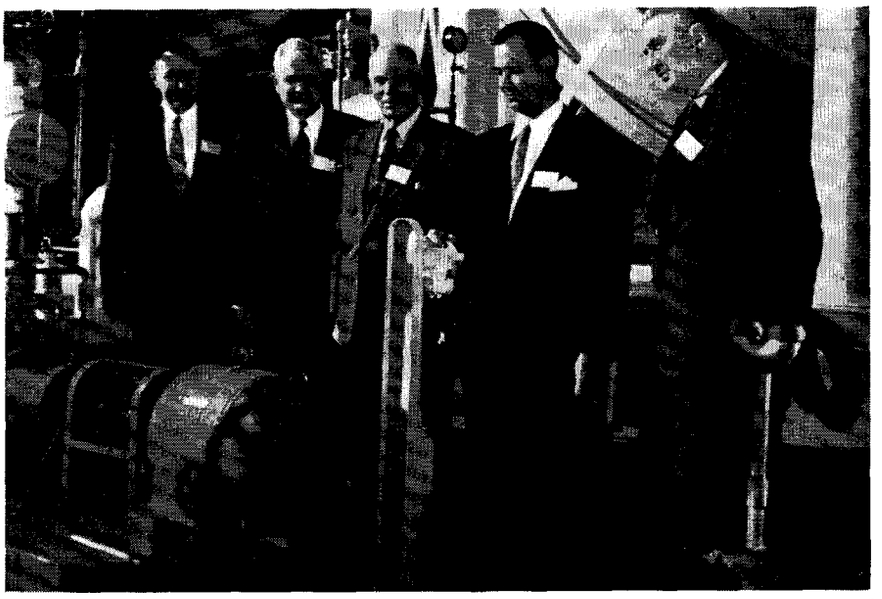


F. D. Kuenzly, plant manager; C. W. Humphreys, vice president; Mayor Petit of Ventura, Calif.; and G. R. Monkhouse, vice president, watch R. C. McCurdy (second from right), president of Shell Chemical, turn the switch putting the new anhydrous ammonia plant into operation

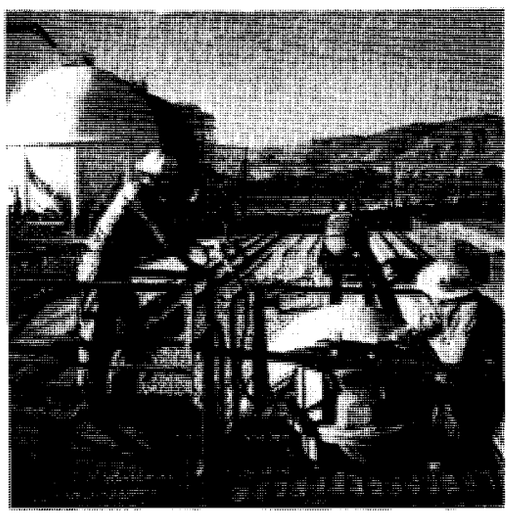
removals" to expand capacity until, in the words of C. W. Humphreys, Shell vice president, the "Shell Point plant became one big bottleneck." Shell recognized further expansion of ammonia could best be accomplished by building an entirely new plant, and it selected Ventura two years ago as the best site, based on readily available raw materials (Shell oil fields here have a plentiful supply of natural gas) and on an expanding adjacent market—southern California and Arizona agriculture. Part of Ventura's output will be used elsewhere by Shell to make ammonium sulfate, presently the largest single source of nitrogen for California growers.

Completion of the Ventura plant, upping Shell production to over 165,000 tons per year, brings operating West Coast ammonia plants to five. In addition to Shell at Shell Point, there are: Hercules, 36,000 tons per year at Pinole, Calif.; Hooker Electrochemical, 15,000 tons per year at Tacoma, Wash.; and Dow, 7000 tons per year at Pittsburg, Calif. When Brea Chemicals, Inc. (Union Oil subsidiary), completes its 73,000-ton-per-year plant at Brea, Calif., total West Coast ammonia capacity will be nearly 300,000 tons annually. (Not all of this, of course, is for fertilizer; nonfertilizer uses include refrigeration, petroleum refining, pulp and paper making, explosives, synthetic fibers. Nationally, about 70% of the ammonia produced is used by the fertilizer industry.)

