniform state law adopted at the 1948 convention, and information relative to the precautionary and antidote statements required for certain poisons. The interest shown in this phase of economic poisons work is reflected in the accomplishments of Mr. Ward and his committee.

Copies of the proposed uniform state act dealing with the application of insecticides, fungicides and herbicides were distributed at the request of Mr. John Thurston, Secretary, Administrative Council, Department of Agriculture. It is recommended that member officials reply promptly to these requests. Further study and discussion of this proposed act will be part of Mr. Lemmon's Legislative Committee report.

A summary of the meeting of the Executive Committee held in Washington was reported in the May issue of the Pest Controller. One important development of this meeting was the reactivation of the Committee on Registration Procedure, at the request of the industry group as a joint committee. Mr. Ijams will render a full report of any new recommendations incidental to this phase of control work.

News releases were distributed through the medium of the Pest Controller. Seven were sent during the course of the year. Interest has developed among other
departments in these bulletins. Requests were received from health departments and other organizations for copies of the Pest Controller. Comment from some members indicates the desire to receive details of accidents resulting from the misuse of economic poisons. Since distribution of this material is restricted to members and health authorities it is intended for confidential use.

The report of the Association was prepared and distributed to all persons attending the 1948 convention in Washington. It is hoped that in the very near future it can be extended to contain standards and precautionary statements for the various chemicals under surveillance of control officials.

Attached hereto you will find a copy of the Treasurer's report covering receipts and disbursements up to September 30, 1949.

Respectfully submitted,

Albert B. Heagy
Secretary-Treasurer
INTRODUCTION

This, the second annual report of the Association of Economic Poisons Control Officials, contains the speeches and committee reports given at the meeting held October 8, 1949 at the Shoreham Hotel in Washington, D. C.

The Association adopted as tentative the regulatory principles and definitions of terms which are scheduled for official action during the 1950 convention.

Also, the Constitution and By-laws, roster of officers, committees, investigators, suggested sampling procedure, uniform bill, application for registration forms, and certificate of registration are included.

Special attention is directed to the proposed bill covering custom application of insecticides, fungicides, and herbicides. This bill has been adopted by the Council of State Governments and was prepared with the cooperation of many interested groups. It is presented here as an aid to those states which may wish to adopt or revise legislation covering custom application of economic poisons.

It is entirely probable that errors of omission and commission have been made in this publication. Your suggestions for improvement in future Association reports will be welcomed.
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</tr>
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OFFICERS, COMMITTEES AND INVESTIGATORS OF
ECONOMIC POISONS CONTROL OFFICIALS

President - J.F. Fudge - College Station, Texas
Vice-Pres. - A.B. Lemmon - Sacramento, California
Secty.-Treas. A.B.Heagy - College Park, Maryland

Executive Committee
President, Vice-President, Secretary-Treasurer,
and Retiring President, Ex Officio

J.D.Patterson, (1951) Chairman - Salem, Oregon
H.J.Hoffmann (1950) - St. Paul, Minnesota
E.W.Constable (1950) - Raleigh, North Carolina
A.B.Buchholz (1950) - Albany, New York
W.G. Reed (1951) - Washington, D.C.

Committees
Legislative

A.B.Lemmon, Chairman - Sacramento, California
W.G. Reed - Washington, D.C.
J.D. Patterson - Salem, Oregon
Paul Ijams - Topeka, Kansas
R.C.Berry - Richmond, Virginia

Toxicity and Antidotes

J.C.Ward, Chairman - Washington, D.C.
A.B.Lemmon - Sacramento, California
G.G.Frary - Vermillion, South Dakota
J.A. Noone - Washington, D.C.
J.H.Foulger - Wilmington, Delaware
E.G. Klarman - Bloomfield, New Jersey
W.A.Simanton - Phoenix, Arizona
S.D. Silver - Edgewood, Maryland
J.C. Krantz - Baltimore, Maryland

Ingredient:

H.H.Shepard, Chairman - Washington, D.C.
A.M.G. Soule - Augusta, Maine
C.A.Bower - Oklahoma City, Oklahoma
M.C. Goldsworthy - Beltsville, Maryland
## Uniform Standards

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>J.L. St. John, Chairman</td>
<td>Pullman, Washington</td>
</tr>
<tr>
<td>C.V. Marshall</td>
<td>Ottawa, Canada</td>
</tr>
<tr>
<td>H.J. Fisher</td>
<td>New Haven, Connecticut</td>
</tr>
<tr>
<td>E.L. Griffin</td>
<td>Washington, D.C.</td>
</tr>
<tr>
<td>D.E.H. Frear</td>
<td>State College, Pennsylvania</td>
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## Registration Procedure

<table>
<thead>
<tr>
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</thead>
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<tr>
<td>Paul Ijams, Chairman</td>
<td>Topeka, Kansas</td>
</tr>
<tr>
<td>G.H. Marsh,</td>
<td>Montgomery, Alabama</td>
</tr>
<tr>
<td>S.C. Billings</td>
<td>Washington, D.C.</td>
</tr>
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## States Relations

<table>
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<tr>
<td>A.B. Heagy, Chairman</td>
<td>College Park, Maryland</td>
</tr>
<tr>
<td>H.L. Bailey</td>
<td>Montpelier, Vermont</td>
</tr>
<tr>
<td>E.A.Epps, Jr.</td>
<td>Baton Rouge, Louisiana</td>
</tr>
<tr>
<td>H.C. Harmond</td>
<td>Bismarck, North Dakota</td>
</tr>
<tr>
<td>F.H. Gates</td>
<td>Denver, Colorado</td>
</tr>
<tr>
<td>G.J. Kuhlman</td>
<td>Harrisburg, Pennsylvania</td>
</tr>
<tr>
<td>W.C. Geagley</td>
<td>Lansing, Michigan</td>
</tr>
<tr>
<td>B.C. Swenson</td>
<td>St. Paul, Minnesota</td>
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</table>

## Investigator

<table>
<thead>
<tr>
<th>Name</th>
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</tr>
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<tbody>
<tr>
<td>J.J.T. Graham</td>
<td>Washington, D.C.</td>
</tr>
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### Methods Clearing House

## Uniform Sampling

<table>
<thead>
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<tbody>
<tr>
<td>A.D. Cromartie</td>
<td>Washington, D.C.</td>
</tr>
</tbody>
</table>
CONSTITUTION OF THE ASSOCIATION OF
ECONOMIC POISONS CONTROL OFFICIALS

Section 1. Name. The name of the association shall be The Association of Economic Poisons Control Officials.

Section 2. Object. The object of the association shall be to promote uniform and effective legislation, definitions, rulings, and enforcement of laws relating to the control of sale and distribution of insecticides, fungicides, and other economic poisons.

Section 3. Membership. The membership of the association shall consist of the officials charged by law with the active execution of the laws regulating the sale of economic poisons and such deputies as shall be duly designated by these officials, and research workers employed by state, territory, dominion or federal agencies who are engaged in the investigation of economic poisons and their component parts.

Section 4. Officers. The officers of the association shall be the president, the vice-president, the secretary-treasurer, and an executive committee.

Section 5. The executive committee. The executive committee shall consist of the president, the vice-president, the secretary-treasurer, the retiring president, and four elected members, two members of whom shall be elected at each annual meeting of the association, except at the 1947 meeting two shall be elected for a one-year term and two for a two-year term.

The executive committee shall have the control and management of the affairs of the association during the interim between regular meetings, and shall take action on majority vote of the committee and report its official activities to the association.

The executive committee shall report on such matters as may be referred to it by the association, and review and present to the association with recommendations all the recommendations of the investigators and special committees and such resolutions and regulations as pertain to economic poisons.

Section 6. Voting. Each state, territory, dominion and federal agency engaged in control of sale and distribution of economic poisons is entitled to a single vote. Voting by proxy shall be permitted.

Section 7. Amendments. The constitution or by-laws may be amended at any regular meeting by a two-thirds vote of the voting membership present. All proposed amendments to the constitution shall be submitted in writing to the secretary at least 30 days prior to the opening of the annual meeting, and the secretary shall distribute copies to the members at least 10 days prior to the meeting. All proposed amendments to the by-laws shall be submitted in writing prior to the opening of the annual meeting.
Section 8. Investigations and special committees. For the purpose of studying the subject of uniformity in legislation, definitions and rulings, and the enforcement of laws concerning economic poisons, the president may appoint investigators or committees. These investigators shall have the authority to appoint such assistants as may be necessary. Investigators shall be appointed for one year and may be reappointed. Special committees may be appointed by the president. No appointment shall be made for a period exceeding two years.

Section 9. Dues. Each state, territory, dominion, and federal agency engaged in the regulation or investigation of economic poisons shall pay dues of $15.00 for each year of its membership, and this shall entitle the members to the services and publications of the association.

BY-LAWS

Section 1. Regular meetings of the association shall be held at least once each year, except in the case of an emergency which would prevent an adequate representation of the membership. Special meetings may be called by the executive committee.

Section 2. Election of officers. All officers shall be elected by ballot, and shall hold office until the adjournment of the annual meeting next following their election, or until their successors are elected.

In the event of a vacancy occurring in any office, except that of president or vice-president, the president shall fill the vacancy by appointment and such appointment shall continue until the close of the next regular meeting of the association, at which meeting the unexpired term shall be filled by election in the usual way.

Section 3. Duties of officers. The president, vice-president, and secretary-treasurer shall perform the duties usual to such officers.

The secretary-treasurer shall keep a record of all proceedings of the association and attend to all necessary correspondence. He shall also receive all moneys due the association, and shall keep an accurate account of all receipts and disbursements, and report with proper vouchers at each annual meeting.

Resolutions, other than those of the resolution committee, shall be presented in writing to the executive committee, which shall provide a place for them on the program.

The following shall be the order of business unless changed at the time by the vote of the association:
1. Reading of the minutes of preceding meeting
2. Report of secretary-treasurer
3. Announcements and appointment of committees
4. President's address
5. Roll call by states
6. Special addresses
7. Reports of investigators and special committees
8. Reports of credentials committee
9. Special topics or executive session
10. Resolutions referring to economic poisons
11. Report of executive committee
12. Report of auditing committee
13. Report of resolutions committee
14. Unfinished business
(Title. It should conform to state requirements. The following is a suggestion; a more complete title should be used where necessary:

"An Act relating to the distribution, sale, or transportation of adulterated or misbranded insecticides, fungicides, rodenticides, and other economic poisons (and devices); regulating traffic therein; providing for registration and examination of such materials, imposing penalties, and for other purposes."

(Be it enacted, etc.)

Section 1. Title. This Act may be cited as the (State) Economic Poisons Act of (Date).

Section 2. Definitions. For the purpose of this Act —

(a) The term "economic poison" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, fungi, weeds, or other forms of plant or animal life or viruses, except viruses on or in living man or other animals, which the Commissioner shall declare to be a pest.

(b) The term "device" means any instrument or contrivance intended for trapping, destroying, repelling, or mitigating insects or rodents or destroying, repelling, or mitigating fungi or weeds, or such other pests as may be designated by the Commissioner, but not including equipment used for the application of economic poisons when sold separately therefrom.)

(c) The term "insecticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects which may be present in any environment whatsoever.

(d) The term "fungicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any fungi.

(e) The term "rodenticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating rodents or any other vertebrate animal which the Commissioner shall declare to be a pest.

(f) The term "herbicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any weed.

(g) The term "insect" means any of the numerous small invertebrate animals generally having the body more or less obviously
segmented, for the most part belonging to the class Insecta, comprising six-legged, usually winged forms, as, for example, beetles, bugs, bees, flies, and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as, for example, spiders, mites, ticks, centipedes, and wood lice.

(h) The term "fungi" means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.

(i) The term "weed" means any plant which grows where not wanted.

(j) The term "ingredient statement" means a statement of the name and percentage of each active ingredient, together with the total percentage of the inert ingredients, in the economic poison; and, in case the economic poison contains arsenic in any form, a statement of the percentage of total and water soluble arsenic, each calculated as elemental arsenic.

(k) The term "active ingredient" means an ingredient which will prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds, or other pests.

(l) The term "inert ingredient" means an ingredient which is not an active ingredient.

(m) The term "antidote" means the most practical immediate treatment in case of poisoning and includes first aid treatment.

(n) The term "person" means any individual, partnership, association, corporation, or organized group of persons whether incorporated or not.

(o) The term "Commissioner" means the (Commissioner, Secretary or Director of Agriculture).

(p) The term "registrant" means the person registering any economic poison pursuant to the provisions of this Act.

(q) The term "label" means the written, printed, or graphic matter on, or attached to, the economic poison (or device), or the immediate container thereof, and the outside container or wrapper of the retail package, if any there be, of the economic poison (or device).

(r) The term "labeling" means all labels and other written, printed, or graphic matter.

(1) upon the economic poison (or device) or any of its containers or wrappers;

(2) accompanying the economic poison (or device) at any time;
(3) to which reference is made on the label or in literature accompanying the economic poison (or device), except when accurate, non-misleading reference is made to current official publications of the United States Departments of Agriculture or Interior, the United States Public Health Service, State Experiment Stations; State Agricultural Colleges, or other similar Federal institutions or official agencies of this State or other States authorized by law to conduct research in the field of economic poisons.

s. The term "adulterated" shall apply to any economic poison if its strength or purity falls below the professed standard or quality as expressed on labeling or under which it is sold, or if any substance has been substituted wholly or in part for the article, or if any valuable constituent of the article has been wholly or in part abstracted.

t. The term "misbranded" shall apply —

(1) to any economic poison (or device) if its labeling bears any statement, design, or graphic representation relative thereto or to its ingredients which is false or misleading in any particular;

(2) to any economic poison —

(a) if it is an imitation of or is offered for sale under the name of another economic poison;

(b) if its labeling bears any reference to registration under this Act;

(c) if the labeling accompanying it does not contain instructions for use which are necessary and, if complied with, adequate for the protection of the public;

(d) if the label does not contain a warning or caution statement which may be necessary and, if complied with, adequate to prevent injury to living man and other vertebrate animals;

(e) if the label does not bear an ingredient statement on that part of the immediate container and on the outside container or wrapper, if there be one, through which the ingredient statement on the immediate container cannot be clearly read, of the retail package which is presented or displayed under customary conditions of purchase;

(f) if any word, statement, or other information required by or under the authority of this Act to appear on the labeling is not prominently placed thereon with such conspicuousness (as compared with other words, statements, designs, or graphic matter in the labeling) and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use, or

(g) if in the case of an insecticide, fungicide, or herbicide, when used as directed or in accordance with commonly recognized
practice, it shall be injurious to living man or other vertebrate animals or vegetation, except weeds, to which it is applied, or to the person applying such economic poison.

Section 3. Prohibited Acts.

(a) It shall be unlawful for any person to distribute, sell, or offer for sale within this State or deliver for transportation or transport in intrastate commerce or between points within this State through any point outside this State any of the following:

(1) Any economic poison which has not been registered pursuant to the provisions of Section 4 of this Act, or any economic poison if any of the claims made for it or any of the directions for its use differ in substance from the representations made in connection with its registration or if the composition of an economic poison differs from its composition as represented in connection with its registration: Provided, That, in the discretion of the Commissioner a change in the labeling or formula of an economic poison may be made within a registration period without requiring reregistration of the product.

(2) Any economic poison unless it is in the registrant's or the manufacturer's unbroken immediate container, and there is affixed to such container, and to the outside container or wrapper of the retail package, if there be one through which the required information on the immediate container cannot be clearly read, a label bearing

(a) the name and address of the manufacturer, registrant, or person for whom manufactured;

(b) the name, brand, or trade mark under which said article is sold; and

(c) the net weight or measure of the content subject, however, to such reasonable variations as the Commissioner may permit

(3) Any economic poison which contains any substance or substances in quantities highly toxic to man, determined as provided in Section 5 of this Act, unless the label shall bear, in addition to any other matter required by this Act,

(a) the skull and crossbones;

(b) the word "poison" prominently, in red, on a background of distinctly contrasting color; and

(c) a statement of an antidote for the economic poison.

(4) The economic poison commonly known as standard lead arsenate, basic lead arsenate, calcium arsenate, magnesium arsenate, zinc arsenate, zinc arsenite, sodium fluoride, sodium fluosilicate, and
barium fluosilicate unless they have been distinctly colored or discolored as provided by regulations issued in accordance with this Act, or any other white powder economic poison which the Commissioner, after investigation of and after public hearing on the necessity for such action for the protection of the public health and the feasibility of such coloration or discoloration, shall, by regulation, require to be distinctly colored or discolored; unless it has been so colored or discolored: Provided, That the Commissioner may exempt any economic poison to the extent that it is intended for a particular use or uses from the coloring or discoloring required or authorized by this section if he determines that such coloring or discoloring for such use or uses is not necessary for the protection of the public health.

(5) Any economic poison which is adulterated or misbranded, (or any device which is misbranded).

(b) It shall be unlawful --

(1) for any person to detach, alter, deface, or destroy, in whole or in part, any label or labeling provided for in this Act or regulations promulgated hereunder, or to add any substance to, or take any substance from, an economic poison in a manner that may defeat the purpose of this Act;

(2) for any person to use for his own advantage or to reveal, other than to the Commissioner or proper officials or employees of the State or to the courts of this State in response to a subpoena, or to physicians, or in emergencies to pharmacists and other qualified persons, for use in the preparation of antidotes, any information relative to formulas of products acquired by authority of Section 4 of this Act.

Section 4. Registration.

(a) Every economic poison which is distributed, sold, or offered for sale within this State or delivered for transportation or transported in intrastate commerce or between points within this State through any point outside this State shall be registered in the office of the Commissioner, and such registration shall be renewed annually; Provided, That products which have the same formula, are manufactured by the same person, the labeling of which contains the same claims, and the labels of which bear a designation identifying the product as the same economic poison may be registered as a single economic poison; and additional names and labels shall be added by supplement statements during the current period of registration. The registrant shall file with the Commissioner a statement including:

(1) the name and address of the registrant and the name and address of the person whose name will appear on the label, if other than the registrant;

(2) the name of the economic poison;

(3) a complete copy of the labeling accompanying the economic
poison and a statement of all claims to be made for it including directions for use; and

(4) if requested by the Commissioner a full description of the tests made and the results thereof upon which the claims are based. In the case of renewal of registration, a statement shall be required only with respect to information which is different from that furnished when the economic poison was registered or last reregistered.

(b) The registrant shall pay an annual fee of $_______ for each economic poison registered, such fee to be deposited (in the Treasury of the State) (to the credit of a special fund to be used only for carrying out the provisions of this Act): Provided, however, That any registrant may register annually any number of brands after the payment of annual fees aggregating $______.

(o) The Commissioner, whenever he deems it necessary in the administration of this Act, may require the submission of the complete formula of any economic poison. If it appears to the Commissioner that the composition of the article is such as to warrant the proposed claims for it and if the article and its labeling and other material required to be submitted comply with the requirements of Section 3 of this Act, he shall register the article.

(d) If it does not appear to the Commissioner that the article is such as to warrant the proposed claims for it or if the article and its labeling and other material required to be submitted do not comply with the provisions of this Act, he shall notify the applicant of the manner in which the article, labeling, or other material required to be submitted fail to comply with the Act so as to afford him an opportunity to make the necessary corrections. If, upon receipt of such notice, the applicant insists that such corrections are not necessary and requests in writing that the article be registered, the Commissioner shall provide him with opportunity for hearing before refusing to issue registration. In order to protect the public, the Commissioner, on his own motion, after hearing, may at any time, cancel the registration of an economic poison. In no event shall registration of an article, be construed as a defense for the commission of any offense prohibited under Section 3 of this Act.

(e) Notwithstanding any other provision of this Act, registration is not required in the case of an economic poison shipped from one plant within this State to another plant within this State operated by the same person.

Section 5. Determinations; Rules and Regulations; Uniformity.

(a) The Commissioner is authorized, after opportunity for a hearing.

(1) to declare as a pest any form of plant or animal life or virus which is injurious to plants, man, domestic animals, articles, or substances;

(2) to determine whether economic poisons are highly toxic to
man; and

(3) to determine standards of coloring or discoloring for economic poisons, and to subject economic poisons to the requirements of Section 3a (4) of this Act.

(b) The Commissioner is authorized, after due public hearing, to make appropriate rules and regulations for carrying out the provisions of this Act, including rules and regulations providing for the collection and examination of samples of economic poisons (or devices).

(c) In order to avoid confusion endangering the public health, resulting from diverse requirements, particularly as to the labeling and coloring of economic poisons, and to avoid increased costs to the people of this state due to the necessity of complying with such diverse requirements in the manufacture and sale of such poisons, it is desirable that there should be uniformity between the requirements of the several States and the Federal Government relating to such poisons. To this end the Commissioner is authorized, after due public hearing, to adopt by regulation such regulations, applicable to and in conformity with the primary standards established by this Act, as have been or may be prescribed in the United States Department of Agriculture with respect to economic poisons.

Section 6. Enforcement

(a) The examination of economic poisons (or devices) shall be made under the direction of the Commissioner for the purpose of determining whether they comply with the requirements of this Act. If it shall appear from such examination that an economic poison (or device) fails to comply with the provisions of this Act, and the Commissioner contemplates instituting criminal proceedings against any person, the Commissioner shall cause appropriate notice to be given to such person. Any person so notified shall be given an opportunity to present his views, either orally or in writing, with regard to such contemplated proceedings and if thereafter in the opinion of the Commissioner it shall appear that the provisions of the Act have been violated by such person, then the Commissioner shall refer the facts to the (District Attorney) for the county in which the violation shall have occurred with a copy of the results of the analysis or the examination of such article: Provided, however, That nothing in this Act shall be construed as requiring the Commissioner to report for prosecution or for the institution of libel proceedings minor violations of the Act whenever he believes that the public interests will be best served by a suitable notice of warning in writing.

(b) It shall be the duty of each (District Attorney) to whom any such violation is reported to cause appropriate proceedings to be instituted and prosecuted in the __________ Court without delay.

(c) The Commissioner shall, by publication in such manner as he may prescribe, give notice of all judgments entered in actions instituted under the authority of this Act.
Section 7 Exemptions

(a) The penalties provided for violations of Section 3a of this Act shall not apply to --

(1) any carrier while lawfully engaged in transporting an economic poison within this State, if such carrier shall, upon request, permit the Commissioner or his designated agent to copy all records showing the transactions in and movement of the articles;

(2) public officials of this State and the Federal Government engaged in the performance of their official duties;

(3) the manufacturer or shipper of an economic poison for experimental use only

(a) by or under the supervision of an agency of this State or of the Federal Government authorized by law to conduct research in the field of economic poisons, or

(b) by others if the economic poison is not sold and if the container thereof is plainly and conspicuously marked "For experimental use only - Not to be sold", together with the manufacturer's name and address: Provided, however, That if a written permit has been obtained from the Commissioner, economic poisons may be sold for experimental purposes subject to such restrictions and conditions as may be set forth in the permit.

(4) No article shall be deemed in violation of this Act when intended solely for export to a foreign country, and when prepared or packed according to the specifications or directions of the purchaser. If not so exported, all the provisions of this Act shall apply.

Section 8 Penalties

(a) Any person violating Section 3a (1) of this Act shall be guilty of a misdemeanor and upon conviction shall be fined not more than $__________.

(b) Any person violating any provision of this Act other than Section 3a (1) shall be guilty of a misdemeanor and upon conviction shall be fined not more than $_______ for the first offense and upon conviction for a subsequent offense shall be fined not more than $_______: Provided, That any offense committed more than five years after a previous conviction shall be considered a first offense.

(c) Notwithstanding any other provisions of this section, in case any person, with intent to defraud, uses or reveals information relative to formulas of products acquired under authority of Section 4 of this Act, he shall be fined not more than $_______ or imprisoned for not more than one year, or both.

Section 9 Seizures

(a) Any economic poison (or device) that is distributed, sold,
or offered for sale within this State or delivered for transporta-
tion or transported in intrastate commerce or between points within
this State through any point outside this State shall be liable to
be proceeded against in any ________ Court in any county of the
State where it may be found and seized for confiscation by process
of libel for condemnation:

(1) in the case of an economic poison;

(a) if it is adulterated or misbranded;

(b) if it has not been registered under the provisions of
Section 4 of this Act;

(c) if it fails to bear on its label the information requir-
ed by this Act;

(d) if it is a white powder economic poison and is not color-
ed as required under this Act.

(2) In the case of a device, if it is misbranded.

(b) If the article is condemned, it shall, after entry of decree, be
disposed of by destruction or sale as the court may direct and the
proceeds, if such article is sold, less legal costs, shall be paid to
the State Treasurer; Provided, That the article shall not be sold
contrary to the provision of this Act; and Provided, further, That
upon payment of costs and execution and delivery of a good and sufficient
bond conditioned that the article shall not be disposed of unlawfully,
the court may direct that said article be delivered to the owner there-
of for relabeling or reprocessing as the case may be.

(c) When a decree of condemnation is entered against the article,
court costs and fees and storage and other proper expenses shall be
awarded against the person, if any, intervening as claimant of the
article.

Section 10. Delegation of Duties. All authority vested in the Com-
missioner by virtue of the provisions of this Act may with like force
and effect be executed by such employees of the (Department of Agricul-
ture) as the Commissioner may from time to time designate for said pur-
pose.

Section 11. Cooperation. The Commissioner is authorized and empower-
ed to cooperate with, and enter into agreements with, any other agency
of this State, the United States Department of Agriculture, and any
other State or agency thereof for the purpose of carrying out the pro-
visions of this Act and securing uniformity of regulations.

Section 12. Separability. If any provision of this Act is declared
unconstitutional, or the applicability thereof to any person or circum-
stance is held invalid, the constitutionality of the remainder of this
Act and the applicability thereof to other persons and circumstances
shall not be affected thereby.
Section 13. Effective Date. All provisions of this Act, except Section 3, "prohibited acts"; Section 8 "penalties"; and Section 9 "seizures", shall take effect upon enactment, and Sections, 3, 8, and 9, shall take effect as follows:

(1) as to devices, upon enactment;

(2) as to rodenticides and herbicides, 6 months after and

(3) as to insecticides, fungicides, and all other economic poisons, one year after enactment.

Section 14. Repeals. Jurisdiction in all matters pertaining to the distribution, sale and transportation of economic poisons (and devices), is by this Act vested exclusively in the Commissioner, and all acts and parts of acts inconsistent with this Act are hereby expressly repealed.

Note: This bill was prepared by The Council of State Governments, and modified by the Association of Economic Poisons Control Officials, October 1948.
1. **Applicability of Principles**: These principles are designed primarily for the guidance of State Economic Poisons Control Officials in those states which have adopted the Uniform State Insecticide, Fungicide and Rodenticide Act, but should be used by other state officials insofar as their statutes will permit.

2. **Definitions and Standards**: The definitions and standards established for this Association should be adopted by state officials insofar as their statutes will permit.

3. **Methods of Analysis**: The current methods of analysis of the Association of Official Agricultural Chemists of North America shall be adopted as the official methods insofar as they are applicable, and such other methods shall be used as may be necessary to determine whether the product complies with the law.

4. **Registration of Products**: Uniform application forms for registration should be used by State Officials. Two specimens or exact copies of the labeling of each proposed product should be submitted with the application. Also, there should be submitted the name and percentage of each active ingredient and the total percentage of inert ingredients in the product, the proposed directions for use, and a list of the specific pests for control of which it is to be sold, if such information is not contained in the labeling. Such other pertinent information concerning inert ingredients and physical properties of the product shall also be included on request.

5. **Registration, General Application of**: A registration of an economic poison is held to apply to the product even though manufactured at or shipped from other than the registered address. When a product has been registered by a manufacturer or a jobber, no registration shall be required of other sellers of the product so registered, provided shipments or deliveries thereof are in the manufacturer's or registrant's original, unopened, and properly labeled immediate containers.

6. **Registration, Refusal or Cancellation of**: Any of the following causes is sufficient to justify refusal or cancellation of registration of a product:

   (a) if the labeling bears any statement, design, or graphic representation relative thereto, or to its ingredients, which is false or misleading in any particular;

   (b) if found to be an imitation of or offered for sale under the name of another economic poison;

   (c) if the labeling bears reference to registration procedure, or number;

   (d) if the labeling accompanying the economic poison does not contain directions for use which are adequate for the protection of the public under customary conditions of use;

   (4) if the label does not contain a warning or caution statement
which may be necessary to prevent injury to living man
and other vertebrate animals, vegetation (except weeds),
and useful invertebrate animals;

(f) if the label does not bear an ingredient statement on that
part of the immediate container and on the outside container
or wrapper, if there be one, through which the ingredient
statement on the immediate container cannot be clearly read,
of the retail package which is presented or displayed under
customary conditions of purchase. Provided that the control
official may permit the ingredient statement to appear pro-
minently on some other part of the container, if the size
or form of the container makes it impracticable to place it
on the part of the retail package which is presented or
displayed under customary conditions of purchase.

(g) if any word, statement, or other information required to
appear on the label or labeling is omitted or not prominent-
ly placed thereon and in such terms as to render it likely
to be read and understood under customary conditions of
purchase and use;

(h) if an economic poison is found to be injurious to living
man or other useful vertebrate animals, vegetation (except
weeds), to which it is applied, of person applying such
economic poison when used as directed.

7. Changes in Labeling or Ingredient Statement: Changes in the sub-
stance in the labeling or ingredient statement of a registered economic
poison shall be submitted in advance to the control official. The
registrant must describe the exact change desired and proposed effec-
tive date and such other pertinent information that justify such changes.
After the effective date of a change in labeling or ingredient state-
ment the product shall be marketed only under the new claims or ingre-
dient statement, except that a reasonable time may be allowed by the
control official for disposal of properly labeled stocks of the old
product. Changes in the composition shall not be allowed if such
changes would result in a lowering of the product's value as an economic
poison.

8. Label Requirements: Each package of economic poison sold separate-
ly shall bear a complete label. The label shall contain the name of
the product; name and address of the manufacturer, registrant, or
person for whom manufactured; directions for use when necessary; state-
ment of net content; and an ingredient statement. The label of every
economic poison, if necessary to prevent injury to man, other animals,
and useful vegetation, must contain a warning or caution statement, in
non-technical language based on the hazard involved in the use of the
economic poison. In addition, any economic poison, highly toxic to
man shall be labelled conspicuously with the word "poison" and the
skull and cross-bones symbol all in red on a background of distinctly
contrasting color, and the first-aid antidote for the poison shall be
given.

9. Directions for Use - When Necessary: Directions for use are re-
quired whenever they are necessary for the protection of the public.
The public includes not only users of economic poisons, but also those
who handle them or may be affected by their use, handling, or storage. Directions for use are considered necessary in the case of most small retail containers which go into the hands of users, and in the case of larger containers with the following exceptions:

(a) Directions may be omitted where the economic poison is sold in containers of 50-pounds or more of a solid or 20 gallons or more of a liquid, Provided; The economic poison is a well-known substance or mixture of substances for economic poison purposes and is intended only for the use to which it is ordinarily applied, and it bears an ingredient statement giving the names and percentages of each of the active ingredients.

(b) Directions may be omitted if the economic poison is to be used by manufacturers in their regular manufacturing processes, Provided; The label clearly shows that the product is intended for use only in manufacturing processes, and bears an ingredient statement giving the name and percentages of each of the active ingredients.

(c) Directions may be omitted if the economic poison is sold only to physicians or veterinarians, Provided; The label bears an ingredient statement giving the name and percentages of each of the active ingredients.

(d) Directions may be omitted if the economic poison is sold to distributors for dilution or mixing with carriers to prepare economic poisons for sale to the public, Provided; The label bears an ingredient statement giving the name and percentages of each of the active ingredients, and the economic poison is a well-known substance or mixture of substances, and there is readily available general knowledge of the composition, methods of use, and effectiveness of the product for economic poison purposes.

10. Other Claims: No claim shall be made for products in any written, printed or graphic matter accompanying the product at any time which differ in substance from representations made in connection with registration.

11. Name of Product: The name of the product shall appear on the labeling so as not to emphasize any one ingredient, or otherwise be misleading. It shall not be arranged on the label in such a manner as to be confused with other terms, slogans or legends.

12. Brand Names, Duplication of, or Infringement on: A brand name is distinctive with reference to the material to which it applies, and the registration of economic poisons under the same brand name by two or more manufacturers or shippers should be discouraged. This principle applies also to the registration of brand names so similar in character as to be likely to be confused by the purchaser. In the event the same name, or a closely similar one is offered by another manufacturer, the official should acquaint both parties with the fact, with the view of avoiding the confusion which follow the duplication of brand names.
13. **Ingredient Statement:** A label shall state: The name and percentage by weight of each active ingredient, together with the total percentage by weight of the inert ingredients. In the ingredient statement all names shall be printed in type of the same size, and in such terms as to render them likely to be read and understood under customary conditions of purchase.

14. **Name of Ingredients:** The well-known common name of the ingredient must be given or, if the ingredient has no common name, the correct chemical. If there is no common name and the chemical composition is unknown or complex, the enforcement official may permit the use of a new or coined name which he finds to be appropriate for the information and protection of the user. If the use of a new or coined name is permitted, the enforcement official may prescribe the terms under which it may be used. A trademark or trade name may not be used as the name of an ingredient except when it has become a common name.

15. **Sliding Scale Percentages:** The "sliding scale" method of expressing percentages shall not be used. (Example: "phosphorus, 2-3%). This is not to be construed as forbidding the use of qualifying statements descriptive of the basic active material or materials, provided such statements do not constitute an integral part of the percentage of total active ingredients. (Example: "Technical chlorinated camphene XX% ((Combined chlorine 67% - 69%)."

16. **Net Contents:** Each package of an economic poison shall show the net weight or measure of content, either stenciled or printed on the package or container, or on a tag attached thereto. Indefinite statements or content such as "...... oz. when packed" shall not be used. Statements of liquid measure, or of specific gravity or density of liquid preparations, or expression of composition in terms of pounds per gallon, shall be made on the basis of 60°F. (20°C) except when other basis has been established through trade custom.

17. **Coloration of Highly Toxic Materials:** The white economic poisons hereinafter named shall be colored or discolored in accordance with this section. Provided, however, that any such white economic poison which is intended solely for use by a textile manufacturer or commercial laundry, cleaner or dyer as a moth proofing agent, which would not be suitable for such use if colored and which will not come into the hands of the public except when incorporated into a fabric, shall not be required to be so colored or discolored in accordance with this section. The hues values, and chromas specified are those contained in the Munsell Book of Color, Munsell Color Company, 10 East Franklin Street, Baltimore, Maryland.

(a) The coloring agent must produce a uniformly-colored product not subject to change in color beyond the minimum requirements during ordinary conditions of marketing and storage, or cause the product to become less effective or cause damage when used as directed.

(b) Standard lead arsenate, basic lead arsenate, calcium arsenate, magnesium arsenate, zinc arsenate, zinc arsenite, and barium fluosilicate shall be colored any hue, except the yellow-reds and yellows, having a
value of not more than 8 and a chroma of not less than 4, or shall be discolored to a neutral lightness value not over 7.

(c) Sodium fluoride and sodium fluosilicate shall be colored blue or green having a value of not more than 8 and a chroma of not less than 4, or shall be discolored to a neutral lightness value not over 7.

(d) The enforcement official may permit other hues to be used for any particular purpose if the prescribed hues are not feasible for such purposes, and if such action will not be injurious to the public.

18. Highly Toxic: An economic poison which falls within any of the following categories when tested on laboratory animals (mice, rats and rabbits) is highly toxic to man within the meaning of these principles:

(a) Oral toxicity. Those which produce death in half or more than half the animals of any species at a dosage of 50 milligrams at a single dose, or less, per kilogram of body weight when administered orally to ten or more such animals of each species.

(b) Toxicity on inhalation: Those which produce death in half or more than half of the animals of any species at a dosage of 200 parts or less by volume of air when administered by continuous inhalation for one hour or less to ten or more animals of each species, provided such concentration is likely to be encountered by man when the economic poison is used in any reasonably foreseeable manner.

(c) Toxicity by skin absorption: Those which produce death in half or more than half of the animals (rabbits only) tested at a dosage of 200 milligrams or less per kilogram of body weight when administered by continuous contact with the bare skin for 24 hours or less to ten or more animals.

Provided, however, that an enforcement official may exempt any economic poison which meets the above standard but which is not in fact highly toxic to man, from these principles with respect to economic poisons highly toxic to man, and may after hearing designate as highly toxic to man any economic poison which experience has shown to be so in fact.

19. Sale or Possession of Sodium Fluoracetate: No person shall sell or possess any sodium fluoracetate except federal, state, county, municipal officers or their deputies for use in their official duties in pest control; research or chemical laboratories in their respective fields; regularly licensed pest control operators for use in their own service work; and wholesalers or jobbers of economic poisons for sale to the aforementioned persons, or for export.

