As They Stand; What Changes Could Mean . . .

PESTICIDE-USE LAWS and regulations, in simply numbers, are practically unchanged from two years ago. A steady stream of amendments, however, is hitting state legislatures, calling for more joint-agency evaluations, more restrictive usage and application, and in some cases outright and across-the-board bans of a wide variety of pesticides and herbicides.

The startling aspect of the amendment onslaught is that sponsors and proponents seem to ignore, or choose to defy, the overwhelming evidence available that much of the legislation is unnecessary and some of it, according to an increasing number of scientists, could bring downright dangerous consequences.

A study of pesticide use and the impact of eliminating pesticides has just been published by the University of Nebraska. Authors are agronomist Orvin C. Burnside, Extension pesticide specialist John D. Furrer, and entomologist Robert E. Roselle.

If you ignore the probability or possibility of certain conditions developing, it's rather simple to come up with alarming projections, they suggest. Publicity to date, they charge, has been centered on the projections of the "anti-pesticide voices." The Nebraska study discounts the projections of attackers of pesticides and considers possible consequences of eliminating pesticide use altogether.

Among consequences:

Crop yields would drop from 20% to 30% and food prices would rise from 50% to 75%. Production of some crops would cease. Agricultural exports would end and a migration of labor back to the farm would have to occur to produce enough food.

Millions of lives would be lost again because of disease in duplications in many parts of the world of what actually happened in Ceylon. The introduction of a DDT mosquito eradication program reduced that country's malaria cases from two million in 1950 to 17 in 1963. DDT use was then stopped, but by 1968 the malaria cases had again reached one million. The program was reinstated last year.

Benefit-Risk Equation

Of course, the elimination of pesticide use entirely is remote, the report concedes. But information of this nature needs to be known by the general public to keep the value of pesticides in perspective.

What is needed, states the report, is public awareness of the "benefit-risk equation" as it relates to pesticides—an equation that has been applied to every other invention from the creative genius of man.

"Modern drugs save millions of lives, but some people have died because of them; the automobile kills and maims, but it has changed our lives generally for the better," state the Nebraskans.

"Chemical pesticides kill pests because they are toxic, and because they are toxic some are also capable, in excessive dosages, of causing illness, even death, in people and wildlife.

Perhaps the most prevalent misunderstanding, about pesticides, the report continued, is that "some people believe that if a chemical is toxic at high level it is toxic at all levels."

The ridiculousness of this assumption is exposed in the established fact that aspirin and even common table salt is more toxic than a number of the more common insecticides, herbicides and fungicides. (Table 2).

Furthermore, the deaths attributed to aspirin far exceed the deaths caused by all pesticides combined.

People fought the addition of fluoride to drinking water, the report reminded, because of the publicized fact that flouride is toxic at high levels and despite the fact it is beneficial in reducing tooth decay at low levels. People brought about the ban of cyclamates because high dosages induced cancer in rats.

However, the report stated, "a human being would have to drink some 300 to 600 bottles of cyclamated beverage, depending on brand, at one time in order to equate the consumption by the rats."

Myths About DDT

The Nebraskans took special offense at the exaggerated and unfounded attacks upon DDT that, for all practical purposes, has eliminated its use. As examples:

1. That DDT and other pesticides have caused fish kills. Table 3 sets the record straight, showing that all insecticides, poisons, etc., have accounted for only 3%.

2. That as many as 100 species of animals and birds are threatened with extinction because of pesticides. Dr. D. A. Spencer, consulting ecologist of the National Agricultural Chemicals Association was quoted as noting that an estimated 99% of all species of life that have existed at one time or another are now extinct. The study charges that the critics perhaps have occasionally taken the easy way out by blaming DDT rather than studying the entire environment.

3. That DDT is building up all over the world. Francis Coon, chief of the Wisconsin Alumni Research Foundation's chemical department is quoted concerning the identification confusion with polychlorinated biphenyls. PCB produces almost an identical picture to DDT when analyzed on a gas-chromatograph, he stated. Most gas chromatographic assays, therefore, have overstated the amount of DDT in samples.

4. That DDT is reducing bird populations. Audubon Society bird counts for 1941 and 1960, before and after widespread use of DDT, show 131, 39, 21, 11 and 12 fold increases in grackles, blackbirds, cowbirds, starlings and robins, respectively.

