gallonage through the relatively small orifice of the largest disc. Therefore, it became necessary to find a new type nozzle.

Vee-Jet and Delavan Nozzles Used

Spraying Systems Vee-Jets and Delavan WF Series nozzles were "discovered" as a result of this search. Both of these series had originally been designed for industrial application and to act as high-volume, flooding-type nozzles. These nozzles have an oblong orifice located in a milled slot on the surface of the nozzle face. They are available in various sizes, from those that handle a fraction of a gallon per minute, up to those that deliver 40 gallons per minute at 40 pounds pressure. They deliver a coarse, driving spray in a flat fan pattern that is ideal for lawn spraying.

Both manufacturers make their nozzles with standard pipe thread, which simplifies the construction of your own spray gun from galvanized pipe.

The choice of pressure is equally as important as the choice of nozzles in the prevention of mist formation. Vee-Jets and Delavan's WF's produce a minimum of mist when operated at 80 psi or less *at the nozzle*. This can be checked by a pressure gauge mounted on a pipe "T." This "T" is inserted between the nozzle and the gun.

Both manufacturers publish performance tables for their respective nozzles. These tables show the gallons per minute delivered by each size nozzle at various pressures. Therefore, if we know the nozzle size and the nozzle operating pressure, we can determine the gallons delivered per minute by consulting the tables. This method can be used as a quick way of calibrating your spray machine.

In summary, control of spray drift or mist is important in maintaining good public relations. The choice of nozzle and the pressure at which this nozzle is operated are the two major factors in preventing mist formation.

Editor's note: More information about the nozzles discussed here may be obtained from Spraying Systems Co., 3201 Randolph St., Bellwood, Ill., or Delavan Mfg. Co., Grand Ave. and Fourth St., West Des Moines, Iowa. Both manufacturers supply specification charts covering the equipment discussed in Mr. Wilson's article.

Handy USDA Guide to Respirato

WITH all the recent attention to pesticides and the concern over their safe use, contract applicators will be particularly interested in safety information contained in a recent bulletin from the U. S. Department of Agriculture. This new brochure, called "Respiratory Devices for Protection against Certain Pesticides" (ARS-33-76), has valuable pointers for spraymen, and includes the chart reproduced on the next page.

Scientists from USDA's Entomology Research Service, who compiled the data, hasten to point out that respirators do *not* provide needed protection from inhalation of pesticide dusts, mists, and vapors for operators formulating or mixing pesticides in closed or inadequately ventilated spaces. "Full-face gas masks equipped with tested canisters are worn under these conditions," the bulletin states. In addition, if servicemen are working in closed spaces, proper protective clothing, as specified on pesticide labels, must be worn.

Use of respiratory protective devices does not eliminate the need for other precautions in handling toxic chemicals. Rubber gloves and clean clothing are a must, and adequate hygienic practices are necessary.

When a serviceman shows any signs of dizziness or nausea, he should be removed from the treatment area immediately and placed in the care of a physician. Management should supply company doctors with all available information about pesticides used from day-to-day, so that illness resulting from accidents can be properly diagnosed.

FOOTNOTES TO CHART AT RIGHT

Respirators With Face-Mounted Cartridges

A. Respirator No. 5055, equipped with R-55 filter and cartridge unit. Two units attached to facepiece. (American Optical Co., Safety Division)

B. Healthguard Respirator style 95, equipped with Code B cartridge and filter 1000 or 1001. One unit attached to facepiece. (Chicago Eye Shield Co.)

C. DCA 6100 Respirator, with Para-A cartridge and DC 6100-7 felt filter. (Pulmosan Safety Equipment Corp.)

D. Agrisol Dust and Vapor Respirator, equipped with R-414 filter and 11-A cartridge. Two units attached to facepiece. (Ray-O-Vac Co., Willson Products Division)

E. Respirator No. 5561, equipped with filter cartridge combination R-561. (American Optical Co., Safety Division)

F. Farm Spray Respirator No. CR-72183, equipped with cartridge No. CR-49293 and filter No. 73488. (Mine Safety Appliances Co.)

G. All Vision Chemical Cartridge Respirator No. CR-74910, equipped with inner cartridge No. CR-73841 and outer cartridge No. 73927. (Mine Safety Appliances Co.)

H. Agritox Respirator, equipped with cartridge No. 11A (new type) and filter No. R490. (Ray-O-Vac Co., Willson Products Division)

I. Respirator No. 5058, with filter-cartridge combination R-58. (American Optical Co., Safety Division)

J. C-241 Respirator, with CMP cartridge and C-241-7 filter. (Pulmosan Safety Equipment Corp.)

K. Gasfoe Respirator No. CM-86007, equipped with cartridge No. CM-76883 and mineral-wool filter No. CM-79786. (Mine Safety Appliances Co.)

Supplied-Air Respirators

a. Whitecap Model SU-1 with No. 901 rubberized shroud, No. 301 cartridge, and No. 101 filter element. (Jamieson Laboratories, Inc.)

b. Same as L, except with extra fine No. 102 filter element. (Jamieson Laboratories, Inc.)

