that additional student population should be met with a proportionate expansion in the number of teachers if the quality of the work and the standing of the university are not to suffer.

The committee recommends that in the allocation of the limited supply of scientists during the reconversion period the order of preference should be: (1) teaching and fundamental research; (2) civil science, both government and industrial; and (3) defense science.

Attention is called to the importance of maintaining an adequate nucleus of able scientists working on the problems of defense, but the committee feels that the most important immediate task is to reconstruct the central core of fundamental research and teaching. As one means of implementing the order of priority improvement of the attractions of an academic career is called for.

The report represents the deliberations of the committee since its appointment in December 1945. A copy may be secured from His Majesty's Stationery Office. A review of the article appeared in *Nature* for Saturday, 15 June.—*M. H. Trytten* (Director, Office of Scientific Personnel, National Research Council).

# *In the Laboratory*

## Agar Technique for Arresting Movement in Protozoa

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Of the several well-known methods of hindering the movements of active Mastigophora and Infusoria so that they can be examined easily through a high-power microscope, none appears to be entirely adequate, and a new technique based on the use of agar has been developed. The idea came from the papers of Whitaker and Berg (*2*), who used agar solutions when studying the development of Fucus eggs, and of Holtfreter (*1*), who adopted the same method when working on the growth of amphibian embryos.

The modification developed for the Protozoa is as follows: Place a *small* drop of the culture solution on a glass slide. Avoid including sand grains or other large pieces of detritus, as these will hold up the cover glass and prevent the use of high-power objectives. Place an equal-sized drop of a melted solution of agar on a cover glass (a 1-per cent aqueous solution kept liquid at about 40° C. in a water bath or oven), immediately invert the cover glass, center the drop of agar solution directly over the drop of culture solution and let the cover glass fall. As the two drops merge and the agar rapidly cools, the mixture becomes solid. The jelly formed in this way contains large numbers of tiny water spaces, most of which are smaller than the field of a high-power microscope, and in these the protozoans are confined. Large species are often held so tightly that they are unable to turn around, but smaller ones can swim about in small circles. If required, animals can be held more tightly by increasing the size of the agar drop relative to the drop of culture solution or by using a 1.5-per cent solution of agar.

The animals continue living in these conditions for at least half an hour and often for many hours (the actual time apparently depending both on size and on species). The cover glass is held sufficiently firmly for an oil-immersion objective to be used. However, care must be taken not to press upon or otherwise move the cover glass, since this will break the jelly reticulum and release the animals.

In the case of marine Protozoa, the agar solution must be made up in sea water, and in the case of parasitic Protozoa, such as those found in the rectum of the frog, it must be made up in normal saline.

### References

1. Holtfreter, J. *Anat. Rec.*, 1945, **93**, 59.
2. Whitaker, D. M., and Berg, W. E. *Biol. Bull.*, 1944, **86**, 125.

## A Simple and Accurate Soil Fumigant Injection Apparatus[1]

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The accurate application of liquid soil fumigants for experimental purposes is somewhat difficult when

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the ordinary commercial applicators are used. The latter fail to deliver uniformly measured doses, since the solvent properties of many materials may destroy rubber, leather, or plastic gaskets in these applicators. In the course of studies with fumigants in pineapple fields under circumstances where depth of application as well as unit dosages were factors, it became necessary to apply a great variety of materials with considerable precision. The applicator described below has been eminently satisfactory and, being of cheap and simple construction, is worthy of description for the use of other workers in the field.

