SCIENTIFIC APPARATUS AND LABORATORY METHODS

A "FOG" OR AEROSOL APPLICATOR FOR DDT

HAVING recently (mid-August) observed a second series of experiments, in the Salt River Valley of Arizona, on application of DDT in an oil fog, we wish to record the method. For the first experiments during April, 1945, the U. S. Navy's "fog generator," then a secret weapon, was released for experimental purposes to Colonel Dale Bumstead, of Tal-wi-wi Ranch, Peoria, Arizona, to be under direction of the authors, acting for the Arizona Agricultural Experiment Station. This generator, manufactured by the Todd Shipbuilding Corporation of New York, produces a remarkable white opaque fog from oil. Since DDT is oil-soluble it was conceived that the fog generator might be readily adapted to peace-time use as an insecticide applicator. Representatives of the manufacturers accompanied the equipment and, during a series of tests and field demonstrations, made and conceived various modifications to produce a more satisfactory fog for the application of DDT in insect pest control work.

The fog best adapted to concealment (the original purpose) is too fine and light for best results in insecticide applications in the field. It billows and rises to heights far greater than required, but does leave a remarkably fine and uniform deposit of minute crystals of DDT on all surfaces of the plants "fogged." Application is rapid. Results of the first experiments on grape leafhopper and on livestock pests and some of the comments of visiting entomologists are set forth in our Mimeographed Report No. 75.[1] Later checks have fully borne out the results therein reported.

Following the spring experiments, the Todd engineers continued their tests, and have now evolved a new machine, specifically for production of insecticidal fog for insect pest control. This machine, while entirely different in appearance from the Navy's generator, uses the same principle in breaking up the insecticidal oil into a fog which has better characteristics for application to field crops and livestock than the obscuring fog for military purposes. The "particle size" is greater, giving a heavier but less opaque fog which, however, deposits the insecticide in a remarkably uniform manner on all surfaces.

Certain simple mechanical changes in the discharging vents have adapted it to better initial distribution from the machine into the crop to be treated. Preliminary checks immediately after the most recent tests indicate better control than in the earlier experiments.

This is, practically, aerosol production on a field scale, and we believe it is destined to rank high as a method of application of insecticides in pest control work. Its adaptability to other than oil-soluble insecticides is yet to be determined.

CHARLES T. VORHIES
LAWRENCE P. WEHRLE
DEPARTMENT OF ENTOMOLOGY AND ECONOMIC ZOOLOGY,
AGRICULTURAL EXPERIMENT STATION,
UNIVERSITY OF ARIZONA

ACETONE CO_2 BATHS

THE following statement may be of interest to laboratory workers who have occasion to use acetone-CO_2 baths for low temperature work:

Acetone-CO_2 baths commonly used to cool low temperature receivers present a certain hazard as a result of their tendency to foam. Foaming may be due to too fast addition of CO_2 in preparing the bath, warming of the receiver during distillation, accidental bumping of a CO_2-supersaturated bath and many other causes. Open flames in the vicinity may cause bad fires.

It has been noted in these laboratories that foaming is markedly reduced if a few drops of silicone fluid or a small piece of silicone stopcock grease is added to the bath. As the stopcock grease (advertised as Dow Corning Stopcock Grease) is available at most of the chemical supply houses it would likely be the more convenient material for use in most laboratories. One application should last indefinitely, provided the Dewar flask is not washed out.

R. R. MCGREGOR
MELLON INSTITUTE OF INDUSTRIAL RESEARCH

DISCUSSION

NOMENCLATURE OF PROTEOLYTIC ENZYMES

THE nomenclature of certain groups of proteolytic enzymes is in an unsatisfactory state at present and is in need of reform. While this difficulty arises to some extent from a lack of knowledge of the nature and mode of action of these enzymes, it is also due in part to an unfortunate tendency to name different groups of proteinases after representative members. Thus enzymes with optimum activity in acidic solution

[1] Charles T. Vorhies and Lawrence P. Wehrle, "Preliminary Tests of DDT Applications to Crop Plants and Livestock with Navy's Fog Generator."

or with specificities similar to that of pepsin are called "pepsinases." Similarly, enzymes which resemble papain in their activation and inhibition behavior are called "papainases."

