FILE NAME: Warning Labels (WL)

DATE: 1945 June

DOC#: WL011

DOCUMENT DESCRIPTION: Article from Trade Journal

A Guide for the Preparation of Warning Labels for Hazardous Chemicals

In the last few years the development of new chemical compounds, the wartime necessity of using unskilled labor, and the introduction of chemical processes into new fields of industry have emphasized the need for improved labeling of chemical products. The Manufacturing Chemists' Association, for many years a strong force in the improvement of methods for the shipping and handling of chemicals, enlarged its activities in this field by forming, about a year ago, its Label and Precautionary Information Committee. This committee, composed of competent technical and legal personnel, has worked intensively during the past year and has developed certain basic principles, classification of hazards, and recommended forms for labels. This work has been compiled by the MCA in its recently issued Manual L-1, entitled "A Guide for the Preparation of Warning Labels for Hazardous Chemicals". Because of the valuable information and recommendations contained in this manual, we are publishing it here with the permission of the Manufacturing Chemists' Association.

THE development of new chemical products and the introduction of chemical processes into ever-widening fields has accentuated the need for furnishing appropriate information in those cases where special precautions are necessary. Many chemicals present no hazards in normal handling and storage and for these products no precautionary labels are necessary.

The education of employees regarding chemical hazards is, and must remain, the direct responsibility of their employers. However, such hazards are not confined to employees alone, and information concerning them should, so far as practicable, reach every person using, transporting, or storing chemicals. The most practical means for the seller to disseminate this information appears to be by labels affixed to containers of hazardous chemicals, bearing appropriate precautionary statements and instructions stated as simply and briefly as circumstances permit.

In the interest of uniformity and more adequate labeling of chemical products, the Manufacturing Chemists' Association has prepared this manual for the benefit and guidance of its members. In addition to the general recommendations contained herein, the MCA has prepared suggested labels for specific products. These have been printed as Manual L-2, which will be supplemented from time to time as additional recommended labels are developed.

In order that the terms used in the Manual may be clearly understood, a series of definitions is included in Schedule 1.

Individual statutes, regulations, or ordinances may require that particular information be included on a label or that a specific label be affixed to a container as in the case of ICC Regulations. In each case, the requirements of these laws should also be studied. *The warning labels suggested in this manual should be used in addition to, or in combination with, any label required by law.*

General Principles

In the preparation of any precautionary label the following principles should first be considered:

1. Each chemical product (including mixtures) presents a distinct problem and must be treated individually, in the light of its own characteristics.
2. Extreme care should be exercised in the choice of terminology. Statements should be brief and simple.
3. On labels for different products, uniformity in language to indicate the same hazards is most desirable in order to gain greater understanding through standardization.
4. Precautionary statements must be accurate and selectively chosen. To be effective, they should be used only when necessary—indiscriminate use will tend to destroy their value. For example, the use of the word "Poison" on labels should be restricted to cases in which (1) it is prescribed by law, or (2) it is associated through common usage with a particular compound, or (3) it is indicated because of special circumstances in a product's distribution to, or utilization by, the public. The commonly accepted meaning of "Poison" refers to single dose oral toxicity. It covers inadequately, in a quantitative sense, the hazards from acute and chronic exposure, ingestion, skin absorption and inhalation. Therefore, in most cases the use of a signal word such as "DANGER", "WARNING", or "CAUTION" with a statement of the hazard present is much more informative.
5. Chemical names should be those recommended by the AMERICAN CHEMICAL SOCIETY.
6. The use of a nondescriptive code designation or trade name as the only identification of a hazardous chemical should be avoided. If for any reason, it is undesirable to show the chemical name, or if the chemical name is so complex as to be meaningless except to the trained chemist, the label should state the type of chemical—e.g., "corrosive acid", "lead compound".
7. The following subject matter should be considered for inclusion on a precautionary label:

1. Chemical name.
2. "Signal word" (DANGER—WARNING—CAUTION) designating degree of hazard (Column A, Schedule 3).
3. Affirmative statement of "hazard" (Column B, Schedule 3).
4. "Precautionary measures" covering actions to be followed or avoided (Column C, Schedule 3).
5. Instructions in case of accident, where advisable (Column D, Schedule 3).

