

to cotton. Elimination of all herbicides is not the answer to our problems, said White; instead fair and proper regulation of hazardous chemicals should ultimately benefit all farmers.

Credit. Special credit terms granted during periods of initial expansion may lead chemical manufacturers and suppliers into the banking business without benefit of security or interest, warned J. A. Walker, Standard Oil of California. Seasonal credit extended for three or four months may stretch into a year; the customer is in effect then operating on the supplier's capital. Agricultural chemical suppliers should establish a sound written credit policy to be clearly understood by management, sales, and the customer. Walker suggests carrying out the policy by determining if the customer's credit is good credit, having an understanding as to when payment is due, and asking for payment when due. Such a positive policy will maintain better customer relations in the long run, which is an important function of credit.

Production Records. Would you have adequate research and production control records if you became involved in product liability litigation? If not, you may tie your lawyer's hands, said J. D. Conner, NAC Association counsel. He stressed the importance of recording all observations on any factor which might become relevant in future liability action, regardless of how obvious it might seem to a technical observer. Data at all stages of plant growth are necessary to parallel farm conditions. All variables which possibly could affect any performance or safety characteristic of the product should be recorded; for example, foliage condition at time of application, rainfall, or temperature. Appraisal of data should be reduced to writing for possible legal reference. Research performed by other agencies should always be evaluated by the manufacturer prior to marketing a product, Conner said.

Contamination or adulteration of a product might be charged in spite of careful research and development. Conner feels that the best record for the defending lawyer in this case is proper product identification by batch numbers and retained samples. Absolute uniformity throughout the batch isn't essential but greater weight will be given to evidence based upon probable high uniformity. Lawyers recommend control tests covering all factors where even a slight deviation might affect the performance characteristics of the product—procedures and results should be clearly recorded.

Research Grants. R. D. Lewis, director of Texas Agricultural Experiment Station, pointed out the importance

of research on chemicals as related to other agricultural projects. Of 324 active projects carried out by his station, 219 relate to chemical's utilization. Grants in aid are provided for 123 studies on use, value, and significance of antibiotics, insecticides, herbicides, defoliants, and fungicides. Such industrial grants make possible research beyond the capacities of federal or state funds. Research directed toward use of chemicals should be continued, but Dr. Lewis emphasized the need for fundamental research to learn the underlying phenomena, mode of action, and functions of chemicals in agricultural applications. This better understanding, he feels, might be useful evidence to convince those who would outlaw all pesticides.

Relative Hazards. Some pesticides may be hazardous, but their benefit far

outweighs the danger when properly used, said F. C. Bishopp of the Pink Bollworm Research Center. In 1951, 14 deaths were claimed to be the result of DDT. However, Federal Security Agency statistics list 20 accidental deaths from aspirin, 117 from kerosene and petroleum products, 87 from lye, and 466 from barbiturates during 1949. Comparing these figures, Dr. Bishopp stated that prohibiting use of effective pesticides by law is not warranted.

Insect damage has been estimated at from \$4 to \$10 billion annually. Dr. Bishopp believes that our increasing population demands maximum yield from every acre of land. Virtual elimination of many insect-borne diseases led Dr. Bishopp to regard DDT and other insecticides developed following its discovery by Mueller as among the greatest gifts of science to man.