In a recent review[1] it was urged that the designations for proteinases be as descriptive as possible of the *properties* of the enzymes. For instance, the terms "acidoproteinase," "neutroproteinase" and "basoproteinase" were suggested to indicate the pH region of optimum activity.

The proteinases of the higher plants appear to fall into two classes. One group includes such enzymes as papain, ficin and bromelin. These enzymes can be reversibly inactivated by mild oxidation and then reactivated by certain reducing agents. The name *anastrophic* (αναστροφη = reversal) is suggested for this group as being descriptive of this characteristic behavior. A second group is represented by solanain, hurain and arachain. Inasmuch as these enzymes are unaffected by either oxidizing or reducing agents, it is proposed that they be termed *stasidynic* proteinases (στασιμος = stationary, δυναμις = activity).

THEODORE WINNICK
DAVID M. GREENBERG

OCTOBER 16, 1945

SOVIET BIOLOGY

IN his recent report on Soviet Biology[1] Dr. Zhebrak assures us that "the careers of *many*[2] Soviet geneticists have not been adversely affected by the above-mentioned [Vavilov-Lysenko] controversy." If, as Zhebrak claims, Lysenko's "influence has been exerted in open debate between proponents of different scientific views and principles and not by political pressure" why should the career of any Soviet geneticist be so "adversely affected"? Of the three geneticists specifically mentioned in my original article Dr. Zhebrak accounts for only one. What has happened to Karpechenko, the geneticist who laid the foundation for work on allopolyploid hybrids which Zhebrak has developed so successfully? Where is Vavilov, one of Russia's greatest scientists and one of the world's greatest geneticists? Vavilov was elected president of the International Genetics Congress which met in Edinburgh in 1939, but Vavilov did not attend, and we have not heard from him since. We now have information from our National Academy of Sciences that Vavilov is dead. How did he die and why?

The American geneticists have long recognized the valuable work done in the Soviet Union and have enjoyed the most cordial personal relationships in the past, but even before the war it was difficult to maintain personal contacts. No Soviet scientists attended the International Botanical Congress in Amsterdam in 1935 or the International Genetics Congress in Edinburgh in 1939. Perhaps lack of funds kept them at home, but China and India were represented. Isolationism in science, or in any other field, has no place in a modern world. We hope that we may soon resume communication and personal association with our Russian friends and colleagues.

KARL SAX

HARVARD UNIVERSITY

[1] D. M. Greenberg and T. Winnick, *Ann. Rev. Biochem.*, 14: 31, 1945.

[1] A. R. Zhebrak, SCIENCE, 102: 357–358, October 5, 1945.

[2] Italics mine.

SCIENCE LEGISLATION

IN the November 30 issue of SCIENCE an article appeared on "Pending Legislation for Federal Aid to Science." It contains a letter to the President with 43 signatures of scientists and is followed by an endorsement of the principles embodied in the letter signed by R. Chambers and J. S. Nicholas on behalf of the executive committee of the Union of American Biological Societies and the American Biological Society.

Since this publication, attention has been called to an impression given by the letter to the President of an uncompromising attitude in regard to the administrative set-up that was recommended for the National Science Foundation. The letter specifically endorses the proposal of the Magnuson Bill, *viz.*, that the foundation be administered by a board of scientists appointed by the President. This form has the approval of a large number of scientists throughout the country and the consensus of opinion seems to be that, for fundamental scientific research, this is the best method of administration. The impression that the letter is uncompromising is unfortunate and should not be considered as such.

There are, at present, two proposals—one advocated by Senator Kilgore, the other by Senator Magnuson. The one differing from what has been presented above advocates a full-time administrator appointed by the President. Thus, we may consider two divergent viewpoints—one, a board appointing its own administrative officer, and the other, a director with an advisory board. If a mutually acceptable decision is not reached, the chances of a realization of a Federal Research Foundation are likely to be seriously jeopardized.

The present is the psychological time for securing a National Science Foundation. The telling experience of the war is fresh and has made the country very aware of science. Congress is reflecting this attitude in the consideration of various proposals for science legislation. The Bush Report, the President's message of September 6, and the four volumes of