Preparation of Precautionary Labels

The basic considerations in the preparation of a precautionary label are:

1. Determination of the hazards present in the particular chemical.
2. Selection of appropriate statements for each hazard.
3. Arrangement of statements in the order of emphasis desired.

The most frequently encountered hazards have been classified by the MCA into 10 types as listed in Schedule 2. Set opposite each class are statements illustrating characteristic precautions usually required for that type of hazard.

Many chemicals will have more than one type of hazard, in which case the statements for each type should, if appropriate, be included on the label.

As each chemical must be treated individually, there will be many instances in which the illustrative statements will not be applicable either because they do not accurately express the degree of hazard or because they fail to cover the particular characteristics. In such cases, suitable statements should be selected from Schedule 3 next page. This schedule presents a more comprehensive list of statements arranged in columnar form, and grouped as follows: (A) Signal Word, (B) Hazards, (C) Precautionary Measures, and (D) Instructions in Case of Accident.

A. The degree of hazard can be expressed only in relative terms. The purpose is twofold: to indicate to the reader the comparative seriousness of the danger involved in handling a given product and to call attention to the precautionary instructions which should immediately follow. The "signal words" recommended are, in the order of diminishing severity of hazard (1) DANGER; (2) WARNING; (3) CAUTION.

Example: WARNING!

B. From this column should be selected the phrase (or phrases) that most accurately describes the principal hazard. This is placed on the same line as the "signal word".

Example: WARNING! FLAMMABLE.

C. The appropriate statement of "precautionary measures" should be chosen from Column C and should follow on subsequent lines.

Example: WARNING! FLAMMABLE.
Keep away from heat and open flame.
Use with adequate ventilation.
Avoid prolonged breathing of vapor.
Avoid prolonged or repeated contact with skin.

D. When it is advisable to include instructions in case of accident, the appropriate statement may be selected from this column. If the statements from Schedule 3 fail to meet the exact needs, they should be modified to suit. In the example chosen, toluene, no phrase from this column appears to be necessary.

While every compound carries some hazard, if improperly used, it is impractical to cover every possible contingency on a label. Efforts should be directed toward naming the serious hazards, and warning against such abuses and accidents as are likely to be encountered under normal conditions. There are scarcely any means of measuring in absolute terms the relative seriousness of hazards, and the recommendations in Schedule 3 only contemplate their division into two or three degrees of intensity. It follows that of two compounds one may be less hazardous than the other and yet may carry the same warnings and cautions.

Schedule 4 presents suggested labels for samples of experimental products for which full data regarding hazards are not yet known.

Schedule 5 illustrates the application of caution statements to three specific products. In the case of toluene, the statements used are similar to those given in Schedule 2 for a compound having hazards in classifications I-B and IV. The second example, aqueous hydrofluoric acid, represents a very special case where the particular hazards require modification of the standard statements. The third example is that of a label for a proprietary compound.

Schedule 1. Definitions

Flammable Liquid[1]. An inflammable[1] liquid is any liquid which gives off inflammable vapors (as determined by flash point from Tagliabue's open-cup tester, as used for test of burning oils) at or below a temperature of 80° F.

Corrosive[2]. (Physiological) A corrosive is an agent which in contact with living tissue will cause more or less severe destruction of tissue by chemical action.

Irritant[2]. (Physiological) An irritant is an agent which in contact with living tissue will induce either immediately or after prolonged or repeated contact a more or less severe local tissue reaction not leading directly to destruction of tissue.

Sensitizer[2]. (Physiological) A sensitizer is a material which as ordinarily handled does not necessarily cause any discernible reaction in living tissue but which after initial or repeated contact with the tissue of some individuals may, at a later date, produce a prompt inflammatory reaction on contact, even in mi-

[1] ICC definition. While the term "Inflammable" is used by the ICC, the preferred form "flammable" is used in this manual.

[2] MCA definition.