In 9,000 Years, Still Impossible

Perhaps the most exaggerated and unfounded claim is the widely publicized report that DDT would destroy the ocean's food supply because it affects the photosynthesis process in the phytoplankton. Concerning this preposterous fable, the report states:

"Presumably these predictions of doom for the human race are based on an article published by C. Wurster, in SCIENCE in March, 1968, (and WEEDS TREES and TURF, August, 1969), where five species of marine algae were studied. To the water in which each of these algae was grown was added 500 parts per billion of DDT in ethanol although the solubility of DDT in water is only 1.2 parts per billion.

"That means the algae were exposed to DDT concentrations up to 400 times as great as would be present in an ocean saturated with DDT. At the 1.2 parts per billion DDT concentration, the algae photosynthesis was not affected, and it was only at the DDT levels far above its solubility in water that photosynthesis was depressed. This is an example of drawing conclusions from a laboratory experiment that has no relation to the natural environment.

"Calculations were made on how

long it would take to saturate the oceans with DDT, making three assumptions: (1) 300 million pounds of world DDT production per year; (2) no DDT breakdown would occur; and (3) all DDT produced was purposely added to the oceans. Even then it would take more than 9,000 years to reach 1 part per billion DDT in the oceans.

"At any conceivable DDT breakdown rate and at any reasonable rate of DDT production, saturation of the oceans to 1 part per billion would be impossible."

Legislation Pending

Still the pesticide legislation floods the state houses. To name a few, bills are pending in New York (AB117), Virginia (SB56), Massachusetts (SB958 and HB345), Rhode Island (HB1014) and Oklahoma (HB 1587), reports the Chemical Specialties Manufacturers Association.

The bills call for bans on use or sale of from one to eight chlorinated hydrocarbons. Punishment is called for to the extreme of $10,000 and/or five years' imprisonment (Virginia) for each offense. This punishment covers other types of contamination also.

California Bans 35

Some state officials react to the outcry against pesticides philosophically, discounting any unbearable consequences.

The State of California has banned 35 chemical pesticides from use in weed and insect control along the 15,000-mile state highway system, forcing the use of environmentally safer, though perhaps more expensive, materials.

State Public Works Director James A. Moe said the order was in keeping with the state's increasing concern over protection of the environment from permanent contamination by persistent chemicals.

Moe said less persistent chemicals will be used on the highways in the future. The state maintains some 7,000 acres of landscaping and 3,000 acres of functional roadside planting, and most chemical applications are handled by the Division of Highways.

"We're the biggest farmer in the state," explained W. H. Armstrong, one of the two landscape specialists in the Division of Highways headquarters office in Sacramento. "But I don't think we'll suffer a bit. We may have to use something which will be a little less effective, or we may have to apply it a little more frequently, or something of this sort."

Armstrong said state weed and insect control is both a matter of protecting adjacent farm and rangelands and for highway appearance and landscaping maintenance. The biggest use of weed control chemicals is to create fire guard strips in forest and rangelands, he explained.

"There will be no let down in any of these programs," Armstrong promised.

The list of banned chemicals was taken from one developed by the State Department of Agriculture. By common name, the pesticides are DDT, DDD, TDE, Paris Green, TEPP, Parathion, Methyl Parathion, EPN, OMPA, Demeton, Phosdrin, Thimet, Di-Syston, Bidrin, 2,4,5-T, MCP, 2,4-DP, Silvex, 2,4-DB, Temik, Starlacide, Avitrol 100, Avitrol 200, Azodrin, Propanil, Chloropicrin, Dieldrin, Endrin, Toxaphene, Heptachlor, Kelthane, Ovex and Thiodan.

"The state has an excellent safety record with chemical products,"

Table 2. Pesticide toxicity in the U. S.

Type of pesticide	Most widely used chemicals in 1969	Acute oral LD_{50}—values for rats mg/kg	Human deaths in 1961*
Insecticides	Parathion	4	18**
	Toxaphene	80	2
	Carybaryl	500	0
	DDT	118	0
	Endrin	7	1
Herbicides	2,4-D Ester	700	1
	Atrazine	3080	0
	Trifluralin	5400	0
	Propanil	2270	0
	Amiben	3500	0
Fungicides	Sulfur	—	0
	Copper sulfate	300	0
	Captan	15000	0
	Zineb	5200	0
	Maneb	7500	0
Other	Aspirin	365	182
	Salt	3750	—
	Picloram	8200	0
	Amitrole	15000	0
	Lead arsenite	10	29
	Strychnine	1	1

*Hayes, W. J. 1964. Occurrence of poisoning by pesticides. Archives of Environmental Health 9:621-625.

