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The Secretary of the Expert Committee on Malaria has the honour to communicate hereunder the following note:

MALARIA CONTROL IN AREAS WHERE THE HOUSES ARE MADE OF MUD

by

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Malaria in India is overwhelmingly a rural problem. About 90 per cent. of the population lives in villages where the majority of houses are 'kutcha' with mud-plastered walls and thatched roofs. The ceiling is generally about 10 ft high and the floors are plastered in the same manner as walls. In general, the houses are without windows but have one or two entrances with or without doors.

DDT residual spraying for malaria control was first started in India for civilian population in 1945. By 1949 large-scale programmes had been taken up in Delhi, Bombay, Mysore, Coorg, Bihar and West Bengal coalfields and some other States with satisfactory results. In Delhi where drainage and anti-larval measures had been started since 1936, the incidence of malaria was reduced from 125 per mille in 1936 to 92.5 per mille in 1942 to 5.7 per mille in 1949. Since then with extensive use of DDT it has been further reduced to 2.1 per cent. in 1952. Likewise, spleen and parasite rates in children have fallen to negligible proportions. In Kanara District of Bombay, spleen rates in the neighbourhood of 70 per cent. prior to DDT spraying in 1942 - 45 were brought down to 7 per cent. in 1948 - 49. Similarly in Mysore, spleen rates well above 60 per cent. were brought down to under 5 per cent. after three years of DDT residual spraying. Results in other parts of India, e.g. Madras,

West Bengal, Uttar Pradesh and Coorg, are also striking and it becomes evident that malaria control has been successfully achieved by the application of residual insecticides in India where houses are mostly made of mud.

In the American continent and in some of the European countries, DDT is applied at 200 mg per sq. ft wall surface and this has been found to remain effective for six months or longer. In India, however, DDT is being applied at the rate of 50 - 60 mg/sq. ft and applications are repeated every 6 - 8 weeks during the transmission season. In areas where the transmission season is prolonged 3 or 4 rounds of spray per year are usually necessary.

Recently larger dosages of DDT such as 100 and 200 mg/sq. ft have been applied. The experience, however, with regard to the duration of residual effectiveness has shown variations. For example, WHO demonstration teams in Malnad and Ernad achieved successful results with a single application of 200 mg DDT/sq. ft. Small-scale experiments in Mysore have yielded similar results. Whereas contrary results have also been reported by Viswanathan and Gadre (1950) in Bombay and Jaswant Singh, Pal and Sharma (1951) in Delhi.

Massive dosages of DDT when applied on mud-plastered walls whether as suspension or emulsion did not show a proportionate increase in the duration of residual effectiveness (Jaswant Singh et al, loc cit).

Usual practice in India is to replaster the houses periodically, thus making insecticidal deposits ineffective, and thereby necessitating DDT spraying at smaller dosages (50 - 60 mg/sq. ft) repeatedly during the transmission season in preference to a single application at a massive dosage (200 mg/sq. ft). Moreover, repeated applications minimize the chances of a fair percentage of houses missing treatment altogether.

It has also been shown by many workers (Clapp et al 1947, Sundararaman and Peffly, 1949, Kruse and Konchandy, 1950, Hadaway and Barlow, 1951, and Pal and Sharma, 1952) that DDT loses its biological effectiveness on mud surfaces rapidly. The rapid loss of residual toxicity of DDT deposits on mud surfaces has been ascribed to the sorption of particles of insecticides into the inner layers (Hadaway and Barlow loc cit

1952). Down et al (1951) demonstrated that DDT undergoes chemical deterioration in the presence of various metallic salts in mud, such as anhydrous ferric oxide, anhydrous ferric, aluminium and chromium chloride and alkaline earth materials such as calcium carbonates. Fleck and Haller (1944) had earlier stated that Fe and Ca catalyze the decomposition of DDT. Bordas et al (1952) pointed out a positive correlation between the iron oxide contents of the soil and their capacity to inactivate DDT deposits. Highest rate of inactivation was seen in soils with higher iron oxide content. Analysis of mud scrapings from villages near Delhi indicated iron oxide contents more than 4 per cent. According to Bordas et al (loc cit) expected duration of activity of even massive dosages of DDT on such surfaces should be less than three months.

The relative efficacy of DDT formulations either in the form of water dispersible powder or as an emulsion has presented variations in the experience of different workers. While the majority of the workers both in the West and in India are agreed that the use of DDT in the form of a water dispersible powder yields better results on mud-plastered walls (Barlow and Hadaway 1949, Sundararaman and Peffly loc cit, Kruse and Konchany loc cit, Jaswant Singh et al loc cit) a contrary experience has also been reported by some workers (personal communication from Dr. Viswanathan as quoted by Jaswant Singh and Pal 1952). During the early phase of malaria control in this country, locally made DDT emulsion was usually employed, but now DDT water dispersible powder being readily available is commonly used.

Although with the slight modifications in the methodology of malaria control as indicated above, encouraging results have been achieved in different parts of the country. Yet there are some problems which require early solution. The most important of these is the rapid loss of biological effectiveness of DDT deposits on mud surfaces. This may perhaps be achieved by either giving a preliminary coating of certain materials which would render such surfaces impermeable or by incorporating such materials in the spray itself.

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