Schedule 2. Classification of Hazards

Class	Typical Label
I. Flammable liquids and oxidizing agents which support combustion	
A. Flash point 20° F. or below.	DANGER! Extremely flammable. Keep away from heat and open flame. Keep container closed.
B. Flash point above 20° to 80° F. inclusive.	WARNING! Flammable. Keep away from heat and open flame. Keep container closed.
C. Flash point above 80° F.	No cautionary label recommended (as regards flammability) except where required by local regulation.
II. Flammable solids and oxidizing agents as classified by the ICC.	CAUTION! Exposure may cause fire or create fire hazard. Keep away from heat and open flame. Keep container closed. In case of contact: Immediately flush with plenty of water. Remove and wash clothing before re-use.
III. Vapors immediately toxic or extremely irritating even on exposure for a short time or to low concentrations.	DANGER! Extremely hazardous vapor. Do not breathe vapor. Do not get on skin. Do not get in eyes. Keep container closed and away from heat. Keep away from feed or food products. Have air line respirator or gas mask approved by U. S. Bureau of Mines for purpose, available for emergency.
IV. Vapors hazardous from prolonged or repeated exposures, or exposure to higher concentrations.	WARNING! Harmful vapor. Use only with adequate ventilation. Avoid prolonged breathing of vapor. Keep container closed and away from heat.
V. Vapors physiologically inert.	CAUTION! Vapor reduces oxygen available for breathing. Use with adequate ventilation. Keep container closed.
VI. Harmful dusts.	CAUTION! Harmful dust. Avoid repeated breathing or skin contact. Keep away from feed or food products.
VII. Skin irritants, corrosive.	DANGER! Causes severe burns. Do not get in eyes. Do not get on skin. Do not get on clothing. In case of contact: Immediately flush with plenty of water. Remove and wash clothing before re-use.
VIII. Materials causing skin irritations after repeated or continued contact.	CAUTION! May cause skin irritation. Avoid prolonged or repeated contact.
IX. Materials toxic through vapor inhalations or skin absorption.	WARNING! Dangerous if absorbed through skin or breathed. Avoid contact with skin or clothing. Avoid breathing vapor. In case of exposure: Remove to fresh air. Immediately wash with soap and plenty of water. Remove and wash clothing before re-use.
X. Toxic if taken internally. Applies to materials covered by statutory definition of poison liable to be destructive of human adults in doses of 60 grains or less (4 grams) or to any material toxic in amounts likely to be taken internally through easily anticipated errors.	Label as legally prescribed. If not covered by regulation a typical label might read: DANGER! May be fatal if swallowed. Do not take internally.

Schedule 3. Recommended Label Cautions

A. Signal Word	B. Hazards	C. Precautionary Measures	D. Instructions in Case of Accident
a. DANGER! b. WARNING! c. CAUTION!	**Flammability**		
	a. Extremely flammable (flash point 20° F. or below). b. Flammable (flash point above 20° to 80° F. inclusive). c. Exposure may cause fire or create fire hazard.	a. Keep away from heat (sparks) and open flame.	

nute amounts, with the tissue of the same individuals.

Dusts[3]. Solid particles generated by handling, crushing, grinding, rapid impact, detonation, and decrepitation of organic or inorganic materials such as rock, ore, metal, coal, wood, grain, etc. Dusts do not tend to flocculate except under electrostatic forces; they do not diffuse in air but settle under the influence of gravity.

Fumes[3]. Solid particles generated by condensation from the gaseous state, generally after volatilization from molten metals, etc., and often accompanied by a chemical reaction such as oxidation. Fumes flocculate and sometimes coalesce.

Mists[3]. Suspended liquid droplets generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as by splashing, foaming, and atomizing.

Gases[3]. Normally formless fluids which occupy the space of enclosure and which can be changed to the liquid or solid state only by the combined effect of increased pressure and decreased temperature. Gases diffuse.

Vapors[3]. The gaseous form of substances which are normally in the solid or liquid state and which can be changed to these states either by increasing the pressure or decreasing the temperature alone. Vapors diffuse.

Poison. There is no definition adequate for all cases. See General Principles 4.

Schedule 4. Labels for Experimental Samples

The labeling of experimental samples of new products presents unusual problems. All of the properties or possible uses of a product are seldom known. The following safeguards are therefore recommended:

1. Samples of products which are already on the market which have a standard warning label should carry the same warnings as are used on commercial shipments.
2. The following label is suggested for samples of any material that has never been in commercial production unless (1) the material is known to be wholly innocuous, or (2) the dangers are limited to known hazards and appropriate cautions are submitted.