**There were 4 deaths from parathion in 1952. Parathion use has increased more than 100% from 1961 to 1967.

Table 3. Pollution causing fish kill in the U. S. in 1967*

Source of pollution	Reported fish killed	% of total
Industrial wastes	8,087,091	72.7
Municipal wastes	643,304	5.8
Transportation wastes	143,123	1.3
Other operations	638,266	5.7
Insecticides, poisons, etc.	329,130	3.0
Fertilizers	10,000	0.1
Manure-silage drainage	1,268,137	11.4
TOTAL	11,119,051	100

*Pollution caused fish kills—1967. Federal Water Pollution Control Admin., Washington, D. C. 8: 1-16.

Armstrong said. "But if there's a way we can make our operation a little safer by spending a little more money, why, this may be what we have to do."

Florida Restricts 35

At the other end of the country, in Florida, a more sensible approach has been taken regarding pesticide use. Rather than establishing outright bans, the legislation restricts usage to those who must prove there is a need and that they know how to apply the chemical properly.

The new Florida law restricts the sale, purchase, use and possession of 35 specific pesticides.

The primary purpose of the law is to limit the use of highly toxic pesticides to commercial agriculture. It also limits the use of certain materials, including DDT, Aldrin, Endrin, Dieldrin, and Heptachlor, according to James E. Brogdon, entomologist, Florida Agricultural Extension Service.

Dealers now must have a license to sell the pesticides, and purchasers must have a permit to buy them, Brogdon points out.

Permits are available to bona fide agricultural users who must be certified as such by county agricultural Extension directors.

Pesticides restricted in all concentrations are: Aldicarb (Temik); Azodrin, Bidrin, Carbofuran (Furadan) (Except grandular 10% and below), liquid hydrogen cyanide; DDD (TDE), DDT, Demeton (Systox), Endrin, EPN (O-Ethyl-P-p-nitrophenyl phenylosphosphoanathioate) O-ethl S-phenyl ethlosphonodiathioate (Dyfonate), Fensulfothion (Dasanit) methyl bromide, methyl parathion, Mevinphos (Phosdrin), Parathion, Phorate (Thimet), Phosphamidon, Phosphorus (white or yellow), Prophos (Mocap), selenites and selenates, sodium fluoroacetate (1080), strychnine and its salts, TEPP (tetraethyl prophosphate), thallium compounds and Zinophos.

Restrictions on pesticides above certain concentrations include: Aldrin (above 10%); inorganic cyanides (5% and above) (except liquid hydrogen cyanide, which is restricted in all concentrations); Dieldrin (above 10%), Disulfoton (Di-syston) (above 2%), Guthion (above 1.1 pounds per gallon), Heptachlor (above 10%), Nicotine and its salts (above 5%), Paraquat (above 0.2% cation), Toxaphene (above 10%).

Arsenic compounds: inorganic insoluble (50% and above as the compound) including calcium arsenate, lead arsenate, magnesium arsenate, paris green. Inorganic soluble: including arsenic trioxide (1½% and above), sodium arsenite, (2% and above), and sodium arsenate, (5% and above).

The user of the above pesticides must state on his application what he intends to use them for.

Permit to purchase and use "restricted pesticides" may be issued for any uses recommended for the pesticide in the labeling of that pesticide, which is registered with the Florida Department of Agriculture and Consumer Services or the United States Department of Agriculture, with these limitations:

Aldrin will be permitted only for use on pine seedlings; as seed treatments; as soil treatment for fruit trees; vegetables, turf; as soil treatment for foliage, flower, fern, and woody ornamentals; and by licensed pest control operators in accordance with federal registration.

Arsenic Trioxide (above 1½%) and Sodium Arsenite (above 2%) will be permitted only for termite control).

DDD (TDE) will be permitted only for use on cotton, corn, peanuts, soybeans, tomatoes, tobacco, chrysanthemums, gladiolus, and as soil treatment for vegetables.