20. Sale or Possession of Thallium: No person shall sell or possess any thallium or thallium compound except federal, state, county, municipal officers or their deputies for use in their official duties in pest control; research or chemical laboratories in their respective fields; regularly licensed pest control operators for use in their own service work; properly registered ant poisons containing thallium expressed as
metallic not more than 1%; wholesalers or jobbers of economic poisons for sale to the aforementioned persons; or for export.

21. Labeling Sodium Arsenite Solution: An economic poison labeled or sold as sodium arsenite solution for control of weeds, termites, or wood-destroying fungi shall bear a statement of the percentage of arsenic trioxide contained therein as the active ingredient, and in addition shall bear a statement of the total arsenic in water-soluble form expressed as metallic, and the pounds of arsenic trioxide per gallon at 68°F. The weight of the solution in pounds per gallon at 68°F may also be given.

22. Labeling Products Containing Arsenic: The label of any economic poison containing arsenic as an active ingredient in any form shall show the total amount of arsenic, expressed as metallic, and the amount of arsenic in water-soluble form, expressed as metallic, in addition to other required statements.

23. Labeling Products Containing Copper: If an economic poison contains a copper compound of uncertain composition, the ingredient statement may be given in terms of copper expressed as metallic providing the type of compound is also shown. For example, the name of active ingredient may be stated as "Copper expressed as metallic (derived from basic copper sulfate)."

24. Labeling Products Containing Alkaloids: Products compounded with tobacco, nux vomica, sabadilla seed, or any other alkaloid-bearing material, shall be stated in terms of the alkaloid and not in terms of the plant material. Where accurate methods for determining alkaloid content are unknown, manufacturer and enforcement official should agree on an acceptable analytical procedure.

25. Labeling Products Containing Organic Thiocyanates: Materials containing organic thiocyanates under the general classification of esters, ethers, and similar compounds, containing up to and including 18 carbon atoms shall be guaranteed according to the actual ester or other content, rather than the percentage of commercial material present. In addition, the application for registration should contain a qualifying statement showing the percentage by weight of the combined nitrogen in the finished product.
TENTATIVE DEFINITIONS OF TERMS

Active Ingredient: An ingredient which will in itself, when present in sufficient quantity, prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds, or other pests; it must not be antagonistic to the activity of the principal active ingredient or ingredients.

Adhesive or Sticker: A substance which increases the firmness of attachment of finely-divided solids or other water-insoluble materials to a solid surface, and may be measured in terms of resistance to time, wind, water, mechanical and chemical action.

Antidote: A practical immediate treatment, including first aid, in case of poisoning.

Antiseptic: A substance which opposes sepsis, putrefaction or decay; one that prevents or arrests the growth or action of micro-organisms, either by destroying them or by inhibiting their growth and activity; when used for short periods of time must be a disinfectant or germicide; but when used for long periods of time may act by preventing growth and development of disease germs; used especially of agents applied to living tissue.

Bactericide: Anything that destroys bacteria. The term is synonymous in large part with germicide, the chief difference being that the latter is somewhat broader, inasmuch as it may include micro-organisms other than bacteria. Bactericide is a precise term applying only to bacteria and to bacteria of all kinds. In practice, however, it is ordinarily regarded in the same light as germicide with respect to the resistance of different bacteria; that is, a substance, in order to be called a bactericide, is not necessarily required to be capable of destroying bacterial spores.

Brand: The name, number, trade-mark, or designation applied to an economic poison of any particular description by the manufacturer, distributor, importer, or vender thereof. Each economic poison differing in the ingredient statement, analysis, name, number, or trade-mark shall be considered as a distinct and separate brand.

Disinfectant: A substance that frees from infection; usually, a chemical agent which destroys disease germs or other harmful microorganisms, but not necessarily the resistant spore forms; commonly used of substances applied to inanimate objects.

The term disinfectant suggests the cleaning of sick rooms, clothing, bedding, lavatories, stables and in fact of any places or things that might harbor disease. By contrast, germicide is a precise, colorless word, conveying its literal meaning and little more. The two terms appear to have the same meaning when applied to substances used in fighting disease. If it is accepted that substances called disinfectants are germicides, and, in general, germicides may act as antiseptics but that antiseptics are not necessarily germicides, then it follows that disinfectants may, theoretically at least, act as antiseptics, but that antiseptics may not necessarily act as disinfectants.
Detergent: A substance used in aqueous or other medium to facilitate removal of foreign matter from solid surfaces.

Deflocculating Agent: A substance which aids in the production or maintenance of a dispersion of a solid within a liquid.

Deposit Builder: A substance which increases the material adhering to the surface during a reasonable period of application; it decreases the affinity between the desirable material and water, resulting in a greater deposit of material and shedding of water with loss run-off of desirable material.

Economic Poison: A substance or mixture of substances intended for use as an insecticide, rodenticide, herbicide, fumigant, pruning paint or wood preservative; also a substance or mixture of substances intended for use as a fungicide, disinfectant, germicide, or bactericide except when for use on or in living man or other animals, and any other product intended for use on other forms of undesirable plant, animal or virus, except viruses on or in living man or other animals.

Emulsifying Agent: A substance which aids in the production or maintenance of a dispersion of one liquid within another.

Fumigant: A substance or mixture of substances which produce gas, vapor, fume, or smoke intended to destroy insects, bacteria or rodents.

Fungicide: A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any fungi.

Fungi: All non-chlorophyll bearing thallophytes (that is, all non-chlorophyll bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts and bacteria, except those on or in living man or other animals.

Germicide: A substance that destroys germs (microorganisms); applied especially to agents that kill disease germs. In practice it is assumed that a substance represented as a germicide, when used as directed, will kill all ordinary disease germs, but is not necessarily required to be capable of destroying bacterial spores.

Herbicide: A substance or mixture of substances intended to prevent, destroy, repel or mitigate any weed.

Insect: Any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class insecta, comprising six-legged, usually winged forms, as for example, beetles, bugs, bees and flies; and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as for example, spiders, mites, ticks, centipedes and wood lice.

Insecticide: A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any insects which may be present in any environment whatsoever.

Label: All written, printed, or graphic matter on, or attached to the economic poison, or the immediate container thereof, and the
outside container or wrapper to the retail package of the economic poison.

Labeling: All information and other written, printed, or graphic matter upon the economic poison or any of its accompanying containers or wrappers to which reference is made on the label or in supplemental literature accompanying the economic poison.

Larvacide: A substance or mixture of substances intended to prevent, destroy, repel or mitigate larva.

Package: The carton, box, barrel or other receptacle into which an economic poison is placed for use, handling, removal, shipment, or conveyance; a single container of such article or articles, or several containers packed together, including both the immediate container of the material and the box, carton, or other container (if any) in which it is enclosed or displayed.

Package, Original Unbroken: The unit retail package as ordinarily displayed on and sold from the shelves of the dealer, distributor, or other vendor.

Package, Unbroken: The package delivered by the shipper to the carrier at the initial point of shipment. It may contain one or more original unbroken packages as defined above.

Rodent: All animals of the order Rodentia, such as rats, mice, gophers, prairie dogs, or squirrels.

Rodenticide: A substance or mixture of substances intended to prevent, destroy, repel or mitigate rodents or any other undesirable vertebrate animal.

Sanitizer: A substance which reduces the number of casual bacterial contaminates to safe levels as judged by health requirements; commonly used of substances applied to inanimate objects.

Selective Wetting Agent: A substance which by affecting the surface, alters the relative ease of wetting a solid by various fluids, for example, causes lead arsenate to be preferentially wetted by oil rather than by water.

Spreader or Film Extender: A substance which increases the area that a given volume of liquid will cover on a solid, or on another liquid.

Sterilize: To render sterile, that is, free from all living microorganisms. Heating for a sufficient time at a temperature at which microorganisms cannot live is recognized as a physical method of freeing inanimate objects and their surroundings from all living microorganisms. Usually understood as referring to the treatment of surgeons' instruments, gauze bandages, culture dishes, and other apparatus rather than the treatment of the sick room or of the human body.

Disinfect refers particularly to the destruction of disease germs, especially the vegetative forms, while sterilize denotes the freeing from all organic life. Sterilize is the more drastic,
and it might easily happen that something is thoroughly disinfected without being completely sterilized.

**Synergist:** A substance which produces in combination with another a pharmacological effect in that the efficiency of one or more of the components may be greatly heightened or potentiated by the other.

**Water Modifier:** A substance which is used to change the pH or the chemical composition of dissolved or suspended material in the spray water in order to prevent undesirable behavior.

**Weed:** Any plant which grows where not wanted.

**Wetting Agent:** A substance which appreciably lowers the interfacial tension between water and a solid, and increases the tendency of a liquid to make complete contact with the surface of a solid, so that no dry area may remain.
AN ACT RELATING TO CUSTOM APPLICATION OF INSECTICIDES, FUNGICIDES, AND HERBICIDES

Organizations which cooperated in the preparation of this Act:

Council of State Governments
Association of Economic Poisons Control Officials
National Association of State Aviation Officials
National Association of Commissioners, Secretaries, and Directors of Agriculture
Civil Aeronautics Administration
United States Public Health Service
United States Department of the Interior
United States Department of Agriculture

Interpretive Statement

Purpose

This bill has been prepared in order to assist States which find it necessary to adopt or revise legislation regulating the application of insecticides, fungicides, and herbicides (weed killers) for hire.

In view of widely differing conditions of agricultural production in different parts of the country, the provisions of the bill should be carefully considered and, when necessary, modified to meet local needs.

While this bill has been confined to custom application of insecticides, fungicides, and herbicides, it may be found in some States that regulation of other than custom application, particularly by aircraft, is necessary.

It should be noted that this bill deals only with the application and use of insecticides, fungicides, and herbicides. It thus covers an entirely different area than the State Insecticide, Fungicide, and Rodenticide Act, which deals with the sale of these economic poisons. The latter bill was first carried as suggested State legislation in the Program for 1947. The definitions of terms used in both bills, except for the definition of "person", are identical.

Problem

Section 1 of the bill points out that in recent years there has been very rapid advance in the discovery and synthesis of insecticides, fungicides, and herbicides. The most spectacular of these, in many ways, is 2,4-D (2,4-Dichlorophenoxyacetic acid), synthesized in 1941 and first used as a weed killer in 1941. This is a selective weed killer which, generally speaking, will kill broad-leaved plants but
not grasses when applied in proper quantities. It is extremely valuable in killing weeds in grains, including wheat, rice, and corn, and in grass used for hay or pasture. However, it drifts very easily and, in some cases, has been known to drift as far as twenty miles when applied in windy weather by aircraft. Considerable drift may occur even when 2,4-D is applied by means of ground equipment. Damage to broad-leaved crops, such as cotton, tomatoes, and other vegetables, has resulted from drift. 2,4-D in dust form is particularly likely to drift, and application in this form by aircraft is at present disapproved by the United States Department of Agriculture. While, 2,4-D may cause damage, it is, when properly applied, a valuable aid to agricultural production. Obviously, however, its use requires great care.

DDT (Dichloro-diphenyl-trichlorethane) is another synthetic compound which has been found to be extremely valuable for control of certain insects. Recently it has been learned that DDT applied to dairy cattle, in dairy barns, or to fodder intended to be fed to dairy cattle or animals being finished for slaughter may be absorbed into the fat of the cattle or may appear in milk, and, for this reason, the United States Department of Agriculture has recommended that DDT should not be used in these ways. Instead, the Department has recommended that methoxychlor, a still newer synthetic compound, be used. When DDT is used to spray forest areas or shade trees in cities to control insects, care must be taken to see that wildlife is not injured.

Among other new insecticides are benzene hexachloride, chlordane, toxaphene (chlorinated camphene), TDE, parathion, tetraethyl pyrophosphate, and lindane. Each of these has its proper uses and dangers. Many of these new materials have not been tested under all conditions and their effects are not fully known.

Concurrently with the discovery of new and highly potent insecticides, fungicides, and herbicides, the business of custom spraying and dusting, including spraying and dusting by airplane, has greatly expanded. As these chemicals and the practices for applying them properly become more numerous and complex, custom spraying and dusting will undoubtedly continue to increase because of the need for specialized training and equipment. Insecticides, fungicides, and herbicides, along with modern machinery, improved varieties and practices, hybridization, etc., are becoming increasingly important factors in greater agricultural production.

The growth of custom spraying and dusting, the rapidity of new discoveries, the possibility of injury to health and to plants and animals, including wildlife, on lands or in waters adjacent to those being sprayed or dusted, and the possibility of fraudulent practices make public regulation increasingly necessary.

One difficult problem in connection with application of insecticides, fungicides, and herbicides is the question of liability for damage to crops or animals resulting from drift of the materials. This problem is particularly serious in the case of 2,4-D where damage may be very substantial and, at the same time, difficult to prove. No provision relating to liability has been included in the bill. It is felt that
it is best to leave this question, at least until further experience accumulates, to existing laws relating to liability. However, the matter is under study.

The requirements for licensing after examination intended to show that the operator is qualified (section 4(b)) and for reports regarding particular applications of insecticides, fungicides, and herbicides (section 7) should help to minimize damage from improper application and to fix responsibility when damage does occur.

Provisions of the Bill

The bill requires that persons engaged in custom application of insecticides, fungicides, or herbicides be licensed. A license would be issued by the Commissioner of Agriculture after the applicant had shown, on examination, that he possessed adequate knowledge concerning the use and application of insecticides, fungicides, and herbicides and upon consideration of other pertinent information. The licenses may be restricted to the use of certain types of equipment or materials if he is found qualified to use only these types. For example, a custom operator might be found qualified to use ground equipment but not aircraft or to use insecticides and fungicides but no herbicides. The license may be revoked or modified for cause. The grant, denial, or revocation of a license is subject to court review on petition of the aggrieved person (Section 3).

Under Section 3(e) a bond may be required from custom operators to secure performance of obligations. The amount of the bond is not specified, as it may be found desirable to fix, by regulation, a larger amount for large operators than for small operators.

Section 4 authorizes inspection of equipment used for application of insecticides, fungicides, or herbicides.

Section 5 authorizes the Commissioner of Agriculture to prescribe materials or methods to be used and to prohibit the use of materials or methods in custom application of insecticides, fungicides, and herbicides. Alternative provisions regarding the scope of such regulations are included. In issuing such regulations, consideration is to be given to pertinent research findings and recommendations of State and Federal agencies, such as the State Agricultural Experiment Station and the United States Department of Agriculture.

Under Section 6 licensees may be required to maintain records and submit reports giving specific information with respect to particular spraying or dusting jobs and other information. Reports relating to the time of application, wind velocity, other weather conditions, kind of material applied, and so on, could be required under this provision. Such information may be especially needed in the case of 2,4-D and other materials likely to cause damage because of drift.

Section 7 authorizes the Commissioner of Agriculture to make rules and regulations but provides that such regulations shall not be inconsistent with other regulations issued by the State or Federal Government with
respect to safety in air navigation or operation of aircraft. In general, the State official responsible for regulation of aircraft would continue to regulate flying from the standpoint of safety and other general aspects. This section also requires the Commissioner to consult with other officials of the State before issuing regulations relating to matters within the jurisdiction of these officials. Application of insecticides, fungicides, and herbicides may concern not only agriculture but also health, forestry, fish and wildlife, etc. as well as regulation of aircraft, and consultation among the officials concerned will frequently be desirable.

Section 8 authorizes the Commissioner of Agriculture, in cooperation with the State Agricultural College, to publish information regarding injury which may result from improper application or handling of insecticides, fungicides, or herbicides and precautions which will help prevent such injury. Much of the damage caused by 2,4-D and other materials results from lack of information as to the effects of the materials and the conditions under which they should be applied. While the act relates principally to custom application, this section will authorize the distribution of information to farmers generally.

Section 10 exempts pest control operators, that is, persons engaged in destroying insects or fungi in or under buildings or in vehicles of transportation, such as termite eradication, fumigation of buildings, ships, etc. Outdoor custom application of insecticides, fungicides, and herbicides in cities, e.g., to trees, gardens, lawns, etc., is not exempted. However, consideration should be given to avoiding dual licensing of operators by both the Commissioner of Agriculture and municipalities.

Sections 3(f) and 13 authorize cooperation with other agencies of the State and with agencies of other States and of the Federal Government.
Title  It should conform to State requirements. The following is a suggestion; a more complete title should be used where necessary;

"AN ACT relating to the application of insecticides, fungicides, and herbicides by aircraft or ground equipment."

(Be it enacted, etc.)

Section 1. Declaration of Purpose. The purpose of this act is to regulate, in the public interest, the custom application of insecticides, fungicides, and herbicides. In recent years a great many new materials have been discovered or synthesized which are valuable for the control of insects, fungi, and weeds. However, such materials may seriously injure health, property, or wildlife if not properly used. Insecticides may injure man or animals, either by direct poisoning or by gradual accumulation of poisons in the tissues. Crops may also be injured by improper use of insecticides or fungicides. The drifting or washing of insecticides into streams or lakes can cause appreciable damage to aquatic life. A herbicide applied by aircraft or ground equipment for the purpose of killing weeds in a crop which is not itself injured by the herbicides may drift, sometimes for miles, and injure other crops with which it comes in contact. Therefore it is deemed necessary to provide for regulation of the custom application of insecticides, fungicides, and herbicides.

Section 2. Definitions. For the purposes of this act -- (a) The term "insecticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects which may be present in any environment whatsoever.

(b) The term "fungicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any fungi.

(c) The term "herbicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any weed.

(d) The term "insect" means any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class Insecta, comprising six-legged, usually winged forms, as, for example, beetles, bugs, bees, and flies, and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as, for example, spiders, mites, ticks, centipedes, and wood lice.

(e) The term "fungi" means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.
(f) The term "weed" means any plant which grows where not wanted.

(g) The term "person" means any individual, firm partnership, association, corporation, company, joint stock association, or body politic, or any organized group of persons whether incorporated or not; and includes any trustee, receiver, assignee, or other similar representative thereof.

(h) The term "Commissioner" means the Secretary, Commissioner, or Director of Agriculture.

(i) The term "custom application of insecticides, fungicides, or herbicides" means any application of insecticides, fungicides, or herbicides by aircraft or ground equipment for hire.

(j) The term "aircraft" means any contrivance now known or hereafter invented, used or designed for navigation of, or flight in, the air.

(k) The term "ground equipment" means any machine or device (other than aircraft), for use on land or water, designed for, or adaptable to use in applying insecticides, fungicides, or herbicides as sprays, dusts, aerosols, or fogs, or in other forms.

Section 3. Licenses. (a) No person shall engage in custom application of insecticides, fungicides, or herbicides within this State at any time without a license issued by the Commissioner. Application for a license shall be made to the Commissioner. Each application for a license shall contain information regarding the applicant's qualifications and proposed operations and other relevant matters as required pursuant to regulations promulgated by the Commissioner.

(b) The Commissioner may require the applicant to show, upon examination, that he possesses adequate knowledge concerning the proper use and application of insecticides, fungicides, and herbicides, and the dangers involved and precautions to be taken in connection with their application. If the applicant is other than an individual, the applicant shall designate an officer, member, or technician of the organization to take the examination, such designee to be subject to the approval of the Commissioner. If the extent of the applicant's operations warrant it, the Commissioner may require more than one officer, member, or technician to take the examination.

See section 10 for exemptions.

In States where only certain areas are liable to be affected by the application of insecticides, fungicides, or herbicides, the following could be inserted: "in counties or areas designated by the Commissioner."
(c) If the Commissioner finds the applicant qualified and if the applicant files the bond required under paragraph (e) of this section, the Commissioner shall issue a license, for such period as he may by regulation prescribe, to perform custom application of insecticides, fungicides, and herbicides within this State. The license may restrict the applicant to the use of a certain type or types of equipment or materials if the Commissioner finds that the applicant is qualified to use only such type or types. If a license is not issued as applied for, the Commissioner shall inform the applicant in writing of the reasons therefor.

(d) The Commissioner may suspend, pending inquiry, for not longer than ten days, and, after opportunity for a hearing, may revoke or modify the provisions of any license issued under this section, if he finds that the licensee is no longer qualified, has engaged in fraudulent business practices in the custom application of insecticides, fungicides, or herbicides, or has made any custom application in a faulty, careless, or negligent manner, or has violated any of the provisions of this act or regulations made thereunder.

(e) The Commissioner shall require a reasonable bond, with surety satisfactory to the Commissioner, from each applicant, under such rules and regulations as he may prescribe, to secure the performance of contractual obligations of the licensee with respect to custom application of insecticides, fungicides, or herbicides. Any person injured by the breach of any such obligation shall be entitled to sue on the bond in his own name in any court of competent jurisdiction to recover the damages he may have sustained by such breach.

(f) The Commissioner may issue a license without examination to a non-resident who is licensed in another State substantially in accordance with the provisions of this act.

(g) Any person aggrieved by any action of the Commissioner may obtain a review thereof by filing in the court within 30 days of notice of the action a written petition praying that the action of the Commissioner be set aside. A copy of such petition shall forthwith be delivered to the Commissioner, and within days thereafter the Commissioner shall certify and file in the court a transcript of any record pertaining thereto, including a transcript of evidence received, whereupon the court shall have jurisdiction to affirm, set aside or modify the action of the Commissioner, except that the findings of the Commissioner as to the facts, if supported by substantial evidence, shall be conclusive.

Section 4. Inspection. The Commissioner may provide for inspection of any ground equipment or of any device or apparatus used for custom application of insecticides, fungicides, or herbicides by aircraft and may require proper repairs or other changes before its further use for custom application.

Section 5. Materials and Methods of Application. The Commissioner may, by regulation after public hearing, prescribe materials or methods to be used and prohibit the use of materials or methods in
custom application of insecticides, fungicides, and herbicides, to the extent necessary to protect health or property to prevent injury, by reason of the drifting, washing or application of such materials, to desired plants or animals (including pollinating insects and aquatic life) on property other than that owned or leased by the person for whom the materials are applied. In issuing such regulations, the Commissioner shall give consideration to pertinent research findings and recommendations of other agencies of this State or of the Federal Government.

Section 6. Reports. The Commissioner may by regulation require any licensee to maintain such records and furnish reports giving such information with respect to particular applications of insecticides, fungicides, or herbicides and such other relevant information as the Commissioner may deem necessary.

Section 7. Regulations. The Commissioner may, after public hearing, make regulations for carrying out the provisions of this act: Provided, That the regulations shall not be inconsistent with regulations issued by this State or by the Federal Government respecting safety in air navigation or operation of aircraft. Before issuing regulations directly related to any matter within the jurisdiction of any other official of this State the Commissioner shall consult with that official with reference thereto.

Section 8. Information. The Commissioner may, in cooperation with the State Agricultural College publish information regarding injury which may result from improper application or handling of insecticides, fungicides, or herbicides and methods and precautions designed to prevent such injury.

Section 9. Penalties. Any person violating the provision of this act or the regulations issued hereunder shall be guilty of a misdemeanor and, upon conviction, shall be fined not more than ______ dollars for the first offense, and not more than ______ dollars for each subsequent offense.

Section 10. Exemptions. This act shall not apply to custom application of insecticides, fungicides, or herbicides to prevent, destroy, repel, or mitigate insects or fungi within or under buildings (except farm buildings other than dwellings) or within vehicles, ships, aircraft, or other means of transporting persons or property by land, water, or air.

Section 11. Enforcement. For the purpose of carrying out the provisions of this act the Commissioner may enter upon any public or private premises at reasonable times in order to have access for the purpose of inspecting any aircraft or ground equipment subject to this act.

Section 12. Delegation of Duties. The functions vested in the Commissioner by this act may be delegated by him to such employees of the Department of Agriculture as the Commissioner may from time to time designate for such purposes.

Section 13. Cooperation. The Commissioner may cooperate with any other agency of this State or its subdivisions or with any agency of
any other State or of the Federal Government for the purpose of carrying out the provisions of this act and of securing uniformity of regulations.

Section 14. Separability. If any provision of this act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, by a court of competent jurisdiction, the constitutionality of the remainder of the act and the applicability thereof to other persons and circumstances shall not be affected thereby.

Section 16. Repeal. All acts and parts of acts inconsistent with this act are hereby expressly repealed.

Section 17. Effective Date. This act shall become effective
REPORT OF THE EXECUTIVE COMMITTEE

Allen B. Lemmon, Chairman

The Executive Committee has held several meetings during the year. On October 13, 1948, following the annual meeting, the committee met to draft a program of activities for the year and assist the President to select committees and investigators.

In April, 1949, the committee was called together in Washington, D.C., to consider proposed caution statements and antidotes and uses of some of the newer organic chemicals. Also, control problems presented by members of industry organizations, together with other subjects relating to the enforcement of federal and state economic poison laws were considered.

At the opening session J. C. Ward, Chief, Pharmacology and Rodenticide Section, Insecticide Division and Chairman, of the Association's Toxicity and Antidote Committee, presented a "Tentative Caution and Antidote Guide" for use on labels covering economic poison formulations. The Executive Committee recommended that this material be published as further interpretations of the regulations for the enforcement of the Federal Insecticide, Fungicide and Rodenticide Act. Full details of this meeting were published in the May issue of Pest Controller.

On Thursday, October 6, the committee held an informal session at 9:30 a.m. at the Shoreham Hotel to discuss the coming Federal hearing on Tolerances for Poisonous or Detererious Residues on or in Fresh Fruits and Vegetables to be held in January 1950, in Washington, and the Proposed Act relating to application of Insecticides, Fungicides and Herbicides.

The committee suggested that a resolution be prepared setting forth the position to be taken by our Association on the subject of tolerances for hazardous chemicals. This resolution was presented by the Resolutions Committee.

The committee met at 10 p.m., Friday evening, October 7, 1949 at the Shoreham Hotel, Mr. A.B. Lemmon, presiding.

Reports of Committees to study Ingredients, Toxicity and Antidotes, Legislation, and Methods Clearing House were reviewed and approved. It was recommended that these committees be continued.

The Investigator for Uniform Sampling Procedure did not submit a revised report due to the introduction of the newer organic chemicals in the economic poisons field. It was recommended that the investigator study the subject for another year with special emphasis on the newer organic chemicals.

Adoption of the report on Uniform Standards was recommended and further it was recommended that qualified investigators be appointed to assist in this work.
The committee concurred in the recommendation that representatives of industry be invited to submit questions for discussion at future States Relations Committee meetings.

The Executive Committee recommended the adoption of the Regulatory Principles and Definitions of Terms as tentative.

The Executive Committee expressed its appreciation to Dr. S.A. Rohwer for his cooperation in keeping the Association advised as to the adoption of common names for chemicals and his resume at the meeting.

The committee appreciates the contribution of Mr. John Thurston in providing copies and information concerning the proposed Act relating to application of economic poisons.

The Executive Committee thanks Mr. Sanford Hill, E.I. duPont de Nemours for his presentation of the Manufacturing Chemists Association Guide for preparation of warning labels for hazardous chemicals.

In conclusion, the Executive Committee expresses its appreciation to the committee members and investigators for the work which they performed during the past year.
SECRETARY'S REPORT COVERING THE THIRD
ANNUAL CONVENTION OF THE ASSOCIATION
OF ECONOMIC POISONS CONTROL OFFICIALS

The third annual convention of the Association of Economic Poisons Control Officials was held at the Shoreham Hotel, Washington, D.C., October 8, 1949. A total of 104 registered; 53 represented 35 states and Canada, 20 from federal agencies; and 35 from industry organizations.

President H. J. Hoffmann, St. Paul, Minnesota in his address reviewed the history of DDT and urged manufacturers to make haste slowly in promoting new products. He offered numerous examples as justification for registration of economic poisons at the state level. Dr. Hoffmann assured the industry that every effort was being made toward unifying and simplifying registration procedures. He asked association support for the proposed model bill covering custom spraying and application of insecticides, fungicides and herbicides. He closed with a request that a committee be appointed to express this association's views on the nomenclature of economic poisons.

Dr. H.H. Hamilton, Secretary, National Association of Insecticide and Disinfectant Manufacturers used as his title, "Some Manufacturing, Selling and Control Problems in the Economical Distribution of Household Insecticides." He traced a picture of the impossible sanitary and food handling conditions which would have prevailed without insect control. He said: "We are the purveyors of the tools to aid in bringing this food safely from production to consumption." Dr. Hamilton pointed out that the control official is the representative of the people to prevent fraud and improper use of the tools. In conclusion, Dr. Hamilton declared: "It is fully recognized that some means must be found to establish the efficacy and hazards, involved in the manufacture and use of any new product which may directly or indirectly affect our tremendous population."

"The National Agricultural Chemicals Association Looks at Residue Tolerance Hearings" was chosen by L.S. Hitchner, Executive Secretary of the Association as the subject of his address. He assured his audience of complete cooperation of the NAC in the forthcoming hearings. Mr. Hitchner urged all control officials and experiment station workers to correlate and present to proper authorities all existing data relating to spray residues. By this means, Mr. Hitchner asserted more speedy decisions could be forthcoming from the scheduled hearings on the subject.

Dr. P.B. Dunbar, Commissioner of Food and Drugs, Federal Security Agency, speaking on "Spray Residues and Tolerances under the Federal Food Law" reviewed the flexibility of the tolerances allowed by the Federal Security Administrator. He noted that the Food and Drugs Act of 1906 carried no authorization for the establishment of legal tolerances for added poisons in foods. The informal tolerances used at this time serve as a basis for subsequent legislation. Procedure at the hearing was outlined by Dr. Dunbar. He said"... the hearing is being visualized as a pooling of all useful information and a humble seeking for light on a problem whose sound solution concerns all of us, and indeed all of those who will come after us."
In this connection the Association adopted the following resolution:

"Whereas the Food and Drug Administration has called a hearing to begin January 17, 1950, regarding spray residue tolerance on or in fresh fruits and vegetables; and whereas the Association of Economic Poisons Control Officials is vitally interested in closely related questions, namely, the determination of the safety and effectiveness of economic poisons so that claims made for such products and recommendations for their use can be properly limited, and so that adequate warning of hazards can be required; and whereas the same information as that upon which determination of spray residue tolerance is based is desirable as a basis for determining the safety and effectiveness of economic poisons for certain uses, we therefore, in the Executive Session of the Association of Economic Poisons Control Officials direct attention to the need for economic poison manufacturers, feed producers, processors, and organizations conducting research on the toxicity and effectiveness of economic poisons to assemble, organize and correlate all scientific data and available information on the need for various economic poisons on fruits and vegetables, the relative toxicity and hazards of economic poisons, methods of spray application and use, and methods of spray residue removal.

We wish to direct attention to the urgent need for immediate action in the assembling of such information. It is directed that copies of this resolution be sent to various interested groups."

Food processors are responsible for everything in the can and on the labels Dr. C.H. Mahoney, Director, National Canners' Association told the Association in his address on "Problems of the Canner with respect to the Use of Insecticides". He said the canner can select safe insecticides and fungicides for his contract crops by following the advice of state entomologists and by keeping up-to-date on current scientific information. Dr. Mahoney discussed physiological effects of insecticides on flavor and drain weight on canned products. He declared that the canner needs all available facts from scientific sources. Dr. Mahoney concluded: "The canner cannot act independently. He must have coordinated information to maintain production at high levels of purity and freedom from chemical residue."

The afternoon session was devoted to discussions of various committee reports and other business matters of the association. These reports are reproduced in full elsewhere in this publication.

With no further business to be considered, members heard the report of the nominating committee. Officers elected to serve for the year of 1949-50 are shown in the front of this publication.
ADDRESS BY THE PRESIDENT

HENRY J. HOFFMANN, ST. PAUL, MINNESOTA

In this, the third meeting of our association, I believe we should pay particular attention to the need of making haste slowly. Our last president, Mr. J.L. St. John, called to our attention this need for caution, and I echo his warning in view of the events of the past year. First, let me refresh your memory as to the history of DDT. In the not too distant past this wonder insecticide was being advocated for every use, - and let me remind you that it was advocated that it be used indiscriminately and without any particular precautions being observed by the user. DDT is an effective insecticide, especially effective against flies, and because of its effectiveness it enjoyed great popularity. We all know now how DDT made its appearance in milk and even in the flesh of animals being slaughtered for human consumption. As a result, we now have greatly restricted the use of DDT and of some other chemicals that behave in a similar manner. Perhaps if manufacturers had heeded the advice of economic poisons control officials and proceeded with the caution recommended by these officials, we never should have experienced these untoward effects of DDT and other similar insecticides, and so none of the restrictions that we now find necessary would have been imposed.

Why am I calling this to your attention? Because I urge manufacturers and distributors to accept the criticism and advice of control officials for the purpose for which they are offered - that when dealing in such toxic chemicals we cannot be too careful and that a sale lost today may be regained a hundredfold tomorrow - if we make haste slowly. I believe I speak for all control officials when I say that we all want manufacturers to be successful, and I mean successful from a financial standpoint. But we believe that such success can only be great if it is permanent. That is why we are so prone to be cautious. How much better it would be for the manufacturers of DDT and similar chemicals if they had not been so ambitious to expand their markets, - for we all know how much more difficult it is to recapture a lost market than to gain a new one.

I do not want you to think that my criticism is aimed exclusively at DDT, Chlordane, or other restricted insecticides. I believe we are all aware of the extreme toxicity of the organic phosphate and mercury compounds and of the damaging results due to the indiscriminate use of 2,4-D products. We know how effective they are - yet because of their extreme effectiveness we must be doubly cautious in our effort to avoid any untoward effect in the use of such chemicals - either to man or to the crop being protected.

The field of insecticides has experienced great progress in recent years. New products are being developed and others improved. Many of us can remember the days when practically the only products used were composed of arsenic, lead, or copper. Today these products are still being used, but we have a host of new chemicals, most of these being organic or metallic organic compounds. Most of these are very effective, and because they will do an effective job as insecticides will have
ready public acceptance. We, however, who are in regulatory work must be extremely cautious before we put our stamp of approval upon these products. We must always remember that once a product is registered, the buying public assumes that the State (or regulating agency) has in fact sanctioned and approved the product. Then if something goes wrong it usually becomes our responsibility — for a few manufacturers are always only too glad to shift the blame for any damage to the approving or licensing bureau.

Perhaps a few words regarding registration procedure would be in order. We have had many requests from various insecticide manufacturers to adopt the simplified registration procedure which would permit the filing of one application sheet for registration, listing thereon all of a manufacturer's products and attaching to such sheet the data forms. We have used this system for the past two years and have found that it simplifies the work in our office, and I heartily recommend that such simplified procedure be adopted by all states where it is not actually contrary to existing laws. The adoption of such a procedure does simplify the work and at the same time shows to manufacturers that we do evidence a spirit of cooperation whenever such cooperation does not affect the enforcement of the law.

From time to time it has come to my attention that some firms have felt that if they have their products registered with the federal department, such registration should obviate the necessity of a state registration. I should like to say a few words in defense of registration of economic poisons and devices at the state level, as it is my opinion that such registration is a proper protective measure, and that it should be required.

Minnesota registration requires the payment of an annual fee of $5.00 for each product for which registration is requested, with a maximum assessment fee of only $25.00 for a firm wishing to register five or more products. Thus the maximum fee which any one company would be required to pay in Minnesota is $25.00, and I do not think this is an amount which should prove to be an excessive burden upon a manufacturer.

States have been criticized for assessing a registration fee on the grounds that the fee charged is insufficient to defray the expense of any great amount of research work. It has also been said that a considerable portion of the fee must certainly be expended for the clerical efforts involved in the collection of the fee. It is admitted that administrative effort is not without cost, but this is equally true of the Federal level; yet registration does place each firm doing business in a state on record as to the type of business it is doing and the type of products it is distributing. It also makes the state agency aware of the approximate amounts and types of insecticides distributed by a manufacturer. Registration also serves as a ready means of assisting a state agency in the investigation of complaints lodged against a particular product or company. Minnesota, in common with most states, has suffered some crop damage as a result of the application of 2,4-D products. We have had complaints from farmers that dealers have supplied them with the ester form when the amine had been requested, or we have
had complaints that the amine form was supplied when the ester had been requested. It has been a very simple matter for the department, in tracing these complaints, to obtain from the farmer the label supplied him at the time of purchase, plus a sample, and to compare the results obtained on the sample with the product submitted to the laboratory at the time of registration. Such a procedure has enabled us to quickly place the blame for the error at the proper doorstep. Had state registration not been necessary, it would have been almost impossible for our office to have made a speedy determination. I feel quite certain that if all these types of complaints were to have been checked by one Federal department, it would have taken months and perhaps longer for the country elevators and farmers to have received the report which would have enabled them to properly adjust a claim.

We also have discovered a great many instances where out-of-state manufacturers have been selling their products in Minnesota without registration. After we have notified these manufacturers as to the illegality of such a procedure, we have in most instances been able to secure registration. It has been my observation that firms who withdraw their products from the state, after being requested to register, have done so because they have felt that their products were not sufficiently labeled so as to pass either Minnesota or Federal inspection. The requirement of state registration has served in such an instance to eliminate from interstate commerce products of questionable merit.