Elsewhere in the West, the Salt Lake City area seems to be coming in for most attention from prospective ammonia producers. Salt Lake City Chemicals, formerly Mill Creek Chemical, and Utah Chemical have announced intentions to enter ammonia production in that area, but neither has started construction. Shell Chemical itself can double Ventura production by additions to the present plant. Present West Coast capacity plus future Shell expansion at Ventura will probably assure adequate West Coast ammonia fertilizer for several years. It appears logical that if and when another ammonia plant is built, it will be at the site of Shell Oil's Anacortes, Wash., petroleum refinery which is under construction with completion scheduled for 1955. Not only will the refinery be a ready source of hydrogen, but the expanding agriculture of the Pacific Northwest, sparked by reclamation projects of the area, should offer an excellent local market.

Shell expects that fertilizer ammonia prices may weaken in 1954, more likely in 1955. This it attributes to dropping farm income, general improvement in supply. Shell notes, however, that prices have remained remarkably steady for the past several years. Present cost per pound applied in California to irrigation water is 10.5 cents as compared to 9 cents prior to the war.

Loading an anhydrous ammonia tank car. Refrigerated sphere in the background holds enough ammonia to fill 100 tank cars



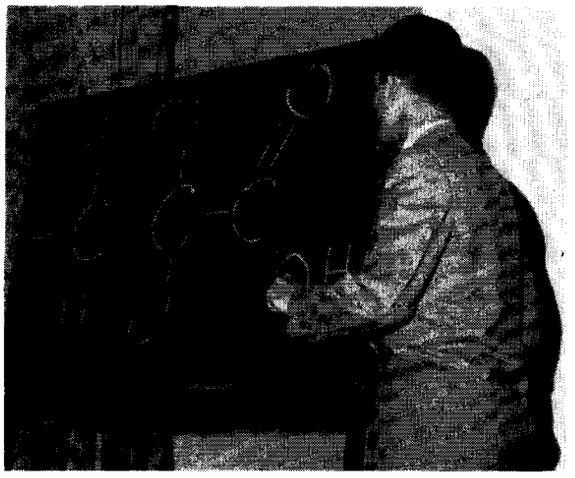
Herbicides Becoming More Useful Every Day

Evaluation of new chemicals continues in many experimental stations and industrial laboratories

KANSAS CITY.—Advances in the last few years have made some optimists speculate whether or not man could throw away the hoe in the never ending battle against weeds, said Byron T. Shaw, Agricultural Research Administration, USDA, at the First National Weed Control Conference held in conjunction with the 10th annual North Central Weed Control Conference here Dec. 8 to 10. The turning point in weed control came about 10 years ago when it was found that certain plant modifying chemicals, especially 2,4-D, could be used to kill weeds effectively. Chemicals have become well established supplemental tools for controlling weeds in the production of corn, wheat, oats, barley, rice, flax, sorghum, cotton, peanuts, sugar beets, and sugar cane. Each year about 25 million acres of small grains and corn are treated with 2,4-D alone; pastures and meadows are also receiving attention.

Translocation of CMU (chlorophenyldimethylurea) probably takes place in plants according to evidence gathered by J. R. Haun and J. H. Peterson, Du Pont. Their experiments, which were reported by their colleague, D. Wolf, consisted of adding carbon-14 ring-labeled CMU to a culture solution in which tomato plants were growing. By drying the plants and placing them in contact with x-ray film for a period of 22 days, radioautograms were produced showing the translocation of the radioactive carbon in the plant.

The investigators pointed out that their results demonstrate the pattern of



K. C. Barrons of Dow sketched the chemical structure of Dow's new herbicide, Dalapon

movement of C^{14} in plants, but do not absolutely establish the translocation of the intact CMU molecule. Further work is under way to clarify this point. The radioautograms showed a gradual uptake of C^{14} in the roots and a much more rapid uptake in the aerial portions of the plant.

Leaf tips of tomato plants were submerged in the solutions of tagged CMU to determine downward translocation. Very little translocation seemed to occur; translocation may therefore be thought to take place chiefly through the xylem. Monocotyledons, such as corn and Johnson grass were also treated with similar results.

Phenyldimethylurea. Phenyldimethylurea should be considered a general herbicide. It is toxic to a wide variety of plants. Cotton, corn, soybeans, and wheat give contradictory results, said D. D. Hemphill, University of Missouri, so the value of the compound for use with these crops is questionable at this time. Flax, sugar beets, sunflower and safflower appear more sensitive and use is not recommended here. Pre-emergence and post-emergence applications on onions and peas and selective foliage application on cranberry bogs appear promising.