DDT will be permitted only for use on cabbage, corn, cotton, peanuts, soybeans, sweet potatoes, public health use, and by licensed pest control operators in accordance with federal registration.

Dieldrin will be permitted only for use on peaches, and sweet potatoes; as seed treatments; as soil treatment for fruit trees, turf; as soil treatment for flower, foliage, fern, and woody ornaments; and by licensed pest control operators in accordance with federal registration.

Endrin will be permitted only for use on cotton, sugar cane, cucurbit seed, and pine seed.

Heptachlor will be permitted only as soil treatment for fruit trees, turf; as soil treatment for flower, foliage, fern, and woody ornamentals; and by licensed pest control operators in accordance with federal registration.

Phosphorus (white or yellow) will be permitted for use as a rodenticide by licensed pest control operators and governmental agencies only, for use in commercial and industrial establishments.

Sodium fluoroacetate (1080) will be permitted for use as a rodenticide by licensed pest control operators and governmental agencies only.

Thallium sulfate will be permitted for use as a rodenticide and for control of insects by governmental agencies only.

Pesticide Container Disposal

ABOUT A YEAR AGO when the noose began to tighten around DDT, one industry spokesman mused: "If there's a residue problem, the worst one will come with a ban of DDT . . . when all the people that have some on the shelf dump it down the drain."

If a pinch of sarcasm is noted perhaps it's justified. Behind every major instance of pesticide damage, there has been ample evidence that the chemical was not used according to label instructions. It would appear logical, therefore, that the least-risk method would be to use the product as recommended until it was gone.

Unfortunately, human nature prescribes quick disposal of a hot potato rather than careful handling until it cools off.

"You can't be too careful with some things," folks say, and chemicals are one of "them things." This feeling is a contributing reason for the FDA and USDA requirement that a chemical must have a 100-fold safety margin built in for the user and consumer. It's a strong building block in the sensitivity that has risen over pesticide container disposal.

Most certainly, containers should be disposed of carefully to avoid the risk of improper dosages at improper places.

Quite a bit of information is available, but research is continual. USDA bulletin 750 is helpful, however a department spokesman said new information was about ready to be released.

Disposal Methods

Disposal methods can be summed up as three: burying, chemical decontamination, and thermal degradation. Burning is regarded the safest.

G. T. Fisher, entomologist at the University of New Hampshire, published these recommendations in February:

1. Container disposal — combustible bags, fiber drums, cardboard and wooden boxes. (a) Burn at public incinerator (must be capable of 900-1200 degrees Fahrenheit) except weed killer containers. Bury these. (b) Dump with prior permission of dump supervisor. (c) Bury on a flat-level area, away from water sources, at least 18 inches deep, and cover with soil. Crush containers. (Par. c sums up recommendation for disposing of DDT).

2. Container disposal — non-combustible metal cans, drums and glass containers. To decontaminate containers (5-30-55-gal. drums) carefully wash and rinse on the outside, then decontaminate chemically by alkaline decomposition of the residual pesticide by the following steps:

a. Drain container as completely as possible in the cleaning or burial area.

b. Carefully add water, detergent and caustic soda according to quantities needed (see Table I).

c. Close containers and rotate carefully to wet all inner surfaces with caustic solution. Let stand for at least 15 minutes, with occasional agitation. Prolonging the contact of the caustic solution improves decontamination.

d. Remove all bungs and closures and drain solution into the burial pit.

e. Rinse container inside and out and dispose of rinse in the burial pit.

If a pesticide container is to be burned by a commercial incinerator, the operator should be instructed in the complete nature of the material contained, Fisher cautioned.

Pesticide Incineration

Research on chemical and thermal methods for disposal of pesticides has been under way at Mississippi State University for several years. A report in Residue Reviews in 1969

. . . a Look at Burning

states that while several disposal methods have been investigated, "none has proved to be ideal procedure, although some have varying degrees of merit."

The widely circulated recommendation of burying, for example, means the site is rendered useless for a number of other purposes "for any time in the foreseeable future."

The paper, by M. V. Kennedy, B. J. Stojanovic and F. L. Shuman, Jr., does conclude that "incineration is superior to chemical methods for the destruction of waste pesticide chemicals."