Manufacturers who do custom packaging for local distributors are most easily controlled by a state agency requiring registration. We recently had an instance where a local distributor had a product packaged for him under his own label in another state and then offered it for sale in Minnesota without registration. Purchasers of this particular product, which was a fly and moth spray, suffered excessive damage to their clothing and to the woodwork and paint in their homes due to the type of solvents and chemicals used to compound this product. This distributor was prosecuted by our department for the sale of an unregistered insecticide and defendant's counsel informed the court at the time of trial that the manufacturer of this product had registered the product with the Federal authorities and with the State of Minnesota. The product, as I have told you, was not registered with Minnesota, and registration would not have been accepted because of the very nature of the product. Defendant's counsel was also unable to prove that the product had been registered with the Federal Government. Inasmuch as the label on this product bore the name of a local Minneapolis distributor, it is extremely doubtful if this sample would ever have come to the attention of the Federal authorities, as the Minneapolis distributor does not, I believe, do an interstate business, even though he purchased this particular product from without the state. I believe that Minnesota's requirement for registration will prove to be of great value in this particular instance, as the distributor's failure to register will, most certainly, enable purchasers who suffered damage from this insecticide to make recovery against him. This illustrates the point previously made—that although a $5.00 registration fee would not have contributed a great deal in defraying the cost of analysis or contributed much towards research costs, still the necessity of registration will repay Minnesota
taxpayers a hundredfold in the protection and assistance they will receive from the Minnesota Department of Agriculture in their efforts to make a recovery for their losses.

I offer these remarks in the hope that manufacturers will concede that there is proper justification for registration of economic poisons at the state level. Our department, in common with most state agencies and the Federal Government, is dependent upon an appropriation to defray the cost of operation; yet I do not feel that it is unreasonable to expect that industry which is regulated and which enjoys the benefit of our work to contribute a little something extra, in the form of a registration fee, to defray a portion of the cost of enforcement.

I also wish to add that I believe that the Committee on Uniform Registration will have a report to present to us as to the progress being made in the development of uniform procedure of registration.

I should also like to say a few words regarding the labeling of economic poisons and devices. The Minnesota law is in many respects similar to the Federal law, and for this reason we have been able, in most instances, to accept federally approved labels. We have received some compliments from the industry as a result of having adopted this procedure, but it has been because of the similarity of the laws that we have been able to do so. We realize that there are some states where such a procedure cannot be adopted, but I believe that if labels which have been approved by the Federal department can be accepted by state agencies wherever possible, it will serve to promote the uniformity which we are striving for in the enforcement of our pesticide acts.

I should also like to touch upon the subject of the adoption of rules and regulations by state agencies. Minnesota has not adopted rules and regulations up to now, principally because we have felt that our law is fairly broad and that it covers most points quite thoroughly. We have also felt that it was better to have the law in effect for a few years before we adopted rules and regulations which we might later wish to retract. However, we now feel that Minnesota is ready to proceed with the adoption of certain rules and regulations which observation has shown to be necessary. In the interest of uniformity, however, I believe that it would be well if each state agency were supplied with the existing rules and regulations of those states which have already adopted such rules. This would serve as a guide to those states that are contemplating the adoption of rules and regulations and will certainly serve to promote uniformity, which, I am sure, is a goal we are all striving for. I personally feel that a regulation governing the size of type of mandatory information which must appear upon the label should be established. In all too many instances the formula, instructions to users, and even antidotes in cases of accidental poisoning, are so small that a reading glass is required to make out the contents of this small type. I believe the association should adopt a rule establishing a minimum size of type for mandatory information. We should also adopt a rule requiring the name of the product, net contents, ingredient statement, caution statement and antidote to appear on the main panel of the label. Such a rule will eliminate the tendency on the part of many manufacturers to distribute the mandatory information on all parts of a label.
In the case of some containers, part of the information may appear upon the main panel of the label, part on side panels and some on the rear panel. I am also in favor of reducing mandatory information to an absolute minimum, as I believe lengthy explanations and excessive verbiage tend to reduce the effectiveness of label statements. Mandatory information should be short and concise and in such simple layman's language as may be readily understood by any user.

There has been a desire expressed by economic poisons control officials that a model bill be prepared which will regulate custom spraying. The original bill which was submitted by Mr. John Thurston, Secretary, Administrative Council, Department of Agriculture, to the Executive Committee at its spring meeting in Washington, regulated only the custom sprayer who uses an airplane. Desire was expressed that the bill should be revised so as to include all types of custom spraying and include a licensing and bonding clause. Mr. Thurston has prepared and submitted to our association such a revised bill covering all types of agricultural custom spraying, and this bill will be submitted to the Council of State Governments at its meeting in Washington on October 13 and 14, 1949. We have been supplied with copies and an interpretative statement of this bill by our Secretary-Treasurer, Mr. A. B. Heagy, and if you have any comments I would suggest that you advise Mr. Heagy or Mr. Thurston, so that any new ideas may be incorporated into the final bill which will be submitted to the Council of State Governments. The model bill regulates every type of custom spraying, whether such spraying be done by hand, by truck, or by plane, and requires licensing and bonding of such custom sprayers. It is felt that a licensing and bonding procedure would eliminate irresponsible people from the field and would assure farmers who avail themselves of this service of adequate protection in case of crop damage. Should the model bill, or any similar bill, be introduced into your various legislatures, I recommend that you as an association member give it your support, as we feel that this is needed legislation.

I believe that our association should be represented in the various committees on nomenclature. I am sure that manufacturers and distributors of economic poisons and members of the American Chemical Society are greatly concerned with nomenclature, and inasmuch as this association is actively engaged in the regulation and sale of chemicals used in the preparation of economic poisons, we should take an active part in this work when it involves the chemicals with which we are concerned. I recommend to you, therefore, that a committee be appointed to represent this association and to express this association's views on the nomenclature of economic poisons.

I have received notice that there will be a hearing in this city on the subject, "Tolerances for Poisonous or Deleterious Residues on or in Fresh Fruits and Vegetables." The notice of hearing appeared in the Federal Register for September 17, 1949, and the date of this hearing was announced as 10 A.M., January 17, 1950. I believe this is a subject in which this association should be vitally concerned, and I therefore recommend that a committee be appointed to represent our association at
That meeting and to supply us with a resume of the testimony which will be given at that hearing.

In closing, let me state that it has been both a privilege and a pleasure to serve as the president of this association. I have enjoyed the work and trust that some progress has been made by our association during my term of office. I wish to thank the many people who have cooperated with me and who have been ever ready to devote their efforts to the work of this association when they were requested to do so. I am particularly grateful for the help which I have received from our Secretary, Mr. A. B. Heagy. He has rendered invaluable assistance to me, and I am sure that I would many times have been at a loss but for his willingness to always be of assistance.

I know that I speak for our association, as well as myself, when I say that we are all extremely grateful to Dr. W. G. Reed, Chief of the Insecticide Division, Production and Marketing Administration, and his staff, and to Dr. S. A. Rohwer, Assistant Chief of the Bureau of Entomology and Plant Quarantine, and his staff. Without their cooperation and help it would have been impossible for our organization to have enjoyed its present degree of progress. I wish to extend to these gentlemen and their staffs our most sincere thanks and appreciation.

I also wish to thank the members of the Executive Committee for their ready response to the calls for assistance which I have made upon them. Ours is a new organization, but I believe that we have made remarkable progress in the short time in which we have been in existence. The fact that we have made such progress is due not only to our individual efforts but to the combined efforts and interest shown by all members of the association, each of whom has contributed much to the growth of our association.

Again I wish to thank you, and, may I add, I greatly appreciate the honor you have bestowed upon me in making me your president. I wish every success to our president, and want you all to know that I shall always be ready to render any assistance I can.
SOME MANUFACTURING, SELLING AND CONTROL PROBLEMS IN THE ECONOMICAL DISTRIBUTION OF HOUSEHOLD INSECTICIDES

H.W. HAMILTON, SECRETARY
NATIONAL ASSOCIATION OF INSECTICIDE AND DISINFECTANT MANUFACTURERS, INC.

The National Association of Insecticide and Disinfectant Manufacturers is honored again by your invitation to be officially represented and to have the opportunity of presenting to you this brief communication.

Our association will shortly become the Chemical Specialties Manufacturers Association. The scope of our activities will be increased by a much broader coverage of the field of chemical sanitation. Our present activities will continue and be enlarged. Actually, most of the fields are now covered by us because of overlapping interests. The five divisions setup under our new program are: Aerosols, Disinfectants and Deodorants, Insecticides, Soaps, Detergents and Sanitary Chemical Products, Waxes and Floor Finishes. You are all acquainted with the general scope of our work. Through the divisional setup we shall strive to bring about a more extensive and intensive broad development of each of the separate fields as well as the coordination of all into the broad general sphere of chemical sanitation.

The newspaper have recently announced that census estimates indicate a population of 150-million people in the United States in 1950. What a field for statistical forecasters in pounds of food consumed, figuring an average per person per day of --, but I am not going to burden you with this sort of calculation.

Rather, let us think back to our own childhood and consider further even than that, the stories our grandfathers told us of living conditions in their boyhood days. The "Gay Nineties" at the turn of the century, fifty years ago, offers a time we might consider. For a moment, let us consider having 150,000,000 people in this country at that time, with a distribution of population much as we have it today. It is impossible to picture the filth, dirt, disease, bugs, vice, immorality, hunger and ill-health that would exist. In that era, the 150-million people would be so busy contaminating each other by improper disposition of wastes from their own bodies and the body wastes of their domestic animals, that the greater ravages of starvation would be insignificant.

Steam trains ran on New York's elevated railways, horses pulled the tram-cars, horses pulled the hansom cabs, hacks, surreys, and buggies. Men with push-carts cleaned up some of the animal droppings from the streets - the rest just remained as fly-food or bird lure. Flies, roaches, waterbugs, mosquitoes, bedbugs, and even body lice were present in all environments. Fly swatters, fly paper and ribbons, arsenical fly poisons were the weapons used to wage a hopeless war against a fly horde encouraged to breed in the nearby livery stable and its open carriage yard. Proper food storage was non-existent on any large scale, and poor preservatives were used all too freely. Imagine these conditions projected into the lives of the 150-million people estimated for 1950.
Could this country have fed 150-million people in the Nineties? I doubt if they could even have been nourished, let alone properly dieted. Why then can it be done now? Why can 150-million people live, be properly fed, be healthy and enjoy longer life spans? There is no single reason. It is all one great picture of marvels in transportation, ventilation, water supplies, sewage disposal, garbage disposal, more and better food for the masses, higher standards of personal cleanliness, preventive medicine, and the advancement in the wherewithal to improve all these needs.

All these millions of people are going to bring about new concentrations of population and new congestions. First, all must be properly fed on wholesome sustaining food. Nowhere in its growth, storage, or preparation should the food be contaminated by anything which will carry to the human or animal digestive tract any toxic properties, products of putrefication or deterioration, germs or viruses of disease.

The production of food is a tremendous problem. We must have more food, better food, at proper prices. With a few exceptions, the manufacturers in our industry are concerned with the food in storage and preparation. Our insecticides, disinfectants and sanitation products all work to this end. These products are vitally needed. They are necessities. Without them, millions of people would soon find their vitality lowered, communicable diseases and contagion rampant, and living would become a miserable chore filled with apprehension and fear of disease.

We must have ample low cost, easily used efficient methods in all forms of food preservation and preparation - such as insect control, prevention of disease dissemination, and general cleanliness.

A vitally important factor in human health is the essential freedom from flies, roaches, mosquitoes, bedbugs and other insects that infest the habitation and outdoor environment of man and animals. No longer need we tolerate the flies about the old molasses barrel of the Nineties, roach infested restaurants and bars, or tick infested cattle. Available now are numerous types of products known to reduce the chance of infection in homes and public places from dust, drinking glasses, eating utensils, towels and barber shop tools.

It is in solving these problems that we meet. We are the purveyors of the tools to aid in bringing this food safely from production to consumption. You are the representatives of the people to prevent fraud, improper use of the tools, and development of means to do this. To prevent fraud many laws have been passed. Some of these laws require product registration. This registration does not prevent fraud but does increase the cost of doing business, especially when fees must be paid in a great many states. Fraud is not prevented by registration. When registration is required and the necessity of policing is not recognized fully, fraud may thrive to an even greater degree.
The ever increasing cost of annual product registration is placing an undue burden on industry and will seriously handicap the ability of the ever increasing millions to survive in health and happiness.

These Federal and State laws are absolute necessities with this ever growing population and its problems. The need of all the people to benefit by products to protect them in every way, in all sections of the country, is paramount. The laws, therefore, must be fundamentally uniform in substance. This uniformity would permit free access to needed products in all sections without any requirement for costly, specialized labeling in a limited section.

To accomplish all of this, we as suppliers would like to see the day come when all State and Territorial Laws - (municipal laws when existent) - should be on the same basic principle as the Federal law, except for registration. All registration should be only at the Federal level with registration lists and data being furnished to each State or Territorial authority. When this accomplished the entire distributional procedure will improve and lower costs will result. We shall have fulfilled our obligations to the almost unbelievable increases in population.

It would be an indication of indifference on our part if some mention is not made here of the present attention being focused on the introduction of new ingredients for our products for use by the public generally. It is fully recognized that some means must be found to establish the efficacy, and hazards, involved in the manufacture and use of any new product which may directly or indirectly affect our tremendous population. There are several ways in which the preliminary evaluation and approval could be accomplished. Our industry believes that any and all Federal and State departments or bureaus designated to carry out new product investigation, and subsequent approval, or disapproval, would be properly organized and fair in their judgment and conclusions. Here again is a case in which possible duplication or overlapping of control laws could become both complicated and costly. It would seem logical to assume that the agencies now enforcing the present laws should have placed at their disposal any additional means required for the testing and verification of claims of new materials. We believe that this authority should remain with the Department of Agriculture of the Federal, State and Territorial governments. By having this duty left with you, much duplication will be avoided. Here again the final approval should be at the Federal level, with all political subdivisions offering support and available facilities to help arrive at proper solutions and limitations. We believe your departments are well organized and qualified to continue and enlarge upon this responsibility.
I want to again express the appreciation of our Association for this opportunity to meet with you and discuss some of the problems in which we have a mutual interest, particularly the Food and Drug Administration Hearings which is the subject upon which I have chosen to speak.

Never before has there been so many confusing issues facing those who have an interest in pest control and certainly there is a need for everyone to avoid being panicked into hasty actions, unsound decisions, and unnecessary and restrictive regulations.

Due to existing conditions, there has never been a time when close cooperation between the Industry and the members of your Association is more important and I can assure you that the NAC will, as it has in the past, endeavor to cooperate with you on any mutual problems.

As regards the forth-coming Food and Drug Hearings on spray residue tolerances, let me tell you what the NAC is attempting to do and what our position is.

A. The NAC recognizes that the purpose of the contemplated hearings is the safeguarding of the public health through protection of the food supply against the improper use of agricultural chemicals necessary for the production of food crops.

The practical effect may be to modify or restrict the grower in his choice of and manner of use of some of these pest-control chemicals.

The NAC believes that the establishment of proper tolerances is primarily a matter between the growers who must use pest-control chemicals and the Food and Drug Administration which is responsible for the safety of the food supply.

B. The NAC Association is vitally interested in seeing that the Industry's products are used safely and with proper regard for the public health. In keeping with this policy, it proposes to cooperate with all interested groups which may take part in the hearings and to offer its services in co-ordinating the presentations of such interested groups to secure a sound and impartial presentation of evidence.

C. The NAC present program contemplates the following:

(a) Every effort will be made in preliminary conferences with the government officials to develop a sound program of procedure.
This proposes a statement by Food and Drug Administration listing those materials and uses on which no residue problems exist and stating that no hearings thereon would be necessary.

(b) The determination of products to be covered at the hearings and the time at which they will be considered.

(c) The possibility of grouping various types of commodities on which the products are used.

(d) A communication is being sent to the Land Grant colleges and to the leading agricultural grower organizations pointing out to them the importance of the hearings and suggesting that they be prepared to present evidence at the hearings on the necessity for use, importance of agricultural chemicals to food production, and such technical data as they deem pertinent to the hearings.

(e) The NAC Association is working with the Liaison Committee to develop a co-operative program for the presentation of data at the hearings.

I want to take this opportunity to express our appreciation to Dr. Dunbar, Mr. Crawford, Tom Bellis and all the members of the Food and Drug Administration for the cooperative manner in which this problem is being approached. Their fundamental position has been fully and frankly given in the talk by Dr. Dunbar before the NAC at Rye and by Mr. Bellis before the NAC at Spring Lake, New Jersey. The next step, that is the development of a more detailed procedure, we believe can be accomplished in the same cooperative manner. For all practical effects the making of tolerances on agricultural chemicals is a new procedure and whatever pattern is set will probably continue for some time.

We have some suggestions on this which we are offering for consideration and criticism. The objectives of these suggestions are to arrive at a program which will accomplish the following:

(1) Adequate protection of the public health from the use of agricultural chemicals by the prompt establishment of reasonable tolerances where they are required on existing chemicals.

(2) The development of an effective program which will permit prompt determination of the tolerance residue on new products.

(3) A program which will permit the farmer a free choice in his selection of competitive materials.

(4) A plan which will not curtail further research and development.

(5) And finally we must all be careful that we do not injure seriously segments of agriculture through creation of undue fear in the minds of the public.
Many segments of our economy will have a major interest in the tolerance hearings, first of which will be the grower of fruits and vegetables and in due course all of the agricultural producers who must use chemicals in the production of food, feed and fiber.

We all have a responsibility to the general public insofar as public health is concerned and this responsibility is fully recognized by our Industry. At the same time we all have a responsibility to the growers to make it possible for them to raise foods.

Unless current problems are met intelligently, growers of many foods and vegetable crops can be seriously damaged through public fear of certain types of food consumption. I cannot emphasize this point too strongly.

It seems to me that your Association might well present evidence before the Food and Drug Administration pointing out the importance of pest control and what you are doing in your state to protect both the public health and assure food production.

I know that many of the members of your Association have very valuable data which should be presented at the Hearings. Some time ago I received a report from Mr. Lemmon showing the inspections which they had made and the residue remaining on a variety of farm products. This report to me was encouraging as they were in most cases below any tolerances which we can reasonably expect. I hope such data is presented at the Hearings.

At the Liaison Committee meeting on Wednesday, Dr. Guterman of Cornell and Dr. Stanley Freeborn of Berkeley recommended close cooperation between the state experimental station and the enforcement officials and I might take the liberty of suggesting to you that you contact the director of your state station so that state-wide data can be coordinated.

With your broad knowledge of the over-all problems, I am sure that you can do much to cooperate with the Land Grant colleges and I would like to further suggest that you might caution them about making recommendations which go beyond label provisions.

Gentlemen, I could talk on the many involved angles of this matter indefinitely but I am going to close and I want to again express my appreciation for this opportunity to be here.
In the Food and Drug Administration, when speaking of subject matter covered by various sections of the Federal Food, Drug, and Cosmetic Act, we often abbreviate by referring to the subjects by their section numbers. For example, we speak of finding a food adulterated under section 402 (a) (2); or we speak of section 401 standards for food. The authorization for the Federal Security Administrator to promulgate regulations setting tolerances for limiting the quantity of added poisonous or deleterious substances in or on foods when such substances are required or cannot be avoided is found in section 406 (a) of the Act. It is convenient to refer to these regulations as 406 (a) tolerances and refer to the hearings upon which they are based as 406 (a) hearings. I should like to make use of this convenient terminology in discussing my subject "Spray Residues and Tolerances Under the Federal Food Law."

The notice announcing the public hearing to take evidence upon which to base 406 (a) tolerances was published in the Federal Register just three weeks ago today. The hearing is scheduled to commence at 10 o'clock on the morning of January 17, 1950, in room 5140 of the Federal Security Building here in Washington. The notice states that it is proposed:

"First, to take evidence on the following points:

"1. Which fruits and vegetables require the addition or application of a poisonous substance in their commercial production.

"2. What poisonous or deleterious substances are required on each such fruit and vegetable for its commercial production.

"3. To what extent can such substances be avoided by washing, cleaning, or otherwise removing residues from the fruits and vegetables before marketing.

"4. The quantity of each poisonous or deleterious substance that can be tolerated on each such fresh fruit or fresh vegetable or on classes of fresh fruits and fresh vegetables without danger to public health, taking into consideration the other ways in which the consumer may be affected by the same or other poisonous or deleterious substances from other sources.

"Second, on the basis of such evidence (if it so indicates), it is proposed to promulgate regulations limiting the quantity of such poisonous or deleterious substances as are required on or in such fruits and vegetables, individually or by classes, the amount of the various substances tolerated to be fixed in terms of parts by weight, or by setting such other limits as is shown by the evidence to be necessary for the protection of public health."
"Third, to repeal or to so amend the regulation limiting the quantity of fluorine remaining as insecticidal residue on apples and pears as to bring it into harmony with other regulations adopted."

Another significant sentence in the notice states that, "For the purposes of the hearing on the points outlined above, evidence will be taken on any insecticidal or fungicidal substance, exclusive of inert ingredients therein, used on any fruit or vegetable."

On another occasion in discussing the thinking of the Food and Drug Administration about the use of poisonous sprays in the production of foods I stated certain fundamentals which it is worth-while to repeat:

1. The Food and Drug Administration recognizes that the use of insecticides is necessary both to bring many agricultural food crops to maturity in a condition suitable for human consumption and to protect many foods against insect depredations during manufacturing operations and storage.

2. By and large, insecticides are poisons. If they were not poisonous they would be of no value as insecticides. Their toxicity varies only in degree.

3. The terms of the Federal Food, Drug, and Cosmetic Act do not preclude the use of insecticides but they do make provisions to guarantee that when they must be used consumer safety shall be assured.

The Food and Drugs Act of 1906 carried no authorization for the establishment of legally binding tolerances for added poisons in foods. Nevertheless, in the administration of that law the necessity for the use of poisonous insecticides was recognized by the announcement of informal tolerances for lead, arsenic, and fluorine remaining as insecticidal residues. These informal tolerances were of value as indicating when the general provisions of the Act of 1906 would be invoked to charge adulteration. However, because these were not legally binding tolerances they left for litigation in the courts, each time an action was brought, the question of whether the particular quantity of poisonous residue on the food might render it injurious to health. The informal nature of such tolerances did not adequately protect consumers, because it was not possible to take into account in each particular action at law the probable intake of other similar poisons or of the same poison from other sources.

In developing the Food, Drug, and Cosmetic Act of 1938 the Congress time and again declared that its general purpose was to set up more effective safeguards against abuses of consumer welfare than were provided by the law of 1906. One can clearly see that the framers of the new law, when considering the question of poisonous substances in food, had in mind that under modern conditions of life consumers are exposed to traces of toxic substances from many sources. They recognized that the sum total of our intake of these minute quantities of toxic substances might prove to be a public-health hazard unless safe limits were established. In the new law Congress prohibited interstate traffic in adulterated foods and declared that any food is adulterated if it contains a poisonous or
deleterious substance which may render it injurious to health or if it contains any added poisonous or deleterious substance not required in the production of the food or capable of being avoided by good manufacturing practice. Congress recognized that it was necessary to provide for the situation where poisonous or deleterious substances are required. The use of insecticides in the production of our fruit and vegetable crops furnishes our best example of such a situation. Where poisonous or deleterious substances are required or are not capable of being avoided, Congress authorized the Administrator to prescribe the limits which I have referred to as 406 (a) tolerances. The law declares a food to be adulterated when the tolerance is exceeded. In prescribing 406 (a) tolerances the Administrator must take into account the extent to which the poisonous or deleterious substance is required or incapable of being avoided in production of the food and also the other ways in which consumers may be affected by either the same substance or by other poisonous or deleterious substances. In any event, the Administrator is required to establish 406 (a) tolerances at such levels as are necessary for the protection of public health. The purpose of this provision of the law is illuminated by the following statement from a House Committee report:

"Section 406, in subsection (a), provides for a fairer and more effective control of the addition of poisons to food than does the present law. This subsection first prohibits the unnecessary addition of poisons. Where such additions are necessary, the establishment of tolerances is authorized, based upon the practical necessities for the use of poisonous substances. It is well recognized that an adequate fruit and vegetable supply could not be brought to maturity without the use of toxic insecticides and fungicides. But the situation is made extremely complex by the number of poisonous substances used for different crops in different localities, and by contaminations which unavoidably occur in many manufacturing processes. The purpose of the subsection is to insure that the total amount of poisons the consumer receives will not be sufficient to jeopardize health. The needs of each branch of the food-producing industry can be met and the public health can be adequately protected."

(H. R. Rep. No. 2139, 75th Cong., 3rd Sess., p. 6)

Possibly some of you are planning to attend the 406 (a) hearing and to participate in it. In the thought that you may not have attended any of our rule-making hearings, it might be worth-while to discuss the procedure followed. The hearing is conducted by an attorney who is designated as the presiding officer. All testimony is recorded by a reporter. The hearing is open to the public, and anyone interested may be heard either in person or by representative. Witnesses testify under oath. Some witnesses prefer to write out their testimony or at least to prepare an outline to prompt their memories as they testify. Others prefer to put in their evidence by answering questions asked by their attorneys. Consideration may well be given to offering such material as tabulations of data and analytical methods in the form of exhibits. If exhibits are offered, the reporter requires five copies of each exhibit. It is desirable to have several additional copies available for distribution to interested persons at the hearing.
Each witness is subject to cross-examination and, generally, greater latitude is permitted in cross-examination in our hearings than is permitted in the courts.

In addition to taking part in the hearing as a witness, anyone in attendance is afforded an opportunity to take part by presenting for the Administrator's consideration written recommendations incorporating suggested findings of fact and regulations and briefs in support of such recommendations. After the record has been studied and the recommendations considered, a tentative order is published in the Federal Register under the heading "Proposed Rule Making." A further opportunity is afforded interested persons to participate in the rule-making procedure by filing exceptions, if they have any, to the tentative order. After all the exceptions have been considered, the final order is published in the Federal Register. As a part of the final order the date when the new regulations shall go into effect is specified. Except where an emergency condition has been shown to exist the effective date is not less than 90 days after the issuance of the order.

From the procedural steps outlined I think you will conclude that the process for establishing 406 (a) tolerances by our public hearing procedure is intrinsically democratic. It is legislative in character and establishes the rules which are to govern future conduct to the end that the needs of industry can be met and yet the health of consumers adequately safeguarded. Some of us are not often afforded an opportunity to play an active role in legislative processes. It is our hope and expectation that the forthcoming 406 (a) hearing will be in no sense what lawyers call an adversary proceeding. It will not be a simple hearing and in all probability it will not be a short hearing; but of this we are certain: it should not be an acrimonious hearing.

Dr. W. B. White, Chief of our Division of Food, has stated that he judges from the prevailing climate of opinion in the food industry and the insecticide-manufacturing industry, as well as in other quarters, that the hearing is being visualized as a pooling of all useful information and a humble seeking for light on a problem whose sound solution concerns all of us, and indeed all of those who will come after us. I trust that his appraisal of the climate of opinion is accurate, and none of us will question the importance he attaches to the legislative task in which we will participate. This task necessitates wholehearted and intelligent work by the representatives of Government and industry. If we will approach this task with the high sense of public responsibility which it merits, I am sure that we can build a record that will support residue tolerances which from the point of view of industry will be workable and from the point of view of the public will be safe.
SUMMARY OF ADDRESS BY
Dr. C.H. MAHONEY
on
PROBLEMS OF THE CANNER WITH RESPECT TO INSECTICIDES

The food processor is responsible to the consumer, Public Health Service, State control officials, and the Food and Drug Administration for the product which he packs. It must meet the minimum standards of identity and quality as established by the Food and Drug Administration and at the same time be free from insects, insect parts and debris, as well as from chemicals applied to the crop. The food processor therefore has a paramount interest in the use of poisonous chemicals for the control of insects and diseases but at the present time is greatly confused as to the proper choice of those insecticides and fungicides which will control insects and diseases but not contaminate the finished product.

During the past couple of years canners have become increasingly conscious of this problem although sometimes they have been accused by growers and regulatory officials of being alarmists when reluctant to use new insecticides. Canners realize, however, that the grower must be able to produce economically and at a profit those crops which he grows for canning and that the use of chemicals is definitely necessary in the production of a crop.

Neither the National Canners Association nor many of the canners have facilities to do comprehensive field research on insect and disease control. Most canners follow quite literally the recommendations of the research entomologists, horticulturists and extension workers on the staffs of the Land Grant colleges in the respective states, believing that these are the logical people to make recommendations for insect control to the growers. In our contacts with canners it has been emphasized that close cooperation should be maintained by canners and their field staffs with the Experiment Station and Extension staffs so that the recommendations of these research workers are conveyed directly to contract growers. We feel that canners should also work closely with the poison control officials in their own states to find out from them what the average insecticide residue level is on those crops which are purchased on the open market for processing. Such information would enable canners to determine whether such products can be canned by normal canning methods without any residue contamination. It is felt that more of this type of information should be made available in the various producing areas to guide canners purchasing raw products so that they can determine what removal methods may be necessary in canning such products. The method of manufacture, that is, whether the product is to be packed whole, peeled or pureed, will sometimes determine the residue level which might be hazardous. It has been pointed out several times by Dr. Dunbar that the Food and Drug Administration feels that baby foods are in the same class as milk and should be substantially free of all chemicals. In some cases raw products are not peeled but are comminuted and the skins removed by screening prior to packing. Such products going into the manufacture of baby foods must necessarily have less chemical residue than those from which the outside layer can be removed prior to processing.
Another problem canners have encountered is the physiological effect of certain chemicals on the product after it has been processed. A good example of this is the off-flavor in tomatoes, carrots and spinach produced on soils which have been treated with even as little as one-half pound per acre of benzene hexachloride. The effect on the flavor of potatoes produced on soil similarly treated is, of course, common knowledge to all of you. Peaches seem to be particularly susceptible to flavor influences from chemicals and it has been shown that even peaches treated with a pure gamma isomer of BHC show an off-flavor after processing, although it may not be detectable in the raw product. Many canners are therefore not accepting peaches treated with BHC after the "shuck-off". Some preliminary evidence exists indicating that some other chemicals applied late in the season will likewise cause off-flavor in certain fruit and vegetable canned products.

Another physiological effect which has been reported by the Michigan Agricultural Experiment Station and presented at the Michigan Canners School this year, indicated the possibility of loss of drained weight in sour cherries by the use of the fungicide Fermate. While this is only a preliminary report and additional research will be required to substantiate the indications, it illustrates the necessity for cooperative research among entomologists, horticulturists and food technologists in preparing recommendations to growers on the use of chemicals. Such recommendations should be based on several years' research on all aspects of the problem.

Another problem canners have encountered in connection with residues is the question of residue on fodder which is to be fed either to dairy cattle or livestock being finished for slaughter. It is well known that a high percentage of the sweet corn and peas grown for canning is being produced by dairymen and livestock feeders in many sections of the country. Although the possibility of chemical contamination of either sweet corn or peas by chemicals may be rather remote, fodder from these crops may have such a high residue of insecticides as to render them unsuitable for feeding as silage to livestock. Canners are necessarily concerned if contamination of milk products is caused by feeding contaminated fodder and for this reason are interested in using chemicals which will not leave any appreciable residue on corn or pea silage. A good deal of experimental work is being done by canners to determine the level of residues in silage treated with various chemicals.

Most of the poison control officials are aware of the fact that canners are able to supervise the production methods used on vegetable crops which are grown under contract, but the majority of fruit used for processing is purchased on the open market and is therefore not subject to such supervision. In many cases the fruit grower -- at the time he is applying sprays for control of insects and diseases -- does not know where the crop will be marketed at maturity. It is extremely important, therefore, that canners, poison control officials and the personnel of the Land Grant colleges work together to insure that these fruit crops do not contain hazardous chemical residues. We all have a vital interest in supplying the consumer with high quality products free from contamination by insects and poisonous chemicals.
SUMMARY OF REMARKS ON NOMENCLATURE
Dr. S.A. Rohwer, Chairman
Interdepartmental Committee
Bureau of Entomology & Plant Quarantine

Primarily, there is a need for establishment of a guidepost for common names of pesticide chemicals.

To be suitable, common names must be accepted and recognized at a common level. When thus established they can be more important from a practical standpoint than correct chemical names.

When no set procedure for establishing common names exists, the need for such a designation arises with the using group. Many technical names are much too long for practical use.

The U.S.D.A. prefers to have names come from entomologists. The first step in actually establishing such nomenclature as a common name then is to have it pre-empted to prevent any subsequent copyright difficulties. It is discussed with control officials, and with the chemical and medical industries. Following these steps it is spread to foreign countries. In all cases it must be completely protected universally from trade-mark registration.

In reply to Dr. Hoffmann's suggestion to submit names to a committee from this Association, my opinion is that such a committee is good only if action on the proposed name can be secured promptly. This has not been possible in the past.

At present, five names are ready for the newer insecticides, one for a rodenticide, and one for a fungicide. Action is pending.

The Federal Act permits use of certain names as "common". This provision has not yet been used. Consideration has been asked for "chlordane", "toxaphene", and others.

In labeling procedure a description - the established chemical name - will be necessary until a designation has become truly a "common name".

A common name should be documented to mean a definite and specific compound. When this is true the enforcement official can take action whenever the material deviates from the composition indicated by the common name.
COMMITTEE ON ACTIVE AND INERT INGREDIENTS

H. H. SHEPARD, CHAIRMAN

In the report of this committee presented to the Executive Committee at the time of the meeting of this Association in October 1948, definitions of the term "active ingredient" were reviewed and some more evident problems enumerated with respect to the classification of ingredients into active and inert.

On the basis of the Federal Insecticide, Fungicide, and Rodenticide Act and the regulations for its enforcement, an active ingredient is one which is capable in itself of killing or repelling pests such as insects "when used in the same manner and for the same purposes as those for which the product is intended." The ingredient would be construed to be active if it would control one or more of the pest organisms named on the label when at full strength the particular ingredient itself is applied in the manner prescribed for the product. In a mixture, therefore, in which two or more toxicants are present, no one of them in sufficient quantity to be effective by itself, the toxicants would still be considered active if they would be effective insecticides when applied at full strength. If the rule were otherwise, some mixtures might contain no ingredient in sufficient quantity to be called active, yet the mixture would be an effective one.

The general definition of an active ingredient is limited, however, to exclude traces of those toxicants that would otherwise be considered active. The limitation depends upon the decision as to what constitutes a proportion of the ingredient which would not "add materially to the effectiveness of the product."

It is important that these definitions of an active ingredient not be construed in such a manner as to lead to confusion. Frequent changes in ingredient statements for the same or similar formulations would become necessary if activity were to be entirely dependent upon the individual claims made on the label. For instance, the oil in a mixture intended for application to roosts for the control of poultry lice would not be active against the lice. If a label claim were made that poultry red mites on the roosts would be killed, then the oil would be active. Since these mites are a common pest of such locations and the claim is often made that they will be killed, it is believed the oil in such a preparation should be uniformly declared active. Another example is that of wood preservatives which contain petroleum as a solvent. Since such materials are employed regularly to treat insect-infested wood, the oil should be declared active whether the label claims are limited to the treatment of new lumber or not. Each instance such as these must be decided on its own merits. The Committee proposes that it point out to the Association from time to time such cases with suggestions for their appropriate handling.
The Chairman keeps, in the form of a card file, available data relating to the activity of ingredients, particularly synthetic organic compounds and with special emphasis on substances not commonly encountered. It is such unusual material which requires the most time to uncover. The Committee would appreciate information as to the existence of similar files and compilations which may be of assistance in this direction. To bring together such material, or information as to where it can be obtained, would be of distinct value to Association members.

A list of active ingredients for insecticides which includes annotations relating to their limitations as to activity, is being compiled by the Chairman. The following are a few selected examples to indicate the proposed manner of listing. As soon as the list has been smoothed up somewhat, copies will be sent to the Committee membership for its reaction as to usefulness to the Association. If this appears to be a worthwhile project, similar lists could be prepared for other types of economic poisons. Additions and exceptions should be made continually so such lists can be kept up-to-date.

Active Ingredients List For Insecticides

Alcohols (aliphatic) - Those higher than isopropyl, when used as solvent in contact sprays, are considered active.

Carbon tetrachloride - Active in preparations recommended as fumigants in closed spaces; inert as a solvent in preparations solely for contact use.

Citronella, Oil of - Active as a repellent against mosquitoes and certain biting flies.

Pine Oil - Active when employed as a solvent in contact sprays, also as an aid to repellency in oil-base livestock sprays.

Sesame oil extractives, including sesamin - Active in mixtures with pyrethrins.

