Prophylactic Proguanil in the Southern Highlands of Tanganyika

The Overseas Food Corporation's training centre at Ifunda, in the Southern Highlands of Tanganyika, situated at an altitude of 5,500 ft. (1,670 metres), was the scene of an outbreak of malaria in 1949. The cases were all of the malignant tertian type, and eight of the patients took proguanil regularly.

The camp, which was originally a Polish refugee camp, is badly sited on a hillside which slopes down to a swamp, the lower edge being scarcely 500 feet (150 metres) from the swamp. The prevailing wind blows from the camp across the swamp, so that it is only when the wind shifts or dies that the mosquitoes which are always present in the swamp gain access to the camp. Both *Anopheles gambiae* and *Anopheles funestus* are found, and occasionally *Anopheles coustani*.

The Poles are reputed to have had a malaria incidence rate of 700–1,000 per annum.

The camp was occupied by the O.F.C. in April, 1948, and the medical staff advised the use of mosquito nets, long trousers, and long sleeves in the evenings, the "flitting" of houses morning and evening, and the taking of prophylactic proguanil, one tablet a day throughout the year. All African quarters were residually sprayed with "gammexane P. 520" monthly, as were ancillaries such as latrines, cookhouses, stores, and so on. D.D.T. residual spraying of their houses was offered to European staff, but, lulled by the absence in the initial period of both mosquitoes and malaria in the camp, most refused the offer.

The second half of 1949 saw a gradual increase in malaria cases, and on investigation in November 39 out

these developed overt malaria. Of the 11 persons with positive blood taking proguanil irregularly, 6 developed overt malaria, and, of 12 persons with positive blood not taking paludrine, 10 developed overt malaria.

Twelve persons gave negative smears on November 10, but 6 of these had had positive smears earlier in the year (Table III).

TABLE III

Negative Bloods	Regular Proguanil		Irregular Proguanil		No Proguanil	
	No.	Overt Malaria, 1949	No.	Overt Malaria, 1949	No.	Overt Malaria, 1949
12	3	2	2	Nil	7	4

Considerable care was taken in checking and cross-checking the stories of regular proguanil-taking. All stories were checked on the evidence of at least one other person, and even those who were known to be proguanil takers, but who admitted to missing one or at the most two doses a week, were put into the irregular class. Of the regular proguanil takers, two were sisters in the camp hospital, one was the doctor, and two were children of the doctor. Another was the health inspector. The symptoms of the disease were mild, whether the persons affected had been taking proguanil regularly, irregularly, or not at all. That is, the symptoms were those commonly occurring in malaria at high altitudes in East Africa.

Attacks or positive blood smears were directly related to the position of the houses occupied, relative to the swamp. The row of European houses next to the swamp, at approximately 500 yards (460 metres), were occupied by 14 persons, and only one of these had a negative blood. The middle row of houses, approximately 700 yards (640 metres) from the swamp, were occupied by seven persons and none were free from the disease. The back row of houses, at approximately 1,100 yards (1,000 metres) from the swamp, were occupied by 31 persons, and six were and had been free from the disease.

Personal precautions had been largely ignored by the inhabitants. The use of nets and of "flitting" was small and most irregular. Residual spraying had been largely refused.

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R. C. MACLEOD, M.B., Ch.B.,
D.P.H., D.T.M.&H.,
Senior Hygiene Officer, O.F.C.

TABLE I

Parasites	No. of Positive Smears	Children	Adults	Remarks
M.T. rings ++ (6 per field)	2	1 (2 yrs.)	1	Adults not infected at Ifunda
M.T. rings + (1 per field)	9	6 (1–5 yrs.)	3	All adults and 2 children of L.R.
M.T. rings, scanty (1 per 6 fields)	9	3 (1–6 yrs.)	6	4 adults of L.R.
M.T. rings, very scanty	19	1 (14 yrs.)	18	10 adults of L.R. Child born in India
Totals ..	39	11	28	

L.R. = Long residence in Tropics, 3 years or more.

of 51 European staff members and their dependants gave blood slides positive for *P. falciparum*. Table I shows the position on November 10.

It will be noted (Table II) that, of the 39 persons with positive blood, 16 took proguanil regularly, and 8 of

TABLE II

Parasites	No. of Positive Smears	Regular Proguanil*		Irregular Proguanil		No Proguanil	
		No.	Overt Malaria†	No.	Overt Malaria†	No.	Overt Malaria†
M.T. rings ++ ..	2	1	—	—	—	1 ad. (L.R.)	1
M.T. rings + ..	9	3 children	3 (2 of L.R.)	1 ad., 1 ch.	Both (ad. of L.R.)	2 ads., 2 ch.	4 (2 ads. of L.R.)
M.T. rings, scanty ..	9	3 children 3 adults	2 ads. (1 of L.R.)	1 ad.	1 ad. of L.R.	2 ads.	2 (1 of L.R.)
M.T. rings, very scanty	19	6 adults‡	3 ads.	8 (7 ads., 1 ch.)	3 ads. (2 of L.R.), 1 ch.	5 ads.	3 (2 of L.R.)
Total ..	39	16	8	11	6	12	10

* Taking proguanil regularly (1 a day). † Refers to attacks in 1949. ‡ 1 regular since October 4.