Simple incineration, however, is not sufficent, cautions Stojanovic. Incinerators should have the capability of recirculating and reburning flue gases. Otherwise, the escaping gases "would present a definite threat from the standpoint of air pollution. Also, it would endanger humans, animals, and vegetation for some distance around the incineration site upon combustion of certain pesticides."

The Mississippi study investigated the thermal degradation for 20 pesticide chemicals: 2,4-D (2 lb./gal. "formula 40"), Picloram (11.6% solution), Atrazine (80WP), Diuron (80WP), Trifluralin (4 lb./gal. — liquid), Bromacil (80WP), DSMA (3.2 lb. gal.) DNBP (3 lb./gal. "premerge"), Dicamba (4 lb./gal.), Dalapon (85WP), Paraquat (2 lb./gal.), Vernolate (6 lb./gal., liquid), 2,4,5-T (4 lb./gal.; 44.1% acid equivalent), Carbaryl (10% dust), DDT (technical flakes), Dieldrin (17.8% solution), Malathion (5 lb./gal.; 57% solution), PMA (Mersoite -88W; 95% water dispersable), Zineb ("Parazate" -C; 75WP), and Nemagon (8.6 lb./gal.).

A differential thermal analysis was conducted in which complete combustion was determined for a reference standard for the pesticide material and also for the commercial formulation.

The study showed that "complete incineration temperatures of the reagent-grade pesticides ranged from about 250 degrees Centigrade to about 850 degrees C.; 15 of the compounds were completely combustible at 700 degrees C. or below, while five required 700 degrees and 900 degrees C.

Under similar conditions, the commercial formulations required essentially the same temperature ranges (See Table 2); dalapon, trifluralin, and nemagon required higher temperatures than the respective reagent-grade compounds. All but six formulations approached complete combustion at 800 degrees C. Atrazine, carbaryl, bromacil, and dalapon contained about 10% of uncombustible residue at 1,000 degrees C., whereas DSMA and zineb yielded

(Continued on Page 18)