At its April 1949 meeting the Executive Committee suggested that the lists of permitted uses of certain insecticides prepared by the Chairman for use by the Insecticide Division would be of value to economic poisons control officials. Arrangements have been made in the Division for sending these lists to those officials who desire them on the basis that they will be considered confidential. Needless to say, these lists require considerable time to prepare and must be continually brought up-to-date.

It is pointed out that a source of information of value to the Association, which will be available soon, is the Chemical-Biological Coordination Center, National Research Center, Washington 25, D.C. At the Center are being accumulated from the literature and from unpublished laboratory reports, all kinds of research data with respect to the biological effects of chemicals. These data are being coded and punched on cards for correlation by means of International Business Machines.
No work has been done on Uniform Sampling since the last meeting. Until we are in a position to prepare a manual with specific instructions covering sampling procedure, it appears little would be accomplished by revising the report previously submitted. The main reasons holding this up are the numerous new economic poisons being placed on the market and the amounts required for the types of tests to be run. In many instances, not only chemical analyses are being run but it has been found necessary to run tests under conditions for which the products are actually recommended for use. This has called for specific sampling instructions on a large number of items or groups of items.

UNIFORM SAMPLING PROCEDURE
(Presented at the 1948 meeting)

I. The purpose of routine sampling is to "spot check" the various products sold or offered for sale by different manufacturers or distributors. It would be impractical, and almost impossible, to give a complete coverage to every product shipped or manufactured, so the next best procedure is to use the "spot check" method. Where violations are found, complete coverage is given by collecting additional samples of these products. In this manner, the products found to be in violation are given more attention and the ones not found in violation are passed up until time for next sampling.

A list of types of economic poisons and suggested amounts for routine samples is attached to this report. Also included is a suggested procedure to be used in making net weight checks and a form for recording weighings.

II. Sampling Retail Units - Where possible, samples should be obtained from original unopened, shipping containers. The shipping containers should be checked for codes, batch numbers, or other distinguishing marks and, when found, the sample units should be identified with corresponding codes or batch numbers. The Collection Reports should also contain this information. When a sample consists of more than one container or unit, they should be taken from different shipping containers when they are available.

A thorough check should be made to see if there are any circulars, literature, placards, or other forms of advertising in which reference is made to the product being sampled. If any are found, they should be submitted with the sample. They should contain a notation stating how they are used, such as - "came in same shipment, given out
over the counter", or "used as advertising poster, did not come in same shipment". If posters or other forms of advertising are used which are too large or bulky to submit as specimen advertising, copies of the wording should be made, with a statement of how they are used and the approximate size of the lettering.

III. Bulk Sampling

1. Dry Materials - A trier of sufficient length to obtain a representative sample should be used in sampling drums, barrels, large paper or burlap bags, or other containers used in shipping products of twenty-five pounds weight or larger. One commonly used is a two section trier, approximately thirty six inches in length.

In drawing the sample, the trier should be inserted diagonally from different sections or corners of the containers. Ordinarily, four trierfuls will give a quantity sufficient for a sample. If not, then the others should be drawn in the same manner midway between the points from where the first four were drawn. The top inch or so of each trierful should not be used as part of the sample, but should be returned to the container from which the sample is being drawn.

Glass jars, friction top cans, and sometimes the round cardboard containers similar to those used for packing ice cream, are usually most suitable for handling samples of dry materials. Cardboard containers should be used only for products which will not be affected upon standing, such as sulfur and sodium fluoride. Air tight containers should be used for all others.

Complete copies of all labels on the containers should be made. A thorough check of the containers for batch numbers or other markings should be made. Any other essential information should also be included in the Collection Report. Copies of all circulars and other advertising should be submitted.

2. Liquid Materials - Before samples are drawn from containers such as cans, drums, or barrels, the contents should be thoroughly mixed by rolling, shaking, or stirring. When the product is of such a consistency that rolling or shaking is not practical, the contents should be stirred thoroughly with a clean rod of metal or wood. However, very few of this latter class are encountered.

Metal, plastic, or rubber tubings used as siphons are usually found to be convenient methods of drawing these samples. They should be inserted about midway down the container, at which point the sample should be drawn. Sometimes it is easier to pour samples of certain types of materials from containers of five gallons or less, which method would be satisfactory provided the contents have been thoroughly agitated. Heavy liquids will often require considerable agitation before the inspector can feel assured the contents are thoroughly mixed. However, there should be no doubt in his mind at the time the sample is drawn.
Glass jars, screw top glass bottles, or screw top cans are preferable for handling liquid samples. Certain types of economic poisons should not be placed in jars with rubber rings as the ingredients, upon standing, effect them. Examples of these are the mineral oil sprays or emulsions, coal-tar creosote dips and disinfectants, liquor cresolici septonatus, creosote wood preservers and products containing chloroform or acetone.

Complete copies of labels, batch or code numbers, and specimens of circulars and other advertising should be obtained. Other essential information should be reported.

IV. Size of Samples — No set rule can be laid down for the size of samples which should be obtained. The type of tests to be run, the concentrations of the active ingredients in the products, the size of the retail containers, and the cost of samples are just a few of the factors. For routine samples, one pound or one pint samples are generally adequate.

A large percentage of products ordinarily sampled are put up in retail containers and the size of the sample depends on the size available. While one pound or one pint is sufficient for the ordinary sample, it would not be practical to pass up a product because the dealer had in stock four-pound bags or one quart or one gallon containers. Many products, such as nicotine sulfate, require much smaller amounts for samples, so in these cases the purchase of quart or larger samples would not be justified.

In sampling bulk containers, the size of the sample can be controlled. In other cases, the sizes available are the determining factors.

V. Preparation of Samples

1. Retail Containers — When a sample consists of more than one unit, if possible, each unit should be identified and sealed separately. The labels should be identified with the sample number, date of collection, and the initials of the inspector collecting the sample. The container should then be sealed with the seal bearing the sample number, the date of collection, and the first name, middle initial, and the last name of the collecting inspector.

When the units are too small to seal without covering part of the label, the labels should be identified with the sample number, date of collection, and the initials of the inspector. They should then be divided into two parts, wrapped, and then sealed. The outside wrapper should also contain the sample number, date of collection, the initials of the inspector, the name of the product, the name and address of the shipper, and any distinguishing marks or codes found on the shipping cartons or containers.

2. Samples from Bulk Containers — The sample containers should be identified with a sticker containing the sample number, date of collection, the initials of the inspector, the name of the product, the name
and address of the shipper, and any distinguishing marks, such as batch or code numbers, found on the shipping containers. The sample containers also should be sealed with seals bearing the sample number, date of collection, and first name, middle initial, and last name of the investigator.

3. Advertising, Circulars, Pamphlets, Displays, Etc. - Specimens should be obtained of all advertising in any form in which reference is made to the product being sampled. That which is attached to the retail unit or inside the retail carton should be replaced as it was after it has been properly identified. All other, such as pamphlets or circulars distributed over the counters, or placards used as displays, should be submitted with the collection report. They all constitute labeling of the product and are a main part of the sample. Each piece submitted should be identified with the sample number, date of collection, initials of the investigator, and a statement as to its source.

SUGGESTED AMOUNTS FOR ROUTINE SAMPLING

I. Calcium Arsenate 1 - 10 cartons or drums, 1 pkg. (or 1 lb.)
Lead Arsenate 10 - 25 " " 2 pkgs. (or 2 lbs.)
Bordeaux Mixture 25 - 100 " " 3 " (or 3 ")
Paris Green 100 - 500 " " 5 " (or 5 ")
(If available, above subdivisions should come from different batch or code numbers.)
Sulfur, Mixtures of two or more of the following products: Sulfur, Cube Powder, Derris Powder, Calcium Arsenate, Lead Arsenate, Copper Compounds, Nicotine, Rotenone, Pyrethrum Powder, Pyrethrum Extract, Ground Sabadilla Seed, Benzene Hexachloride, Cryolite, and similar products follow schedule above.

II. Miscellaneous plant insecticides and fungicides. (Other than those in group I) - 1 pint or 1 quart; concentrates - sufficient to give 5-10 gallons of finished spray.

III. Oil Emulsions - Lime Sulfur Solution

One quart - If more than one batch number available, sample up to three different batches.

IV. Products for treating seeds, soil, or turf to prevent plant diseases.

One-half pound or one quart.

V. Miscellaneous household and livestock insecticides. These include products which have claims for one or more insects and containing one or more of the following: Dichloro diphenyl trichloroethane, pyrethrum extract or powder, lethane, chlordane, cube or derris powder, and other products.

One pound or one quart samples.
VI. Moth and carpet beetles (only) preparations.

One pound or one quart samples.

VII. Ant preparations. (For ants only)

One pint or one pound. If baits or traps - 36

VIII. Pine oil disinfectant, Coal tar disinfectant, Liquor cresolis saponatus.

Retail sizes - one pint or one container - Bulk or drum lots one pint from each code or batch number, not to exceed 3 divisions.

IX. Sodium hypochlorite, chlorinated lime, Calcium hypochlorite and Chloramines.

One pound or one quart sample.

X. Products which may have lost strength. These include preparations containing nicotine, naphthalene, chlorinated lime, calcium hypochlorite, sodium hypochlorite solution and other similar products.

All shipments valued at $35.00 or over and over 4 months old, should be sampled.

1 - 25 cases - 6 units
26-100 " - 10 "
101-500 " - 18 "
Over 500 " - 24 "

XI. Mill, warehouse, and granary insecticides and fungicides.

One quart or one pound sample.

XII. Products for control of bots in horses and mules.

Sample should consist of 12 doses.

XIII. Products used against termites or "white ants".

One pound or one quart sample.

XIV. Rodenticides. The products usually consist of preparations containing one or more of the following: Antu, Arsenious oxide, Barium carbonate, Phosphorus, Strychnine sulfate, Strychnine alkaloid, Sodium fluoroacetate (1080), Thallium sulfate, and Zinc phosphide. There may also be others composed of ingredients not listed.

As a general rule, one pound or one pint samples are adequate. Samples of the pure products such as strychnine (alkaloid) and strychnine (sulfate) and sodium fluoroacetate (1080) should consist of one ounce.
XV. Weed killers or herbicides. These products may consist of one or more of the following: Liquid and powder forms of esters, amines and other salts of 2,4-D, sodium arsenite solutions, ammonium sulfamate, sodium pentachlorophenate, petroleum, creosote or crude oils, dinitro compounds.

One pound or one quart samples.

XVI. Devices - Should be sampled only upon request.

XVII. Products not covered above.

One pint or one pound. The quantity may vary, depending upon the type of product. The investigator will have to use his judgement in many cases.

SUGGESTED PROCEDURE FOR MAKING NET WEIGHT CHECKS

1. Scales should be balanced before weighings are made.

2. If fifteen or twenty units are weighed from two or three shipping containers and no shortage is indicated, no further weighings are necessary. However, a weigh sheet should be written up and submitted along with the tare or tares used. It is not necessary to write up collection reports for this type of sample.

3. If a shortage of 5% or more is indicated, a minimum of 50 units should be weighed.

4. Tares: One tare should be used in order to see how the weights run. This, along with the units used for the sample, should be submitted with the collection report and weight sheet. In case of official samples, tares should be submitted as follows:

   - 1 oz. or less sizes 11 tares in addition to one used.
   - 2,4, & 6 oz. " 4 " " " " "
   - 8 oz. or larger " 3 " " " " "

In sizes other than those listed, the Investigator's judgement should be used as to the number of tares to submit.

It should be indicated on the weight sheet by an "X" the units that are submitted for the sample and tares. If units 10,25,40 and 50 are submitted for sample, these numbers should be marked on the containers. The carton from which weighings are made should be initialed in some inconspicuous spot for reference in case of further action.

5. Weighings should be made as follows: 0 - 5 cartons 50 units with equal no. per carton; 6 -25 cartons 10 units from each of 5 cartons; 25 - 50 cartons 8 units from each of 7 cartons; 51 - 100 cartons 6 units from each of 10 cartons; 101 - 225 cartons 4 units from each of 15 cartons; 226 - 400 3 units from each of 20 cartons; and 401 and above 3 times the square root of the number of cartons in the shipment. Three units should be weighed from each carton.
**SUGGESTED FORM FOR RECORDING WEIGHINGS**

Date Weighed: ___________  
Sample No. ___________

Product: ____________________________  

Shipper:  
(Name)  
(Address)  

Weighings made at  
(Name)  
(Address)  

Balance  
(Kind)  
(Was it checked)  

Evidence of Leakage:  
(State whether or not leaking packages were weighed)

**Gross Weights**

Consisted of: _____ units taken _____ from each of _____ cases

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Average Gross Weight ___________

Preliminary Tare taken by Investigator ___________

* Represents units taken as official sample. They should be distributed among the units weighed.

Investigator: ____________
UNIFORM REGISTRATION PROCEDURE

Paul Ijams, Chairman

The committee met at 9:30 P.M., Friday, October 7, at the Shoreham Hotel. Mr. G.H. Marsh, Mr. S.C. Billings, Dr. E.W. Constable, and Paul Ijams, Chairman met with industry representatives and after discussion, presents the following recommendations:

(1) In as much as the simplified registration system has been so successful in those states in which adopted; it is recommended that this association encourage those states not using the simplified application form approved by this association, to adopt the form for the sake of uniformity and simplicity.

(2) That the following procedure for re-registration is recommended: When there is no change in the labeling or composition of a product since the last registration period, that it not be necessary for the applicant to re-submit the label and/or data sheet. Provided, that at the discretion of the official, he may periodically require the submission of complete labeling and/or data sheets at the beginning of any registration period. This provision is included in order that the official may insure the accuracy of the registration information in his files.

(3) It is further recommended that a committee study the terminology on the various state application and registration blanks to the end of eliminating existing confusion.

The committee reports that registration is required by the Federal Government, thirty-one states and the Territory of Hawaii.

All except three states permit use of the simplified registration procedure either by use of newly designed forms or adaptations of existing forms.

The simplified re-registration procedure is permitted by the Territory of Hawaii and eleven states.
APPLICATION FOR REGISTRATION OF ECONOMIC POISONS

Control Office ___________________________, 19

Application is hereby made for the registration of the following (number) Economic Poisons for a period beginning with the actual date of registration and continuing until December 31, 19__. There is submitted as part of this application individual data sheets (8½ X 11) to which is attached a copy of the label for each product. (See instructions on reverse side).

Remittance payable to the State of _________ in an amount of $______ is enclosed herewith to cover annual inspection fees for the following products.

BRANDS

I hereby certify that the information appearing on the attached data sheets is true and correct in every respect; that, each and every package of the above named materials will be labeled as described (and in addition that net weight and manufacturer's name and address will be shown); that the attached declarations are the guarantees of the applicant as to the chemical composition of the material above named for and on behalf of:

Address correspondence to: Submitted by:
Firm ___________________________ Firm ___________________________
Attention _____________________ By __________________________
Street & No. _____________________ Title __________________________
City & State _____________________ Date __________________________

(Certificate not to fill in below this line)

CERTIFICATE OF REGISTRATION

This certifies that the above named applicant is hereby licensed to sell the above brands of economic poisons in the State of _________ for a period beginning with the actual date of registration and ending December 31, 19__ when sold, offered or exposed for sale under the brand name and guarantees as described.

Date __________________________ State Chemist ____________________
Comptroller _____________________
CERTIFICATE OF REGISTRATION OF ECONOMIC POISONS

TO:

On the basis of the information furnished by the registrant, and the receipt of the registration fee, the following named economic poisons are hereby registered under the provisions of the ______ State Economic Poisons Act of ________, and the sale of said economic poisons is hereby authorized in the State of ________ when offered and exposed for sale, or sold under a label showing the information required by law and otherwise in compliance therewith, for the calendar year 19____, unless said registrations, or any of them, are canceled for cause:

Claims or directions for use which differ in substance from the representations made in connection with the application or changes in the name or formula of the economic poison covered by this notice should not be made prior to their submission to the Secretary of the ________ Board of Agriculture, and receipt of notice that they have been accepted.

Registration of a product is in no way to be construed as an endorsement of approval by this department or any claims made for it. The labeling must not bear any reference to registration under the Economic Poisons Act of ________. In order to protect the public, the Secretary may at any time cancel the registration of an economic poison. Request for registration under a new formula or labeling may be submitted at any time.

Dated at _____________, this _____ day of ___________, 19____

___________State Board of Agriculture

Receipt No. ____________  _____________, Secretary
STATE OF __________________ REGISTRATION NO. ________________

APPLICATION FOR REGISTRATION OF ECONOMIC POISONS

For the Calendar Year 19___

Application is hereby made to the Secretary of the State Board of Agriculture, _______ for registration, under the provisions of the _________ Economic Poisons Act of ____, of the following economic poisons:

There is submitted, herewith, a copy of the label (affixed to 8½ X 11 sheet of paper) and all other written, printed, or graphic matter used on, or attached to, the containers of the above listed economic poisons. Ingredient statements are shown on label sheets when required under Section ____ of the Act.

I hereby certify that all labels submitted, herewith, are exact copies of labels that have been registered without protest with the U.S. Department of Agriculture, except those marked with an asterisk (*).

Remittance is enclosed to cover the registration fee for ___ products ($ ______ for each product) in the amount of _________.

Address correspondence to: Submitted by:
Firm ________________ Firm ________________
Attention ________________ By ________________
Street & No. ________________ Title ________________
City & State ________________ Date ________________, 19 ___
It is the understanding that this committee was appointed to develop standards for the individual economic poisons and to work toward the development of a publication which would contain these standards and closely related information in what may be designated as a Pesticopoeia. This might, in a very general way, simulate the Pharmacopoeia in medicine.

Consideration has been given to the development of general policies to be followed regarding the development of standards. Information which should accompany these standards and methods of presentation have been considered.

Our hardworking secretary, Mr. Heapy, had already made some progress on this and has turned the results of his work over to the chairman of the committee. He has tabulations on about forty inorganic compounds and ten organic, covering formula, definitions, reference to source of methods of analysis, conversion factors, coloration, general type of use, toxicity rating, antidote, caution statement, and storage.

The committee feels that a Pesticopoeia should contain the name including the common name where this is established by usage or has been coined by the designated cooperating agencies, the formula for the compound including the structural formula of organics, a definition or standard for the product, reference to the methods of analysis in the A.O.A.C. or elsewhere, conversion factors if these offer any special problem, information regarding coloration, general types of use including types of pests and perhaps in some instances individual pests, toxicity to warm-blooded animals, toxic effect on plants when applicable, antidote, caution statements, storage and shipping directions and precautions, physical properties and constants, incompetencies where known, perhaps dosages, residue tolerances where definitely established and tentative tolerances in cases where this seems advisable, general standard formulations which are generally accepted and perhaps certain specific formulations where these seem desirable.

The question of proper classification or organization in such a publication is particularly difficult. It has been suggested that they might be classified according to the general classification used by the U.S. Pharmacopoeia, alphabetically, according to broad usage, or according to practical types of usage.

Such a publication should, in general, contain only basic materials and should not contain commercial formulations, although certain standard generally accepted formulations as mentioned above might be incorporated.
The work of this committee, as suggested in outline above, may perhaps be thought of as monumental. It would undoubtedly cover a period of several years. It would, however, seem to be of definite value to a variety of groups, including chemists, entomologists, pharmacologists and toxicologists, physiologists both plant and animal, public health workers and doctors, research workers on economic poisons in general, pest control operators, growers, insecticide manufacturers, food processors, and perhaps others.

If a handbook of this type is to be endorsed and sponsored by the Association, it would appear that a number of subcommittees might be essential, involving the chairman of other Association committees, such as those on Ingredients, Toxicity, and Methods of Analysis. In addition to other reports, the chairman of our Toxicity Committee previously made a rather extensive report to the Executive Committee at our April, 1949, meeting.

As this work progresses, there are, of course, many sources of information, including recent books such as Frear's Second Edition, Frear's Catalogue of Insecticides and Fungicides, Volumes One and Two, the bulletin published by Penn State and Maine State entitled Pest Control Materials, 1949, de Ong's Book on Insecticides, 1948, Pharmaceutical Standards including Tolerances and Methods of Analysis, published by American Drug and American Pharmaceutical Manufacturers Association, the Pharmacopoeia, Merck's Index, and various chemistry handbooks.

In Pest Control Materials, 1949, Frear, et.al., list over 700 materials on Pages 83-99 and on Page 104. This publication also lists over 2,300 formulations as an alphabetical list of trade names. De Ong, in his new book, lists over 700 materials.

The financing of such a publication may be a difficult problem. There may be some question as to whether or not such a book could be made a financial success in its own right. The cost might well be rather large. The size of the publication must be kept within bounds and not become too cumbersome. The committee should consider the possibility that it might be necessary to ask that such a publication be subsidized in some form.
REPORT OF THE COMMITTEE ON TOXICITY AND ANTIDOTES

J.C. WARD, CHAIRMAN

Due to conflict with sessions of other equally important groups, the attendance at the October 9, 1948 meeting of the Committee on Toxicity and Antidotes was disappointing. It was apparent that the program of the Committee would have to be carried on through correspondence and by infrequent telephone contacts with nearby members. This was done. The annual report of the Committee is as follows:

1. During the year, the major accomplishment of the Committee was the completion of its reviewing of precautionary labels and antidote statements, and their presentation to the Executive Committee for further action. This was an extensive job which required considerable careful study by each member of the group. The Executive Committee recommended to the Insecticide Division that the revised statements be published as interpretations under the Federal Insecticide, Fungicide, and Rodenticide Act. This recommendation is being followed.

2. Another significant contribution which the Committee made in the toxicity field was to survey the attitude of regulatory, advisory and industrial groups toward the general public sale of sodium fluoroacetate in certain ant bait. The adverse opinion which was uncovered in this survey was very useful both to the Insecticide Division and to the manufacturer.

3. The Committee was recognized by the American Medical Association shortly after the October 1948 meeting of the Association when the Chairman was invited to attend a fact-finding conference at the American Medical Association headquarters in Chicago to discuss the various problems relating to evaluation of new economic poisons, both prior to and during early public sale. Again, in January 1949, the Chairman was asked to serve on a Toxicity Committee of the American Industrial Health Conference meeting in Chicago. These meetings served to establish the Committee as an active unit in the fields of toxicity and antidote study.

4. The Committee reviewed the question of warning statements on household poisons, based on the solvents present. It was recommended to the Executive Committee that warnings should be required, based on the presence of petroleum distillates in household formulations. The Executive Committee endorsed the recommendation and so informed the Insecticide Division.

5. An accident survey was attempted through a group of insurance companies and when this move failed to produce data of significant value, the problem was presented to the Council on Pharmacy and Chemistry of the American Medical Association and to the Bureau of Vital Statistics, Public Health Service. This Bureau proved to be cooperative and helpful insofar as the records of fatalities were concerned, but had no information on sublethal involvements. This search was then carried to the District of Columbia office of the American Red Cross where records on all hospitalizations from accidents for some five years were available for review.
These records proved to be helpful, but were inadequate. The American Medical Association was approached for an exchange of reports on non-fatal accidents. Cooperation has not extensive as yet, although it is increasing.

6. The matter of incomplete death certificates for accidental poisoning victims was taken up with the American Medical Association in the hope that steps could be taken immediately in the Journal of the American Medical Association to instruct local doctors as to what added information should be entered on such certificates. The results of this contact are still undetermined.

7. A survey has been started to determine how much toxicological information should be demanded of a manufacturer before a new poison should be given an Experimental Permit, and how much added data would be needed before the poison is given full registration. The returns have not all been received.

8. The Committee presented proposals to the April 24th (1949) meeting of the Executive Committee with respect to –-

   a. Enlargement of the section covering the use of color with white economic poisons.

   b. Increasing the coverage of the Federal Insecticide, Fungicide, and Rodenticide Act to include mole and predatory animal poisons, and bird repellents.

   c. Redefinition of the term "highly toxic" to include poisons not sufficiently toxic to rats, mice or rabbits to meet the requirements in the regulations under the Federal Insecticide, Fungicide, and Rodenticide Act, but which have been responsible for a number of serious accidents in use.

   d. Accepting rat viruses for registration.

None of these points have been fully explored, and consequently they are all still pending.

9. Of importance also in this Committee's program is the question of how best to stimulate research on poisons and antidotes, a project which would seem to be a definite committee responsibility. One proposal which has been considered is that of contacting the heads of Pharmacology Departments in all the medical schools in the country, with the suggestion that such new substances as tetraethyl pyrophosphate, parathion and sodium fluoracetate be introduced into class study to demonstrate their effects and to show the action of anesthetic or other drugs on them. It is felt that in this way interest in testing all potential antidotal drugs might be stimulated on such a wide scale that some very useful treatments might be discovered much more promptly than if such work was limited to a very small group of investigators. Such a program might entail extensive correspondence between the Committee members to whom this phase of the project would be assigned and the medical officials
- as well as with the companies which would be in position to furnish samples. The reaction of the Executive Committee to the activation of this project would be appreciated.

10. One change in membership occurred during the year when Mr. Joseph A. Noone replaced Dr. Charles L. Smith as the member representing the National Agricultural Chemicals Association.

The above report has been presented in narrative form, but even so, it abstracts the activities of the Committee to a marked degree. The Committee has had varying degrees of success in carrying on its several projects. Should the Executive Committee now be in position to define the precise responsibilities of the Committee on Toxicity and Antidotes, it is felt that should be done.
REPORT OF LEGISLATIVE COMMITTEE

Allen B. Lemon, Chairman

This Committee held no meetings during the year but has followed with interest the trend for improved legislation with regard to economic poisons by the various states. According to the information provided us, on December 31, 1948, there were thirty-seven states with laws governing the sale of economic poisons, in addition to those of the Federal government, Territory of Hawaii, and Dominion of Canada. Eleven states either had no law or had laws governing only a few of the different types of products involved. Several of these during 1949 enacted legislation governing the sale of economic poisons in the respective states. Other states modified their laws to bring them in general agreement with the Federal Insecticide, Fungicide and Rodenticide Act and the proposed model uniform law.

This Committee wishes to bring to attention another trend in the development of regulation with regard to economic poisons, and that is laws with regard to pest control operators who are applying economic poisons for hire. Fifteen states have laws of one type or another affecting agricultural pest control operators.

A proposed uniform act relating to application of insecticides, fungicides, and herbicides has been prepared by interested parties and is being submitted to the Drafting Committee of the Council of State Governments. If it approves the bill, it will forward it to the states for consideration in accordance with its established procedure. Copies of the draft prepared August 30, 1949, together with interpretative statement, were sent by the Secretary to all members of the Association of Economic Poisons Control Officials. It seems to cover the problems involved and should be a worthwhile contribution to uniformity of regulation in this field.
The committee met Friday evening, October 7, at 8 p.m. in the East Room, Shoreham Hotel. Ten topics were submitted by members of the committee for discussion by industry representatives and members of the association, as follows:

1. What is the policy regarding registration of unregistered economic poisons which have been discontinued by the manufacturer?

   Mr. Berry and Mr. Jones of Virginia stated they offer the manufacturer three options:

   (a) Register the item for the current registration period, with the understanding that shipments will be discontinued and no further application for registration will be made.

   (b) Advise the trade to return items on hand for credit.

   (c) Refuse to register, nor have it returned from all retail and wholesale dealers.

   If option (c) is elected, stop-sale is placed on the items, or reasonable time is allowed the dealer to dispose of the goods by private use or otherwise.

   In general the majority of State Officials considered this procedure fair and equitable, and operated in whole or part in the same manner.

2. What is the policy regarding re-registration of registered economic poisons which are discontinued during a registration period?

   Majority of states do not require registration or inspection fees on items discontinued during a registration period. Some permit notification by letter or separate listing, while others require these items to be listed on the regular application forms.

3. Should water of crystallization be claimed as an active ingredient in (a) dry economic poisons, and (b) in economic poisons consisting of aqueous solutions?

   Citing Disodium Ethylene Bisdithiocarbamate Hexahydrate as an example, it was the consensus of opinion that the water of crystallization may be declared as an active ingredient in (a). In the case of a water solution only the anhydrous chemical is considered to be active. If desired, the hexahydrate equivalent may be declared in addition to the anhydrous declaration.

4. What tolerances are allowed on (a) net content declaration and (b) on ingredient claims?

   In general no tolerances have been established by state officials. Some expressed the opinion that the allowance of a tolerance
would in effect be the lowering of the guarantee. Each individual case is considered separately and the various factors weighed before decision is made.

5. Should Economic Poisons Laws include nematodes and other worms?

Many of the more recent laws, following the pattern of the uniform act, have extended the definition of "insects" in the Federal Act to include nematodes and other worms. It was the consensus of opinion that these pests should be considered within the purview of most laws. Many states include worms by regulation or various definitions.


Discussion brought out the fact that some states allow dealers to repackage economic poisons from large containers and require him to obtain certificate of registration and label his own packages in conformance with the law. Others discourage this practice due to the hazards involved and find dealers very cooperative and willing to discontinue the practice. Representatives of the trade requested that dealer packaging be discouraged by all state officials.

7. Horse fly repellents and killers.

These products are generally subject to state laws. Federal and state officials require substantiation of any claims made for products of this type. At present there are few materials recognized for this use.

8. What is the attitude of control officials toward a brand name showing percentage figures which differ from the guaranteed analysis?

Examples cited for discussion were 20-20-60 Copper Mixture, Sulfur-Calcium Arsenate, 50-50 Dust, Sulfur-Calcium Arsenate, 25-75 Dust, etc.

Generally the policy has been adopted of accepting brand names which include percentages figures where usage has established their true meaning to all parties concerned.

The arsenic percentages refer to the commercial product and the actual percentages of arsenic is shown in the ingredient statement. The manufacturer is within his rights to use a percentage statement in the brand name provided the buyer is not deceived.

The committee recommends that Economic Poisons manufacturers be invited to submit questions for discussion and send representatives to meet with the States Relations Committee in order that problems of mutual interest may be presented.

The committee adjourned omitting the last two topics because of the lateness of the hour and the scheduled Executive Committee meeting to follow.
REPORT ON METHODS OF ANALYSIS

METHODS CLEARING HOUSE

J.J.T. GRAHAM, CHAIRMAN

Last year the Secretary announced in the "Pest Controller" that the Insecticide Division had accumulated a number of methods in mimeographed form that were being used in the Division's laboratories, and that these methods were available for distribution to the Economic Poisons Control Officials and other interested persons. During the year a number of requests were made for the methods, and following the 1943 meeting additional requests were made.

A mailing list has been compiled of all of the Control Officials who requested the sets of methods and whenever new methods are added they will be sent to the officials on the mailing list.

This list at present includes the Control Officials of the States of Arizona, California, Connecticut, Delaware, Florida, Georgia, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Nebraska, New Jersey, North Carolina, North Dakota, Oregon, Pennsylvania, South Carolina, Texas, Utah, Virginia, Wyoming, and the Territory of Hawaii. The list also includes the Control Laboratory at Ottawa, Canada.

Besides the sets of methods requested after last year's meeting, methods for the following determinations have been sent to those on the mailing list:

- Alpha naphthyl thiourea
- Metaldehyde
- Naphthalene
- Zinc in zinc dimethyl dithiocarbamate
- Gamma isomer of benzene hexachloride, by J.B. LeClair
- Dinitro cresol in liquid preparations containing emulsifying agents, etc.
- Dinitro Cresol
- Dinitro-O-Cresol in powders containing an inert diluent
- Mercury in organic compounds
- Revision of the official method for rotenone in derris and cube powder
Gamma isomer of benzene hexachloride by chromatography.
( This method is an improved procedure proposed by T.H. Harris and published in the August 1949 issue of the Journal of the Association of Official Agricultural Chemists.)

In addition to the above, the Victor Chemical Works method for determination of tetraethyl pyrophosphate (Anal. Chem., Vol. 21, No. 7, 808, 1949) has been mimeographed and will soon be distributed.

A number of methods have also been furnished to industrial laboratories, and a complete set was given to the National Agricultural Chemical Association for their official files.

One of the most important method developments is the improvement in the chromatographic method for determination of the gamma isomer of benzene hexachloride by T.H. Harris. Following this procedure the gamma isomer may be separated quantitatively from the other isomers of benzene hexachloride, and also from DDT and methoxychlor.

Last year a request was made that the members of this association furnish the Chairman of the Methods Clearing House copies of methods that may be developed or which may be discovered and found useful in their laboratories. If this is done, the methods may be made available to all on the mailing list.
PERSONS IN ATTENDANCE AT THIRD ANNUAL MEETING
OF THE
ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

Representing States and Canada:

Alabama
George H. Marsh, Director
Div. Agricultural Chemistry

California
Allen B. Lemmon, Chief
Bureau of Chemistry

Canada
G. W. Michael, Assoc. Chief
Div. Fertilizer Control
Charles V. Marshall
Superintendent of Laboratory
Plant Products Division

Colorado
F. Herbert Gates, Chief
Plant Industry

Connecticut
H. J. Fisher, Chemist
Agricultural Experiment Sta.

Delaware
R. Earle Dickey, State Chemist
Board of Agriculture

Florida
J. J. Taylor, State Chemist
Department of Agriculture
E. R. Winterle, Chemist
Department of Agriculture

Georgia
R. A. Moncrief,
Assistant State Chemist
Department of Agriculture

Indiana
F. W. Quackenbush
State Chemist
Purdue University

Iowa
Mrs. E. M. Johnston
Acting State Chemist

Kansas
Paul Ijams, Director
Control Division
M. E. Rohrer
Board of Agriculture

Louisiana
Ernest A. Eops, Jr., Chief Chemist
Department of Agriculture

Maryland
L. E. Bopst, State Chemist
Inspection & Regulatory Service
A. B. Heagy, Chemist
Inspection & Regulatory Service
J. E. Schueler, Chemist
Inspection & Regulatory Service
R. W. Neal, Inspector
Inspection & Regulatory Service
H. R. Walls, Micro.-Chemist
Inspection & Regulatory Service

Michigan
W. C. Geagley, Chief Chemist
Department of Agriculture

Minnesota
H. A. Halvorson, Chemist in Charge
Div. Feed & Fertilizer Control
Henry J. Hoffmann, Chief Chemist
Dept. Agriculture, Dairy & Food
Bernhard C. Swenson, Deputy Com.
Department of Agriculture

Mississippi
M. P. Etheredge, State Chemist
Department of Chemistry

North Carolina
E. W. Constable, State Chemist
Department of Agriculture
North Dakota
Ronald T. Ottes, Assoc. Chemist
State Laboratories Department

Floyd Roberts, Chief Chemist
State Laboratories Department

New Hampshire
Henry A. Davis, Asst. Chemist
Agriculture Experiment Station

G. H. Lamarie, Supervisor
Department of Agriculture

New Jersey
Stacy B. Randle, State Chemist
Agricultural Experiment Sta.

New Mexico
R. W. Ludwick, Deputy in Charge
Feed & Fertilizer Control

New York
A. B. Buchholz, Director
Dept. Agriculture & Markets

Ohio
W. S. Thompson, Chemist
Department of Agriculture

Oklahoma
Clyde A. Bower, Director
Div. Entomology & Plant Ind.

Oregon
J. D. Patterson, Chief Chemist
Department of Agriculture

Pennsylvania
Donald E. H. Frear, Prof.
Agr. Biochem. Penn State Col.

G. J. Kuhlman, Chief Chemist
Bureau Foods & Chemistry

Rhode Island
John B. Smith, Prof.
Agr. Chem. State College

South Carolina
H. J. Webb, Chief Chemist
Clemson College

South Carolina
E. D. Clawsonger, Head
Dept. Fertilizer Insp. & Anal.

South Dakota
Guy G. Prerry, State Chemist
Department of Agriculture

D. J. Mitchell, Asst. Chemist
State Chemical Laboratory

Texas
J. F. Fudge, State Chemist
Agricultural Experiment Station

Vermont
Harold L. Bailey, Deputy
Commissioner of Agriculture

L. S. Walker, Chemist
Department of Agriculture

Virginia
Rodney C. Berry, State Chemist
Department of Agriculture

J. Claggett Jones, Chemist-Exec.
Division of Chemistry

Washington
J. L. St. John, State Chemist
Agricultural Experiment Station

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C. H. Amick, Director
Food & Dairy Div., Dept. of Agr.

Edgar Shanholtzer, Chemist
Department of Agriculture

Marvin H. Snyder, Chief Chemist
Department of Agriculture

Wisconsin
W. B. Griem, Chief Chemist
Department of Agriculture

Wyoming
George B. Harston, State Ent.
Department of Agriculture
Representing Federal Government:

Insecticide Division
Production & Marketing Administration:

S. C. Billings, Technician
E. L. Green, Chemist
E. P. Carter, Pathologist
E. L. Griffin, Ass't. Chief
R. L. Caswell, Chemist
C. F. Hoffman, Adm. Officer
W. E. Chappell, Agronomist
W. G. Reed, Chief
A. D. Cromartie, Adm. Officer
H. H. Shepard, Entomologist
H. H. Custis, Chemist
E. A. Walker, Chief Pathologist
D. W. Dean, Field Representative
J. C. Ward, Chief Pharmacologist
C. G. Donovan, Senior Chemist
R. O. White, Entomologist
J. J. T. Graham, Chief Chemist
P. B. Dunbar, Commissioner of Food & Drugs, Washington, D.C.