Industry

Brea Starts Up New \$13 Million Ammonia Plant in California

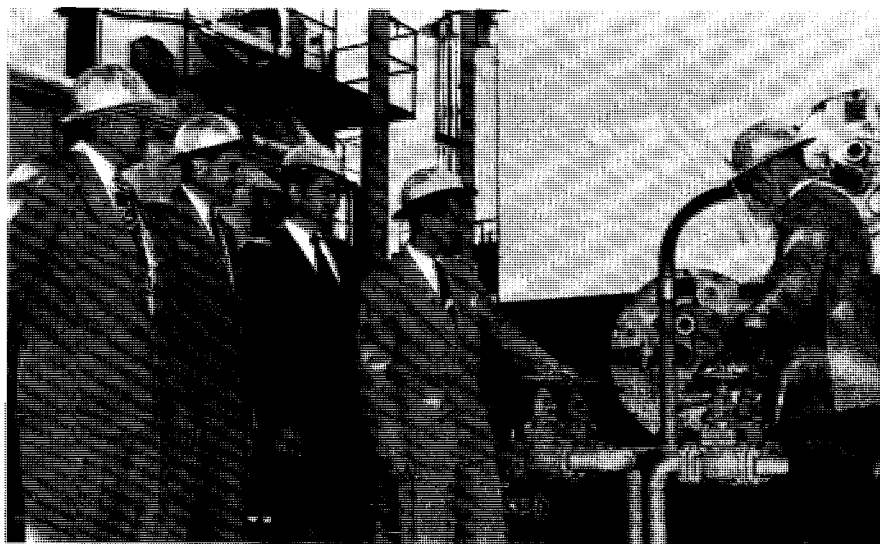
BREA CHEMICALS INC. fired up the boilers of its new \$13 million ammonia plant at Brea, Calif., March 26. This was the first step in getting the big chemical plant into operation, which by June should be producing 235 tons of ammonia per day for agricultural purposes.

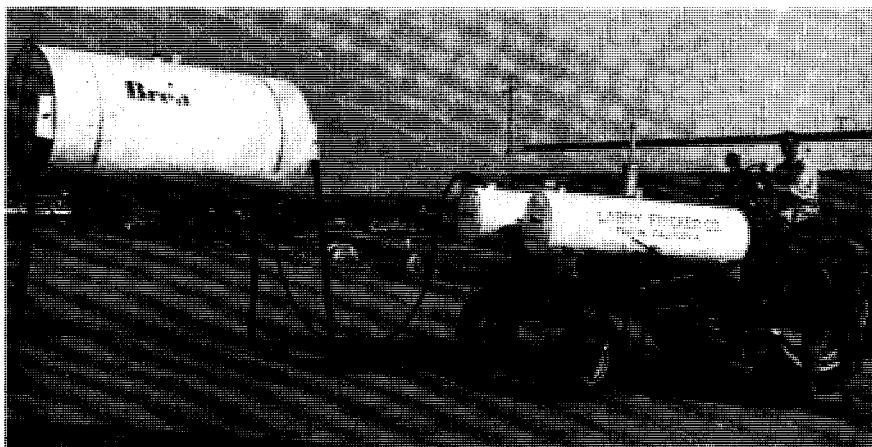
Brea plans to market and distribute the product as aqua ammonia. Economies of marketing, storage, and application prompted Brea's decision to become the

first major ammonia producer to market the aqua ammonia product.

H. R. Fifer, vice president in charge of marketing, told visitors at the press preview that Brea had decided on the aqua ammonia route as its major marketing effort for the following reasons: It provides an easy, safe, economical system of handling agricultural nitrogen from producer to consumer. The storage problem with aqua ammonia is not so

An operator lights the first boiler at Brea Chemical's new ammonia plant in California. Watching are Homer Reed (left), Brea president; Robert S. Ogilvie, plant superintendent; Robert S. Ray, manager of manufacturing; and Jack Tielrooy, manager of development





R. L. Luckhardt of Brea's Agricultural Technical Service points out the method of aqua ammonia soil injection while tractor tanks are filled from portable storage tanks. Small pipes attached to rear of each chisel shank place nitrogen at depths from four to eight inches. Tanks can be filled with same pump which forces liquid through shank pipes

great as other agricultural chemicals. Despite seasonal demand for fertilizer the product can be stored in sufficient quantities to provide a steady year-round production schedule. The liquid can be transported in existent standard transportation facilities. There is a possibility of combining aqua ammonia with other plant nutrients or soil conditioners.

Brea has selected the Pacific Coast and the Territory of Hawaii as the initial areas for marketing its branded product.

Aqua ammonia will be marketed to consumers by independent dealer organizations throughout the Pacific Coast. The chemical company will maintain 12 major distribution stations in the area with a total storage capacity of over 20 million gallons, equivalent to 16,000 tons of nitrogen.