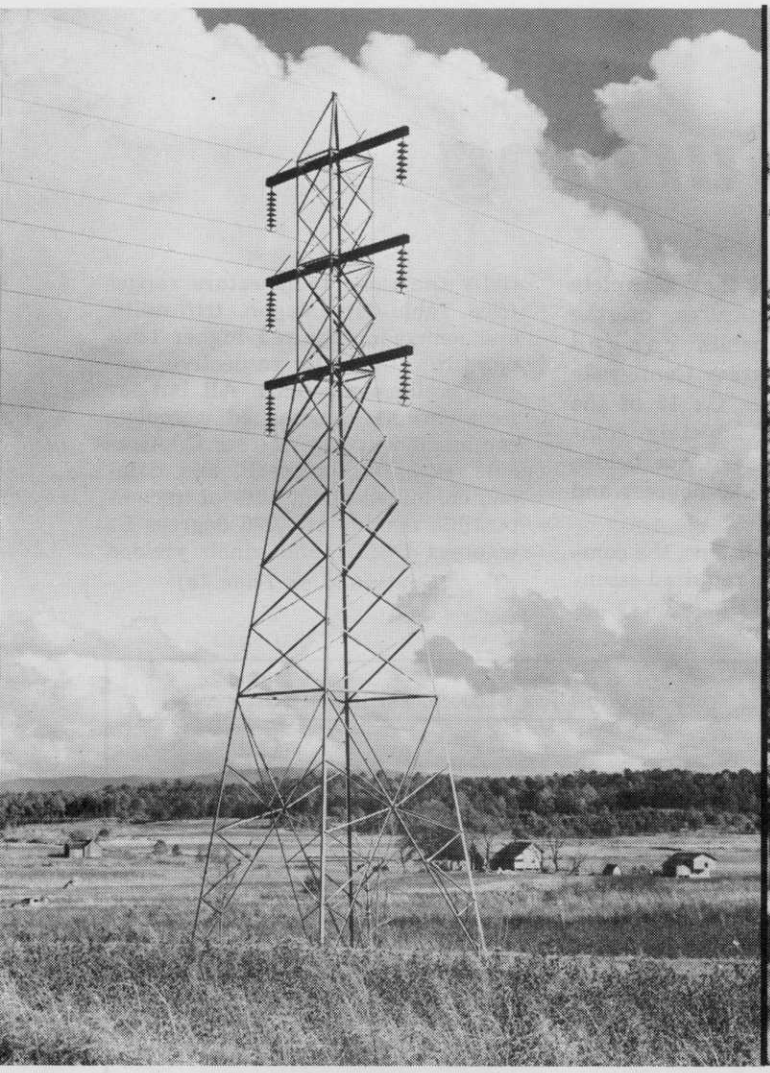
TABLE 1. CAUSTIC RINSE SOLUTION FOR ORGANIC PHOSPHATE CONTAINERS

Container Size	Water	Detergent	Caustic Soda (lye)
Less than 5-gallons	1 pint	1 tablespoon	1-2 tablespoons
5-gallons	2 quarts	2 tablespoons	½ cup
15-gallons	1½ gallons	¼ cup	½ pound
30-gallons	3 gallons	½ cup	1 pound
55-gallons	5 gallons	1 cup	2 pounds

TABLE 2. Percent loss on combustion of commercial formulations of pesticides at five temperatures.

Commercial formulation	Loss (%) at				
	600° C.	700° C.	800° C.	900° C.	1000° C.
Picloram	90.8	91.8	95.6	98.7	99.2
Atrazine	87.8	88.1	88.8	88.9	89.0
Nemagon	99.6	99.6	99.6	99.6	99.6
Trifluralin	99.7	99.8	99.8	99.8	99.8
Malathion	95.3	96.0	96.3	96.4	96.7
2,4,5-T	99.9	99.9	99.9	99.9	99.9
Zineb	70.1	71.3	71.5	72.7	72.8
Vernam	99.6	99.6	99.6	99.6	99.6
Paraquat	98.3	98.6	99.0	100.0	100.0
Dicamba	98.6	98.7	98.9	99.0	99.4
Bromacil	88.8	89.1	89.4	90.5	91.3
Dieldrin	99.1	99.4	99.5	99.5	99.5
DDT	99.2	99.3	99.7	99.9	100.0
Dalapon	64.3	64.3	67.8	73.8	91.0
2,4-D	99.8	99.9	99.9	99.9	99.9
Diuron	94.6	95.0	95.4	95.5	95.7
DNBP	99.8	99.8	99.8	99.8	99.8
DSMA	80.6	80.7	80.7	81.2	81.2
Sevin	88.7	88.8	88.8	89.1	89.5

Is grass your heaven,



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Cedar	Pine	Smartweed
Cherry	Poplar	Dog fennels
Clover	Sassafras	Corn cockle
Common chickweed	Service berry	Cow cockle
	Sheep (red) sorrel	Knawel
Curly dock	Sourwood	Fiddleneck
Dog fennel (mayweed)	Sumac	Canada thistle
	Sycamore	Field bindweed
Elm	Thorn apple	Pepperweed
Hickory	Thornberry	Tansy ragwort
Hornbeam	Willow	Purslane
Knotweed	Witch hazel	Sunflower
Locust	Yaupon	Careless weed

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TABLE 3. National Barrel and Drum Association firms having burning equipment.

Apex Drum Co.
6226 Ferguson Drive
Commerce, Calif. 90640

Myers Drum Co.
6549 San Pablo Avenue
Oakland, Calif. 94608
and
5400 South Soto
Los Angeles, Calif. 90058

A. Rooke Cooperage Co.
7702 Maie Avenue
Los Angeles, Calif. 90001

Ted Levine Cooperate
9629 El Poche Street
South El Monte, Calif. 91733

S. Rose Cooperage
1051 Union Street
Montebello, Calif. 90640

Lorentz Barrel & Drum
1515 South 10th Street
San Jose, Calif. 95112

Kaminsky Barrel
2200 Blake Street
Denver, Colo. 80205

Drum Service Co. of Fla.
803 Jones Avenue
P.O. Box 278
Zellwood, Fla. 32798

Atlanta Cooperage
647 Bankhead Avenue
Atlanta, Ga. 30318

J & B Smith Co.
P.O. Box 10504
Station A.
Atlanta, Ga. 30318

Georgia Steel Drum
Box 575
Austell, Ga. 30001

Alsip Barrel & Drum Co., Inc.
4100 W. 123rd Street
Alsip, Ill. 60658

Acme Barrel Co.
2300 West 13th
Chicago, Ill. 60608

American Steel Cont.
4445 West 5th Avenue
Chicago, Ill. 60624

E. Hansen Co., Inc.
2703 South Loomis Street
Chicago, Ill. 60608

Skolnik Drum Corp.
4601 West 48th Street
Chicago, Ill. 60632

Sterling Drum Co.
610 West 81st Street
Chicago, Ill. 60620

Des Moines Barrel & Drum
S.E. 19th at Scott Street
Des Moines, Iowa 50316

Sims Barrel Co.
1161 So. 12th Street
Kansas City, Kans. 66105

Allied Drum Service, Inc.
401 Colorado Avenue
P.O. Box 8055 Sta. E.
Louisville, Ky. 40208