Gas-Mask Canisters

1. Chin Style (282-OVAG-F) Insecticide Canister. (Acme Protection Equipment Co.)
2. Canister GMC-1. (Mine Safety Appliances Co.)
3. Canister G3FD. (Ray-O-Vac Co., Willson Products Division)
4. Universal-type canister of any manufacturer. Type N, bearing Bureau of Mines approval.
5. Military Canister No. 084-Military. (Acme Protection Equipment Co.)
6. Canister No. H-3, equipped with facepiece filter holder and throwaway filter No. R361 or R393. Can be obtained with either a full-face gas mask or a half-mask facepiece. The half-mask facepiece should not be used when mixing or handling insecticides in enclosed spaces or applying aerosols in greenhouses, but is suitable for field use. (Ray-O-Vac Co., Willson Products Division)
7. Canister No. 3235 Type C-40. (Davis Emergency Equipment Co.)

The addresses of the companies supplying these respirators and gas masks are given below. Respirators are also available from pesticides distributors and mail-order houses.

Acme Protection Equipment Co.,
1201 Kalamazoo St., South Haven, Mich.

American Optical Co.,
Safety Division, Southbridge, Mass.

Chicago Eye Shield Co.,
2300 Warren Blvd., Chicago, Ill.

Davis Emergency Equipment Co.,
45-57 Halleck St., Newark 4, N.J.

Jamieson Laboratories, Inc.,
7900 Haskell Ave., Van Nuys, Calif.

Mine Safety Appliances Co.,
201 North Braddock Ave., Pittsburgh 8, Pa.

Pulmosan Safety Equipment Corp.,
644 Pacific St., Brooklyn 17, N.Y.

Ray-O-Vac Co.,
Willson Products Division, Reading, Pa.

hows Spraymen Which Mask to Use on the Job

Commercially available respirators and gas-mask cannisters that have been tested by the USDA and found to give adequate protection against dusts, mists, and low vapor concentrations of certain pesticides are listed below. Save this and refer to it whenever using a chemical included here.

Pesticides and pesticide mixtures	Respirators with face-mounted cartridges											Supplied-air respirators		Gas-mask canisters						
	A	B	C	D	E	F	G	H	I	J	K	a	b	1	2	3	4	5	6	7
aldrin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
calcium copper chloride					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
carbophenothion (S-[(p-chlorophenylthio)methyl] O, O-diethyl phosphorodithioate); Trithion.					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ceresan M (N-(ethylmercuri)-p-toluenesulfonanilide)					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
chlordane	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
DD-Mixture (dichloropropane-dichloropropene mixture)					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
DDVP					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Delnav (a mixture of 2, 3-p-dioxanedithiol S, S-bis(O, O-diethyl phosphorodithioate)(70%) and related compounds).					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
demeton					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
diazinon (O, O-diethyl O-(2-isopropyl-4-methyl-6-pyrimidinyl) phosphorothioate).					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dicapthon					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dieldrin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dimethoate					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Di-syston (O, O-diethyl S-[2-(ethylthio)ethyl] phosphorodithioate)					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
endosulfan (6, 7, 8, 9, 10, 10-hexachloro-1, 5, 5a, 6, 9, 9a-hexahydro-6, 9-methano-2, 4, 3-benzodioxathiepin-3-oxide); Thiodan.					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
endrin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
EPN	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ethion					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ethylene dibromide					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ferbam					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
malathion	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
methyl parathion	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Methyl Trithion (O, O-dimethyl S-p-chlorophenylthiomethyl phosphorodithioate).					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
naled (emulsion) (1, 2-dibromo-2, 2-dichloroethyl dimethyl phosphate); Dibrom.					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
naled (xylene solution); Dibrom									+	+	+	+	+	+			+	+	+	+
nicotine	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Panogen (cyano(methylmercuri)guanidine)					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
parathion	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
phorate					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Phosdrin (a mixture of the alpha isomer of 2-carbomethoxy-1-methylvinyl dimethyl phosphate (not less than 60%) and related compounds (not more than 40%).									+	+			+	+			+	+	+	
Phostex (a mixture of bis(dialkyloxyphosphinothioyl) disulfides (alkyl ratio 75% ethyl, 25% isopropyl).					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ronnel					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
schradan					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sevin (1-naphthyl N-methylcarbamate)					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Shell SD-3562 (2-dimethylcarbamoyl-1-methylvinyl dimethyl phosphate).					+			+	+	+										
TEPP					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Terrachlor (pentachloronitrobenzene)					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Vapam (sodium N-methyldithiocarbamate)					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
zineb					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Zinophos (O, O-diethyl O-2-pyrazinyl phosphorothioate)						+	+	+	+	+		+	+	+	+	+	+	+	+	+
carbophenothion + methyl parathion + DDT						+				+	+									
DDVP + malathion									+	+				+	+	+	+	+	+	+
DDVP + ronnel									+	+				+	+	+	+	+	+	+
methyl parathion + endrin								+	+	+	+			+			+	+	+	
Methyl Trithion + DDT					+	+	+	+	+	+	+			+	+	+	+	+	+	+
toxaphene, DDT, methyl parathion + ethion					+	+	+	+	+	+	+			+	+	+	+	+	+	+

1/ Letters and numbers refer to those given in the preceding lists. Plus sign (+) indicates acceptability.