Sample

For Experimental Use Only

(Name or Description of Product)

CAUTION! The chemical, physical, and toxicological properties of this product have not been fully investigated and its handling or use may be hazardous. Exercise due care.

Nonwarranty clause—optional

The supplier makes no warranty of any kind, express or implied, concerning its use. The user assumes all risk of use or handling, whether or not in accordance with any directions or suggestions of the supplier.

3. The identity of the sample, indicated in parentheses above, should be as clear as possible. Wherever feasible, it should be the name of the compound, and in any case it should be the best possible identification to aid the user in knowing with what he is concerned.
4. Where there are significant known hazards they should be so indicated.
5. The above label may be used in the case of old products being considered for new uses.

[3] As defined in Chapter II, "Engineering Control of the Air Contamination of the Working Environment" (Allen D. Brandt), page 198, "Manual of Industrial Hygiene", USPHS.

Schedule 3. Recommended Lable Cautions (Cont'd.)

Volatility		
a. Highly volatile. *b.* Volatile (solvent).	*a.* Keep out of sun and away from heat.	
Inhalation		
a. Extremely hazardous vapor. *b.* May be fatal if inhaled. *c.* Harmful vapor. *d.* Vapor reduces oxygen available for breathing. *e.* Harmful dust. *f.* Causes irritation to eyes, nose, and throat.	*a.* Do not breath vapor (or) Avoid breathing vapor. *b.* Avoid prolonged or repeated breathing of vapor. *c.* Use (only) with adequate ventilation. *d.* Avoid prolonged breathing of dust.	*a.* In case of exposure remove to fresh air. *b.* Have air-line respirator or gas mask approved by U. S. Bureau of Mines for purpose available for emergency.
Contact		
a. Corrosive liquid. *b.* Causes (severe) burns. *c.* Dangerous because (rapidly) absorbed through skin. *d.* Causes skin irritation. *e.* May cause skin irritation.	*a.* Do not get (1) in eyes, (2) on skin, (3) on clothing. *b.* Avoid contact with (1) eyes, (2) skin, (3) clothing.	*a.* In case of contact: (1) Immediately flush with plenty of water (for at least 15 minutes). (2) Immediately wash with soap and plenty of water. (3) Remove and wash clothing before re-use.
Ingestion		
a. Poison (skull and crossbones). *b.* May be fatal if swallowed.	*a.* Do not take internally.	
General		
a. Keep container closed (and away heat). *b.* Keep away from feed or food products. *c.* Keep dry. *d.* Store in cool place.		*a.* Get medical attention. *b.* In case of spillage, flush with plenty of water. *c.* In case of spillage, absorb with sand, ashes, or earth.

The use of any warning or other statement listed above in Schedule 3 is not necessarily limited to the hazard under which it is grouped. The grouping merely indicates the type of hazard to which given statements most frequently apply.