Representing Industry:

G. M. Baird, President
N.A.I.D.M., New York
W. R. Flach, Lab. Dir.
Eastern States Farmers Exchange, N.Y.

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N.P.C.A., Brooklyn, N.Y.
J. B. Friday, Chemist
Naco Fertilizer Co., South Carolina

William Chapman, Chemist
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N.A.I.D.M., New York

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P. B. Heller, President
B. Heller & Co., Illinois

J. D. Conner, General Counsel
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E.I. duPont de Nemours Co., Delaware

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O.M.Scott & Sons Co., Ohio
C. J. Krist, Manager
Agr. Products Dept., DuPont, Delaware

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Esso Standard Oil Co., N.Y.
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Moorman Mfg. Co., Illinois

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C. C. McDonnell, Consultant
Chevy Chase, Md.

J. A. Noone, Tech. Adviser
N.A.C.A., Washington, D.C.

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West Disinfecting Co., N.Y.

John Powell, Exec. Com.
N.A.I.D.M., N.Y.

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Monsanto Chem. Co., Missouri

A. M. Smith, Market Research
Mathieson Chem. Corp., N.Y.

P. D. Sparre, Legal Dept.
E. I. duPont de Nemours Co., Del.

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N.A.I.D.M., New York

Dow Chem. Co., Michigan

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R. J. Prentiss & Co., Inc., N.Y.

G. J. Turner, Chemist

M. C. Van Wormer, Chemist
Farm Bur. Coop. Ass'n., Ohio

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J.R. Watkins Co., Minnesota
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Tucson

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Plant Board, War Memorial Bldg.,
Little Rock

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Bureau of Chemistry
Department of Agriculture
Sacramento 14

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Denver

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Dept. of Analytical Chemistry
P.O. Box 1106, New Haven

DELAWARE - No law

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Production & Marketing Admr.,
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Dairy & Food Division
Department of Agriculture
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Control Division
Board of Agriculture
Topeka

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Mrs. F.C. Dugan, Director
Div. of Food, Drugs & Hotels
620 S. 3rd St.,
Louisville 2

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M.S. Perkins, Asst. Commissioner
Dept., Agriculture & Immigration
P.O.Box 951, Baton Rouge
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<thead>
<tr>
<th>State</th>
<th>Name and Title</th>
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<td>E.A. Epps, Jr., Chief Chemist</td>
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<td>552 State Office Bldg., St. Paul</td>
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<td>Mississippi</td>
<td>M.P. Etheredge, Chief Chemist</td>
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<td>New Hampshire</td>
<td>G. H. Laramie, Control Supervisor</td>
<td>Department of Agriculture</td>
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<td>State House, Concord</td>
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<td>New Jersey</td>
<td>S.B. Randle, State Chemist</td>
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<td>New Brunswick</td>
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<td>North Carolina</td>
<td>E.W. Constable, State Chemist</td>
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<td></td>
<td>Raleigh</td>
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<td>North Dakota</td>
<td>R.O. Baird, State Food Commissioner</td>
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<td></td>
<td>State Laboratories Department</td>
<td>Lock Box 900, Bismarck</td>
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<td>Ohio</td>
<td>Frank Farnsworth, Director</td>
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<td>Insect &amp; Plant Disease Control</td>
<td>Department of Agriculture</td>
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<td>Columbus 15</td>
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<td>Oklahoma</td>
<td>Clyde Bower, Director</td>
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<td>Entomology &amp; Plant Control Div.</td>
<td>Department of Agriculture</td>
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<td>Capitol Bldg., Oklahoma City</td>
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<td>Oregon</td>
<td>J.D. Patterson, Chief Chemist</td>
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<td></td>
<td>Division of Foods &amp; Dairies</td>
<td>Department of Agriculture, Salem</td>
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</table>
PENNSYLVANIA

W.S. Hugel, Director
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G.J. Kuhlman, Head Chemist
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Clemson

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G.B. Harston, State Entomologist
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C.V. Marshall, Superintendent
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Division of Marketing
Board of Commissioners
Agriculture & Forestry
Honolulu 1
REPORT

OF THE

ASSOCIATION OF ECONOMIC POISONS

CONTROL OFFICIALS

1948
REPORT OF THE SECRETARY

Introduction

It was considered advisable to issue the report of the Secretary prior to the meeting in Washington to conserve time on the morning program of the Association. Herein is a brief summary of the activities of this office during the interim between meetings.

Cooperation

The Insecticide Division, Production and Marketing Administration, has requested State opinions on problems involving labeling of some insecticidal formulations before rendering decisions. This procedure is doing much to overcome the lack of uniformity in interpretations of the various state regulatory laws. One recommendation seems to be in order: - That the member officials reply promptly to these requests. Collaborative study and effort are necessary to attain our objective of uniformity in legislation; regulation and enforcement of laws controlling economic poisons. Every official should submit opinions when requested on these questions as they arise.

Meetings

In recognition of our Association, your Secretary was invited to attend various meetings and conventions as an official representative. Decisions emanating from these formal discussions involving technical data have been transmitted to the membership. Other information has been released by the appropriate agencies.

Your Secretary has been in attendance at the following meetings and conventions:

Interdepartmental Committee on Pest Control in Washington, D.C.

National Association of Insecticide and Disinfectant Manufacturers in Baltimore and Spring Lake, N.J.

Agricultural Insecticide and Fungicide Association in Washington, D.C. and Spring Lake, N.J.

Labeling and Precautionary Committee of Industry and the Federal Department in Washington, D.C.

Federal Insecticide Department Officials and the Executive Committee of the Association of Economic Poisons Control Officials in Washington, D.C.
Label Clearance

Experimental data, proposed labels, and Federal statements have been distributed to the membership for opinions and criticisms. This was carried out at the suggestion of members of the industry in the interest of uniformity. The approach to the problem is a healthy improvement over the usual practice of having labels printed, advertising prepared and other useless expenditure of time and money. If our Association will encourage manufacturers to act in this fashion many control headaches will be overcome. Close scrutiny should be given to any labels submitted under this plan before rendering decisions, to avoid misrepresentations and misunderstanding.

General Duties

Correspondence incidental to the office has been carried on in response to inquiries regarding state laws, requests for information concerning the Association, analytical methods, policies regarding labeling for new economic poisons, and precautionary requirements and supporting data for some of the newer economic poisons.

Proposed regulations and definitions of terms were prepared and distributed to the membership and four industry organizations. After examining the proposals, as formulated by the Executive Committee of the Association, industry representatives met with the Secretary to present such comment and criticism as they believed to be warranted. These recommendations were compiled and resubmitted to the Executive Committee.

News Releases

Information was circulated among our membership through the medium of the "Pest Controller". Three releases were sent out during the course of the year. These bulletins were limited in number due to the fact that it was considered desirable to formulate material of a worthwhile nature rather than to meet a definite publication schedule. Although this procedure was inaugurated as an experiment response by members indicate the desirability of continuing publication.
INTRODUCTION

This report, the first of its type, has been prepared for the dual purpose of recording the early business of the Association and to serve as a source of reference material for the control official.

It should be noted that the Uniform State Bill, Regulatory Principles and Definitions of Terms are still in the proposed stage and are yet to be adopted by the Association.

Two of the addresses given at the morning session were not available in their entirety and are herewith summarized.

It is entirely probable that errors of omission and commission have been made in this initial publication. Suggestions for future improvement are always welcome.
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<td>Control Officials</td>
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</tr>
</tbody>
</table>
OFFICERS, COMMITTEES AND INVESTIGATORS OF
ECONOMIC POISONS CONTROL OFFICIALS

President - H.J. Hoffmann - St. Paul, Minnesota
Vice-Pres.- J.F. Fudge - College Station, Texas
Secy-Treas. A.B. Heagy - College Park, Maryland

Executive Committee
President, Vice-President, Secretary-Treasurer,
and Retiring President, Ex Officio

A.B. Lemmon, (1949) Chairman - Sacramento, California
J.L. St. John (1949) - Pullman, Washington
W.G. Reed (1949) - Washington, D.C.
E.W. Constable (1950) - Raleigh, N.C.
A.B. Buchholz (1950) - Albany, N.Y.

Committees

Legislative

A.B. Lemmon, Chairman - Sacramento, California
W.G. Reed - Washington, D.C.
J.F. Fudge - College Station, Texas
J.D. Patterson - Salem, Oregon
Paul Ijams - Topeka, Kansas

Toxicity and Antidotes (Joint)

J.C. Ward, Chairman - Washington, D.C.
A.B. Lemmon - Sacramento, Cal.
G.G. Frary - Vermillion, South Dakota
J.M. George - Winona, Minnesota
C.L. Smith - New York, N.Y.
J.H. Foulger - Wilmington, Delaware
E.G. Klarmann - Bloomfield, New Jersey
W.A. Simanton - San Francisco, California
S.D. Silver - Edgewood Arsenal, Md.
J.C. Krantz - Baltimore, Maryland

Ingredient

H.H. Shepard, Chairman - Washington, D.C.
A.M.G. Soule - Augusta, Maine
C.A. Bower - Oklahoma City, Oklahoma
L.W. Kephart - Beltsville, Maryland
M.C. Goldsworthy - Beltsville, Maryland
### Uniform Standards

<table>
<thead>
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<tr>
<td>J.L. St. John, Chairman</td>
<td>Pullman, Washington</td>
</tr>
<tr>
<td>C.V. Marshall</td>
<td>Ottawa, Canada</td>
</tr>
<tr>
<td>H.J. Fisher</td>
<td>New Haven, Connecticut</td>
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<td>E.L. Griffin</td>
<td>Washington, D.C.</td>
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### State Relations

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<tr>
<td>A.B. Heagy, Chairman</td>
<td>College Park, Md.</td>
</tr>
<tr>
<td>E.A. Epps, Jr.</td>
<td>Baton Rouge, Louisiana</td>
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<tr>
<td>R.C. Berry</td>
<td>Richmond, Virginia</td>
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<td>H.L. Bailey</td>
<td>Montpelier, Vermont</td>
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<td>J.D. Patterson</td>
<td>Salem, Oregon</td>
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<tr>
<td>W.T. McGeorge</td>
<td>Tucson, Arizona</td>
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<td>Howard Hammond</td>
<td>Bismarck, North Dakota</td>
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<td>Paul Ijams</td>
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### Investigators

Methods Clearing House

<table>
<thead>
<tr>
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<tr>
<td>J.J.T. Graham</td>
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### Uniform Sampling

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<tr>
<td>A.D. Cromartie</td>
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</table>
CONSTITUTION OF THE ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

Section 1. Name. The name of the association shall be The Association of Economic Poisons Control Officials.

Section 2. Object. The object of the association shall be to promote uniform and effective legislation, definitions, rulings, and enforcement of laws relating to the control of sale and distribution of insecticides, fungicides, and other economic poisons.

Section 3. Membership. The membership of the association shall consist of the officials charged by law with the active execution of the laws regulating the sale of economic poisons and such deputies as shall be duly designated by these officials, and research workers employed by state, territory, dominion or federal agencies who are engaged in the investigation of economic poisons and their component parts.

Section 4. Officers. The officers of the association shall be the president, the vice-president, the secretary-treasurer, and an executive committee.

Section 5. The executive committee. The executive committee shall consist of the president, the vice-president, the secretary-treasurer, the retiring president, and four elected members, two members of whom shall be elected at each annual meeting of the association, except at the 1947 meeting two shall be elected for a one-year term and two for a two-year term.

The executive committee shall have the control and management of the affairs of the association during the interim between regular meetings, and shall take action on majority vote of the committee and report its official activities to the association.

The executive committee shall report on such matters as may be referred to it by the association, and review and present to the association with recommendations all the recommendations of the investigators and special committees and such resolutions and regulations as pertain to economic poisons.

Section 6. Voting. Each state, territory, dominion and federal agency engaged in control of sale and distribution of economic poisons is entitled to a single vote. Voting by proxy shall be permitted.

Section 7. Amendments. The constitution or by-laws may be amended at any regular meeting by a two-thirds vote of the voting membership present. All proposed amendments to the constitution shall be submitted in writing to the secretary at least 30 days prior to the opening of the annual meeting, and the secretary shall distribute copies to the members at least 10 days prior to the meeting. All proposed amendments to the by-laws shall be submitted in writing prior to the opening of the annual meeting.
Section 8. Investigations and special committees. For the purpose of studying the subject of uniformity in legislation, definitions and rulings, and the enforcement of laws concerning economic poisons, the president may appoint investigators or committees. These investigators shall have the authority to appoint such assistants as may be necessary. Investigators shall be appointed for one year and may be reappointed. Special committees may be appointed by the president. No appointment shall be made for a period exceeding two years.

Section 9. Dues. Each state, territory, dominion, and federal agency engaged in the regulation or investigation of economic poisons shall pay dues of $15.00 for each year of its membership, and this shall entitle the members to the services and publications of the association.

BY-LAWS

Section 1. Regular meetings of the association shall be held at least once each year, except in the case of an emergency which would prevent an adequate representation of the membership. Special meetings may be called by the executive committee.

Section 2. Election of officers. All officers shall be elected by ballot, and shall hold office until the adjournment of the annual meeting next following their election, or until their successors are elected.

In the event of a vacancy occurring in any office, except that of president or vice-president, the president shall fill the vacancy by appointment and such appointment shall continue until the close of the next regular meeting of the association, at which meeting the unexpired term shall be filled by election in the usual way.

Section 3. Duties of officers. The president, vice-president, and secretary-treasurer shall perform the duties usual to such officers.

The secretary-treasurer shall keep a record of all proceedings of the association and attend to all necessary correspondence. He shall also receive all moneys due the association, and shall keep an accurate account of all receipts and disbursements, and report with proper vouchers at each annual meeting.

Resolutions, other than those of the resolution committee, shall be presented in writing to the executive committee, which shall provide a place for them on the program.

The following shall be the order of business unless changed at the time by the vote of the association:
1. Reading of the minutes of preceding meeting
2. Report of secretary-treasurer
3. Announcements and appointment of committees
4. President's address
5. Roll call by states
6. Special addresses
7. Reports of investigators and special committees
8. Reports of credentials committee
9. Special topics or executive session
10. Resolutions referring to economic poisons
11. Report of executive committee
12. Report of auditing committee
13. Report of resolutions committee
14. Unfinished business
The Association of Economic Poisons Control Officials was organized during a meeting of the Western Cooperative Spray Conference in Portland, Oregon, on January 21, 1947. Dr. J. L. St. John was selected to serve as President and Allen B. Lerman as Secretary-Treasurer. A committee composed of these officers and J. D. Patterson drafted a proposed constitution and by-laws, with the object of promoting uniformity and effective legislation, definitions, regulations and enforcement of laws relating to the control of sale and distribution of insecticides, fungicides and other economic poisons.

The executive committee was selected geographically to give representation from all sections of the country. In addition to the president and secretary-treasurer, the following served on this committee: L. E. Bopst, State Chemist, Maryland; H. A. Lopper, Secretary-Treasurer, Association of Official Agricultural Chemists; D. S. Coltrane, Assistant Commissioner of Agriculture, North Carolina; W. G. Reed, Chief, Insecticide Division, U. S. Department of Agriculture; H. J. Hoffmann, State Chemist, Minnesota; J. F. Fudge, State Chemist, Texas; H. J. Fisher, Chemist in Charge, Connecticut, and J. D. Patterson, Chief Chemist, Oregon.

A draft of the proposed constitution and by-laws was sent to each state and federal official concerned with economic poisons law enforcement. Forty-three states endorsed the plan which resulted in the first annual meeting at the Shorham Hotel in Washington, October 19, 1947. A report of this meeting follows:

The meeting was called to order at 9:55 a.m. by President J. L. St. John. Address of welcome was given by Dr. P. M. Annand, Chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture. Dr. Annand emphasized the interest of his organization in the formation of this Association. He pointed out that in order to have adequate control of pests the economic poisons used must correspond to guarantee and be adequately regulated.

Following the report of the Secretary-Treasurer, Allen B. Lerman, Dr. J. L. St. John presented his paper entitled, "Some Objectives of the Association". Some of these objectives, as outlined by Dr. St. John were: (1) development and establishment of uniform procedures and requirements for the marketing of economic poisons, (2) to afford an opportunity for consideration of various problems confronting regulatory officials, (3) to act as a clearing house for information relating to economic poisons control, and (4) to provide a workable means for carrying out cooperation between federal and state control officials.

Dr. W. G. Reed, Chief, Insecticide Division, U. S. Department of Agriculture, discussed the new federal economic poisons law and regulations. In his discussion Dr. Reed pointed out the provisions in the new federal law with regard to cooperation with state officials and indicated his desire for full cooperation with this Association.
Mr. L. S. Hitchner, Executive Secretary-Treasurer, Agricultural Insecticide and Fungicide Association, discussed, "Our Mutual Responsibilities". Among the items that he thought should be considered were (1) primary object of labels, (2) proper poison labeling including precautionary labeling, (3) a national policy with regard to what are active ingredients, and (4) development in use of a uniform application for registration.

The paper presented by Dr. H. W. Hamilton, Secretary, National Association of Insecticide and Disinfectant Manufacturers, was entitled, "From 1910 to 1950". Dr. Hamilton mentioned that in 1910 only eleven states had economic poisons laws, while in 1946 thirty-seven states had such legislation. The uniform economic poisons law has been passed by seven state legislatures.

At the end of this portion of the program there was a period of discussion by members present. Dr. S. A. Rohwer, Assistant Chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, raised the question with regard to the suitability of the term "economic poisons" in the name of the Association and suggested that it be changed to "pesticides". Dr. A. J. Cox pointed out that the term "economic poisons" was only a term defined by law to cover a class of materials that are used for pest control purposes and does not denote poisonousness of a material.

Other items discussed in general were proper statement of ingredients, and what is an active ingredient. Dr. S. A. Rohwer explained with regard to the establishment of common names such as was done in selecting the name chlordane.

The meeting recessed at 12:30 for luncheon at which time honor was paid to pioneers in economic poisons control work. Those specifically introduced were Dr. C. C. McDonnell, retired Chief, Insecticide Division, U. S. Department of Agriculture, Dr. A. J. Cox, retired Chief, Bureau of Chemistry, California Department of Agriculture, Dr. E. L. Griffin, Assistant Chief, Insecticide Division, U. S. Department of Agriculture, and J. J. T. Graham, Senior Chemist, Insecticide Division, U. S. Department of Agriculture. The introductions were made by Allen B. Lommon.

In the afternoon the meeting was open to federal and state officials. It was called to order at 2:30 p.m. The first order of business was the adoption of the constitution and by-laws. The amendments recommended by the Executive Committee were accepted and Section 9 was further amended to include the words, "and this shall entitle the members to the services and publications of the Association".

The afternoon program included the following:

"The Association of Official Agricultural Chemists and this Organization" by H. A. Lopper, Secretary, Association of Official Agricultural Chemists. Mr. Lopper stated that the A.O.A.C. had incorporated to avoid possible personal liability in certain instances and that this Association should consider the matter carefully.
"Model State Insecticide Bill" by E. W. Constable, State Chemist, Department of Agriculture, North Carolina. Dr. Constable compared the present North Carolina law with the proposed uniform state bill and pointed out certain sections that he considered inadequate in the uniform bill. He strongly recommended adoption of a uniform application for registration in order to aid the industry in complying with registration requirements.

"Federal-State Cooperation" by Dr. W. G. Reed. Dr. Reed stated that he believed this Association should study, among other things, proper ingredient declarations; warnings; cautions; antidotes to appear on labels; adequacy of directions for use; and methods of evaluating the effectiveness of economic poisons products. He said that each official interested should write to his office as to the extent of possible cooperation with the federal government in enforcement.

"New Organic Insecticides" by Dr. R. C. Roark. Dr. Roark discussed the new organic insecticides as follows: (1) chlorinated camphene, (2) hexaethyl tetraphosphate, (3) diethyl parathion monothionophosphate, (4) benzene hexachloride, (5) chlordane, (6) dichloro diphenyl dichloroethane, and (7) methoxychlor.

With no unfinished business at hand, the meeting turned to consideration of the nominating committee report and election of officers as follows:

President                J. L. St. John
Vice-President           H. J. Hoffmann
Secretary-Treasurer       A. B. Hoagy
Executive Committee
W. G. Reed               (1949)
A. B. Lemmon             (1949)
J. F. Fudge              (1948)
H. J. Fisher             (1948)
PROPOSED UNIFORM STATE ECONOMIC POISONS BILL

(Title. It should conform to state requirements. The following is a suggestion; a more complete title should be used where necessary:

"An Act relating to the distribution, sale, or transportation of adulterated or misbranded insecticides, fungicides, rodenticides, and other economic poisons (and devices); regulating traffic therein; providing for registration and examination of such materials, imposing penalties, and for other purposes."

(Be it enacted, etc.)

Section 1. Title. This Act may be cited as the Economic Poisons Act of

Section 2. Definitions. For the purpose of this Act --

a. The term "economic poison" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, fungi, weeds, or other forms of plant or animal life or viruses, except viruses on or in living man or other animals, which the Commissioner shall declare to be a pest.

b. The term "device" means any instrument or contrivance intended for trapping, destroying, repelling, or mitigating insects or rodents or destroying, repelling, or mitigating fungi or weeds, or such other pests as may be designated by the Commissioner, but not including equipment used for the application of economic poisons when sold separately therefrom.

c. The term "insecticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects which may be present in any environment whatsoever.

d. The term "fungicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or
mitigating any fungi.

e. The term "rodenticide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating rodents or any other vertebrate animal which the Commissioner shall declare to be a pest.

f. The term "herbicide" means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any weed.

g. The term "insect" means any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class Insecta, comprising six-legged, usually winged forms, as, for example, beetles, bugs, bees, flies, and to other allied classes of arthropods whose members are wingless and usually have more than six legs, as, for example, spiders, mites, ticks, centipedes, and woodlice.

h. The term "fungi" means all non-chlorophyll-bearing thallophytes (that is, all non-chlorophyll-bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts, and bacteria, except those on or in living man or other animals.

i. The term "weed" means any plant which grows where not wanted.

j. The term "ingredient statement" means a statement of the name and percentage of each active ingredient, together with the total percentage of the inert ingredients, in the economic poison; and, in case the economic poison contains arsenic in any form, a statement of the percentage of total and water soluble arsenic, each calculated as elemental arsenic.

k. The term "active ingredient" means an ingredient which
will prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds, or other pests.

1. The term "inert ingredient" means an ingredient which is not an active ingredient.

m. The term "antidote" means the most practical immediate treatment in case of poisoning and includes first aid treatment.

n. The term "person" means any individual, partnership, association, corporation, or organized group of persons whether incorporated or not.

o. The term "Commissioner" means the (Commissioner, Secretary or Director of Agriculture).

p. The term "registrant" means the person registering any economic poison pursuant to the provisions of this Act.

q. The term "label" means the written, printed, or graphic matter on, or attached to, the economic poison (or device), or the immediate container thereof, and the outside container or wrapper of the retail package, if any there be, of the economic poison (or device).

r. The term "labeling" means all labels and other written, printed, or graphic matter.

(1) upon the economic poison (or device) or any of its containers or wrappers;

(2) accompanying the economic poison (or device) at any time;

(3) to which reference is made on the label or in literature accompanying the economic poison (or device), except when accurate, non-misleading reference is made to current official publications of the United States Departments of Agriculture or Interior, the United States Public Health Service, State Ex-
periments; State Agricultural Colleges, or other similar Federal institutions or official agencies of this State or other States authorized by law to conduct research in the field of economic poisons.

s. The term "adulterated" shall apply to any economic poison if its strength or purity falls below the professed standard or quality as expressed on labeling or under which it is sold, or if any substance has been substituted wholly or in part for the article, or if any valuable constituent of the article has been wholly or in part abstracted.

t. The term "misbranded" shall apply --

(1) to any economic poison (or device) if its labeling bears any statement, design, or graphic representation relative thereto or to its ingredients which is false or misleading in any particular;

(2) to any economic poison --

(a) if it is an imitation of or is offered for sale under the name of another economic poison;

(b) if its labeling bears any reference to registration under this Act;

(c) if the labeling accompanying it does not contain instructions for use which are necessary and, if complied with, adequate for the protection of the public;

(d) if the label does not contain a warning or caution statement which may be necessary and, if complied with, adequate to prevent injury to living man and other vertebrate animals;

(e) if the label does not bear an ingredient statement on that part of the immediate container and on the outside container or wrapper, if there be one, through which the ingredient statement on the immediate container can not be clearly read,
of the retail package which is presented or displayed under customary conditions of purchase;

(f) if any word, statement, or other information required by or under the authority of this Act to appear on the labeling is not prominently placed thereon with such conspicuousness (as compared with other words, statements, designs, or graphic matter in the labeling) and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use, or

(g) if in the case of an insecticide, fungicide, or herbicide, when used as directed or in accordance with commonly recognized practice, it shall be injurious to living man or other vertebrate animals or vegetation, except weeds, to which it is applied, or to the person applying such economic poison.

Section 3. Prohibited Acts.
a. It shall be unlawful for any person to distribute, sell, or offer for sale within this State or deliver for transportation or transport in intrastate commerce or between points within this State through any point outside this State any of the following:

(1) Any economic poison which has not been registered pursuant to the provisions of Section 4 of this Act, or any economic poison if any of the claims made for it or any of the directions for its use differ in substance from the representations made in connection with its registration, or if the composition of an economic poison differs from its composition as represented in connection with its registration: Provided, That, in the discretion of the Commissioner, a change in the labeling or formula of an economic poison may be made within a registration period without requiring reregistration of the product.
(2) Any economic poison unless it is in the registrant's or the manufacturer's unbroken immediate container, and there is affixed to such container, and to the outside container or wrapper of the retail package, if there be one through which the required information on the immediate container can not be clearly read, a label bearing

(a) the name and address of the manufacturer, registrant, or person for whom manufactured;
(b) the name, brand, or trade mark under which said article is sold; and
(c) the net weight or measure of the content subject, however, to such reasonable variations as the Commissioner may permit.

(3) Any economic poison which contains any substance or substances in quantities highly toxic to man, determined as provided in Section 5 of this Act, unless the label shall bear, in addition to any other matter required by this Act,

(a) the skull and crossbones;
(b) the word "poison" prominently, in red, on a background of distinctly contrasting color; and
(c) a statement of an antidote for the economic poison.

(4) The economic poison commonly known as standard lead arsenate, basic lead arsenate, calcium arsenate, magnesium arsenate, zinc arsenate, zinc arsenite, sodium fluoride, sodium fluorosilicate, and barium fluorosilicate unless they have been distinctly colored or discolored as provided by regulations issued in accordance with this Act, or any other white powder economic poison which the Commissioner, after investigation of and after public hearing on the necessity for such action for the protection of the
public health and the feasibility of such coloration or discoloration, shall, by regulation, require to be distinctly colored or discolored; unless it has been so colored or discolored: Provided, That the Commissioner may exempt any economic poison to the extent that it is intended for a particular use or uses from the coloring or discoloring required or authorized by this section if he determines that such coloring or discoloring for such use or uses is not necessary for the protection of the public health.

(5) Any economic poison which is adulterated or misbranded, (or any device which is misbranded).

b. It shall be unlawful --

(1) for any person to detach, alter, deface, or destroy, in whole or in part, any label or labeling provided for in this Act or regulations promulgated hereunder, or to add any substance to, or take any substance from, an economic poison in a manner that may defeat the purpose of this Act;

(2) for any person to use for his own advantage or to reveal, other than to the Commissioner or proper officials or employees of the State or to the courts of this State in response to a subpoena, or to physicians, or in emergencies to pharmacists and other qualified persons, for use in the preparation of antidotes, any information relative to formulas of products acquired by authority of Section 4 of this Act.

Section 4. Registration.

a. Every economic poison which is distributed, sold, or offered for sale within this State or delivered for transportation or transported in intrastate commerce or between points within this State through any point outside this State shall be registered in the office of the Commissioner, and such registration shall be re-
nowed annually; Provided, That products which have the same formula, are manufactured by the same person, the labeling of which contains the same claims, and the labels of which bear a designation identifying the product as the same economic poison may be registered as a single economic poison; and additional names and labels shall be added by supplement statements during the current period of registration. The registrant shall file with the Commissioner a statement including:

(1) the name and address of the registrant and the name and address of the person whose name will appear on the label, if other than the registrant;

(2) the name of the economic poison;

(3) a complete copy of the labeling accompanying the economic poison and a statement of all claims to be made for it including directions for use; and

(4) if requested by the Commissioner a full description of the tests made and the results thereof upon which the claims are based. In the case of renewal of registration, a statement shall be required only with respect to information which is different from that furnished when the economic poison was registered or last reregistered.

b. The registrant shall pay an annual fee of $_______ for each economic poison registered, such fee to be deposited (in the Treasury of the State) (to the credit of a special fund to be used only for carrying out the provisions of this Act): Provided, however, That any registrant may register annually any number of brands after the payment of annual fees aggregating $_______.

c. The Commissioner, whenever he deems it necessary in the administration of this Act, may require the submission of the
complete formula of any economic poison. If it appears to the Commissioner that the composition of the article is such as to warrant the proposed claims for it and if the article and its labeling and other material required to be submitted comply with the requirements of Section 3 of this Act, he shall register the article.

d. If it does not appear to the Commissioner that the article is such as to warrant the proposed claims for it or if the article and its labeling and other material required to be submitted do not comply with the provisions of this Act, he shall notify the applicant of the manner in which the article, labeling, or other material required to be submitted fail to comply with the Act so as to afford him an opportunity to make the necessary corrections. If, upon receipt of such notice, the applicant insists that such corrections are not necessary and requests in writing that the article be registered, the Commissioner shall provide him with opportunity for hearing before refusing to issue registration. In order to protect the public, the Commissioner, on his own motion, after hearing, may at any time, cancel the registration of an economic poison. In no event shall registration of an article, be construed as a defense for the commission of any offense prohibited under Section 3 of this Act.

e. Notwithstanding any other provision of this Act, registration is not required in the case of an economic poison shipped from one plant within this State to another plant within this State operated by the same person.

Section 5. Determinations; Rules and Regulations; Uniformity.
a. The Commissioner is authorized, after opportunity for a hearing.

(1) to declare as a pest any form of plant or animal life
or virus which is injurious to plants, men, domestic animals, articles, or substances;

(3) to determine whether economic poisons are highly toxic to man; and

(3) to determine standards of coloring or discoloring for economic poisons, and to subject economic poisons to the requirements of Section 3 a (4) of this Act.

b. The Commissioner is authorized, after due public hearing, to make appropriate rules and regulations for carrying out the provisions of this Act, including rules and regulations providing for the collection and examination of samples of economic poisons (or devices).

c. In order to avoid confusion endangering the public health, resulting from diverse requirements, particularly as to the labeling and coloring of economic poisons, and to avoid increased costs to the people of this state due to the necessity of complying with such diverse requirements in the manufacture and sale of such poisons, it is desirable that there should be uniformity between the requirements of the several States and the Federal Government relating to such poisons. To this end the Commissioner is authorized, after due public hearing, to adopt by regulation such regulations, applicable to and in conformity with the primary standards established by this Act, as have been or may be prescribed in the United States Department of Agriculture with respect to economic poisons.

Section 6. Enforcement.

a. The examination of economic poisons (or devices) shall be made under the direction of the Commissioner for the purpose of determining whether they comply with the requirements of this Act. If it shall appear from such examination that an economic
poison (or device) fails to comply with the provisions of this Act, and the Commissioner contemplates instituting criminal proceedings against any person, the Commissioner shall cause appropriate notice to be given to such person. Any person so notified shall be given an opportunity to present his views, either orally or in writing, with regard to such contemplated proceedings and if thereafter in the opinion of the Commissioner it shall appear that the provisions of the Act have been violated by such person, then the Commissioner shall refer the facts to the (District Attorney) for the county in which the violation shall have occurred with a copy of the results of the analysis or the examination of such article: Provided, however, That nothing in this Act shall be construed as requiring the Commissioner to report for prosecution or for the institution of libel proceedings minor violations of the Act whenever he believes that the public interests will be best served by a suitable notice of warning in writing.

b. It shall be the duty of each (District Attorney) to whom any such violation is reported to cause appropriate proceedings to be instituted and prosecuted in the Court without delay.

c. The Commissioner shall, by publication in such manner as he may prescribe, give notice of all judgments entered in actions instituted under the authority of this Act.

Section 7. Exemptions.

a. The penalties provided for violations of Section 3a of this Act shall not apply to --

(1) any carrier while lawfully engaged in transporting an economic poison within this State, if such carrier shall, upon request, permit the Commissioner or his designated agent to copy all
records showing the transactions in and movement of the articles;

(2) public officials of this State and the Federal Government engaged in the performance of their official duties;

(3) the manufacturer or shipper of an economic poison for experimental use only

(a) by or under the supervision of an agency of this State or of the Federal Government authorized by law to conduct research in the field of economic poisons, or

(b) by others if the economic poison is not sold and if the container thereof is plainly and conspicuously marked "For experimental use only - Not to be sold", together with the manufacturer's name and address: Provided, however, That if a written permit has been obtained from the Commissioner, economic poisons may be sold for experiment purposes subject to such restrictions and conditions as may be set forth in the permit.

b. No article shall be deemed in violation of this Act when intended solely for export to a foreign country, and when prepared or packed according to the specifications or directions of the purchaser. If not so exported, all the provisions of this Act shall apply.

Section 8. Penalties.

a. Any person violating Section 3 a (1) of this Act shall be guilty of a misdemeanor and upon conviction shall be fined not more than $__________.

b. Any person violating any provision of this Act other than Section 3 a (1) shall be guilty of a misdemeanor and upon conviction shall be fined not more than $____ for the first offense and upon conviction for a subsequent offense shall be fined not more than $____: Provided, That any offense committed more than five
years after a previous conviction shall be considered a first offense.

c. Notwithstanding any other provisions of this section, in case any person, with intent to defraud, uses or reveals information relative to formulas of products acquired under authority of Section 4 of this Act, he shall be fined not more than $____ or imprisoned for not more than one year, or both.

Section 9. Seizures.

a. Any economic poison (or device) that is distributed, sold, or offered for sale within this State or delivered for transportation or transported in intrastate commerce or between points within this State through any point outside this State shall be liable to be proceeded against in any _____ Court in any county of the State where it may be found and seized for confiscation by process of libel for condemnation:

(1) in the case of an economic poison,
   (a) if it is adulterated or misbranded;
   (b) if it has not been registered under the provisions of Section 4 of this Act;
   (c) if it fails to bear on its label the information required by this Act;
   (d) if it is a white powder economic poison and is not colored as required under this Act.

(2) In the case of a device, if it is misbranded.)

b. If the article is condemned, it shall, after entry of decree, be disposed of by destruction or sale as the court may direct and the proceeds, if such article is sold, less legal costs, shall be paid to the State Treasurer; Provided, That the article shall not be sold contrary to the provisions of this Act: and Pro-
vided, further, That upon payment of costs and execution and delivery of a good and sufficient bond conditioned that the article shall not be disposed of unlawfully, the court may direct that said article be delivered to the owner thereof for relabeling or reprocessing as the case may be.

c. When a decree of condemnation is entered against the article, court costs and fees and storage and other proper expenses shall be awarded against the person, if any, intervening as claimant of the article.

Section 10. Delegation of Duties. All authority vested in the Commissioner by virtue of the provisions of this Act may with like force and effect be executed by such employees of the Department of Agriculture as the Commissioner may from time to time designate for said purpose.

Section 11. Cooperation. The Commissioner is authorized and empowered to cooperate with, and enter into agreements with, any other agency of this State, the United States Department of Agriculture, and any other State or agency thereof for the purpose of carrying out the provisions of this Act and securing uniformity of regulations.

Section 12. Separability. If any provision of this Act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, the constitutionality of the remainder of this Act and the applicability thereof to other persons and circumstances shall not be affected thereby.

Section 13. Effective Date. All provisions of this Act, except Section 3, "prohibited acts"; Section 8 "penalties"; and Section 9 "seizures", shall take effect upon enactment, and Section 3, 8, and 9, shall take effect as follows:
(1) as to devices, upon enactment;

(2) as to rodenticides and herbicides, 6 months after

and

(3) as to insecticides, fungicides, and all other economic
poisons, one year after enactment.

Section 14. Repeals. Jurisdiction in all matters pertaining
to the distribution, sale and transportation of economic poisons
(and devices), is by this Act vested exclusively in the Commis-
sioner, and all acts and parts of acts inconsistent with this Act
are hereby expressly repealed.

