papers are fastened with a double row of stitches by means of a sewing machine. The material to be separated is applied as a ribbon on the thick paper just beyond the "seam," using the kymograph technic of Yanofsky *et al.* The thin paper is then brought into contact with the solvent, where it acts as a "valve," which allows the requisite slow passage of the solvent along the heavy paper. A strip of thin paper approximately 9 cm in diameter results in a slowing of rate such that 24 hr are required for the solvent to traverse 17 cm of C. S. & S. No. 470-A. Resolution so achieved is superior even to that obtained on Whatman No. 1, and, curiously, it is worth noting that the relative rates of flow are not invariably the same for the two papers with the same solvent.

The rate of flow can be increased by using a narrower strip of light paper, and vice versa. If the ascending method is used, the cylinder of paper must be supported at the top by tying it to a glass or stainless steel support, for the rim of thin paper is not strong enough to support the weight of the heavy paper plus solvent.

Reference

1. YANOFSKY, C., WASSERMAN, E., and BONNER, D. M. *Science,* 1950, **111**, 61.

Preparation of Thin Films of Crystalline DDT and γ-Hexachlorocyclohexane in Celloidin[1]

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At this laboratory investigations are in progress to determine the possibility of breeding strains of beneficial insects resistant to DDT and other insecticides; during this work it became necessary to devise a suitable and easily produced test surface. A new method is described here of making thin films of crystalline DDT and γ-hexachlorocyclohexane (benzene hexachloride) rapidly and in large numbers in a celloidin base on glass. As well as being crystalline, these deposits fulfil the requirements of being reasonably uniform and of possessing known quantities in a given area.

Solutions of pure para para DDT (mp $> 108°$ C) or of γ-hexachlorocyclohexane of at least 99% purity (lindane) are made up in a mixture of equal parts of absolute alcohol and ether in which 0.2% celloidin has been dissolved. Insecticide concentrations ranging from 0.3% to 3.0% have been used up to the present. A lantern slide cover glass, size 3¼ in. × 4 in., is thoroughly cleaned with a solvent and lens paper, and a circle 2 in. in diameter is drawn with the aid of a guide in the center of the glass, with a grease china-marking pencil. From a microburette or Mohr pipette 0.15 ml of celloidin-insecticide solution is run into the middle of the cover glass. The solution spreads out rapidly as a very thin film with a circular outline until it is stopped by the grease-penciled circle. Evaporation of the solvents proceeds rapidly; and after about 30 sec or so, determined by trial, the drying

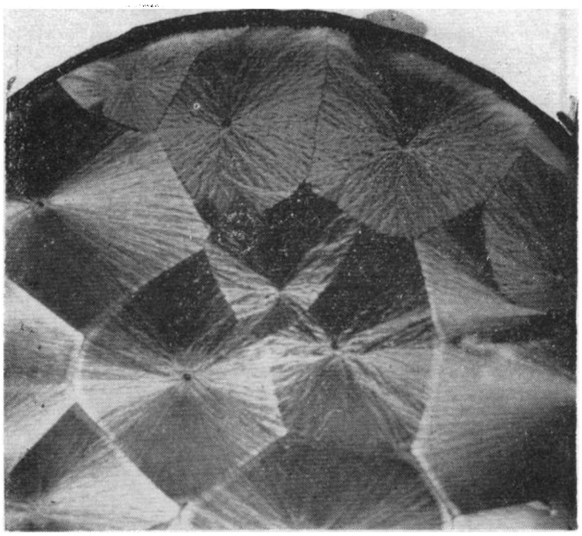

FIG. 1. Part of a crystallized DDT deposit in celloidin, containing approximately 0.08 mg DDT/cm² and showing centers of crystallization (× 2).

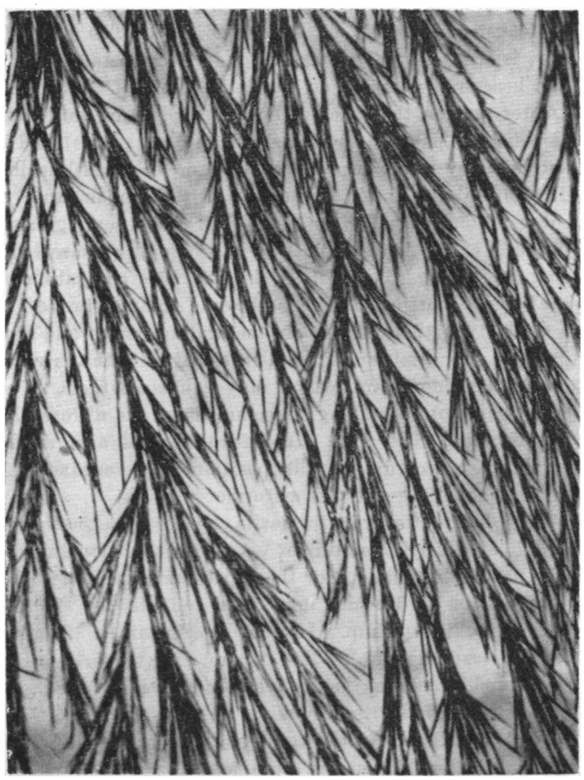

FIG. 2. Detail of structure of crystals deposited from an alcohol-ether-celloidin solution containing 1% DDT (× 120).