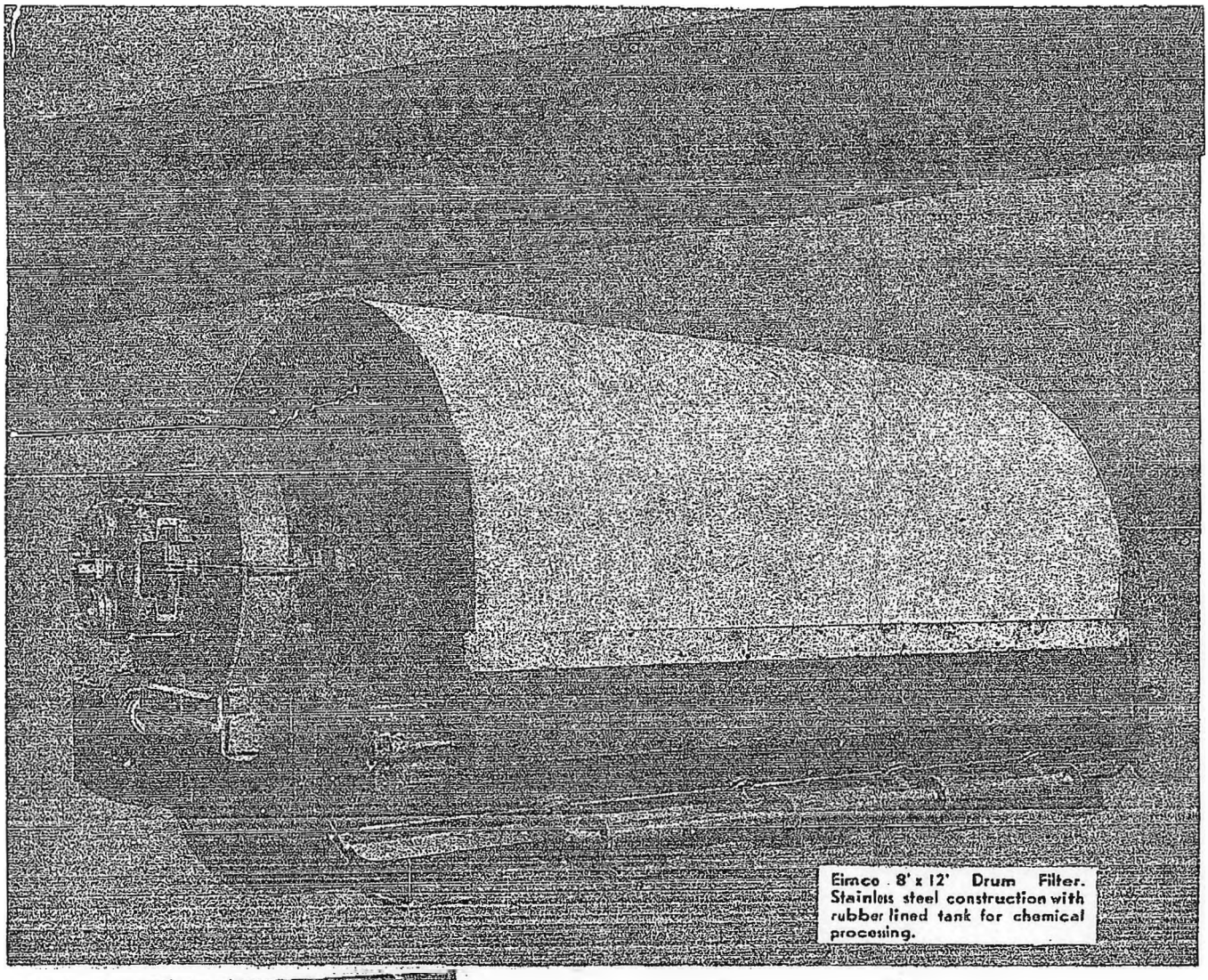
The small letters are not intended to indicate a correlation between similarly lettered statements in adjacent columns but are for identification only.

The parenthetical words indicate optional statements.

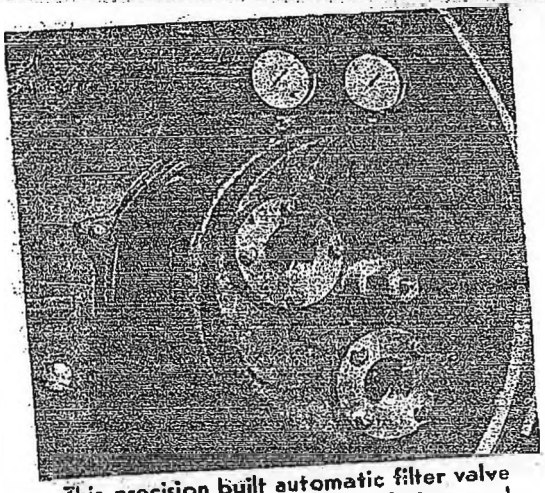
Schedule 5. Specimen Product Labels

The following specimen labels illustrate the application to specific products of the principles set forth in this Manual.

