Ag and Food Interprets . . .

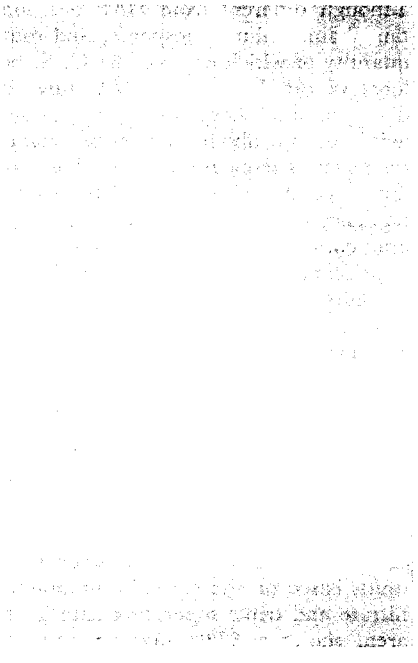
- **Few incidents make insecticide safety big problem**
- **Diammonium phosphate—trend or incident?**
- **Indirect insect control offers new angle**
- **Five billion board feet forest insect loss**
- **Weather service and pest surveys helping farmer**
- **Development of new pesticides is a coordinated operation**

Insecticide Safety

Serious industry problem is small relative to amounts used, but big in its humanitarian and publicity aspects

DESPITE strenuous, industry-wide effort, insecticide handling remains a public health problem. Judged by the tons of potentially harmful chemicals that go onto U. S. crops each year without mishap, the problem is small.

Warnings must be read to be useful. Monsanto translates its warnings posters into the language of its prospective user



But it is serious when judged by the objective: accident-free insecticide use. Next to humanitarian aspects stand public relations; here, the problem is yet more serious. No group knows more than the insecticide industry how vulnerable are "chemicals" to bad publicity.

Certainly much of the industry has tried, some have appeared to bend over backward. American Cyanamid has publicized heavily the precautions to be taken with parathion, the very useful but also very hazardous organic phosphate insecticide. More than once Cyanamid has circularized all appropriate medical facilities and doctors in the U. S. and Canada. It has offered educational services to all farms and plants who handle organic phosphates made by any basic producer. Monsanto will sell its parathion only to formulators. And before a formulator can buy, Monsanto's industrial hygienists must investigate and approve his physical and technical ability to handle the product safely.

Calspray is a heavy safety plugger at the formulator level. Recently, it mailed 13,000 detailed safety promotion letters to federal, state, university, and extension specialists. A similar program is under way in Canada. Every piece of Calspray insecticide literature, including advertisements, carries hazard warnings. Note, however, that Calspray is unusually large. Many of the approximately 500 U. S. formulators are quite small and must lean heavily on basic producers and others for large scale safety promotion.

Many Agencies Have Pitched In

Industry is not alone in the act. Federal and state agencies, universities, 4-H clubs, the Farm Bureau, medical associations, and many others take an active part. While accidents continue to occur, there can be little doubt that the campaign has helped and that many more accidents would occur if it did not exist. One authority thinks the safety record of the newer insecticides, notably

Properly equipped parathion sprayman on Hawaiian pineapple plantation shown washing hands at fresh water tank, standard equipment where parathion is used, as safety measure. Sprayman wore gauntlet-type rubber gloves while spraying, but with parathion there is no point in taking chances

the organic phosphates, has not been far out of line with the early record of nicotine sulfate, for instance, which has been around some 40 years. In Oklahoma, where organic phosphates find heavy use, the State Board of Agriculture does not feel the problem is growing worse and does not favor more restrictive laws.

On the other hand, organic phosphates caused more than 300 injuries in California from 1950 to 1954 and four deaths in the last two years of that period. Mississippi officials are amazed at the state's low fatality rate, relative to the amount of careless insecticide handling they find. A Texas state health officer asked recently for laws regulating the sale of organic phosphates. He objects strongly to their use by home gardeners and other "amateurs." And a highly publicized TEPP fatality last year set

off an intensive state safety campaign in Oregon

Carelessness Is the Villain

Carelessness and ignorance cause nearly all insecticide mishaps, some of which are incredible. A California sprayman, splashed with a parathion formulation, refused to wash it off when so directed. He further proved his manhood by drinking from the irrigation ditch where the spray tank was being filled. Another "accident" in the record. Cases nearly as extreme as this are not infrequent. In a negative sense they are perhaps encouraging, in that they seem a prime target for education compared with more nearly accidental cases like broken pipes and inadvertent spillage.

Labels offer a more concrete point of attack. The good ones go about as far as a label can go. Many exceed the legal minimum, but this, unfortunately, is no guarantee of effectiveness. Labels are read widely, but this again does not guarantee effectiveness. Some feel, for instance, that home gardeners are not likely to obey labels that direct them to to wear masks or protective clothing. Others may feel differently, but this is the sort of thing that must be weighed carefully when deciding whether or not the label will be adequate to the job.