Note: This bill was prepared by The Council of State
Governments, and modified by the Association of
Economic Poisons Control Officials, October 1948.
PROPOSED REGULATORY PRINCIPLES

1. **Applicability of Principles:** These principles are designed primarily for the guidance of State Economic Poisons Control Officials in those states which have adopted the Uniform State Insecticide, Fungicide and Rodenticide Act, but should be used by other state officials insofar as their statutes will permit.

2. **Definitions and Standards:** The definitions and standards established for this Association should be adopted by state officials insofar as their statutes will permit.

3. **Methods of Analysis:** The current methods of analysis of the Association of Official Agricultural Chemists of North America shall be adopted as the official methods insofar as they are applicable, and such other methods shall be used as may be necessary to determine whether the product complies with the law.

4. **Registration of Products:** Uniform application forms for registration should be used by State Officials. Two specimens or exact copies of the labeling of each proposed product should be submitted with the application. Also, there should be submitted the name and percentage of each active ingredient and the total percentage of inert ingredients in the product, the proposed directions for use, and a list of the specific pests for control of which it is to be sold, if such information is not contained in the labeling. Such other pertinent information concerning inert ingredients and physical properties of the product shall also be included on request.

5. **Registration, General Application of:** A registration of an economic poison is held to apply to the product even though manufactured at or shipped from other than the registered address. When a product has been registered by a manufacturer or a jobber, no registration shall be required of other sellers of the product so registered, provided shipments or deliveries thereof are in the manufacturer's or registrant's original, unopened, and properly labeled immediate containers.

6. **Registration, Refusal or Cancellation of:** Any of the following causes is sufficient to justify refusal or cancellation of registration of a product:

   (a) if the labeling bears any statement, design, or graphic representation relative thereto, or to its ingredients, which is false or misleading in any particular;

   (b) if found to be an imitation of or offered for sale under the name of another economic poison;

   (c) if the labeling bears reference to registration procedure, or number;

   (d) if the labeling accompanying the economic poison does not contain directions for use which are adequate for the protection of the public under customary conditions of use;
(e) if the label does not contain a warning or caution statement which may be necessary to prevent injury to living man and other vertebrate animals, vegetation (except weeds), and useful invertebrate animals;

(f) if the label does not bear an ingredient statement on that part of the immediate container and on the outside container or wrapper, if there be one, through which the ingredient statement on the immediate container cannot be clearly read, of the retail package which is presented or displayed under customary conditions of purchase. Provided that the control official may permit the ingredient statement to appear prominently on some other part of the container, if the size or form of the container makes it impracticable to place it on the part of the retail package which is presented or displayed under customary conditions of purchase.

(g) if any word, statement, or other information required to appear on the label or labeling is omitted or not prominently placed thereon and in such terms as to render it likely to be read and understood under customary conditions of purchase and use;

(h) if an economic poison is found to be injurious to living man or other useful vertebrate animals, vegetation (except weeds), to which it is applied, of person applying such economic poison when used as directed.

7. Changes in Labeling or Ingredient Statement: Changes in the substance in the labeling or ingredient statement of a registered economic poison shall be submitted in advance to the control official. The registrant must describe the exact change desired and proposed effective date and such other pertinent information that justify such changes. After the effective date of a change in labeling or ingredient statement the product shall be marketed only under the new claims or ingredient statement, except that a reasonable time may be allowed by the control official for disposal of properly labeled stocks of the old product. Changes in the composition shall not be allowed if such changes would result in a lowering of the product's value as an economic poison.

8. Label Requirements: Each package of economic poison sold separately shall bear a complete label. The label shall contain the name of the product; name and address of the manufacturer, registrant, or person for whom manufactured; directions for use when necessary; statement of net content; and an ingredient statement. The label of every economic poison, if necessary to prevent injury to man, other animals, and useful vegetation, must contain a warning or caution statement, in non-technical language based on the hazard involved in the use of the economic poison. In addition, any economic poison, highly toxic to man shall be labelled conspicuously with the word "poison" and the skull and cross-bones symbol all in red on a background of distinctly contrasting color, and the first-aid antidote for the poison shall be given.

9. Directions for Use - When Necessary: Directions for use are
required whenever they are necessary for the protection of the public. The public includes not only users of economic poisons, but also those who handle them or may be affected by their use, handling, or storage. Directions for use are considered necessary in the case of most small retail containers which go into the hands of users, and in the case of larger containers with the following exceptions:

(a) Directions may be omitted where the economic poison is sold in containers of 50-pounds or more of a solid or 20 gallons or more of a liquid, Provided; The economic poison is a well-known substance or mixture of substances for economic poison purposes and is intended only for the use to which it is ordinarily applied, and it bears an ingredient statement giving the names and percentages of each of the active ingredients.

(b) Directions may be omitted if the economic poison is to be used by manufacturers in their regular manufacturing processes, Provided; The label clearly shows that the product is intended for use only in manufacturing processes, and bears an ingredient statement giving the name and percentages of each of the active ingredients.

(c) Directions may be omitted if the economic poison is sold only to physicians or veterinarians, Provided; The label bears an ingredient statement giving the name and percentages of each of the active ingredients.

(d) Directions may be omitted if the economic poison is sold to distributors for dilution or mixing with carriers to prepare economic poisons for sale to the public, Provided; The label bears an ingredient statement giving the name and percentages of each of the active ingredients, and the economic poison is a well-known substance or mixture of substances, and there is readily available general knowledge of the composition, methods of use, and effectiveness of the product for economic poison purposes.

10. Other Claims: No claims shall be made for products in any written, printed or graphic matter accompanying the product at any time which differ in substance from representations made in connection with registration.

11. Name of Product: The name of the product shall appear on the labeling so as not to emphasize any one ingredient, or otherwise be misleading. It shall not be arranged on the label in such a manner as to be confused with other terms, slogans or legends.

12. Brand Names. Duplication of, or Infringement on: A brand name is distinctive with reference to the material to which it applies, and the registration of economic poisons under the same brand name by two or more manufacturers or shippers should be discouraged. This principle applies also to the registration of brand names so similar in character as to be likely to be confused by the purchaser. In the event the same name, or a closely similar one is offered by another manufacturer, the official should
acquaint both parties with the fact, with the view of avoiding the confusion which follow the duplication of brand names.

13. **Ingredient Statement**: A label shall state: The name and percentage by weight of each active ingredient, together with the total percentage by weight of the inert ingredients. In the ingredient statement all names shall be printed in type of the same size, and in such terms as to render them likely to be read and understood under customary conditions of purchase.

14. **Name of Ingredients**: The well-known common name of the ingredient must be given or, if the ingredient has no common name, the correct chemical. If there is no common name and the chemical composition is unknown or complex, the enforcement official may permit the use of a new or coined name which he finds to be appropriate for the information and protection of the user. If the use of a new or coined name is permitted, the enforcement official may prescribe the terms under which it may be used. A trademark or trade name may not be used as the name of an ingredient except when it has become a common name.

15. **Sliding Scale Percentages**: The "sliding scale" method of expressing percentages shall not be used. (Example: "phosphorus, 2-3%). This is not to be construed as forbidding the use of qualifying statements descriptive of the basic active material or materials, provided such statements do not constitute an integral part of the percentage of total active ingredients. (Example: "Technical chlorinated camphene XX% ((Combined chlorine 67%-69%).")

16. **Net Contents**: Each package of an economic poison shall show the net weight or measure of content, either stenciled or printed on the package or container, or on a tag attached thereto. Indefinite statements of content such as ".....oz. when packed" shall not be used. Statements of liquid measure, or of specific gravity or density of liquid preparations, or expression of composition in terms of pounds per gallon, shall be made on the basis of 60°F. (20°C.) except when other basis has been established through trade custom.

17. **Coloration of Highly Toxic Materials**: The white economic poisons hereinafter named shall be colored or discolored in accordance with this section. Provided, however, that any such white economic poison which is intended solely for use by a textile manufacturer or commercial laundry, cleaner or dyer as a moth proofing agent, which would not be suitable for such use if colored and which will not come into the hands of the public except when incorporated into a fabric, shall not be required to be so colored or discolored in accordance with this section. The hues, values, and chromas specified are those contained in the Munsel Book of Color, Munsell Color Company, 10 East Franklin Street, Baltimore, Maryland.

(a) The coloring agent must produce a uniformly-colored product not subject to change in color beyond the minimum requirements during ordinary conditions of marketing and storage, or cause the product to become less effective or cause damage when used as directed.
(b) Standard load arsenato, basic load arsenato, calcium arsenato, magnesium arsenato, zinc arsenato, zinc arsenite, and barium fluosilicato shall be colored any hue, except tho yellow-rod and yellows, having a valuo of not more than 8 and a chroma of not less than 4, or shall be discolored to a neutral lightness value not over 7.

(c) Sodium fluorido and sodium fluosilicato shall be color-od blue or green having a value of not more than 8 and a chroma of not less than 4, or shall be discolored to a neut-ral lightness value not over 7.

(d) The enforcement official may permit other hues to be used for any particular purpose if the prescribed hues are not feasible for such purposes, and if such action will not be injurious to the public.

18. Highly Toxic: An economic poison which falls within any of the following categories when tested on laboratory animals (mice, rats and rabbits) is highly toxic to man within the meaning of these principles:

(a) Oral toxicity. Those which produce death in half or more than half the animals of any species at a dosage of 50 milligrams at a single dose, or less, per kilogram of body weight when administered orally to ten or more such animals of each species.

(b) Toxicity on inhalation: Those which produce death in half or more than half of the animals of any species at a dosage of 200 parts or less by volume of air when administered by continuous inhalation for one hour or less to ten or more animals of each species, provided such concentration is likely to be encountered by man when the economic poison is used in any reasonably foreseeable manner.

(c) Toxicity by skin absorption: Those which produce death in half or more than half of the animals (rabbits only) tested at a dosage of 200 milligrams or less per kilogram of body weight when administered by continuous contact with the bare skin for 24 hours or less to ten or more animals.

Provided, however, that an enforcement official may exempt any economic poison which meets the above standard but which is not in fact highly toxic to man, from these principles with respect to economic poisons highly toxic to man, and may after hearing designate as highly toxic to man any economic poison which experience has shown to be so in fact.

19. Sale or Possession of Sodium Fluoroacetate: No person shall sell or possess any sodium fluoroacetato except federal, state, county, municipal officers or their deputies for use in their official duties in pest control; research or chemical laboratories in their respective fields; regularly licensed pest control opera-tors for use in their own service work; and wholesalers or jobbers of economic poisons for sale to the aforementioned persons, or for export.
20. Sale or Possession of Thallium: No person shall sell or possess any thallium or thallium compound except federal, state, county, municipal officers or their deputies for use in their official duties in pest control; research or chemical laboratories in their respective fields; regularly licensed pest control operators for use in their own service work; properly registered ant poisons containing thallium expressed as metallic not more than 1%; wholesalers or jobbers of economic poisons for sale to the aforementioned persons; or for export.

21. Labeling Sodium Arsenite Solution: An economic poison labeled or sold as sodium arsenite solution for control of weeds, termites, or wood-destroying fungi shall bear a statement of the percentage of arsenic trioxide contained therein as the active ingredient, and in addition shall bear a statement of the total arsenic in water-soluble form expressed as metallic, and the pounds of arsenic trioxide per gallon at 68°F. The weight of the solution in pounds per gallon at 68°F may also be given.

22. Labeling Products Containing Arsenic: The label of any economic poison containing arsenic as an active ingredient in any form shall show the total amount of arsenic, expressed as metallic, and the amount of arsenic in water-soluble form, expressed as metallic, in addition to other required statements.

23. Labeling Products Containing Copper: If an economic poison contains a copper compound of uncertain composition, the ingredient statement may be given in terms of copper expressed as metallic providing the type of compound is also shown. For example, the name of active ingredient may be stated as "Copper expressed as metallic (derived from basic copper sulfate)."

24. Labeling Products Containing Alkaloids: Products compounded with tobacco, nux vomica, saffron, or any other alkaloid-bearing material, shall be stated in terms of the alkaloid and not in terms of the plant material. Where accurate methods for determining alkaloid content are unknown, manufacturer and enforcement official should agree on an acceptable analytical procedure.

25. Labeling Products Containing Organic Thiocyanates: Materials containing organic thiocyanates under the general classification of esters, ethers, and similar compounds, containing up to and including 18 carbon atoms shall be guaranteed according to the actual ester or other content, rather than the percentage of commercial material present. In addition, the application for registration should contain a qualifying statement showing the percentage by weight of the combined nitrogen in the finished product.
PROPOSED DEFINITIONS OF TERMS

**Active Ingredient**: An ingredient which will in itself, when present in sufficient quantity, prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds, or other pests; it must not be antagonistic to the activity of the principal active ingredient or ingredients.

**Adhesive or Sticker**: A substance which increases the firmness of attachment of finely-divided solids or other water-insoluble materials to a solid surface, and may be measured in terms of resistance to time, wind, water, mechanical and chemical action.

**Antidote**: A practical immediate treatment, including first aid, in case of poisoning.

**Antiseptic**: A substance which opposes sopsis, putrefaction or decay; one that prevents or arrests the growth or action of microorganisms, either by destroying them or by inhibiting their growth and activity; when used for short periods of time must be a disinfectant or gormicide; but when used for long periods of time may act by preventing growth and development of disease germs; used especially of agents applied to living tissue.

**Bactericidio**: Anything that destroys bacteria. The term is synonymous in large part with gormicide, the chief difference being that the latter is somewhat broader, inasmuch as it may include microorganisms other than bacteria. Bactericidio is a precise term applying only to bacteria and to bacteria of all kinds. In practice, however, it is ordinarily regarded in the same light as gormicide with respect to the resistance of different bacteria; that is, a substance, in order to be called a bactericidio, is not necessarily required to be capable of destroying bacterial spores.

**Brand**: The name, number, trade-mark, or designation applied to an economic poison of any particular description by the manufacturer, distributor, importer, or vendor thereof. Each economic poison differing in the ingredient statement, analysis, name, number, or trade-mark shall be considered as a distinct and separate brand.

**Disinfectant**: A substance that frees from infection; usually, a chemical agent which destroys disease germs or other harmful microorganisms, but not necessarily the resistant spore forms; commonly used of substances applied to inanimate objects. The term disinfectant suggests the cleaning of sick rooms, clothing, bedding, lavatories, stables and in fact of any places or things that might harbor disease. By contrast, gormicide is a precise, colorless word, conveying its literal meaning and little more. The two terms appear to have the same meaning when applied to substances used in fighting disease. If it is accepted that substances called disinfectants are gormicides, and, in general, gormicides may act as
antiseptics but that antiseptics are not necessarily germicides, then it follows that disinfectants may, theoretically at least, act as antiseptics, but that antiseptics may not necessarily act as disinfectants.

**Detergent:** A substance used in aqueous or other medium to facilitate removal of foreign matter from solid surfaces.

**Deflocculating Agent:** A substance which aids in the production or maintenance of a dispersion of a solid within a liquid.

**Deposit Builder:** A substance which increases the material adhering to the surface during a reasonable period of application; it decreases the affinity between the desirable material and water, resulting in a greater deposit of material and shedding of water with less run-off of desirable material.

**Economic Poison:** A substance or mixture of substances intended for use as an insecticide, rodenticide, herbicide, fungicide, pruning paint or wood preservative; also a substance or mixture of substances intended for use as a fungicide, disinfectant, germicide, or bactericide except when for use on or in living man or other animals, and any other product intended for use on other forms of undesirable plant, animal or virus, except viruses on or in living man or other animals.

**Emulsifying Agent:** A substance which aids in the production or maintenance of a dispersion of one liquid within another.

**Fumigant:** A substance or mixture of substances which produce gas, vapor, fume, or smoke intended to destroy insects, bacteria or rodents.

**Fungicide:** A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any fungi.

**Fungi:** All non-chlorophyll bearing thallophytes (that is, all non-chlorophyll bearing plants of a lower order than mosses and liverworts) as, for example, rusts, smuts, mildews, molds, yeasts and bacteria, except those on or in living man or other animals.

**Germicide:** A substance that destroys germs (microorganisms); applied especially to agents that kill disease germs. In practice it is assumed that a substance represented as a germicide, when used as directed, will kill all ordinary disease germs, but is not necessarily required to be capable of destroying bacterial spores.

**Herbicide:** A substance or mixture of substances intended to prevent, destroy, repel or mitigate any woof.

**Insect:** Any of the numerous small invertebrate animals generally having the body more or less obviously segmented, for the most part belonging to the class insecta, comprising six-legged, usually winged forms, as for example, beetles, bugs, bees and flies; and to other allied classes of arthropods whose numbers are wingless and usually have more than six legs, as for example, spiders, mites, ticks, centipedes and wood lice.
Insecticide: A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any insects which may be present in any environment whatsoever.

Label: All written, printed, or graphic matter on, or attached to the economic poison, or the immediate container thereof, and the outside container or wrapper to the retail package of the economic poison.

Labeling: All information and other written, printed, or graphic matter upon the economic poison or any of its accompanying containers or wrappers to which reference is made on the label or in supplemental literature accompanying the economic poison.

Larvacide: A substance or mixture of substances intended to prevent, destroy, repel or mitigate larva.

Package: The carton, box, barrel or other receptacle into which an economic poison is placed for use, handling, removal, shipment, or conveyance; a single container of such article or articles, or several containers packed together, including both the immediate container of the material and the box, carton, or other container (if any) in which it is enclosed or displayed.

Package, Original Unbroken: The unit retail package as ordinarily displayed on and sold from the shelves of the dealer, distributor, or other vendor.

Package, Unbroken: The package delivered by the shipper to the carrier at the initial point of shipment. It may contain one or more original unbroken packages as defined above.

Rodent: All animals of the order Rodentia, such as rats, mice, gophers, prairie dogs, or squirrels.

Rodenticide: A substance or mixture of substances intended to prevent, destroy, repel or mitigate rodents or any other undesirable vertebrate animal.

Sanitizer: A substance which reduces the number of casual bacterial contaminates to safe levels as judged by health requirements; commonly used of substances applied to inanimate objects.

Selective Wetting Agent: A substance which by affecting the surface, alters the relative ease of wetting a solid by various fluids, for example, causes lead arsenate to be preferentially wetted by oil rather than by water.

Spreader or Film Extender: A substance which increases the area that a given volume of liquid will cover on a solid, or on another liquid.

Sterilize: To render sterile, that is, free from all living microorganisms. Heating for a sufficient time at a temperature at which microorganisms cannot live is recognized as a
physical method of freeing inanimate objects and their surroundings from all living microorganisms. Usually understood as referring to the treatment of surgeons’ instruments, gauze bandages, culture dishes, and other apparatus rather than the treatment of the sick room or of the human body.

Disinfect refers particularly to the destruction of disease germs, especially the vegetative forms, while sterilize denotes the freeing from all organic life. Sterilize is the more drastic, and it might easily happen that something is thoroughly disinfected without being completely sterilized.

**Synergist:** A substance which produces in combination with another a pharmacological effect in that the efficiency of one or more of the components may be greatly heightened or potentiated by the other.

**Water Modifier:** A substance which is used to change the pH or the chemical composition of dissolved or suspended material in the spray water in order to prevent undesirable behavior.

**Weed:** Any plant which grows where not wanted.

**Wetting Agent:** A substance which appreciably lowers the interfacial tension between water and a solid, and increases the tendency of a liquid to make complete contact with the surface of a solid, so that no dry area may remain.
SUGGESTED LEGISLATIVE CONTROL OF 2,4-D, ITS DERIVATIVES AND RELATED PRODUCTS

1. Whereas, these products, as hereafter defined in Section I, have become essential for the economical control of weeds in crops; and,

2. Whereas, in certain forms and under certain conditions, these products are detrimental and destructive to susceptible plants; and,

3. Whereas it is essential that proper methods of application be used to prevent danger to susceptible crops when these products are used for control; and,

4. Whereas, ________, gives the ________ authority to promulgate such rules, regulations and standards as are necessary to properly control the use of these products in accord with the intent and purposes of the Act.

5. Therefore I ________, ________ by virtue of the power conferred upon me by the above named act ________, do hereby establish and promulgate the conditions which shall control these products in ________.

Section I -- Definitions:

1. By "2,4-D, its derivatives and formulated products" is meant:

   (a) 2,4-Dichlorophenoxyacetic Acid, its salts and esters.
   (b) The free acids, salts and esters of other halo­
gonated phenoxy-acetic acids or phenyl-acetic acids.

2. By "related products" is meant:

   (a) Other weed control chemicals having plant hormone characteristics.

Section II -- Requirements and Limitations: Any person may use 2,4-D, or related products provided the following conditions are fulfilled:

   (a) All operators doing custom spraying or dusting for hire shall be bonded and shall secure a per­
      mit from ________.
   (b) All operators doing custom spraying or dusting shall keep a record of each herbicidal applica­
       tion. This record, a copy of which must be mail­
       ed to the ________ within 24 hours of the day of application, must include:

       1. Name of owner or owners of the area treated.
2. The exact location of the area treated.
3. The date and time of day when the application was made.
4. Velocity and direction of wind at time of application.
5. Type of formulation used (acid, salt or ester and concentration).
6. Pounds in terms of free acid applied per acre.
7. Name of crop treated.

(c) Persons, other than those doing custom spraying or dusting for hire, making application covering more than one acre at any one time shall keep records similar to those set forth in section II-b, which records shall be preserved and made available to on demand.

(d) Airplane spraying and dusting with 2,4-D or related products for weed control are prohibited in the vicinity of susceptible plants during the growing season. The may define such vicinity and establish conditions of airplane application.

(e) Containers which have been used for transporting or handling 2,4-D or related products, shall not be used for transporting or handling any materials other than such products and shall be clearly marked.

(f) Containers which have been used for the transportation or handling of 2,4-D or related products shall be disposed of by crushing, burying or in such manner as not to constitute a hazard to crops or other desirable plants.

(g) 2,4-D and related products shall not be stored with other products and shall at all times be handled and stored in such manner as to eliminate the possibility of contaminating other materials used in the growing of crops or desirable plants.
The Executive Committee has held several meetings during the year. On October 12, 1947, after the first annual meeting, the Committee met to prepare a program and aid the President to select committees and investigators.

In April, 1948, the Committee was called together in Washington D.C., to consider proposed interpretations under the Federal Insecticide, Fungicide, and Rodenticide Act. This meeting was at the request of Dr. W.G. Reed and all expenses were paid by the Insecticide Division of the U.S. Department of Agriculture. All members of the Committee were present for the whole period of this meeting, April 26-30. After certain suggested modifications were made in the proposed interpretation statement, it was approved and the Committee unanimously recommended publication as soon as possible. The Committee also considered the proposed regulations and definitions drafted by the Secretary and after making some revisions, approved their being sent to members for further comment.

Upon receipt of the June 8, 1948, report of the Legislative Committee concerning the Uniform Bill, drafted by the Council of State Governments, the Executive Committee voted by mail to inform the Secretary of the National Association of Commissioners, Secretaries, and Directors of Agriculture that it opposed the alternate provision for labeling of ingredient statements in the Uniform Bill and recommended that this be changed to require on the label of each economic poison the name and percentage of each active ingredient and the total percentage of inert ingredients.

The Committee met at 2:00 o'clock, Friday afternoon, October 8, 1948, at the Shoreham Hotel.

Reports of Committees to study Toxicity and Antidotes, Active and Inert Ingredients, Homologation, and Uniform Registration Procedure were approved.

The Executive Committee thanked the investigators for Uniform Sampling Procedure and Methods Clearing House for their comprehensive reports and recommended that they continue this work. It was suggested that these reports along with all committee reports be published and sent to all persons attending the convention.

Since comments and suggestions concerning Proposed Regulations and Definitions were received too late for study, it was recommended that they be included in a report of the proceedings.

The Executive Committee suggested that the luncheon be discontinued which was later approved by the Association.

In conclusion, the Executive Committee expressed its appreciation to the Committee Members and Investigators for the work which they performed during the year and especially to commend and thank the Secretary.
Secretary's Report Covering the Second Annual Convention of the Association of Economic Poisons Control Officials

The second annual meeting of the Association of Economic Poisons Control Officials was held at the Shoreham Hotel, Washington, D. C., October 9, 1948. A total of 85 delegates registered; 44 represented 34 states, Canada and Hawaii; 18 from the federal government; and, 23 from industry.

Dr. J. L. St. John called the meeting to order at 9:37 a.m. The Secretary-Treasurer's report was omitted since it was mailed to the membership prior to the meeting.

The Secretary called the roll by states and Dr. St. John asked Dr. H. W. Hamilton, Secretary of the National Association of Insecticide and Disinfectant Manufacturers to introduce members of his association and to say a few words. Mr. Lea D. Hitchner, Executive Secretary of the Agricultural Insecticide and Fungicide Association introduced members of his group and made a few remarks.

Following the announcements and appointments of committees, Dr. H. J. Hoffmann, Vice President, introduced Dr. J. L. St. John's presidential address. The complete text of this and the following addresses are reprinted in full as part of this report. Other speakers on the morning program were Mr. James McConnon, Vice President, McConnon and Company, representing the Interstate Manufacturers Association; Dr. G. F. MacLeod, President of the Pacific Insecticide Institute; Mr. J. C. Ward, Chief, Pharmacology and Rodenticide Section, Production and Marketing Administration, Department of Agriculture; and, Dr. S. A. Rohwer, Assistant Chief, Bureau of Entomology and Plant Quarantine, Department of Agriculture.

The morning session adjourned at 12:30. Fifty-four persons attended the Association's luncheon.

The afternoon program was devoted to reports of the various committee chairmen and investigators. These reports are reproduced in full elsewhere in this publication.

Dr. S. A. Rohwer, in supplementing his report on activities of the Nomenclature Committee, outlined the procedure followed in arriving at common names for insecticides, fungicides and other economic poisons. The Interdepartmental Committee of Pest Control in cooperation with the Association of Economic Entomologists, the American Phytopathological Society, the American Medical Association, the American Chemical Association, and industry groups, have ways and means of implementing and devising a procedure for coining common names for complex chemicals. It is being recommended that suggestions for names originate with the subject matter specialist group. The Interdepartmental Committee carries the ball from this point.

Mr. H. H. Shepard, Chairman of the Ingredient Committee, outlined the difficulties involved in the classification of various materials, and presented a suggested procedure for future consideration.
Uniform Sampling Procedure, by A. D. Cromartie, Chief Investigator, Insecticide Division, Department of Agriculture, is a comprehensive discussion of sampling as applied to economic poisons.

In considering the report of the Legislative Committee, presented by Mr. A. B. Lemmon, the membership indicated much interest in the proposals of the National Association of Commissioners, Secretaries, and Directors of Agriculture. It was moved that the Association of Economic Poisons Control Officials go on record endorsing the Uniform State Bill prepared for and recommended by the Council of State Governments as amended by Resolution 6 of the National Association of Commissioners, Secretaries and Directors of Agriculture at their meeting in Bozoxi, Mississippi. The motion was passed by an acclamation vote.

It was brought out in Mr. J. J. T. Graham's report as Investigator for the Methods Clearing House that these procedures have not been studied by the Association of Official Agricultural Chemists, but are, in some cases, the only methods available for the newer chemicals. He added that some will be investigated collaboratively as soon as Associate Referrees can be found.

Mr. Paul Ijams, Chairman of the Committee on Uniform Registration Procedure, presented the proposed uniform application form and certificate of registration shown in this report. Mr. Lemmon called attention to the fact that the registration certificate can be duplicated for use by inspectors. In California eighteen to twenty readable copies are prepared with an electric typewriter and distributed to the inspectors who are covering a large area. This system keeps them up to date on the progress of registration.

Mr. Ward reviewed the future program arranged for the Committee on Toxicity and Antidotes. The members were interested in knowing when the information prepared by Mr. Ward would be available to control officials. It was announced that precautionary labels, in so far as federal requirements were concerned, would be released as soon as arrangements could be completed.

Reports of the Executive, Credentials, Auditing, and Resolutions Committees were discussed and adopted.

With no unfinished business to be considered, members heard the report of the nominating committee and election of officers. The following were named to serve for the year of 1948-49:

President H. J. Hoffmann
Vice President J. F. Fudge
Secretary-Treasurer A. B. Heagy

Executive Committee

A. B. Lemmon (1949)
W. G. Roed (1949)
E. W. Constable (1950)
A. B. Buchholz (1950)
* J. L. St. John (1949)

* Retiring President
ECONOMIC POISONS
PROGRESS AND PROBLEMS

J.L. St. John

Two hundred million dollars worth of chemicals were sold for agricultural uses in 1947, according to Chemical Industries for June 1948. This includes a large variety of insecticides, fungicides, herbicides, rodenticides, and other products to the extent of several thousand in number. Rapid progress has been made in the development of new products, even during the short year since the first annual meeting of this Association. Many things must be known regarding these products before they can be released for sale.

A year ago a number of problems were enumerated by your president. Some progress has been made toward the solution of some of these difficulties. However, with progress, there have come added problems, some of which may be even more difficult. We are all aware, including manufacturers, state and federal research, control, and public health agencies, of at least some of these difficulties. All are interested in products of maximum efficiency for the purpose for which they are designed, and which are at the same time feasible and safe for use by the consumer.

The Executive Committee of this Association appointed committees, and later, investigators to study some of the most obvious and pressing of the problems. That progress has been made during the year will be shown by the committee reports this afternoon. The committee on uniform registration has developed cooperatively with industry a form which may be of direct value in the efficient registration of products in the various states. It is hoped that uniform state registration blanks will be ready in the immediate future to submit to the various states for their consideration and for adoption if they so desire. The committee on toxicity was later expanded to include antidotes. This very important phase of the work on economic poisons will be discussed later this morning by the chairman of our committee. Analytical methods are of importance from a number of standpoints, and a Methods Clearing House has been established and coordinated with the work of the Association of Official Agricultural Chemists. The results of the cooperative effort of industry and government in the development of satisfactory methods may, at least partially, funnel through this methods clearing house, so that analytical methods which have not yet found their way into ordinary sources of accepted and approved methods may be available for preliminary use by those, especially in outlying states, who have need for such methods. The clearing house is designed to furnish a means, primarily, of making available unapproved methods of quantitative analysis, and not tests, although occasionally newer qualitative tests might also be made available.

One of our important committees is the Legislative Committee which, like certain others, was set up with advisory members from industry. This committee has given careful consideration during the year to the proposed Uniform State Economic Poisons Bill, which was originally developed prior to the formation of this Association. Certain proposals regarding this bill have also been given careful consideration by the Executive Committee, as well as by other organizations. The results of this consideration will be presented to our membership this afternoon so that our Association may determine its viewpoint regarding provisions in the proposed bill, and so that it may determine its policy regarding the approach to problems of this type.

The federal law which recently became effective provides for cooperation with the states. This provision was implemented by a joint meeting in April
between those in charge of the enforcement of the federal law and the members of the Executive Committee of this Association. Some results of this meeting have been reported. The type of approach developed by this meeting to some extent may be unique in cooperative state-federal relations and may thus serve as a model to this extent. In dealing with the variety of problems existing, some of them rather serious, cooperation between and within groups is essential for satisfactory progress. We need state cooperation, federal-state cooperation, government-industry cooperation and cooperation within industry. The organization of our Association and the state-federal conference last April are added steps in establishing cooperation and uniformity in the enforcement of economic poison laws. Cooperation between government and industry is further illustrated in progress which has been made in the development of uniform registration. The different industry associations are cooperating on manufacturing, marketing, and other problems including the new problems which have arisen within recent months.

Definitions and Regulations seem to be a necessary part of regulatory work. Progress has been made by our Executive Committee, led by our secretary, toward the development of uniform definitions and regulations for consideration by industry and by our Association. These may serve in a sense as a statement of principles which may be used as a basis by the states for the development of their own regulations. Progress has been made toward the development in book form of information of this and other types of immediate importance in control work, which may later be published under the title of Pesticopoeia.

Dissemination of information and of the results accomplished by our Association is essential. There are many avenues for the dissemination of such information. The journals of the industry associations have been generous with space regarding the formation of our association. Some new channels being developed by the Association for the distribution of information regarding pesticides include the "Pest Controller", edited by our secretary, and the proposed Pesticopoeia to contain regulations of this Association. It might be added that it is hoped that information regarding pesticides contained in the "Pest Controller" and in the Pesticopoeia will not include the listing of regulatory officials among the pests to be controlled.

The primary objective in the development of new pesticides is the production of materials which will be more highly effective for the purpose for which they are designed than were previous products. The majority of the unusually large number of new chemicals for use as economic poisons which have been introduced are synthetic organic materials which are distinctly different from the majority of pesticides previously used by agriculture. In the Pacific Northwest, a large quantity of lead arsenate and oil, and of fluorine compounds was used for many years. DDT has now largely taken over for the control of the codling moth. This does not control the mite, and miticides have been injected into the picture during the season just past. With these new products have come new problems, some of which probably no one could anticipate. One of the difficulties with economic poison is that they are poison, not only to the pest which they are designed to control, but unfortunately, in some cases, they are highly toxic to man and other warm-blooded animals. Some of these new organic pesticides have been found to leave a residue for several weeks on the food to which they are applied. Some of them are said to penetrate into the tissues of the food and others to give off undesirable flavor and odor, even though the quantity of the pesticide used may be surprisingly small. In order to control pests, the grower demanded these new materials. At the same time, residues, which might be harmful to the consuming public, should not be carried into the food. Thus has developed a situation which requires the careful and intelligent cooperation of all groups concerned.
Statements regarding certain phases of this problem have been found in the public press and in some journals. Manufacturing chemists and the food processing industry are well aware of this, and are, I believe, working vigorously toward its solution. All available information and data are being collected regarding the various phases of the problem, and directed toward the development of additional needed information. Adequate information regarding the undesirable characteristics of a new pesticide, such as toxicity to man and the limits of its toxicity, is essential, as well as information regarding its toxicity to the pest, and concerning proper methods for use. Each industry must establish its own quality standards and its own quality control. However, the marketing of new and comparatively untried products cannot be postponed indefinitely because of their acute need in food production. Voluntary control by the producers is preferable and should be more effective. If inadequate or ineffective, voluntary control may be supplemented by further legislation.

In the long run more rapid, effective, and sound progress will be made in the introduction of new economic poisons if we make haste slowly. Adequate facts regarding the important phases of the problem should be available before releasing a new pesticide to the public. Too hasty a release might boomerang and delay the progress of pest control for many years with a resultant adverse effect on agriculture.

Two illustrations of a cooperative plan of attack on somewhat similar problems might be given. The first is the nation-wide work that is being done on radioactive materials in soil fertility research. There are 23 or more experiments in progress at present, including 19 different crops located in 14 states, representative of diverse soils and growing conditions in these states, extending from Georgia to the state of Washington. Greenhouse as well as field work is included. Under such an organization much more conclusive results can be attained in a single season, although two or more seasons' work will be necessary before final conclusions are justified. Such a plan provides for a carefully organized and controlled experimental plan whereby the results will be more effective and subject to statistical treatment where desirable, and thus more definite conclusions may be secured. A second illustration may be found in the Western Cooperative Spray Conference which has included the states of the Pacific Northwest and the provinces of southwest Canada. Cooperative work has been done for a period of over 20 years. Such a plan provides for more definite and conclusive results within a shorter period of time. A research Institute has also been considered since many of the new economic poisons now available require rather extended evaluation from various standpoints before they can be recommended with full confidence. Some plan of this general type might profitably be adapted to determine not only the effectiveness of the product for the purpose for which it is designed, but also to determine other necessary information before the product is released for general usage. Accompanying information should include data in such fields as toxicity to humans, methods of formulation and of application, newer methods of application and essential facts in regard to residues, including amounts of residue both surface and internal, feasible methods of residue removal, and residue tolerances where these seem desirable and essential.

Difficulties which have developed in recent months may also serve to emphasize further the need for detailed and adequate information on the labels of all pesticides regarding the composition of the product in the container, and unscaled directions for use with adequate precautions for the protection of operators, and for the protection of adjoining crops.

The primary function of the regulatory official is to protect the consumer and the large majority of manufacturers who set up and maintain adequate quality
standards. The consumer is not organized, and has not developed facilities for his own protection to the extent, or as adequately as the great majority of manufacturers.

New information is being rapidly accumulated by both governmental and industry research agencies. This is being assembled, organized and digested as rapidly as possible, with industry particularly emphasizing this at the present time. Another avenue of distribution of scientific facts is through scientific papers and symposia at our national meetings. A symposium on economic poisons is being organized for the national meeting of the American Chemical Society to be held in San Francisco in March 1949. In addition to an emphasis on the tremendous loss and the need and importance of new insecticides in food and feed production, this symposium will offer an opportunity to present the latest information on the chemistry of the development of new organic insecticides including the organic phosphates, the polyhalogen organics and natural products, formulation, the toxicology of the various newer economic poisons. Various phases of the important residue problem which has recently received added emphasis in connection with the newer developments in this field may be emphasized. Papers may present data on harvest residues, translocation of residue materials, residue requirements of the food processor, and methods and effectiveness of residue removal. It is hoped that various individuals present here can offer scientific data within the several research fields enumerated.