As might be expected there is little difference between phenyldimethylurea and the similarly constituted CMU in controlling annual broad-leaved and narrow-leaved weeds. The most significant difference between the two chemicals appears to be their persistance, although there may be some slight difference in selectivity.

Since phenyldimethylurea disappears from the soil more rapidly than many soil sterilants, it appears that it may have an important place in control of deep-rooted perennial weeds where it is essential that the soil be tied up for a minimum of time.

Dalapon. Dalapon, Dow's 2,2′ dichloro-propionic acid, is still available only for experimental purposes and a few industrial applications such as railroad right-of-ways. It is absorbed and translocated by living grass foliage and is also absorbed by roots following soil application, according to K. C. Barrons, Dow. For maximum effect the foliage should be wet when sprayed. It should be noted that the chemical does not translocate through dead tissue; any spray component that gives a quick kill of grass foliage may reduce its herbicidal activity.

Sodium 2,4-dichlorophenoxyethyl sulfate is unusual in that it is inactive when applied and only becomes activated after it is applied to the soil. It is presumed that microbial action is responsible. The active form kills both germinating and emerging weeds of many species. Application to dry surface soil seems to result in slow conversion. Low temperature of soil can also delay action. A number of analogs with various degrees of effectiveness have been prepared, said E. L. Denisen, Iowa State.

From the limited data available, it seems certain that amino triazole is a potent new herbicide, according to R. Behrens, Texas A & M. It is relatively nontoxic to rats, and is readily absorbed by roots and aerial parts of plants. Inside the plant it is translocated, mostly to the growing point and young tissues, probably through the phloem. The development of chlorosis in treated plants possibly shows that ATA disrupts the chlorophyll synthesis and destruction balance. Foliar application of iron and nitrogen do not prevent chlorosis, indicating that ATA does not act by combining with one of these.

N-1 napthyl phthalamic acid has been tested as a selective herbicide for the last four seasons and is now marketed in limited quantity. It usually gives best control when applied to the soil before weed emergence. Good control with no crop injury has been shown in asparagus, said G. F. Warren, Purdue. Performance with cotton has been promising in drier areas of the Southwest, while there has been some injury in the damper areas. Good results have been reported with soybeans, peanuts, gladiolus, and for crabgrass control in turf. Some sensitive crops are beets, spinach, parsnips, tomatoes, tobacco, strawberries, and many of the crucifers. Effective rates of application have varied from two to eight pounds per acre. Lowest quantities are for light, sandy soils; much or peat soils are poor even at 12 pounds per acre.

Schechter, LaForge Honored By CSMA for Allethrin Synthesis

In recognition of their contributions to insecticide manufacturers by the development of a synthesis for allethrin Milton S. Schechter and Frederick B. LaForge were presented achievement award scrolls by the Chemical Specialties Manufacturers Association at the recent meeting here. Both men are employed by the USDA, Bureau of Entomology and Plant Quarantine.

Aerosol dispensers are apparently gaining on mothballs for the dominant position in the housewife's arsenal for the destruction of insects. This was presented in a survey on aerosol products reported by the Du Pont Co. The survey estimates that about 130 million units of aerosol products will be purchased in the U. S. this year. Insecticides are by far the most popular of these products. Another interesting fact: most consumers buy their aerosol insecticides in grocery stores.

Insecticide Analyses. The insecticide chemical analysis committee of the CSMA met for a full day on Dec. 6. The morning session was a panel meeting on the cooperative test of pyrethrum extracts and other analytical methods for pyrethrins. The afternoon session consisted of a symposium in which four original papers on analytical methods for pyrethrums were presented.

Insect Resistance. Frank H. Babers of the USDA Bureau of Entomology and Plant Quarantine, presented a survey of insects resistant to insecticides.

He said that most of the common household insect pests have now developed resistance to the postwar insecticides of the DDT type. However no high resistance to the organic phosphorus insecticides, pyrethrins, or allethrin has yet developed.

Some other insect pests which have developed resistance to DDT include: potato beetle, cattle tick, redspider grain weevil, and grape leafhopper.

H. L. Haller, chief of the Bureau of Entomology and Plant Quarantine, USDA, served as moderator for the symposium on household and industrial insecticides at the CSMA meeting