Export Drum Co.
7627 Scenic Highway
Baton Rouge, La. 70807

Geo. P. Garratt Sons & Co.
2815 Waterview Avenue
Baltimore, Md. 21230

H. F. Clark & Sons
236 Third Street
Chelsea, Mass.

Ryan Barrel Co.
56 Pulaski Street
Peabody, Mass. 01960

Acme Service & Cont.
12800 Eaton Avenue
Detroit, Mich. 48228

American Renovating
9201 Freeland Avenue
Detroit, Michigan 48228

Atlas Gottlieb Co.
1505 East Ferry Avenue
Detroit, Michigan 48211

Michigan Drum Renovating Co.
24800 Schoenherr Road
Warren, Mich. 48089

Dworsky Barrel Co.
260 12th Street
Minneapolis, Minn. 55401

Minnesota Barrel & Drum
763 North 3rd Street
Minneapolis, Minn. 55401

Industrial Steel Cont.
293 Commercial Street
St. Paul, Minn. 55106

Midwest Barrel & Drum Co.
807 Farrington Avenue
St. Paul, Minn. 55117

Northwestern Cooperage
42 Ferry Street
St. Louis, Mo. 63160

Conway Barrel & Drum
Route 125
Haverhill Road
Kingston, N. H. 03865

Bayonne Barrel & Drum
Raymond Boulevard & Route 1
Newark, N.J. 07105

Gold Cooperage
401 South Street
Newark, N.J. 07105

Acme Steel Drum Co.
1050 Grand Street
Brooklyn, N.Y. 11211

H. Hyman Drum & Barrel
878 South Division Street
Buffalo, N.Y. 14210

Active Steel Drum
52-30 34th Street
Long Island City, N.Y. 11101

Academy Steel Drum
P.O. Box 455
Charlotte, N.C. 28201

Acme Barrel & Drum
16 - 38 DeCamp Avenue
Cincinnati, Ohio 45216

Alex Gottieb Container
6401 Wiehe Road
Cincinnati, Ohio 45237

Advance Barrel & Drum
6830 Beaver Avenue
Cleveland, Ohio 44104

Amity Drum
101 E. Amity Road
Cincinnati, Ohio 45237

Queen City Barrel & Drum
1937 South Street
Cincinnati, Ohio 44404

General Steel Barrel
3967 Pearl Road
Cleveland, Ohio 44109

Standard Pail & Drum
8110 Preble Avenue
Cleveland, Ohio 44104

Columbus Steel Drum
2829 East 4th Avenue
Columbus, Ohio 43219

Lammers Barrel Corp.
Radio Rd., P.O. Box 3087
Overlook Station
Dayton, Ohio 43219

Reimann & McKenney
3000 N.W. St. Helens Road
Portland, Ore. 97210

General Cooperage Co.
2435 Island Road
Philadelphia, Penna. 19142

National Steel Drum
Ontario & Trenton
Philadelphia, Penna. 19134

Southwark Cooperage
Meadow & Wolf Streets
Philadelphia, Penna. 19148

New England Container
2072 Smith Street
Centredale, R.I. 02911

D. F. Farrell Sons
Box 286
Coventry, R.I. 02816

Moore Drums, Inc.
Stark Industrial Park
Charleston Heights, S.C. 29405

Dallas Steel Drums
2215 North Beckley
Dallas, Texas 75208

Drum Service Co.
P.O. Box 15337
Houston, Texas 77020

Port Drum Co.
237 West 9th Street
Port Arthur, Texas 77641

Northwest Cooperage
7152 First Avenue South
Seattle, Wash. 98108

Atlas Steel Drum
P.O. Box 187
Nitro, W. Va. 25143

Kitzinger Cooperage
2529 East Norwich Street
Milwaukee, Wisc. 53207

Pesticide Container Disposal

(Continued from Page 15)

19% and 23% ash, respectively, at 1,000 degrees C."