	Toluene
Product Combining Hazards of Class I-B and IV (Schedule 2) Chemicals.	WARNING! Flammable. Keep away from heat and open flame. Use with adequate ventilation. Avoid prolonged breathing of vapor. Avoid prolonged or repeated contact with skin.
	Aqueous Hydrofluoric Acid
Product Requiring Modified Cautions and First Aid.	DANGER! Corrosive liquid. Hazardous vapor. Causes severe burns which may not be immediately painful or visible. Do not breathe vapor. Do not get in eyes. Do not get on skin. Do not get on clothing. In case of contact or suspicion of contact: Immediately flush skin (until whiteness disappears) and eyes (for at least 15 minutes) with plenty of water, paying particular attention to skin under nails. Avoid use of greasy ointments. Get medical attention. Remove and wash clothing before re-use.
Proprietary Product—e.g., containing fluorine salts	(Proprietary Name) Contains Fluorine Compounds. WARNING! Poisonous if taken internally. Avoid breathing dust. Flush spillage to sewer with water.



Eimco 8' x 12' Drum Filter. Stainless steel construction with rubber lined tank for chemical processing.



This precision built automatic filter valve is typical of the careful design and oversize, heavy-duty construction of Eimco filters. It offers exclusive features which make for easier installation and higher efficiencies. Let us tell you more about it.

B-89

Eimco continuous vacuum filters are being used in essential food, chemical and metallurgical processing plants.

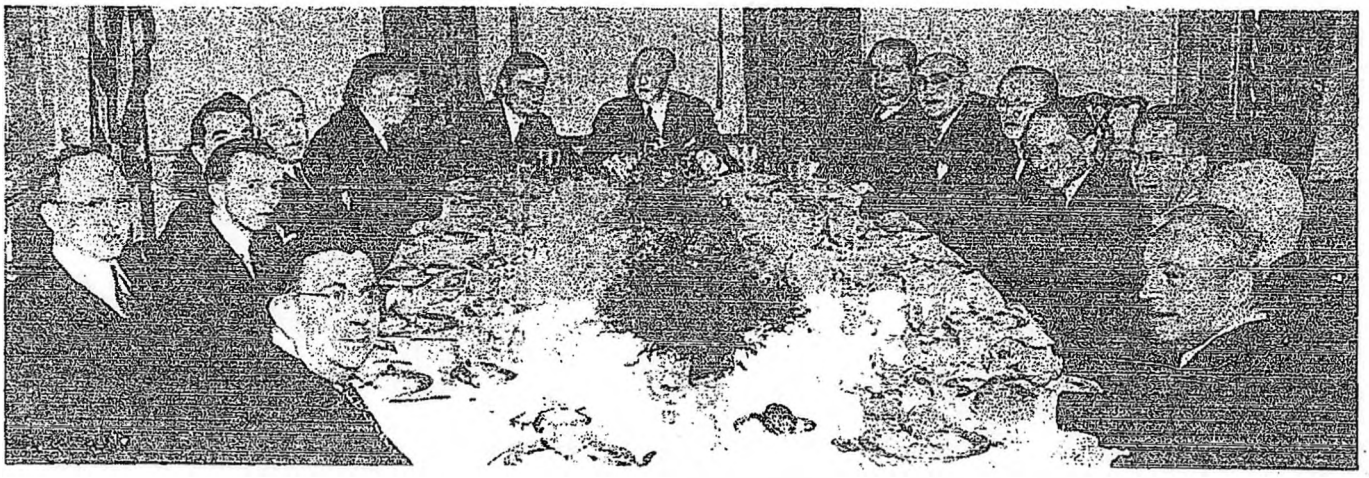
Exclusive Eimco features of design and construction assure greater filter capacity, lower moisture content of cake and longer cloth life. Eimco filters are available in all wood or all steel construction with protective coatings of special materials for acid resistance.

We solicit an opportunity to consult with you on your filtration problems. The complete facilities of our testing laboratories, located at both our New York and Chicago offices, may be used without obligation.

