alent. Additional supporting evidence will be presented in a subsequent, more detailed, report. It should also be noted that tetraploids have been isolated by an analogous procedure.

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SEYMOUR POMPER

Biology Division,
Oak Ridge National Laboratory,
Oak Ridge, Tennessee.
April 22.

[1] Subramaniam, M. K., and Krishna Murthy, S. N., *Proc. Ind. Acad. Sci.*, **30**, 185 (1949).
[2] Mitra, K. K., and Subramaniam, M. K., *La Cellule*, **53**, 7 (1949).
[3] Subramaniam, M. K., *La Cellule*, **54**, 145 (1951).
[4] Tobias, C. A., in Oberlin Symposium on Radiobiology, June 1950 (John Wiley and Sons, Inc., New York, 1952).
[5] DeLong, R., and Lindegren, C. C., *Bact. Proc.* (51st General Meeting), 63 (1951).
[6] Lindegren, C. C., and Lindegren, G., *J. Gen. Microbiol.*, **5**, 885 (1951).
[7] Pomper, S., and Burkholder, P. R., *Proc. U.S. Nat. Acad. Sci.*, **35**, 456 (1949).
[8] Lindegren, C. C., and Lindegren, G., *Ann. Missouri Bot. Garden*, **30**, 453 (1943).
[9] Lindegren, C. C., and Lindegren, G., *Proc. U.S. Nat. Acad. Sci.*, **29**, 306 (1943).

Apparent Fumigant Action of Non-volatile Insecticides in African Huts

DURING the course of experiments conducted by one of us (G. D.[1]) on the residual action of various insecticidal preparations applied to the interior of native-type African houses, a pronounced fumigant-type action was found in houses treated with preparations of DDT and dieldrin.

Since then, tests have been done (G. F. B.) by filtering the air in a hut sprayed with dieldrin wettable powder five weeks previously. The apparatus used consisted of fumigant chambers made from 1-lb. glass jars fitted with waxed bungs. Air was removed from the top of the jar through a tube by means of a filter pump; fresh air entered through an upright funnel and was delivered at the bottom of the jar. The funnel had a screwed ring by means of which a disk of filter paper cut to size could be firmly stretched over the mouth of the funnel. The whole apparatus was sealed with paraffin wax. To reduce control mortalities, the jars were lined with a rough-surfaced paper and a piece of moist cotton-wool was put in the jar, the air passing over this as it was delivered. The jars were also covered with a dark cloth. Owing to a breakage in transit, the control could not be run at the same time as the test, and was carried out separately in the field laboratory.

Air was sucked through the single jar at 90 litres/hr. for forty minutes, and as a filter one thickness of Whatman No. 1 filter paper used. The house to be tested had been sprayed five weeks before (November 26, 1951) with dieldrin wettable powder to give an estimated deposit of 40 mgm. dieldrin per square foot.

Twenty to forty female *A. gambiæ* and *A. funestus* mosquitoes were used in each test. Of the four trials carried out in the treated house, two were done with the funnel leaning against the wall in the darkest and the quietest corner, and two with the jar suspended just beneath the roof. In each of these positions one trial was made with the filter in position. The two other trials were done without filters; for the one near the wall, the filter-paper was simply removed, but when the jar was hung close to the roof the bung and funnel were taken off and the jar covered with mosquito gauze, the suction tube passing through this to the bottom of the jar.

Deaths 18 hours after exposure are given in the accompanying table.

		Number dead	Total	Percentage dead
Dieldrin with filter	(*a*) Wall	3*f*	9*g* + 5*f*	21
	(*b*) Roof	2*f*	8*g* + 22*f*	7
Dieldrin without filter	(*a*) Wall	2*g* + 21*f*	5*g* + 37*f*	55
	(*b*) Roof	2*g* + 23*f*	2*g* + 23*f*	100
Control		5*f*	5*g* + 29*f*	15

g = *A. gambiæ*. *f* = *A. funestus*.

Thus the apparent fumigant action is due to solid particles too large to pass the filter paper.

Further laboratory trials indicated that DDT and dieldrin wettable powders sprayed on to mud, plywood and glass all produce lethal particles. Thus an important source of such particles in a mud-walled hut may be the roof. However, mosquitoes caged close to the wall usually suffer higher mortalities than those suspended in the middle of the hut. The presence of lethal particles may help to explain why the efficacy of DDT insecticides on a practical scale, for example, against *A. gambiæ* and *A. funestus* in Mauritius[2] and *A. darlingi* in British Guiana[3], has been greater than might be expected from laboratory and semi-field trials[4,5]. Insects activated to flight by contact with DDT[6] either on the substrata or as airborne particles would pick up more airborne particles in a given time than if they remained at rest[7]. Dr. G. Giglioli has recently informed us that in British Guiana he has been able to detect airborne particles of DDT for up to two years after spraying a house with non-absorbent walls.

There remains the question of any possible danger to health from these particles when those of the newer insecticides are breathed in for a period of years. The manufacturers of dieldrin now take a more optimistic view than they originally did of its toxicity to human beings (information supplied by the Shell Chemical Co. of Africa). DDT has already been used for many years without reported cases of ill-effects from inhaling drifting particles in houses. Dieldrin is applied at 20 per cent or less of the rate at which DDT is used. Unless it is correspondingly more toxic, the risk of using this exceptionally efficient preparation appears small.

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G. DAVIDSON

Ross Institute,
Gower Street,
London, W.C.1.

G. F. BURNETT

Colonial Insecticide Research Unit,
Arusha, Tanganyika Territory.
Aug. 5.

[1] Davidson, G., *Nature*, **170**, 702 (1952).
[2] Dowling, M. A. C., Malaria Eradication Scheme, Mauritius, Annual Report for 1951.
[3] Giglioli, G., "Malaria, Filariasis and Yellow Fever in British Guiana" (Georgetown, 1948).
[4] Hadaway, A. B., and Barlow, F., *Bull. Ent. Res.*, **40**, 323 (1949).
[5] Thomson, R. C. M., *Nature*, **163**, 109 (1949).
[6] Kennedy, J., *Bull. Ent. Res.*, **37**, 593 (1947).
[7] David, W. A. L., and Bracey, P., *Bull. Ent. Res.*, **37**, 177 (1946).