In regulatory work, attention has been given from time to time to the establishment and use of tolerances. Those favoring such tolerances present the viewpoint that a tolerance below the guarantee is justified due to sampling errors and to small analytical errors. In most cases much the larger error is the sampling rather than the analytical error. Tolerances, when used, have in effect shifted or lowered the manufacturer's guarantee by the amount of the tolerance. It is believed that the viewpoints which have been used to justify such tolerances, when they are used, can be as logically and as effectively used to justify a tolerance above the guarantee, although they have not in the past been so used. If this is correct, then it would appear that the justifiable compromise between a tolerance above the guarantee, and a tolerance below the guarantee would, in effect, the guarantee itself. In other words, there would be no justification for a tolerance, and the line of demarcation should be the guarantee itself. We should not in any way, however, confuse the matter of sampling and analytical tolerances with that of progressively increasing penalties for violation, which are advocated by some control officials.

Much of the regulatory work on economic poisons has in the past been based primarily on chemical composition. While this is of primary importance and should be known in detail, in some cases it may not be adequate. Other factors may have an important bearing on the effectiveness of a particular product. Many of you are perhaps more familiar than I with the importance of such factors as formulation, stickers, spreaders, synergists, methods of application, uniformity of application and many other factors on the relative effectiveness of a product. Some use has been made of methods for the determination of performance of an economic poison in its evaluation from regulatory as well as a research standpoint. Further work on performance methods of evaluation and their utilization in regulatory work may be of interest and value. Here again, the work of the regulatory official is closely interwoven with that of the research man. Cooperation of state and federal regulatory officials with the agricultural experiment stations, the U.S. Department of Agriculture, and with industry is highly desirable.

I am anxious to thank the secretary and other members of the Executive
Committee for their cooperation and their ready and helpful response to calls for information, suggestions, and decisions during the year. All have devoted time and careful thought to promote the interests of the Association. The secretary has borne the brunt of many duties and is given due credit for many long hours of devotion to correspondence, and the editing and publishing of the "Pest Controller". He has been aggressive in the development of proposed definitions and regulations or principles, some of which have already become evident to you. He has represented the Association in many ways, of which you will find a modest presentation in his report. There is reason to believe that he has spent many long evenings in work devoted to the interests of the Association. Likewise the various committees and investigators have given careful consideration to their assignments as is evident from the carefully prepared and detailed reports which have already been presented to the Executive Committee. They likewise have made a definite contribution to this difficult formulative year in the history of the Association.
GOVERNMENT INDUSTRY COOPERATION IN GROWER PROTECTION

By: James McConnon, Vice-President
McConnon & Company, Winona, Minnesota

(A Summary)

First, let me tell you that Dr. St. John has covered many of the points I intended to introduce. Even though we discussed the matter en route to the meeting, there is still duplication of ideas.

The Interstate Manufacturers' Association is a small group whose business consists of preparation and distribution of economic poisons direct to the grower. This method serves to recall the wagon peddler of old times. McConnon and Company, however, have expanded to include the manufacture and sale of bulk agricultural chemicals. For this reason we also hold membership in both the Agricultural Insecticide and Fungicide Association and the National Association of Insecticide and Disinfectant Manufacturers.

Our problem, that of your Association and mine, is the same, namely, to protect the grower and the public. It is our job to instruct the grower in how to control his pests. My belief is that the problem can best be attacked through the medium of more research. Industry and experiment station research workers could gain a great deal by exchanging results; industry research could supplement the work being done by the various state agencies.

This season we had a heavy infestation of pea aphids. It was found after investigation that these pests were originating in an alfalfa area where the vegetation was heavily infested. These winged migrants were moving from the alfalfa fields into the pea crop. Best results were obtained by applying insecticide at the height of infestation. In this connection it can be stated that there is much to be learned concerning predators and other circumstances affecting control.

What can industry do to improve the situation? First, is the need for improvement in the formulation of economic poisons. Much has been accomplished; however, there still remains a great deal to do. DDT, for example, was used at first in only a few ways, but later it was found that DDT could be dissolved in a solvent such as methylated naphthalenes before being applied to the diluent. Thus the available concentration could be increased.

What can experiment stations do? They can accumulate and distribute information on the biology of pests, study predators, and experiment with the old and new economic poisons. The corn borer problem continues to harass the grower. Some aid has been effected by the expansion of the airplane spraying program for the distribution of economic poisons.

DDT and other emulsions used in entomological supervised demonstrations have increased corn production. Various levels of sprays ranging from 1 gallon of concentrate per acre to 25 gallons per acre were used in these experiments. Many of the DDT emulsions – volatile and non-volatile caused damage. As these sprays were applied it was noted that they ran down in a whirl. Commercial and control research failed to pursue the
subject far enough. We must not force the consumer into private research.

The history of DDT reveals the fact that the restrictions placed on this miracle insecticide stimulated the press to ferret out enough information to develop a large bubble. The result, of course, being that more was expected than was really justified.

It is the hope of industry that you control officials will consult us when drafting laws and regulations to supplement them. When drawing up these legislative procedures it is desirable to make sure the proposals coincide with existing laws. Also, these articles should be practical and reasonable.

The present fee system now in use is believed to be unreasonable. Recent conversation with a manufacturer revealed that he does a million dollar business which costs him $13,000 in registration fees. A 1.3% cost for registration cannot be absorbed by the manufacturer and will result in passing this cost on to the consumer and grower. The Food, Drug and Cosmetic industry are not faced with registration costs; however, the inspection expenses are borne by the tax payers. I propose that the Economic Poisons inspection fees be distributed so that all will bear a portion of the cost.
WESTERN INDUSTRY - ATTITUDES AND REASONS

Dr. G.F. MacLeod, President
Pacific Insecticide Institute

At the outset of this discussion it is important that some major limitations of both subject and speaker be pointed out. Mutual recognition of hoped for boundaries if they do not preclude misunderstandings, may perhaps provide assurance of desirable even though seemingly forgotten terminal facilities.

As for the subject matter, it seems fitting that I try to bring to you some of the current thinking of the agricultural chemical industry of the west with what appears to be some reasons for these attitudes. By the west I must, of course, confine myself to the states of Washington, Oregon, California, and Arizona, in which the membership of the P.I.I. is contained.

It would be manifestly impossible to consider specific details in any reasonable length of time. One could but entertain extreme and endless controversy in selecting any one problem over another. It is my hope to select rather broad general problems which horse sense should brand as of interest to this group - horse sense being defined as that quality in a horse that keeps them from betting on people.

To many of you the personal limitations involved are well known from experience. To others I must admit an extremely circumscribed business or industry exposure. It would thus appear that the sensible procedure would be to admit my lack of qualifications to present this subject and sit down. I tried to escape, conscientiously, earnestly, fervidly. Too late in life I learned that a propensity for a diarrhoea of words, coupled with an infamous but justified enthusiasm for the west, inevitably would trap me. It has; and you too are with me in that trap.

The opinions here expressed are personal and do not necessarily reflect the thinking of my own company nor that of my capable colleagues and competitors. This may aid in explaining errors of both omission and commission.

For want of a better approach and at the risk of repeated boredom, I should like to emphasize what has already been said by more capable speakers respecting western agriculture and agricultural chemical industries which serve it, because these are basic to an understanding of attitudes regarding current major problems. Following this, I should like to discuss with you a few of the more important subjects as illustrative of our thinking - or, perhaps from your point of view, lack of it.

It should be pointed out that western industry is not a homogenous collection of companies, individuals or policies. Naturally then, attitudes, reasoning, and the resultant activities are averaged with great difficulty. However, the relative terms of "normal" or "abnormal" can be evolved in terms of east vs. west and within the west itself. The western deviations from what is normal in the east are much greater than those within the west as would be expected. These deviations are more a matter of degree or magnitude than they are of kind. Within western industry itself there are those whose entire interests, including the "home office", plant and field of marketing are entirely in the west. Many of our colleagues, however, represent eastern manufacturers whose products are distributed in the west. There is less difference in viewpoint of these groups in the west than there is within a given company in many instances. This, again, is the natural outcome of environmental marketing influences, superseding hereditary policies.
The familiar cry of western representatives trying to educate eastern "policy determiners" with respect to their problems is not unknown to you, I am sure. There are real differences and they are inherent in western agriculture, nor can they be absorbed and encompassed by a three week flying visit once a year, even by the most agile mental acrobat.

Members of industry, state and federal control officials and farmers are mostly human beings. They are therefore, products of heredity and environment and no behavior manifestation is entirely independent of these factors. If we consider the inherent nature of western agriculture, it is different from that of the east. There is a greater diversity of farm commodities produced, they are grown on larger unit holdings with consequently greater investment required. Instead of a heritage of forests cleared to plant grain for subsistence while fighting Indians, the west has a background of fighting for water to mine gold with which to get land and fight for more water to make more money through crop production on an always increasing scale. These are not philosophic meanderings, they are facts easily substantiated by statistics. Environmentally, the differences are as great. All these things are well known to all of us but they frequently slip our minds in the everyday struggles to analyze reasoning and attitudes. They have a direct bearing on the stand which western industry takes with regard to legislative and regulatory matters.

The men of industry in the west do not look upon our local control officials as ogres to be condemned and purged. They do not (to quote Robert Louis Stevenson) consider these individuals in the light of "What a monstrous specter is this man, the disease of agglutinated dust, lifting alternate feet or lying drugged in slumber; killing, feeding, growing, bringing forth small copies of himself; grown upon with hair like grass, fitted with eyes that move and glitter in his face; a thing to set children screaming; ..." On the contrary, we know them as "Al", "Bill", or "John". We are close to each other and differences are ironed out before rather than after they occur. There has to be mutual understanding and respect between research workers, control officials and members of industry. They have a common objective.

Two factors will operate in favor of improved relationships between industry and officialdom. First, they must speak the same language and second, increasingly frequent and frank contacts must be maintained. Western industry has and will continue to employ top flight personnel in the chemical and agricultural sciences. Competition both between companies and between industry and federal or state agencies for qualified personnel is too well known to need amplification. We do speak the same language. The problem of contacts for western industry is not so simple nor so far along the road toward solution.

Those of your group who come from western states, will, I am confident bear me out, in the statement that they have frequent, personal visitations from many members of firms doing business in their states. They join us in most of our meetings.

With the advent of the new federal law, the problem of distance as a barrier to mutual understanding became extremely acute. Despite the Super Chief and DC Sixes, it is a long, time-consuming, and expensive trip to Washington. Based on the established value of frequent personal contacts between industry and officials, we have raised a justifiable request for adequate representation of administrative personnel on the West Coast. We feel we can justify this demand on volume of products, numbers of products, investments at stake, the nature of our problems and the necessity for
eliminating penalties imposed by remoteness from the seat of national control. Dr. Reed and his group have responded generously and fairly to our request. We are awaiting confidently the materialization of a West Coast office of the federal agency. Please note that the emphasis given to this problem is naturally greater in the west than in the east.

Another problem of major interest on the Pacific Coast has to do with recent court decisions regarding product liability. The term "liability without negligence" does not materially ease the discomfort of a chemical manufacturer -- I believe it is safe to say that most members of the agricultural chemical industry are just as anxious to have their products used correctly as are the manufacturers of any other item be it cars, guns, knives or airplanes. After having taken all possible precautions many chemicals still remain as sharp tools. Properly employed, they are economic necessities. Used wrongly, great damage can occur, particularly where large acreages are involved, as is the case in the west.

We are sympathetic no end to the need for greater dealer, applicator and grower education. We believe it is a mutual function of industry and official workers. Indeed we know it is of the utmost importance if our industry is to survive in a world of increasing chemical complexities, but we also feel that this task is one which cannot be accomplished by labels on containers alone. Nor can it be solved by shifting prepositions and delving deeply into the connotation of synonyms. There is very often a broad chasm between the meaning of words as conceived by research or regulatory officials and a Chinese or Mexican foreman who is supposed to read the label before using the material. There is a happy medium between whittling points on hairs and "Laissez Faire" in labeling.

The west also has uniquely generated problems as a result of the rapidity with which new products are coming into demand. Not infrequently, one may hear resentment on the part of a manufacturer because he must, in meeting grower demand, assume liability for a product reported by some research worker as far superior to any existing chemical. The technical worker in all fields knows that our information is pitifully limited. The hazards to plant, man and animals are almost invariably but little if at all known. Yet large operators with much money at stake will insist on taking a chance. This is characteristic of the gambling west. They will try anything, uninhibited even when confronted with the need for further knowledge. This characteristic is quite in juxtaposition to that of many eastern farmers and has cost many a grower both dollars and embarrassment.

As you are well aware, the west has many food processing industries of a magnitude commensurate with the volume of food produced. These gentlemen, together with industry and agricultural research workers have been confronted with serious problems in connection with the use of new chemicals in food production and their effects upon the nutritional value or aesthetic appeal of the processed product. In typical western manner, we have been sitting around a table in San Francisco trying to find our way out of the strange woods which modern chemistry has built around us. Frequently conferences deteriorate into just meetings of individuals who can do nothing, coming together to decide that nothing can be done. Not so with this group.

Early in our deliberations, it became apparent that our confusion, as usual, stemmed from our ignorance. The solution appears to lay in rapidly filling in the gaps in our knowledge. Industry can, has and is making new synthetic, organic chemicals which the entomologist and plant pathologist have tried and found of great value in combating pests of food crops. Plant
physiologists have lagged slightly behind in providing data as to the effects of these compounds on the plant and its basic physiological processes. The food chemist, the food and drug people, the public health agencies have tried their best to get some scanty information. They are definitely embarrassed by lack of funds, personnel and equipment. The medical groups, toxicologists, pharmacologists and physiologists have contributed relatively little to this social problem which is of fundamental importance in maintaining a vigorous, well nourished public while advancing our agricultural and industrial economy. They, too, need financial help from government.

There is great need for at least an administrative if not a physical unit which will integrate the present widely separated fields of effort in agricultural, food, chemical and medical world. Until orderly, concomitant development, testing, screening and coordinated findings are made available to all concerned from food producer to food consumer, controversy, doubt, ignorance and misunderstanding will provide confusion. Agriculture and medicine must join hands more intimately than they have in the past.

About a month ago the President of the United States addressing the A.A.A.S., reported the recommendations of a Scientific Research Board appointed two years ago. Pertinent to the present discussion, it was indicated that out of a national income of 200 billion dollars annually, we spend only one half of one percent of combined federal and private funds on research. Of further significance, the Board recommended greater emphasis be placed on basic research and on medical research. We in the west heartily endorse this thinking and respectfully point out that food is a matter of basic import.

There are countless other details which could be cited and discussed at the expense of continued ennui and unwarranted infringement of good taste. I have not dealt in any part with industry reaction to the Model Uniform State Bill or the guiding principles set forth. The Legislative Committee of the P.I.I. has yet to consider these and a report is scheduled for our annual meeting later this month.

The impact of many agencies both federal and state on the Western Agricultural Chemical Industry in common with similar groups all over the country becomes more complex than the problems associated with the chemicals in which we deal. Many of these things are not even of passing interest to your group, yet they help to psychologically condition the men with whom you must deal. Traffic rate problems, fair practices acts, labor acts, pricing complexities, packaging standard and requirements, fire prevention bureaus, credit limitations, tax problems and many other phases of everyday existence in business today may well produce the ulcers which motivate a belligerent registrant who becomes your problem. If you will but try to put yourself in the position of the conscientious man of industry, it will be easy to understand their desire to weigh carefully any additional burden of proposed legislation, regulation or directive. Most members of industry in the west want the protection of sound legislation to prevent scapegoat competition with worthless products. To insure that such legislation is constructive rather than restrictive, they want to thresh out the intent of the proposed action as well as the phraseology. Recognition of this simple fact by western E.P.C.O. has made allies rather than opponents of industry personnel.

Thus, in this rambling discussion, I have tried to present some attitudes of western industry and the reasons for them. We are mutually aware of all I have said. There is nothing new of moment added. We share with you and all industry many problems in a world of increasing social complexi-
ties. The differences in the west are of emphasis or degree rather than kind, the basic problems differ but slightly in nature and most of these can be easily resolved by mutual respect and understanding through frequent contact. The day has long since passed when the American chemical industry can be looked upon as charlatans, astrologers or alchemists, needing a vigilant gendarmerie to protect the unsuspecting public. We have a big job to do and I am confident we can do it best working together.
ABSTRACT SUMMARY OF REMARKS BY JUSTUS C. WARD, 
CHIEF OF THE PHARMACOLOGICAL AND RODENTICIDE 
SECTION, INSECTICIDE DIVISION, U.S. DEPARTMENT 
OF AGRICULTURE, ON "ARE THE NEW ECONOMIC POISONS 
TOO DANGEROUS?"

It was pointed out that the warfare against pests is a critical and con-
tinuing one which must be waged aggressively and effectively if man is to re-
tain supremacy and insure his continued existence in the world. A successful 
war depends both on the available weapons and on the ability of the users to 
handle them effectively.

Mr. Ward said that through years of association we have learned to live 
with and use the older economic poisons such as arsenic, strychnine, nicotine, 
phosphorus, the cyanides, and a number of other highly dangerous agents. The 
question would seem to be largely one of how much we must know about the newer 
poisons before they can be substituted for those with which we have had long 
years of experience.

Mr. Ward said that much remained to be learned about these newer economic 
poisons before they can be used with the same assurance as the older products. 
Problems of food contamination and hazards involved in correct or careless hand-
ling need to be carefully studied. Such investigations are closely related to 
the studies bearing on the intended uses of the economic poisons in pest control.

Mr. Ward stated that such studies are necessarily quite time-consuming 
and can only be achieved by hearty cooperation of the groups and agencies con-
cerned both in and out of government. He stated that the Insecticide Division 
is anxious to cooperate and called attention to the provisions of the Federal 
Insecticide, Fungicide, and Rodenticide Act that require adequate caution and 
poison labeling, as well as directions for use. It was emphasized that the 
caution statement to be required should in all cases be consistent with effect-
ive use of the economic poison.

In conclusion, Mr. Ward emphasized the necessity of persistent well cor-
related research in the many fields related to the safe and effective use of 
economic poisons.
PROBLEMS ASSOCIATED WITH THE USE OF NEWER ECONOMIC POISONS

S.A. Holwer

Many questions frequently mentioned and discussed as being problems associated with the newer economic poisons actually do not differ in type from those which have existed, or may still exist, in reference to the use of economic poisons which have been accepted and widely used for many years. The presence of residues on food products; the effect of pesticidal chemicals on soil, plants, animals, pollinating insects and wildlife; and the hazard the use of pesticides may present to the operator are problems that have been considered and studied in connection with standard materials. For the materials which have had long use practical answers have been found to most of the questions and acceptable procedures developed which have provided reasonably effective control of many pests.

The hazard to the operator associated with the use of many of the new pesticides is markedly less than that associated with the use of hydrocyanic acid, methyl bromide, nicotine, thallium, or strychnine materials which have long been used. Many new materials appear to present less of a problem of soil poisoning than that associated with the use of arsenicals. This question has been under study for a number of years and has received special attention in the sandy soil sections of the Southeast where calcium arsenate was used on cotton to control the boll weevil, and in the Pacific Northwest where lead arsenate applied to control orchard insects dripped to the ground and remained in the soil. Perhaps several of the new materials are less hazardous to wild-life when used in grasshopper baits than arsenites and sodium fluosilicate which were "cleaned" for such use after studies concluded years ago. We may perhaps now conclude that DDT properly formulated and applied is no more hazardous to wildlife in forest areas than is lead arsenate which has been applied, without unfavorable results, to considerable areas for gypsy moth control. Use practices now suggested for the application of several of the new insecticides leave residues on harvested food products no more objectionable than those of the arsenicals even when established safeguards are followed.

The question of the safe use of pesticidal chemicals presents the same types of problems whether the chemicals are new or old. With the older standard materials acceptable answers are available, for the newer materials much needs to be determined and this requires time and intensive study. The biggest problem associated with the use of newer economic poisons is the variety and complexity of questions that need to be answered, but rather the general impatience and willingness to ignore the fundamental requirement for the orderly development of needed information. This is a real problem and unless it is solved incidents may occur which will so cloud the issue for some new materials that the benefits they can contribute to our economy through pest control will be lost. Impatience is greatly accentuated by (1) the general recognition by the public of the importance of pest control and the willingness to use chemicals and especially the newer ones for this purpose; (2) the enthusiasm of technical workers to report results of tests with new materials, especially those which are highly effective; (3) the eagerness with which research tests are examined; and (4) the competitive influence on industry which results in making new pesticides generally available before adequate information is known on where, when, and how to use them safely. The number one problem associated with the newer economic poisons is how to properly balance the enthusiasm of technical workers, including the effect this
has on the public, and the competitive practices of industry, so as to ensure that new pesticides will be carefully appraised and properly evaluated for their various uses before they are made available and generally applied.

Many of the newer economic poisons differ from the widely used standard materials in the amount of the chemical required to kill the pest. This important feature has introduced a type of problem which has been largely disregarded by those who recommend the use of pesticides, by those who package them for sale, and by those who review and approve labels. It has to do with the question of formulation. Some of the newer chemicals have another characteristic, persistency, which is closely associated with degree of toxicity and problems of formulation. These questions are of such significance that they present the second most important type of problem associated with the use of the newer economic poisons. The solution of these needs the combined attention of all concerned with recommendation, the manufacture, the distribution, and the use of pesticides. They have a direct bearing on the work of regulatory officials, particularly in the consideration of ingredient and caution statements. When we are considering using one-half of one percent or even ten percent of a chemical for the control of pests, the remainder of the mixture becomes a matter of major importance and one which cannot be covered in general terms.

There is much more that needs to be learned about the way materials should be formulated and what should be used in formulations. It is more or less generally accepted that the kind of solvent, wetting agent, emulsifier, carrying dust, or other diluent has an important relation to performance, safety of use, and "shell-life" of the product that is to be applied. Some of the so-called "carriers" increase the effectiveness of certain chemicals and reduce the effectiveness of others. Some excellent solvents can be safely used on certain surfaces and yet be very injurious to others. There are striking illustrations where animals and plants have been seriously injured by the use of the amount of certain insecticidal chemicals which should be applied with safety had the right kind of carriers been used. Gas-propelled aerosols can have their efficiency almost destroyed by relatively minor shifts in the amounts of solvents or propellents and their safety from a health point of view radically modified by changing the brand of a solvent normally present in an amount as small as five percent of the total formulation. Some solvents disappear so slowly that the effective character of the toxicant is modified; others may penetrate the surface or evaporate so rapidly that they leave the toxicant in places where it is ineffective. Many of the carriers may be excellent if the finished insecticide is used immediately, but because of changes which occur during distribution and storage they reduce, if not eliminate, the effectiveness of the product.

To safely and effectively use many of the newer pesticidal chemicals it will be necessary to say how and with what they should be formulated. Recommendations for use should indicate the percentage of the chemical to be applied and the rate of application, and at the same time specify the kinds of carriers, diluents, emulsifiers, etc. that should be used. Even with such specifications appropriate caution directions will be needed. Recommendations cannot be made by trade names, hence ways must be found by which the purchaser can select suitable products. The label should be a means of supplying this information. This means a different type of arrangement for and perhaps a more complete ingredient statement. It may well result in the abandonment of the long established practice of classification of ingredients into "active" and "inert". Such terms are not factual under all conditions. Kerosene in a fly spray may be active, but in a gas-propelled
aerosol it is a carrier of active ingredients.

Important as it may be to make changes of this nature, we do not now have adequate information on which to prescribe a satisfactory new procedure. Full formula disclosure is not the answer and might even be confusing since it does not disclose formulation "know-how", and might result in listing ingredients which have no bearing on effectiveness or safety of use. Pending the development of needed information on which to base minimum requirements all those who report experimental results and recommend use of pesticides should give full and appropriate specifications and officials who pass on labels should endeavor to see that the ingredient statements accurately reflect available information on the combination of ingredients needed to make an effective and safe pesticide.
The Committee on Nomenclature has not held any meetings since its appointment. Some few questions have been presented in correspondence between members, but no action has been taken other than that which was associated with the coining of the name "parathion" for the insecticidal chemical, O,O-diethyl O-p-nitrophenyl thiophosphate.

The Committee has been appraised of developments in reference to procedures that might be followed in coining names for complex pesticidal chemicals and will follow developments in this field with interest and actively. The Committee feels, however, that they should serve largely in a review capacity rather than attempt to initiate problems associated with the establishment of coined names or standardization of chemical names.
REPORT ON
ACTIVE AND INERT INGREDIENTS

H.H. Shepard, Chairman

At the Washington meeting of the Association of Economic Poison Control Officials in October, 1947, the Executive Committee selected the following Committee on Active and Inert Ingredients:

H.H. Shepard, Chairman .................... Washington, D.C.
Paul Ijams ..................................... Topeka, Kansas
J.D. Patterson ................................... Salem, Oregon
A.M.G. Soule .................................... Augusta, Maine
Clyde A. Bower ................................. Oklahoma City, Okla.

Until recently the work of registering insecticides under the new Federal Insecticide, Fungicide and Rodenticide Act required most of the time of the chairman. The present report is therefore solely a statement of the views of the chairman which at this time is being mailed to the members of the committee for their consideration. To a large extent, the views expressed herein are based upon experience of the Insecticide Division, U.S. Department of Agriculture, in the registering of economic poisons under the new Federal law. They are presented for purposes of discussion and development of a program of action.

Definitions of the terms "active ingredients" and "inert ingredients" would appear appropriately considered at this point. If the several Federal and State laws concerned with economic poisons are referred to, we discover the following pertinent statements:

Federal Insecticide, Fungicide and Rodenticide Act, sec. 21: "The term "active ingredient" means an ingredient which will prevent, destroy, repel, or mitigate insects, fungi, rodents, weeds or other pests."

Sec. 21: "The term "inert ingredient" means an ingredient which is not active."

"Active ingredient." An "active ingredient" is an ingredient which:

(1) Is capable in itself, and when used in the same manner and for the same purposes as directed for use of the product, or preventing, destroying, repelling, or mitigating insects, fungi, rodents, weeds or other pests; and

(2) Is present in the product in an amount sufficient to add materially to its effectiveness; and

(3) Is not antagonistic to the activity of the principal active ingredient;

Provided, however, That the Director may require an ingredient to be designated as an active ingredient, if in his opinion, it sufficiently increases the effectiveness of the economic poison to warrant such action."
Economic Poisons Act of 1945 (Arizona), Sec. 2: "active ingredient" means an ingredient which of itself prevents, destroys, repels, or mitigates the insects or fungi against which the product is to be used;

"inert ingredient" means any material contained in or mixed with the active ingredient which does not of itself have any effect on the pest to be controlled."

The following State Laws contain essentially the same definitions of these terms as does the Federal Act:

North Dakota
South Dakota
Vermont
Virginia

The regulations under the Canadian Pest Control Act of 1939 contain a tabulated list of active substances to be guaranteed for various classes or kinds of products.

The following statement was made by Dr. Alvin Cox in the California State Department of Agriculture Bulletin, Vol. 33, No. 2, 1944:

"In general, an economic poison constituent that is itself effective in preventing, destroying, repelling, or mitigating the pest against which the product is recommended, under conditions of use involved, is an active ingredient.*** If a proprietary economic poison is recommended for use against several kinds of insects or other pests, and a particular constituent is an active ingredient with respect to one of the pests named, although without effect against others, unless actually misleading, it is considered an active ingredient in the product and generally should be so designated."

These general interpretations of the terms "active ingredient" and "inert ingredient" are uncertain aids in deciding to which category some border-line materials belong. Some substances, clearly active when applied for the control of some organisms, are ineffective against others. Because of the variety of such problems it becomes advantageous to review the situation separately with respect to each substance, group of related materials or general class of preparations.

The following are some of the problems which present themselves:

1. Specific activity. Certain ingredients of economic poisons (for instance, talc) are rated uniformly as inert. Other ingredients are sometimes considered to be active and at other times inert according to the particular insect or other organism against which the product is to be applied. For example, sulfur is considered an active ingredient of poultry louse...
powders and of cotton dusts for application against plant bugs but as an inert ingredient of flea powders for dogs and of rotenone-containing cattle grub powders.

2. Variety of uses. When a product is sold for a variety of economic poison uses, the classification of the particular ingredients is based on overall use. DDT would not be active as a disinfectant but it would be considered active in a disinfectant for which suitable insecticidal claims also were made. When, however, a product is sold for both economic poison uses and non-economic poison uses, (for example, a combination insect repellent and sun-tan lotion) only the economic poison uses are considered in designating the ingredients as active and inert.

3. Activators. Sesamin by itself does not have insecticidal activity, yet it increases several times the effectiveness of pyrethrins in certain types of formulations. It would be designed as an active ingredient of such a mixture with pyrethrins but would not be considered an economic poison by itself.

4. Antagonists. When an ingredient is antagonistic to the action of other ingredients in a product, it is considered inert. For instance, potassium hydroxide and sodium hydroxide are active ingredients of alkaline cleaners for which disinfectant claims are made, but are inert in mercury salts because they tend to antagonize the mercury salt. Cationic detergents are active bactericides but in combination they may antagonize other ingredients.

5. Surface active agents. It is customary to designate both the surface active agent and the diluent in wettable powders, such as 50% wettable DDT, as inert. Such uniformity does not exist for this class of substances in liquid insecticidal preparations where some of the emulsifiers utilized possess activity against forms such as spider mites. Synthetic emulsifiers of bactericides are considered inert unless evidence is available to the contrary.

6. Solvents. Acetone and certain of the lower alcohols are considered inert against insects. In substantial quantities (3 percent or more) they are active, however, in bactericides.

7. equivalents. In the case of compounds of known definite composition, the name of the compound is used as the name of the material in the ingredient statement. At times it is not feasible to state the actual active ingredient. This is the case when the nature of the ingredient is little known chemically or when compounds of indefinite composition are involved.

(a) The total ground sabadilla seed has been accepted as the active ingredient in dusts containing sabadilla but most of the activity apparently resides in the alkaloids and further consideration of this point may be needed.

(b) Statement of the active ingredient of nicotine sulfate is not always in uniform terms. Canadian regulations specify nicotine as the active ingredient of preparations containing nicotine sulfate. In this country, it has been rather general practice to declare the actual nicotine sulfate content. Strychnine preparations present a similar problem relative to the designation of salts.
(c) For lack of information as to the nature of the active ingredient, red squill is stated in terms of the powder or extract and the biological equivalence is given in terms of minimum toxicity for male rats.

(d) Certain compounds of metals, particularly of copper, are of indefinite composition. Because the principal activity of copper is associated with the soluble copper content, the copper is expressed as metallic and the source of the copper given, for instance, "Copper (in basic copper sulfate) expressed as metallic". This would apply to Bordeaux mixture and to copper carbonate. When copper is present in the form of compounds of definite composition, such a compound would be given as the active ingredient (for instance, yellow cuprous oxide or copper sulfate).

(e) Certain arsenical compounds are of indefinite composition or occur in mixtures. For instance, a statement of sodium arsenite content is often preferred to arsenic trioxide as the active ingredient of solutions made from arsenic trioxide, sodium hydroxide and water. California regulation No. 16 (1940) provided, however, that arsenic trioxide be considered the active ingredient of such solutions. The situation is somewhat comparable to the customary designation of the active ingredient of calcium arsenate mixtures in terms of tri-calcium arsenate.

8. Lotions and ointments. The classification of the ingredients of lotions and ointments, such as petrolatum, lanolin, and olive oil as active and inert is often inconsistent. In preparations of these types, where some of the ingredients may be present only in small quantities, the general question often arises as to when to consider the action "sufficient to add materially to *** effectiveness."

To develop a workable plan for arriving at general uniformity with respect to the designation of active and inert ingredients would appear to be a prime objective of this committee. Naturally, experience must be the basis for deciding on the category in which to place a given material. At the present time, the specific information needed as the basis for a particular decision is often lacking. It would be a tremendous undertaking to obtain data which will fill a considerable portion of the gaps in our knowledge as regards commercial materials applied in various ways against all the pest organisms likely to be mentioned in labeling. To apply the definition of active and inert ingredients literally in all cases, however, would lead to confusion of the public whereas ingredient statements are for the purpose of informing and safeguarding the public.

A practical or workable solution of the problem which face us, in this connection would appear to be:

(1) To review present practices as a means of suggesting certain rules with reference to rather broad phases. It should be possible to establish general policies covering certain classes of substances used in the formulation of economic poisons. These would be subject to exceptions when individual conditions so warrant. As an example, such a policy might be established for surface active agents incorporated in wettable powders. The number of individual ingredients which require detailed study would be reduced materially by means of these general rules.

(2) To accumulate existing pertinent data of a reliable nature from official and industrial sources. Published literature and unpublished reports of experimental stations are sources of such data. This would
will gladly serve as a clearing house for this information.

(3) To encourage projects for the development of new information by suitable agencies.

(4) To prepare an approved list of active and inert ingredients of specific economic poisons. Either this list should be approved only in parts as reliable information is obtained, or it should be approved subject to changes as new information is acquired. However, due to the present need, it is urgent that such a list be brought up to date as rapidly as possible. It is important also for the sake of uniform action that this list not be subject to numerous changes.
REPORT OF THE UNIFORM REGISTRATION COMMITTEE

Paul Ijams, Chairman

The committee has had under consideration the preparation of a form to be recommended for adoption by the Association as the Uniform Registration Blank.

It is the opinion of the committee that the application for registration should be separate from the certificate of registration. The committee, therefore, recommends the attached form marked "Exhibit 1" as the Uniform Application for Registration of Economic Poisons, and the form marked "Exhibit 2" as the Uniform Certificate of Registration of Economic Poisons.

Note: "Exhibit 1" - Page 64
"Exhibit 2" - Page 65
APPLICATION FOR REGISTRATION OF ECONOMIC POISONS

For the Calendar Year 19____

Application is hereby made to the secretary of the state board of Agriculture, ________ for registration, under the provisions of the ______ Economic Poisons Act of _____, of the following economic poisons:

There is submitted, herewith, a copy of the label (affixed to 8 1/2 x 11 sheet of paper) and all other written, printed, or graphic matter used on, or attached to, the containers of the above listed economic poisons. Ingredient statements are shown on label sheets when required under Section 2 (j) of the Act.

I hereby certify that all labels submitted, herewith, are exact copies of labels that have been registered without protest with the U.S. Department of Agriculture, except those marked with an asterisk (*).

Remittance is enclosed to cover the registration fee for ______ products ($_______ for each product) in the amount of ________________.

Address correspondence to: Submitted by:
Firm ____________________________ Firm ____________________________
Attention ______________________ By ________________________________
Street & No. ____________________ Title ______________________________
City and State ___________________ Date ________________________, 19_______
On the basis of the information furnished by the registrant, and the receipt of the registration fee, the following named economic poisons are hereby registered under the provisions of the _______ State Economic Poisons Act of _____, and the sale of said economic poisons is hereby authorized in the state of ________ when offered and exposed for sale, or sold under a label showing the information required by law and otherwise in compliance therewith, for the calendar year 19____, unless said registrations, or any of them, are canceled for cause:

Claims or directions for use which differ in substance from the representations made in connection with the application or changes in the name or formula of the economic poison covered by this notice should not be made prior to their submission to the Secretary of the ________ Board of Agriculture, and receipt of notice that they have been accepted.

Registration of a product is in no way to be construed as an endorsement of approval by this department or any claims made for it. The labeling must not bear any reference to registration under the Economic Poisons Act of ______. In order to protect the public, the Secretary may at any time cancel the registration of an economic poison. Request for registration under a new formula or labeling may be submitted at any time.

Dated at ____________, this ______ day of _________, 19____.

________________________ State Board of Agriculture

Receipt No: ____________

_______________________ Secretary
APPLICATION FOR REGISTRATION OF ECONOMIC POISONS

Control Office

Application is hereby made for the registration of the following (number) Economic Poisons for a period beginning with the actual date of registration and continuing until December 31, 19___. There is submitted as part of this application individual data sheets (8½ X 11) to which is attached a copy of the label for each product. (See instructions on reverse side).

Remittance payable to the State of _____ in an amount of $_______ is enclosed herewith to cover annual inspection fees for the following products.