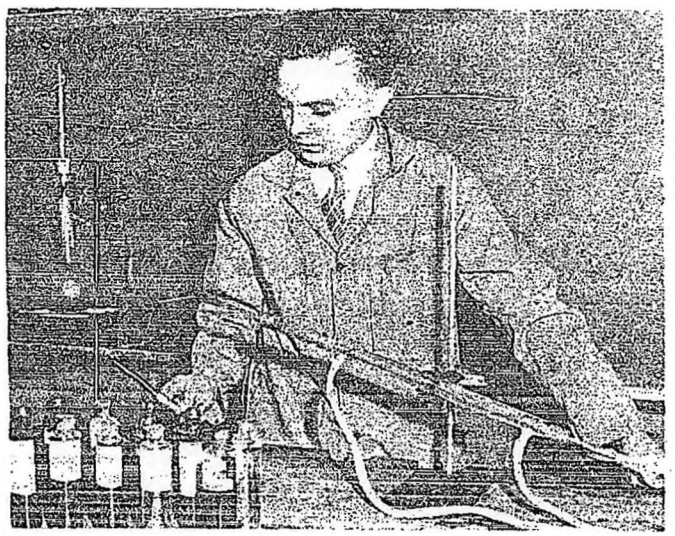
EIMCO

THE EIMCO CORPORATION

Executive Offices and Factories: Salt Lake City 8, Utah
Branches: New York, Chicago, El Paso, Sacramento, St. Louis

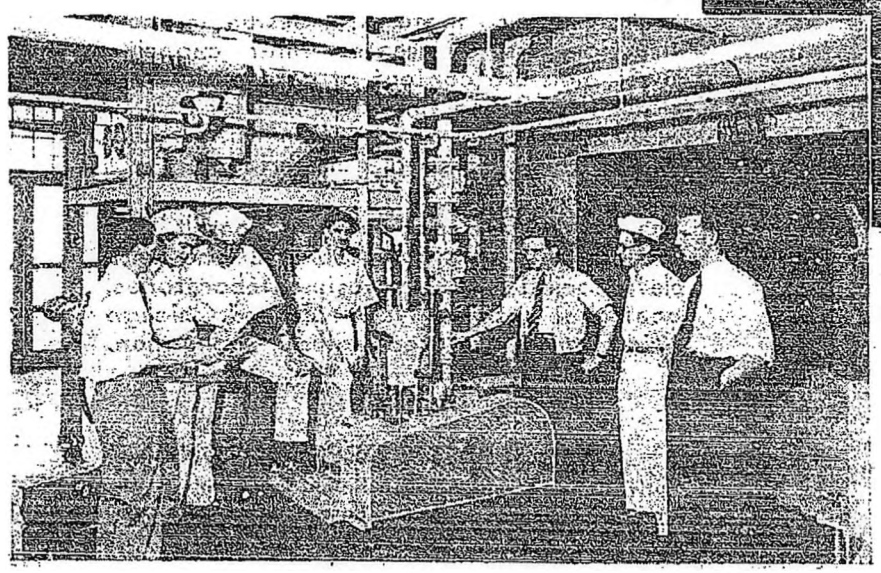


Harold Raistrick, professor of biochemistry, University of London, and a director at the London School of Hygiene and Tropical Medicine, was honored in Philadelphia by Wyeth, Inc., whose penicillin laboratories he visited in Kimberton and West Chester, Pa. At far end of table, *Left*, Dr. Raistrick. *Clockwise from him:* H. S. Howard, president, Wyeth, Inc.; G. R. Rettew, penicillin production; F. F. Law, pharmaceutical division; C. W. Heathcote, Jr., penicillin production; R. A. Beeson, nutritional division; W. C. Hovey, plant operations; John Reichel, biological division; S. V. Smith, sales; E. F. Voigt, biological division; Alfred Barol, director, Wyeth Institute of Applied Biochemistry; E. T. Stiller, organic chemistry division of institute; Richard Roley, public relations; H. S. Duke; Paul Gyorgy, University of Pennsylvania



Harry L. Yakel, a student of the Midwood High School, Brooklyn, who is the first recipient of the Permatex scholarship to the Polytechnic Institute of Brooklyn, working on a problem of crude oil distillation in his high school laboratory. The scholarship provides full tuition for four years, and was established by the Permatex Co., Inc., of Brooklyn





Above. Harry L. Derby, president, MCA, and American Cyanamid, and W. M. Jeffers, president, Union Pacific R.R., and former Rubber Director. Mr. Derby spoke recently on the Union Pacific radio program, telling of the chemical industry's achievements in producing war materials

←

Process supervisors from an English penicillin factory study large-scale production methods at Commercial Solvents, Terre Haute. *Left to right,* J. J. H. Hastings, technical adviser, R. H. Murray, Harry Sansbury, F. H. Foster, G. E. Hines, superintendent at Terre Haute, A. R. Lockwood, and James G. Corrie, process superintendent