Oregon officials screening label registration bids note a trend toward omitting emergency treatment data, particularly with less hazardous insecticides. They feel such data should be included and that they should cover the vehicle as well as the active ingredients. Kerosine poisoning, they point out, for example, is not uncommon and can be serious.

Complete or partial illiteracy is a label problem as is unfamiliarity with English. (Monsanto attacks the latter by printing appropriate safety posters in Spanish and Portuguese as well as in English.) Some have suggested that colored labels might cure these ills, but most authorities feel color in itself does not give adequate warning. A major reason is that one man in 12 is color blind to some extent and one in 50 is in effect completely color blind.

Analysis Shows Weak Points

Analysis of organic phosphate mishaps reveals several points that may deserve particularly strong educational effort. One is the apparently common idea that a poison is harmless unless swallowed. This is not universally true, of course, since some organic phosphates enter the body through the skin as easily as through the mouth and are equally hazardous by either route. It might also be useful to stress that one insecticide's being "safer" than another does not mean it is completely harmless. Malathion, for example, is one of the least hazardous organic phosphates; yet a Mississippi farmer is reported to have lost several calves after spraying them with a malathion formulation.

Medical facilities are a current educational target, and rightly so. Doctors must handle a terrific variety of problems; unless alerted, they cannot always be expected to diagnose and treat a parathion case, for example, correctly and with the necessary speed. The antidote for organic phosphates is atropine (dangerous itself if not used properly). One doctor, confronted with a parathion case, gave atabrine upon the patient's assuring him it was the correct antidote. Others, faced with organic phosphate-induced convulsions, have given sedatives, exactly the wrong thing to do.

The easy way out of this safety maze is to use less hazardous insecticides, and there is in fact a trend in this direction. Many agencies now tend to recommend malathion, where it will do an adequate job, in preference to the most dangerous organic phosphates. Less hazardous products would certainly be welcomed, but for many jobs the insecticides now used are the only ones that perform efficiently and economically. In the status quo, then, education and yet more education seems in order if public opinion is not to legislate slowly away the many benefits of insecticidal "economic poisons."

DAP Fits Trends

CF&I's diammonium phosphate jibes with high analysis move, but what about other coke ovens and fertilizers?

COLORADO FUEL & IRON's January shift from coke oven ammonium sulfate to diammonium phosphate fits nicely into two trends, one well established, the other barely under way. First is the very evident move toward higher fertilizer analyses; CF&I's DAP qualifies easily at 21-53-0. Second is the coke oven operators' budding concern about ammonium sulfate's future (AG AND FOOD page 283, April). Besides CF&I and Bennett Chemical Co. only U. S. Steel has moved and then only part way. Currently preparing to make ammonia from by-product hydrogen at its Geneva, Utah, works, USS will presumably continue to make ammonium sulfate. Kaiser Steel at Fontana, Calif., began test runs on coke oven diammonium phosphate in late March but has not committed itself.

CF&I, with assists from Monsanto and Koppers, has apparently made a smooth transition. Basically, electric furnace phosphoric acid (from Monsanto) replaced sulfuric acid in the standard ammonium sulfate saturator units. Process control in the saturator is more critical for DAP than for ammonium sulfate, but on the other hand gives less trouble during washing and drying. Materials of construction must be considered too. Stainless steel, now used in most sulfate units, will take the change, but one firm is said to have decided against conversion because its monel equipment would not handle phosphoric acid

Industry Will Watch Closely

CF&I's 10,000 to 15,000 ton per year DAP output should not profoundly affect any but a local fertilizer market. The same is true of the 5000 tons (maximum) that TVA will apparently make and distribute commercially this year. DAP has the earmarks of a quality product, however, and the industry will doubtless keep a sharp eye on its progress. DAP's 53 phosphate units are reported to be completely water-soluble, a property to which high importance is attached today. The 21 nitrogen units, all in the ammonia form, should be as available as anhydrous or aqua ammonia nitrogen although TVA, at least, has not reported a definitive study of this aspect.

DAP's physical properties are said to be good. Commercial users, however, might want thorough proof chiefly because of the reputation of the unruly German product, Nitrophoska, which although different from DAP did contain diammonium phosphate, and some quantity of which entered the U. S. before World War II. TVA says its diammonium phosphate (from furnace acid) shows about the same caking tendency as monoammonium phosphate and ammonium sulfate, and less caking tendency than ammonium nitrate. Several commercial mixers reported 1946 pilot plant batches of TVA's product to be satisfactory in storage, handling, and mixing; TVA finds it compatible with all commonly used fertilizer constituents.

While relative selling prices do not give the complete picture of a fertilizer's value, they do give some basis for comparison. CF&I recommends a DAP retail price of $162 per ton in the Denver area; 10-20-0 costs $74.50 per ton in the same area. A system of common value units, based on the prices of ammonium nitrate and triple superphosphate in the area, shows a $2.08 tag per common