BRANDS

I hereby certify that the information appearing on the attached data sheets is true and correct in every respect; that, each and every package of the above named materials will be labeled as described (and in addition that not weight and manufacturer's name and address will be shown); that the attached declarations are the guarantees of the applicant as to the chemical composition of the material above named for and on behalf of:

Address correspondence to: Submitted by:
Firm ___________________________ Firm ___________________________
Attention ______________________ By ____________________________
Street & No. _________________ Title _________________
City & State _________________ Date __________________________

(Applicant not to fill in below this line)

CERTIFICATE OF REGISTRATION

This certifies that the above named applicant is hereby licensed to sell the above brands of economic poisons in the State of _____ for a period beginning with the actual date of registration and ending December 31, 19____ when sold, offered or exposed for sale under the brand name and guarantees as described.

Date __________________________

State Chemist

Comptroller
I. INVESTIGATOR ON SAmLING PROCEDURE
   A. D. CROMARTIE

   The purpose of routine sampling is to "spot check" the various products sold or offered for sale by different manufacturers or distributors. It would be impractical, and almost impossible, to give a complete coverage to every product shipped or manufactured, so the next best procedure is to use the "spot check" method. Where violations are found, more complete coverage is given by collecting additional samples of these products. In this manner, the products found to be in violation are given more attention and the ones not found in violation are passed up until time for next sampling.

   A list of types of economic poisons and suggested amounts for routine samples is attached to this report. Also included is a suggested procedure to be used in making not weight checks and a form for recording weighings.

II. Sampling Retail Units

   Where possible, samples should be obtained from original, unopened, shipping containers. The shipping containers should be checked for codes, batch numbers, or other distinguishing marks and, when found, the sample units should be identified with the corresponding codes or batch numbers. The Collection Reports should also contain this information. When a sample consists of more than one container or unit, they should be taken from different shipping containers when they are available.

   A thorough check should be made to see if there are any circulars, literature, placards, or other forms of advertising in which reference is made to the product being sampled. If any are found, they should be submitted with the sample. They should contain a notation stating how they are used, such as - "came in same shipment, given out over the counter", or "used as an advertising poster, did not come in same shipment". If posters or other forms of advertising are used which are too large or bulky to submit as specimen advertising, copies of the wording should be made, with a statement of how they are used and the approximate size of the lettering.

III. Bulk Sampling

   1. Dry Materials

      A trier of sufficient length to obtain a representative sample should be used in sampling drums, barrels, large paper or burlap bags, or other containers used in shipping products of twenty-five pounds weight or larger. One commonly used is a two section trier, approximately thirty six inches in length.

      In drawing the sample, the trier should be inserted diagonally from different sections or corners of the containers.
Ordinarily, four trierfuls will give a quantity sufficient for a sample. If not, then the others should be drawn in the same manner midway between the points from where the first four were drawn. The top inch or so of each trierful should not be used as part of the sample, but should be returned to the container from which the sample is being drawn.

Glass jars, friction top cans, and sometimes the round cardboard containers similar to those used for packing ice cream, are usually most suitable for handling samples of dry materials. Cardboard containers should be used only for products which will not be affected upon standing, such as sulfur and sodium fluoride. Air tight containers should be used for all others.

Complete copies of all labels on the containers should be made. A thorough check of the container for batch numbers or other markings should be made. Any other essential information should also be included in the Collection Report. Copies of all circulars and other advertising should be submitted.

2. Liquid Materials

Before samples are drawn from containers such as cans, drums, or barrels, the contents should be thoroughly mixed by rolling, shaking, or stirring. When the product is of such a consistency that rolling or shaking is not practical, the contents should be stirred thoroughly with a clean rod of metal or wood. However, very few of this latter class are encountered.

Metal, plastic, or rubber tubings used as siphons are usually found to be convenient methods of drawing these samples. They should be inserted about midway down the container, at which point the sample should be drawn. Sometimes it is easier to pour samples of certain types of materials from containers of five gallons or less, which method would be satisfactory provided the contents have been thoroughly agitated. Heavy liquids will often require considerable agitation before the inspector can feel assured the contents are thoroughly mixed. However, there should be no doubt in his mind at the time the sample is drawn.

Glass jars, screw top glass bottles, or screw top cans are preferable for handling liquid samples. Certain types of economic poisons should not be placed in jars with rubber rings as the ingredients, upon standing, affect them. Examples of these are the mineral oil sprays or emulsions, coal-tar creosote dips and disinfectants, liquor creosolis saponatus, creosote wood preservers and products containing chloroform or acetone.

Complete copies of labels, batch or code numbers, and specimens of circulars and other advertising should be obtained. Other essential information should be reported.

IV. Size of samples
No set rule can be laid down for the size of samples which should be obtained. The type of tests to be run, the concentrations of the active ingredients in the products, the size of the retail containers, and the cost of samples are just a few of the factors. For routine samples, one pound or one pint samples are generally adequate.

A large percentage of products ordinarily sampled are put up in retail containers and the size of the sample depends on the size available. While one pound or one pint is sufficient for the ordinary sample, it would not be practical to pass up a product because the dealer had in stock four-pound bags or one quart or one gallon containers. Many products, such as nicotine sulfate, require much smaller amounts for samples, so in these cases the purchase of quart or larger samples would not be justified.

In sampling bulk containers, the size of the sample can be controlled. In other cases, the sizes available are the determining factors.

V. Preparation of Samples

1. Retail Containers

When a sample consists of more than one unit, if possible, each unit should be identified and sealed separately. The labels should be identified with the sample number, date of collection, and the initials of the inspector collecting the sample. The container should then be sealed with the seal bearing the sample number, the date of collection, and the first name, middle initial, and the last name of the collecting inspector.

When the units are too small to seal without covering part of the label, the labels should be identified with the sample number, date of collection, and the initials of the inspector. They should then be divided into two parts, wrapped, and then sealed. The outside wrapper should also contain the sample number, date of collection, the initials of the inspector, the name of the product, the name and address of the shipper, and any distinguishing marks or codes found on the shipping cartons or containers.

2. Samples from Bulk Containers

The sample containers should be identified with a sticker containing the sample number, date of collection, the initials of the inspector, the name of the product, the name and address of the shipper, and any distinguishing marks, such as batch or code numbers, found on the shipping containers. The sample containers also should be sealed with seals bearing the sample number, date of collection, and first name, middle initial, and last name of the investigator.
3. Advertising, Circulars, Pamphlets, Displays, Etc.

Specimens should be obtained of all advertising in any form in which reference is made to the product being sampled. That which is attached to the retail unit or inside the retail carton should be replaced as it was after it has been properly identified. All other, such as pamphlets or circulars distributed over the counters, or placards used as displays, should be submitted with the Collection Report. They all constitute labeling of the product and are a main part of the sample. Each piece submitted should be identified with the sample number, date of collection, initials of the investigator, and a statement as to its source.

SUGGESTED AMOUNTS FOR ROUTINE SAMPLES

I. Calcium Arsenate
   Lead Arsenate
   Bordeaux Mixture
   Paris Green
   Sulfur:
   Mixtures of two or more of the following products:
   Calcium Arsenate, Lead Arsenate, Copper Compounds, Nicotine, Rotenone, Pyrethrum Powder, Pyrethrum extract, ground sabadilla seed, benzene hexachloride, cryolite, and similar products.

   If available, above subdivisions should come from different batch or code numbers.

II. Miscellaneous plant insecticides and fungicides.
   (Other than those in Group I)

   I pt. or 1 qt; concentrates - sufficient to give 5-10 gal. of finished spray.

III. Oil Emulsions
   Lime Sulfur Solution

   1 qt. If more than one batch number available, sample up to three different batches.

IV. Products for treating seeds, soil, or turf to prevent plant diseases.

   One-half pound or one quart samples.

V. Miscellaneous household and livestock insecticides. Those include products which have claims for one or more insects and containing one or more of the following: Dichloro diphenyl trichloroethane, pyrethrum extract or powder, lothane, chlordane, cube or derris powder, and other products.
VI. Moth and carpet beetles (only) preparations. One pound or one quart samples

VII. Ant preparations. (For ants only) One pint or one pound. If baits or traps - 36

VIII. Pine Oil Disinfectant Retail sizes - 1 pt. or 1 container
Coal Tar Disinfectant Bulk or drum lots - 1 pint from each
Liquor cresolis saponatus code or batch number, not to exceed 3 divisions.

IX. Sodium hypochlorite 1 pound or 1 quart sample
Chlorinated Lime
Calcium hypochlorite
and chloramines

X. Products which may have All shipments valued at $35.00 or lost strength. These include preparations containing nicotino, naphtha- over and over 4 months old, should lene, chloronated lime, be sampled.
calcium hypochlorite, sodium 1 - 25 cases - 6 units
hypochlorite solution and 26 - 100 cases - 10 units
other similar products 101- 500 cases - 18 units
Over 500 cases - 24 units

XI. Mill, warehouse, and gran- 1 quart or 1 pound sample
ary insecticides and fungicides

XII. Products for control of bots Sample should consist of 12 in horses and mules doses

XIII. Products used against ter- 1 pound or 1 quart sample
mites or "white ants"

XIV. Rodenticides. The products As a general rule, one pound or usually consist of preparations samples are adequate. containing one or one pint samples are adequate. more of the following: Antu, Samples of the pure products such arsenious oxide, barium carbon- as strychnine (alkaloid) and nate, phosphorus, strych- strychnine (sulfate) and sodium chnine sulfate, strychnino fluoracetate (1080) should consist of one ounce.
alcoholic, sodium fluoracetate (1080), thallium sulfate, and zinc phosphide. There may also be others composed of ingredients not listed.

XV. Weed Killers or Herbicides. 1 pound or 1 quart samples
Those products may consist of one or more of the following: Liquid and powder forms of Esters, Amines and other salts of 2,4-D, sodium arsenite solutions, ammonium sulfate, sodium pentachlorophenate, petroleum, creosote or crude
XV. (cont')

oils, dinitro compounds.

XVI. Devices

Should be sampled only upon request.

XVII. Products not covered above

1 pint or 1 pound. The quantity may vary, depending upon the type of product. The investigator will have to use his judgement in many cases.

SUGGESTED PROCEDURE

FOR MAKING NET WEIGHT CHECKS

1. Scales should be balanced before weighings are made.

2. If fifteen or twenty units are weighed from two or three shipping containers and no shortage is indicated, no further weighings are necessary. However, a weigh sheet should be written up and submitted along with the taro or tares used. It is not necessary to write up Collection Reports for this type of sample.

3. If a shortage of 5% or more is indicated, a minimum of 50 units should be weighed.

4. Tares: One tare should be used in order to see how the weights run. This, along with the units used for the sample, should be submitted with the Collection Report and Weight Sheet. In case of official samples, tares should be submitted as follows:

- 1 oz. or less sizes 11 tares in addition to one used.
- 2, 4, & 6 oz. " 4 " " " " " "
- 8 oz. or larger " 3 " " " " "

In sizes other than those listed, the investigator's judgment should be used as to the number of tares to submit.

It should be indicated on the weight sheet by an "X" the units that are submitted for the sample and tares. If units 10, 25, 40 and 50 are submitted for sample, those numbers should be marked on the containers. The carton from which weighings are made should be initialed in some inconspicuous spot for reference in case of further action.

5. Weighings should be made as follows:

- 5 or less cartons Min. of 50 units with equal no./carton
- 6 - 35 cartons 10 units from each of 5 cartons
- 25-50 " 8 " " " " 7 "
- 51 - 100 " 6 " " " " 10 "
- 101 - 235 " 4 " " " " 15 "
- 236 - 400 " 3 " " " " 20 "
- 401 - above 3 times the square root of the number of cartons in the shipment. Three units should be weighed from each carton.
SUGGESTED FORM FOR RECORDING WEIGHINGS

Date Weighed: ___________ Sample No. ______

Product: ____________________________________________

Shipper: _____________________________ (Name) _____________________________ (Address)

Weighings made at _____________________________ (Name) _____________________________ (Address)

Balance _____________________________ (Kind) _____________________________ (Was it checked?)

Evidence of Leakage: _____________________________________________ (State whether or not leaking packages were weighed.)

Gross Weights

Consisted of: _____ units taken _____ from each of _____ cases

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Average Gross Weight ________

Preliminary Tare taken by Investigator ________

* Represents units taken as official sample. They should be distributed among the units weighed.

________________________________________ (Investigator)
REPORT OF THE LEGISLATIVE COMMITTEE

A.B. Lemmon, Chairman

This Committee has held two meetings so far. On October 20, 1947, the first meeting was held in Washington, D.C., and those present were:

J.F. Fudge, Texas
J.L. St. John, Washington
W.G. Reed, Washington, D.C.
John D. Conner, N.A.I.D.M.
C.L. Smith, A.I.F.
E.W. Constable, North Carolina
J.D. Patterson, Oregon
Allen B. Lemmon, California

Mr. Conner gave a full explanation further with regard to the background of the Uniform State Insecticide, Fungicide and Rodenticide Act prepared by the Council of State Governments at the request of the National Association of Commissioners, Secretaries and Directors of Agriculture. There was general discussion with regard to this proposed Act but no specific recommendations were made at this meeting.

The National Association of Commissioners, Secretaries and Directors of Agriculture at its annual convention, November 10, 11, 12, 13, 1947, at Biloxi, Mississippi, passed a resolution No. 6 as follows:

"WHEREAS, this Association at its meeting last year in Detroit voted to approve and urge adoption by the states of the Uniform Insecticide Bill prepared by the Council of State Governments, and

"WHEREAS, this Association believes that the Bill should be strengthened in several of its sections, therefore

"BE IT RESOLVED, That the proposed uniform insecticide, fungicide and rodenticide act as prepared by the Council of State Governments and approved by this organization at its 1946 meeting, be amended:

(a) To include larvacides and ovicides.

(b) By deleting the alternate provision that permits the registration of the name of each active ingredient and the name and the total percentage of each of the inert ingredients.

(c) By deleting that part of the bill that permits an economic poison registered with the Federal Government to enter the trade channels of the state without registration in that state.

(d) By deleting that part of the bill which permits economic poisons to be registered under protest and sold during the period in which experimental trials are conducted."

In order to develop further information with regard to the opinions and attitudes of the different members of the Committee, and also their suggestions
with regard to these proposed amendments, a meeting of the Committee was called for June 5, 1948, at the Hotel Clark in Los Angeles. In view of the fact that the previous meeting was on the East Coast, it was believed that it was desirable to have the second meeting on the West Coast. Those members who could not attend were requested to send their comments in writing. Those present at the meeting in Los Angeles were:

Members of the Committee:  
W.U. Reed, Washington, D.C.  
L.S. Hitchner, A.I.F.  
W.E. Ball, P.L.I.  
H.W. Hamilton, M.A.I.D.A.  
Allen B. Lennox, Chairman, California

Letters received from:  
E.W. Constable, North Carolina  
J.F. Fudge, Texas  
J.D. Patterson, Oregon

Others in attendance:  
Alvin J. Cox  
E.T. Doyle, Tobacco By-Products & Chem. Corp.  
Elmer J. Davis, Los Angeles Chemical Co.  
G.F. MacLeod, Sunland Industries, Inc.  
Gerson D. Bender, Bureau of Chemistry (Cal.)  
W.D. Gray, P.L.I.  
N.Z. Davis, Shell Oil Co.  
W.A. Simanton, Shell Oil Co.  
R.L. Miller, Miller Products Co.  
Charles Kipple, Stauffer Chemical Co.  
Henry Morris, Stauffer Chemical Co.  
A.J. Flebut, Niagara Chemical Div.  
Food Machinery Corp.  
Don Penny, California Spray-Chemical Corp.  
Earl Cannon, California Spray-Chemical Corp.  
Leo R. Gardner, California Spray-Chemical Corp.  
Mr. McCrory, Pennsylvania Salt Mfg. Co.

At this meeting the Chairman reviewed the background of the model legislation resolution from the National Association of Commissioners, Secretaries and Directors of Agriculture and its recommendations; letter dated May 28, 1948, from J.D. Patterson; letter dated May 13, 1948, from E.W. Constable; letter dated May 23, 1948, from George D. Harston; letter dated May 18, 1948, from Albert B. Heagy, Secretary-Treasurer; and letter of May 10, 1948, from J.F. Fudge. These letters indicated approval by the writers of the proposed amendments suggested by the National Association of Commissioners, Secretaries and Directors of Agriculture.

Dr. Reed was called upon for his comments and he spoke in favor of the provision with regard to registration under protest. He explained its operation under the Federal law and stated he believed it to be advantageous both to industry and enforcement officials.

Dr. Hamilton read a paper opposing any changes in the uniform state bill as drafted. Mr. Hitchner also voiced similar objections to any change in the bill.

Mr. N.B. Davis, speaking at the request of Mr. Ball of the P.L.I., commented that the legislation seemed to be set up in a negative nature as to requirements of law and suggested that consideration be given to re-drafting
in a straight forward and direct manner, stating what was required rather than what was misbranded.

There was no one present representing Interstate Manufacturers Association and no letter was received from this organization, although notice of the meeting had been sent to it.

General discussion followed. The Chairman raised the point that the model bill apparently did not require the name and address of the registrant to be on the label but permitted a distributor to have his name on the label of a product manufactured and registered by another. This procedure is acceptable under the present Federal law but not permitted under California law or that of some of the other Western states. Dr. Hamilton discussed private brand packaging and the importance to the industry of not requiring the distributor always to be the registrant. Others who commented were Dr. Cox, Mr. Miller and Mr. Gardner. Mr. Gardner emphasized the fact that at all times we should look at the problem of legislation from the viewpoint of the farmer and what it does to protect him.

As there was no further discussion the Chairman summarized the meeting and stated he would turn in a report to the Association as follows:

(a) The Uniform State Insecticide, Fungicide and Rodenticide Act prepared by the Council of State Governments is believed to include larvacides and ovicides. There is no objection either by industry or officials to having them specifically defined and spelled out in the law if the attorneys believe this is desirable.

(b) The officials charged with the administration of economic poisons laws recommend and believe that it is imperative that the name and percentage of each active ingredient and total percentage of inert ingredients be required to be shown on each label. Representatives of the industry strongly oppose this and state that the industry has gone as far as it can at this time by accepting the alternate of the name of each active ingredient and the name of each inert ingredient, in descending order of magnitude, and the total percentage of inert ingredients.

(c) Each official expressed the opinion that an economic poison should be registered in each state in which it is sold even though it might be registered under the Federal law, but members of the industry stated that some states did not desire to set up the machinery to register economic poisons and that it was not necessary for all to have the same type of control machinery. It was stated that Rhode Island and New York, for example, were satisfied with Federal registration solely and did not desire authority for state registration. It was pointed out that the multiplicity of high fees made it impossible for many manufacturers to do business in all states and restriction through high fees acted as a trade barrier.

(d) Although considered undesirable by many economic poisons control officials, the provision in the uniform Act which permits economic poisons to be registered under protest is regarded by the industry as a necessary safeguard to arbitrary action by an administrator. In view of the increased penalties where a product registered under protest is found in violation, it would seem that demand for registration under protest would not be made lightly.

In view of the wide divergence of opinion between officials and representatives of the industry on this joint committee with regard to the three
previously mentioned items, it is our recommendation that the Association neither endorse nor oppose the uniform state insecticide, fungicide and rodenticide act prepared by the Council of State Governments but instruct the secretary that whenever requested by an official or other person desiring information with regard to the act, that he reply giving the arguments on both sides of the three debatable points.
INVESTIGATOR FOR METHODS CLEARING HOUSE

J.J.T. Graham

The Insecticide Division has accumulated a number of methods of analysis which have been mimeographed for use in the Division laboratories. A list of these methods was published in the "Pest Controller" for May 1943, and was given other publicity. This list with several additions follows:

Total Chlorine in Benzene Hexachloride

Acetone

Antu

Aerosols

Arsenic & Antimony (Ant Poisons)

Boric Oxide in Boric Acid (Borax)

Chlordane (Mineral Oil)

DDT

DDT, Preparation of para para para isomer

DDT (Setting Point)

DDT Determination of para para para isomer

DDT (Colorimetric)

2,4-D

Dinitroresol

Dinitro-ortho-cyclohexyl-phenol

Dinitro ortho secondary butyl phenol

Dinitro ortho phenol in oil

2,4 Dinitranisole

Disinfectants (Coal Tar)

Hexamyl Tetraphosphate

Liquid Cresolis Saponatus

Mercury (in Paints containing organic matter)

Ferric Dimethyl Dithiocarbamate

Naphthalene

Oil emulsions

Organic Halides

Organic Thiocyanates

Organic Thiocyanates in Dusts

Phenols (emulsified)

Phosphorus in tetra ethyl pyro phosphate

Piperonyl Butoxide (Qual.)

Piperonyl Cyclohexenone (Qual.)

Pyrethrines-Mineral Oil-Lethane Mixture

Pyrethrins (Dusting Mixtures)

Pyrethrins in presence of Organic Thiocyanates

Rotenone (Prep. of Pure)

Ether soluble extract of Derris or Cube in presence of Sulfur

Rotenone-Sulfur Mixtures

Sabadilla

Saponified Cresol Solution

Selenium

Silica in Bordeaux Mixture

Strychnine

Sulfur-DDT Dusting Mixture

Sulfur in Spray Oil

Total Oil
Sulfur in dusting mixtures

Water in Germicides, containing
Isopropyl alcohol, Soap, etc.

Requests for these methods have been received from both official and industrial chemists, and complete sets have been furnished to the following State Laboratories: Oregon, New Jersey, North Carolina, Virginia, Michigan, Louisiana, California, Hawaii, Arizona, Nebraska, Georgia, and Iowa, and a partial set to the State Laboratory of Delaware.

Complete sets have been furnished to the following industrial firms:

Agricultural Supply Company
Grand Forks, North Dakota

Michigan Chemical Corporation
St. Louis, Michigan

Flag Sulfur and Chemical Company
Tampa, Florida

Stauffer Chemical Company
New York, New York

Partial sets were also sent to the following firms:

Julius Hyman and Company
Denver, Colorado

The Geigy Company
New York, New York

woolfolk Chemical Works, Ltd.
Fort Valley, Georgia

Crop-Saver Chemical Corporation
New York, New York

McLaughlin, Gormley and King Company
Minneapolis, Minnesota

J.T.Baker Chemical Company
Phillipsburg, New Jersey

The Sherwin-Williams Company
Bound Brook, New Jersey

Carbide and Carbon Chemicals Corp.,
New York, New York

The Sherwin-Williams Company
Cleveland, Ohio

The Clearing House has also received from Mr. Allen B. Lemmon a reprint of a method for determination of the gamma isomer of benzene hexachloride that was developed in the California State Laboratory by Mr. J.B. La Clair. This method is based on the differential dehydrochlorination of two charges of the sample. Mr. Lemmon stated that this method is being used in his laboratory for this determination, and on this basis we have had this method mimeographed.

In the course of their work the members of this association may develop or discover methods of analysis that are new, or improvements over methods now being used. In such cases it is desirable that such methods be made available for the use of others, and the Clearing House Chairman will be glad to receive copies of these methods for distribution to the laboratories on our mailing list.
Authorization for the appointment of this Committee, and tentative plans for its composition, were made between the organization meeting of the Association in October, 1947, and May 20, 1948, at which time final notice of appointment went to each member.

The Committee is composed of the following:

Mr. A.B. Lemmon, Chief, Bureau of Chemistry California State Department of Agriculture Sacramento, California

Mr. Guy B. Frary, State Chemist Vermillion, South Dakota

Dr. S.D. Silver, Chief, Toxicological Branch Medical Division, Chemical Corps Edgewood, Maryland

Dr. John C. Krentz, Head, Pharmacology Department University of Maryland, School of Medicine Baltimore, Maryland

Dr. C.L. Smith, Agricultural Insecticide & Fungicide Assn., 235 Madison Ave., New York, 17, New York

Mr. J.M. George, Secretary, Interstate Manufacturers' Assn., Winona, Minnesota

Dr. E.G. Klarmann, National Insecticide & Disinfectant Mfrs. Lehn & Fink Products Company Bloomfield, New Jersey

Dr. W.A. Simanton, Pacific Insecticide Institute Entomologist, Special Products Department Shell Oil Company, Inc., 100 Bush Street San Francisco, 4, California

Dr. J.H. Foulger, Manufacturing Chemists Association Director, Haskell Laboratories, E.I. duPont de Nemours & Co., Wilmington, Delaware

Justus C. Ward, Chairman, Chief, Pharmacology & Rodenticide Section Insecticide Division, U.S.D.A. Room 3936, South Agriculture Building Washington, D.C.
It has been difficult to organize a program for the Committee, since it has been impossible to call a meeting because of economic difficulties, but a tentative plan of action has been proposed, as follows:

The Committee on Toxicity and Antidotes shall:

1. Assemble toxicity records for use by all interested parties, either regulatory, manufacturing or research groups.

2. Assemble data on the effects of formula ingredients on active principle toxicity.

3. Record all reported cases of accidents with economic poisons, and investigate them as fully as possible, in order to prepare means to avoid repetition.

4. Assemble data on the effects of particle size, method of application and similar factors on toxicity.

5. Correlate data on various testing methods as they might influence evaluation of formulations as to legal toxicity.

6. Study all factors surrounding the introduction of completely new poisons, develop recommendations on the degree of control to be exerted by regulatory officials.

7. Sponsor tests on antidotes in relation to all poisons and particularly as associated with new materials. Undertake to stimulate research in antidotes at various medical schools.

8. Sponsor studies aimed at discovering chemical and physical methods for evaluating such economic poisons as red squill, "Castrix", Antu, and the like.

In serving its function as an advisory group under item No. 1, it has taken a definite part in the problem of revising precautionary and antidote statements for use on labeling of economic poisons. This job has occupied the major attention of the Committee for the rather short time it has been activated.

Other Committee activity has been confined to correspondence on economic poison accidents, methods of analysis -- both chemical and biological -- for new poisons, correspondence on toxicity of certain poisons and formulations, and discussions of 1080 safety regulations.

The Committee hopes to hold a meeting during the general sessions of the Association, and a more comprehensive program will be discussed at that time.
PERSONS IN ATTENDANCE AT SECOND ANNUAL MEETING
OF THE
ASSOCIATION OF ECONOMIC POISONS CONTROL OFFICIALS

Representing States,
Canada and Hawaii:

Alabama
George H. Marsh, Director
Department of Agr. & Industry
Montgomery, Alabama

Louisiana
E. A. Epps, Jr.
Department of Agriculture
Baton Rouge, Louisiana

California
Allen B. Loomon, Chief
Department of Agriculture
Sacramento, California

Maine
A. M. G. Soulo
Department of Agriculture
Augusta, Maine

Canada
A. M. W. Carter, Assoc. Chief
Department of Agriculture
Ottawa, Canada

Maryland
L. E. Bopst
Inspection Service
College Park, Maryland

Colorado
F. Horbert Gates
State Entomologist
Denver, Colorado

A. B. Hoagy
Inspection Service
College Park, Maryland

Florida
E. R. Winterle
Tallahassee, Florida

J. E. Schuoler
Inspection Service
College Park, Maryland

Hawaii
Allan Thistle, Director
Division of Marketing
Honolulu, Hawaii

R. W. Neal
Inspection Service
College Park, Maryland

Indiana
F. W. Quackenbush
Purdue University
Lafayette, Indiana

Michigan
W. C. Geagley
Department of Agriculture
Lansing, Michigan

Kansas
B. H. Hewolt, President
Board of Agriculture
Coldwater, Kansas

Minnesota
H. J. Hoffmann
Department of Agr., Dairy & Food
St. Paul, Minnesota

Paul Ijams
Board of Agriculture
Topka, Kansas

B. S. Swenson
Department of Agr., Dairy & Food
St. Paul, Minnesota

Kentucky
M. L. Mistrungor
Department of Health
Louisville, Kentucky

Mississippi
M. P. Etheredge
Department of Chemistry
State College, Mississippi

Bruce Poundstone
University of Kentucky
Lexington, Kentucky

New Hampshire
G. H. Larario
Department of Agriculture
Concord, New Hampshire
New Jersey
S. B. Randle
Agricultural Experiment Sta.
New Brunswick, New Jersey

New Mexico
R. W. Ludwick
Food & Fort. Control Office
State College, New Mexico

New York
A. B. Buchholz
Dept. of Agr. & Markets
Albany, New York

North Carolina
D. S. Coltrano
Dept. of Agriculture
Raleigh, North Carolina

E. W. Constable
Dept. of Agriculture
Raleigh, North Carolina

Oklahoma
C. A. Bower
Dept. of Agriculture
Oklahoma City, Oklahoma

Oregon
J. D. Patterson
Dept. of Agriculture
Salon, Oregon

Pennsylvania
G. J. Kuhlman
Dept. of Agriculture
Harrisburg, Pennsylvania

Rhode Island
J. B. Smith
State College
Kingston, Rhode Island

South Carolina
B. D. Cooanigor
Agr. & Mechanical College
Clemson, South Carolina

South Dakota
G. G. Frary
Dept. of Agriculture
Vermillion, South Dakota

Tennessee
V. L. Fuqua
Dept. of Agriculture
Nashville, Tennessee

Texas
J. F. Fudge
Agr. Experiment Station
College Station, Texas

Utah
E. E. Christenson
Dept. of Agriculture
Salt Lake City, Utah

Vermont
H. L. Walker
Dept. of Agriculture
Montpelier, Vermont

Virginia
R. C. Berry
Dept. of Agr. & Immigration
Richmond, Virginia

J. C. Jones
Department of Agriculture
Richmond, Virginia

B. L. Samuel
Department of Agriculture
Richmond, Virginia

Washington
J. L. St. John
State College of Washington
Pullman, Washington

Wisconsin
W. B. Grieom
Department of Agriculture
Madison, Wisconsin
Representing Federal Government:

Insecticide Division,
Production & Marketing Administration:

S. C. Billings
R. L. Caswell
C. G. Donovan
J. J. T. Graham
E. L. Griffin
T. H. Harris
C. F. Hoffman
F. B. McAuliffe
S. A. Rohwar, Bureau of Entomology & Plant Quarantine.
Olaf Mickelson, United States Public Health Service.

Representing Industry:

G. M. Baird
Baird & McGuire, Inc.
Holbrook, Massachusetts

J. D. Conner
N. A. I. D. M.
Washington, D. C.

H. C. Doellinger
O. M. Scott & Sons Co.
Marysville, Ohio

Melvin Fuld
N. A. I. D. M.
Baltimore, Maryland

H. W. Hamilton
N. A. I. D. M.
New York, New York

C. S. Harris
Shell Oil Co., Inc.
New York, New York

S. J. Hill
DuPont Company
Wilmington, Delaware

L. S. Hitchner
A. I. F. A.
New York, New York

W. G. Reed
H. H. Shepard
F. A. Spurr
L. S. Stuart
E. A. Walker
M. M. Walton
J. C. Ward
R. O. White

M. D. Leonard
Julius Hyman & Co.
Denver, Colorado

L. A. Long
Agr. Chem. Magazine
New York, New York

G. F. MacLeod
Pacific Insecticide Institute
Fresno, California

I. P. MacNair
Agr. Chem. Magazine
New York, New York

G. W. McBride
Carbide & Carbon Chem. Corp.
Washington, D. C.

James McConnon
McConnon & Co.
Winona, Minnesota

J. A. Noonie
Philadelphia, Pennsylvania

L. J. Oppenheimer
West Disinfecting Co.
New York, New York
John Powell  
John Powell & Co., Inc.  
New York, New York

C. L. Smith  
A. I. F. A.  
New York, New York

A. L. Sodergreen  
West Disinfecting Co.  
Long Island City, New York

F. D. Sparre  
DuPont Company  
Wilmington, Delaware

Mrs. E. D. Sullivan  
N. A. I. D. M.  
New York, New York

W. W. Sunderland  
The Dow Chemical Co.  
Midland, Michigan

Frier Thompson, Jr.  
N. A. I. D. M.  
New York, New York
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<tr>
<td>Alabama</td>
<td>C.H. Marsh</td>
<td>Director, Division of Agricultural Chemistry</td>
<td>519 Dexter Ave., Montgomery, AL</td>
</tr>
<tr>
<td>Arizona</td>
<td>W.T. McGeorge</td>
<td>State Chemist, Feed, Fertilizer &amp; Economic Poisons</td>
<td>Tucson</td>
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<td>Arkansas</td>
<td>P.H. Miller</td>
<td>Chief Inspector, Plant Board</td>
<td>Little Rock</td>
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<td>California</td>
<td>A.B. Lemmon</td>
<td>Chief, Bureau of Chemistry</td>
<td>Sacramento, CA</td>
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<td>Colorado</td>
<td>P.H. Gates</td>
<td>State Entomologist</td>
<td>Denver</td>
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<td>Connecticut</td>
<td>H.J. Fisher</td>
<td>Chemist in Charge, Dept. of Analytical Chemistry</td>
<td>New Haven, CT</td>
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<tr>
<td>Delaware</td>
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<td>J.D. Taylor</td>
<td>State Chemist, Agricultural Dept., Chemical Div.</td>
<td>Tallahassee</td>
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<td>Georgia</td>
<td>C.R. Clark</td>
<td>State Chemist, Department of Agriculture</td>
<td>254 Capitol Place, S.W., Atlanta, GA</td>
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<td>P.M. Harmon</td>
<td>Supt., Registration &amp; Education</td>
<td>Springfield</td>
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<td>Iowa</td>
<td>R.A. Sours</td>
<td>Dairy &amp; Food Division</td>
<td>Des Moines, IA</td>
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<td>Kansas</td>
<td>Paul Ijams</td>
<td>Director, Control Division</td>
<td>Topeka</td>
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<tr>
<td>Kentucky</td>
<td>Mrs. F.C. Dugan</td>
<td>Director, Div. of Food, Drugs and Hotels</td>
<td>Louisville, KY</td>
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<tr>
<td>Louisiana</td>
<td>M.S. Perkins</td>
<td>Asst. Commissioner</td>
<td>Baton Rouge, LA</td>
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<td>Maine</td>
<td>A.M.G. Soule</td>
<td>Chief, Division of Inspection</td>
<td>Augusta</td>
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<td>Portland</td>
<td>J.J. Taylor</td>
<td>State Chemist, Agricultural Dept., Chemical Div.</td>
<td>Tallahassee</td>
</tr>
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</table>
MARYLAND
L.E. Bopst, State Chemist
Inspection & Regulatory Service
College Park
A.B. Heagy, Chemist
Inspection & Regulatory Service
College Park

MASSACHUSETTS
C.S. Ferguson, Director
Food & Drug Div., Dept. Health
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MICHIGAN
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Bur. of Chemical Laboratories
Department of Agriculture
Lansing

MINNESOTA
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Dept., Agriculture, Dairy & Food
552 State Office Bldg.,
St. Paul

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Dept. of Chemistry
State College

MISSOURI - No law

MONTANA
E.M. Andrews, Administrator
Food & Drug Div., Board of Health
Helena

NEBRASKA - No law

NEVADA - No law

NEW HAMPSHIRE
J.G. Conklin, State Entomologist
Department of Agriculture
Durham

NEW JERSEY
S.B. Randle, State Chemist
Agricultural Experiment Station
New Brunswick

NEW MEXICO - No law

NEW YORK
A.B. Buchholz, Director
Plant Industry Bureau
Department of Agriculture
Albany, 1

NORTH CAROLINA
E.W. Constable, State chemist
Department of Agriculture
Raleigh

NORTH DAKOTA
R.O. Baird, State Food Commissioner
State Laboratories Department
Lock Box 900
Bismarck

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Insect & Plant Disease Control
Department of Agriculture
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OKLAHOMA
Clyde Wover, Director
Entomology & Plant Control Div.,
Department of Agriculture
Capitol Bldg., Oklahoma City

OREGON
J.D. Patterson, Chief Chemist
Division of Foods & Dairies
Department of Agriculture
Salem

PENNSYLVANIA
W.S. Hagar, Director
Bureau of Foods & Chemistry
Department of Agriculture
Publication Bldg., Harrisburg

RHODE ISLAND - No law

WISCONSIN
G.J. Kuhlman, Head Chemist
Bureau of Foods & Chemistry
Department of Agriculture
Publication Bldg., Harrisburg

WYOMING
- No law
SOUTH CAROLINA

J.A. Berly, Assoc. State Entomologist
Crop Pest Commission
Clemson

SOUTH DAKOTA

O.E. Shock, Director of Inspections
Department of Agriculture
Pierre

TENNESSEE

V.L. Fuqua, Supt. & State Chemist
Div. of Dairies, Foods & Drugs
502 State Office Bldg.,
Nashville, 3

TEXAS

J.F. Fudge, State Chemist
Agricultural Experiment Station
College Station

O.C. Hayworth
Div. Plant Inspection & Quarantine
Austin

UTAH

M.E. Christensen, State Chemist
Board of Agriculture
Salt Lake City

VERMONT

H.L. Bailey, Director
Division Plant Pest Control
Department of Agriculture
Montpelier

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1123 State Office Bldg.,
Richmond, 19

WASHINGTON

J.L. St. John, State Chemist
Division of Chemistry
Agricultural Experiment Station
Pullman

WEST VIRGINIA - No. law

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