Work is continuing at MSU, Stojanovic said, to determine how the most efficient incinerator can be constructed.

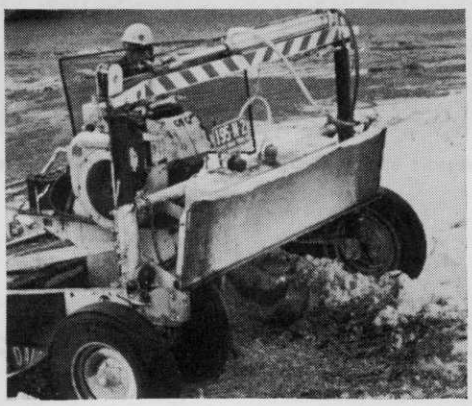
Drum Reconditioning

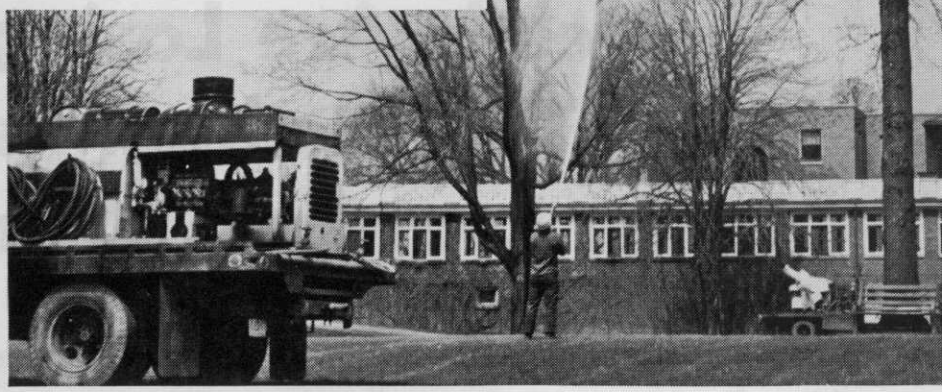
In view of the research data showing that burning is the best method to dispose of waste pesticides, the National Agricultural Chemicals Association has conducted a survey of members of the National Barrel and Drum Association who have burning equipment. (Table 3).

Large pesticide users stand to gain two benefits by choosing the burning method of disposal: getting rid of their containers and being reimbursed, to a small extent, for the cost of the container. Drum reconditioning firms pay from 50 cents to $2.00 for metal drums, depending on size (30 or 55 gal.) and condition.

These firms clean the drums thermally and/or chemically, strip them to bare metal (by blasting them with steel particles for example), reshape, repaint and then sell them for the same or different use.

Manufacturers selling products in drums can realize considerable saving by utilizing reconditioned drums. The practice is common in the petroleum industry.





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Chemical Maintenance, Inc., of Shreveport sprayed Daconate. The blackened seed heads and fallen stems indicate weed kill.

Report from Chemical Maintenance, Inc.

Weeds Are Losing The Ditchbanks In Louisiana War

Before the attack, waist-high Johnsongrass lined both sides of Bayou Pierre.

IT MAY NOT BE as bad as the Amazon basin jungle, but in steamy Louisiana it wouldn't take long for weeds and undergrowth to take over just as soon as man's bulldozer leaves. For those whose job is building ditches, levees, industrial plants, rights-of-way, etc., that fact is a headache that just won't quit.

For Jim McCoy and Max Edwards, operators of Chemical Maintenance, Inc., Shreveport, the fact that weeds grow like weeds in Louisiana is money in the bank. Their firm is the Excedrin for the builder's headache.

Chemical Maintenance, Inc., is basically in the business of industrial and right-of-way vegetation control. McCoy has been in the business for five years and Edwards for nine. Their work includes cleaning up weeds and underbrush around industrial plants, in ditches, along pipelines, highways, bayous, and just about anywhere that man wants to get rid of unwanted vegetation. In an area where just about every parish, or county, has miles and miles of drainage ditches and bayous to keep cropland and even cities above water level, this job can be considerable.

"We do go around to industrial plants, inquire as to their weed control problems, try to point out needs and recommend programs, but the majority of our work—probably 65% —is in ditch and riverbank under-