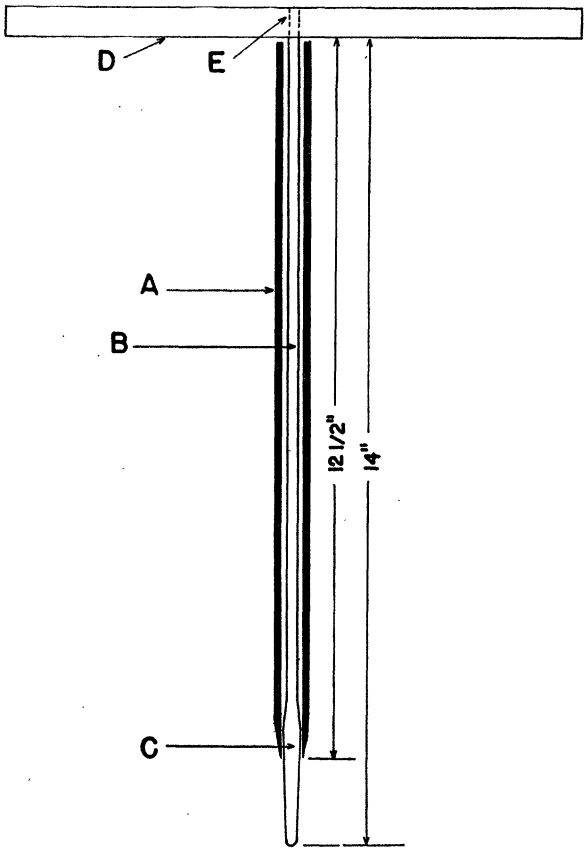


FIG. 1. Assembled injection apparatus. A—standard ¼-inch pipe; B—¼-inch steel rod; C—enlargement tapering toward point; D—pipe handle; E—weld.

The device consists of a length of iron pipe of approximately ¼-inch inside diameter, sharpened at one end, and an iron prod with a transverse handle, as shown in Fig. 1. It was found that the device operated with greater ease if the prod was slightly enlarged at the end and tapered toward the tip. The assembled pipe and prod are thrust into the soil to the required depth, the prod withdrawn, and the fumigant poured into the pipe and allowed to drain, after which the pipe is withdrawn from the soil and the hole closed. In practice it was found desirable to have enough pipes to treat an entire plot without resetting pipes. With pineapple the current standard plot requires 100-unit doses, but this would vary with other crops, depending on the plot size required for calculating significance of results.

A number of measuring devices ranging from simple, graduated cylinders to serological syringes have been used to measure the unit dose of liquid. The most satisfactory method has been the use of glass burettes of 100-ml. capacity, the unit doses being marked with steel or brass bands on the outside of the burette.

This device might also be used by the home gardener or for treating seed beds in glasshouses, where the number of unit doses is sufficiently small not to merit investment in more complicated and expensive equipment.

## A Spectrophotometric Method for the Determination of p,p′-DDT

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In 10 minutes 10–50 μg. of p,p′-DDT may be determined with an error not greater than 10 per cent. A large number of analyses may be run at one time.

### PRINCIPLE

When dissolved in 95 per cent ethanol p,p′-DDT absorbs very slightly at 250 mμ. After dehydrochlorination by dilute alcoholic NaOH to the olefin, 2,2,-bis(p-chlorophenyl)1,1-dichlorethylene, the solution absorbs strongly at this wave length (see Fig. 1). Measure-

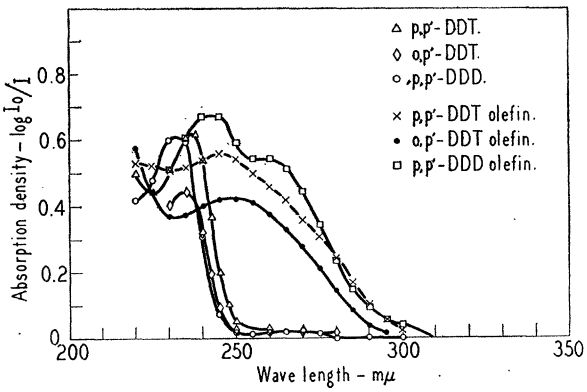


FIG. 1. Ultraviolet absorption curves of 10 μg./ml. of p,p′-DDT, o,p′-DDT, p,p′-DDD, and their respective olefins dissolved in 95 per cent alcohol.