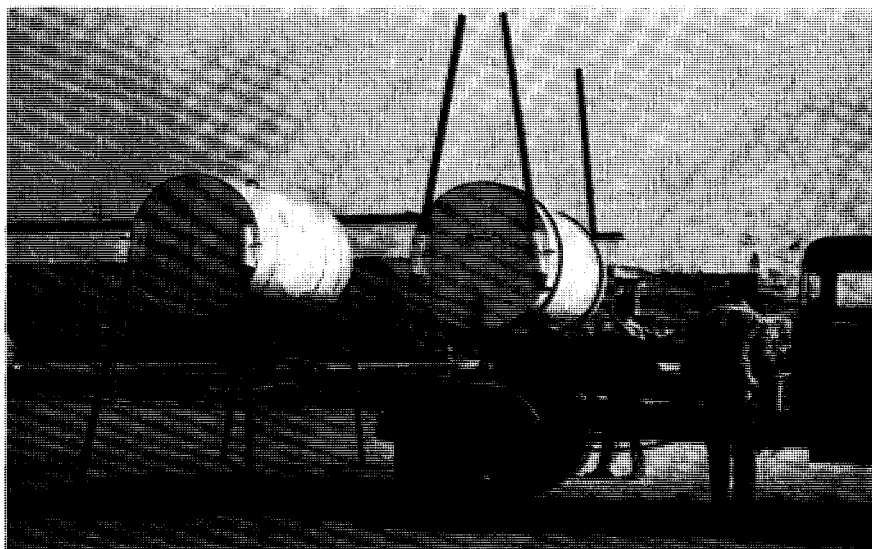
Economics will dictate shipment of

ammonia to distribution points. The two distribution stations in Hawaii will receive aqua ammonia by tankships, while anhydrous ammonia will be shipped to such overland points as Bakersfield, Calif., to be converted to aqua ammonia.

Shipment of aqua ammonia by rail is not economically feasible and for overland transport, Brea will utilize high pressure tank car cylinders. At the distribution points, however, the anhydrous ammonia is converted to the aqua form, 24.5% ammonia, 20% nitrogen, for ease of storage.

Boat shipment of aqua ammonia, on the other hand, is practical and costs per pound of nitrogen are competitive. Anhydrous ammonia requires about 2.5 pounds of steel per pound of ammonia, and the containers must be returned to the manufacturer. With aqua ammonia

Leg tanks allow truck delivering fertilizer to drive out from under a 500-gallon tank. Turntable bed enables truck to carry two tanks and unload them both in less than 10 minutes



at three pounds of water to a pound of ammonia, shipment in conventional tank ships of type used for oil and gasoline offers competition to anhydrous ammonia.

The aqua ammonia will be sold at the same price per pound of nitrogen as anhydrous ammonia. However, Brea claims that ease of application and handling make it a cheaper source of nitrogen for plants.

The company says that aqua ammonia is more efficient in nutrient action especially in dry territory than either anhydrous ammonia or ammonium salts.

The company also expects advantages from ease of application as compared with anhydrous ammonia. The comparatively low pressures, about 50 pounds per square inch, of storage and application of the solution means that the consumer can economically buy and operate his own application equipment.

Brea Chemicals is a wholly owned subsidiary of Union Oil Co. of California. The ammonia plant will receive natural gas from the union wells in the vicinity. Water, the other basic raw material, will be obtained from the Los Angeles Metropolitan Water District. Only natural gas will be burned for steam production, and the only material freed to the atmosphere is oxygen, a by-product of the nitrogen purification process.

New Du Pont Lab for Toxicology And Industrial Medicine

Du Pont dedicated its \$2 million laboratory for research in toxicology and industrial medicine in Wilmington on March 29. The new building provides enlarged facilities for this research project which was formerly located at the company's experimental research. The project was formerly concerned almost entirely with learning the toxicity of certain Du Pont products, but its assignment has now been enlarged to include research on ways and means of safeguarding the health of employees.

Education

Summer Session on Food Technology Offered by MIT

Massachusetts Institute of Technology has announced that its special summer session on food technology will be held from July 12 to July 30. The session, for which no academic credit will be given, is intended for those in the food industry who wish to study recent developments in food manufacture and control. It is also planned for advanced students in chemistry and engineering who wish to investigate the field.

During the first two weeks the program will include lecture, demonstrations, conferences, and visits to food plants. Content will concern such fundamental food