[1] Contribution No. 2,669, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Ontario.

film is touched lightly at several points with a needle that has previously been in contact with the insecticide. This seeding induces centers from which a regular branching crystallization proceeds rapidly through the film as it dries. If it dries too rapidly the celloidin hardens before crystallization is complete. This is prevented by covering the films after about 45 sec with a shallow lid, to reduce the rate of evaporation (a flat brass ring 2 in. in diameter and a second cover glass are convenient). The

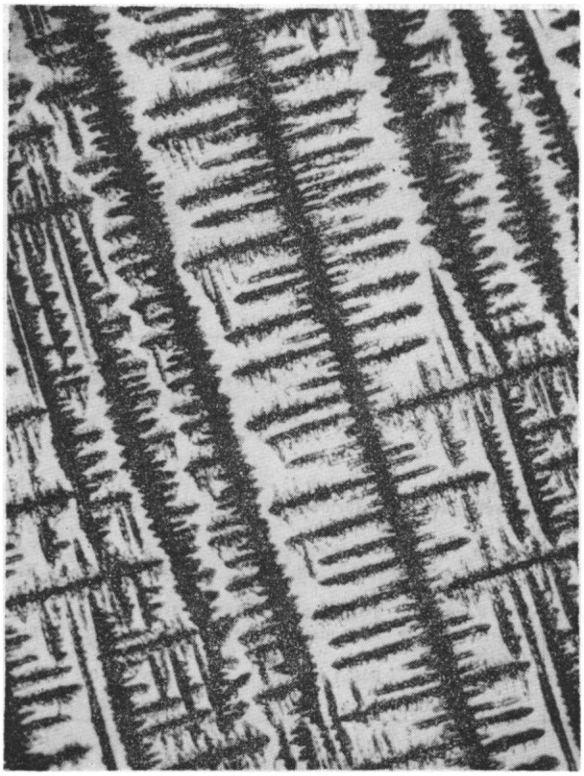

FIG. 3. Detail of structure of crystals deposited from a 1% solution of γ-hexachlorocyclohexane ($\times$120).

celloidin base is estimated to be approximately 0.15 μ thick when dry. A small proportion of films have to be discarded because of irregular or unevenly spaced crystallization. Less seeding is needed in γ-hexachlorocyclohexane than in DDT; and less is needed in the higher concentrations of either, crystallization being more rapid and spontaneous. When crystallization is complete and the celloidin hardened, the cover glasses may be stacked up for a time until needed; a standard 5 in. $\times$ 3 in. card index drawer equipped with slotted racks is convenient for storage. The films of DDT are more persistent than those of γ-hexachlorocyclohexane.

The general appearance of part of the DDT deposit showing the centers from which crystallization radiates is shown in Fig. 1. Fig. 2 shows detail of DDT crystal structure under magnification, and Fig. 3 that of the more angular deposit of γ-hexachlorocyclohexane. Fig. 4 shows a simple test chamber convenient for use with *Drosophila melanogaster* Meig. The chamber is made by clipping two cover glass films face to face, separated by a brass ring 3/16 in. thick and of internal diameter equal to the deposit circle. Such rings may be made by sawing off pieces 3/16 in. long from standard heavy-gauge brass pipe of suitable size.

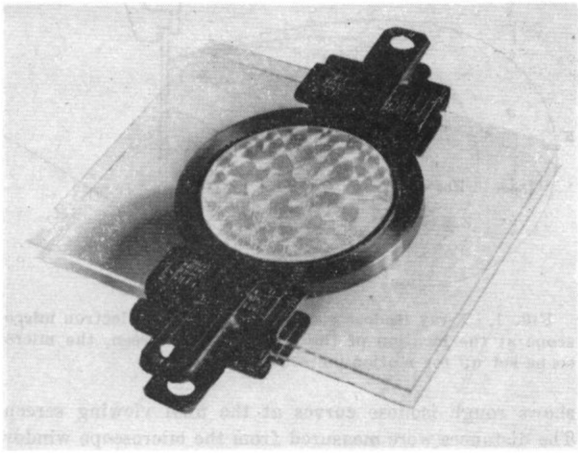

FIG. 4. Test chamber made by clipping two cover glass films face to face, separated by a brass spacer ring.

Anesthetized insects are introduced into the chamber and exposed for varying periods of time. They may be anesthetized again for removal by slipping a strip of paper impregnated with ether between the ring and the upper cover glass, the glass being first moved a little to one side so that the deposit is off center and the ether strip does not touch it. The data obtained are susceptible to the usual probit analysis treatment. The great convenience of the method lies in the rapidity with which films can be made and in the large number of tests that can be carried out simultaneously.

X-Radiation from Electron Microscopes

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We have had occasion recently to monitor our electron microscope for x-radiation while taking motion pictures of electron microscope images (*3*). The survey was necessary from a health standpoint because the microscope was being operated under abnormal conditions, which were optimum not only for the motion-picture techniques but also for the production of x-rays. Following the published work of Silverman *et al.* (*2*) on the same subject, the results of the survey may be of interest and are reported here along with the data of surveys conducted on 3 Detroit instruments operating under normal conditions.

The abnormal conditions for motion-picture work are: (1) the final viewing screen is tilted at an angle of about 30 degrees, and (2) the usual 25-mil condenser aperture is opened to 50 mils. Thus, a more intense beam is al-