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A FURTHER LOOK AT SOME INDIAN POPULATIONS OF BRAZIL AND VENEZUELA

(With a special note on malaria)

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PAN AMERICAN HEALTH ORGANIZATION
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A FURTHER LOOK AT SOME INDIAN POPULATIONS OF BRAZIL AND VENEZUELA*

INTRODUCTION

It is with some diffidence that once again I undertake to discuss with you some aspects of the medical problems of an Indian group. However, Dr. Da Silva was rather insistent that a presentation of this type be on the program, and as you all know, he is a rather persuasive man. After some thought, and in view of the particular attention we are devoting to malaria at this session, it seemed worthwhile to present to you some of our recent experiences with malaria among the Yanomama (Waica) Indians of Venezuela and Brazil.

The Yanomama are a relatively large and unacculturated tribe found in Venezuela and Brazil between, approximately, the equator and latitude 5° North and longitudes 63° and 66° (descriptions in Zerries, 1964; Chagnon, 1966). In the approximately 60,000 square miles of their distribution there are perhaps 10,000 of them dispersed in 100 to 125 villages. Although there have been several individuals and expeditions which have traversed portions of this area (Humbolt, 1800; Schonburgk, 1840; Spruce, 1840; Koch-Grünberg, 1911-1912; Rice, 1919-1921), sustained contacts with the group were not initiated until 1950, when Mr. James P. Barker of the New Tribes Mission ascended the Orinoco to establish residence in a village at a place now designated as Platanal. At present the Yanomama have permanent contacts with some 8 mission posts of various denominations and two posts of the Indian Protective Service of Brazil. In Brazil, a few adventurous Yanomama also make contacts with settlers on the Rio Branco and some of its tributaries. However, the great majority of Yanomama villages

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have no direct contacts with the non-Indian world. Their material culture is, by the standards of the ethnologist, quite low. Thus, they do not work metals or practice weaving, other than making a simple hammock of cotton fiber. Both men and women go largely or completely unclothed. They engage in a slash-and-burn type of tropical agriculture, with heavy reliance on plantains, mandioca, and sweet potatoes. They are also hunters and gatherers, supplementing their agricultural produce by shooting monkeys and other game and by such products of the forest as palm fruits, the fruits of various deciduous trees, and wild honey. Their social organization is quite simple, each village being an autonomous unit within which, although there is a nominal chief, authority is well distributed. There is a constantly shifting pattern of overt hostility between villages. (The oral presentation will at this point be extensively supplemented by lantern slides.)

For some years, a group of us have been interested in conducting multidisciplinary studies on such populations as the Yanomama. The overall objectives are to obtain an integrated anthropological, medical, and genetic picture of such people, with the idea of arriving at a better understanding than now exists of the significant biological pressures and population parameters in such people. In pursuit of these objectives, the team attempts to assemble in the field cultural, geneological, and medical data, following which blood, urine, saliva and stool specimens are subjected to a variety of laboratory studies. The group has now made two expeditions to the Yanomama, one in January-February of 1966 and one January-February of 1967. This, incidentally, is the dry season. The studies have involved collaborative

arrangements between the University of Michigan, the Venezuelan Institute of Scientific Investigation, and the University of Rio Grande do Sul. Principal participants have been Dr. Miguel Layrisse, Dr. Tulio Arends, Dr. Charles Brewer, Dr. Francisco Salzano, Dr. Manuel Ayres, Dr. Napoleon Chagnon, Dr. Lowell Weitkamp, Dr. William Oliver, and myself.

THE OCCURRENCE OF MALARIA IN THIS GROUP

I am really rather reluctant to discuss malaria in the presence of so many people more knowledgeable than I am in this respect, but yet feel our fragmentary observations might be of some interest to the group. That malaria is a serious problem in this area is well-known to the Malaria Control Services of both Brazil and Venezuela. The Malaria Service of Venezuela is quite active along the Orinoco, attempting regular visits to all accessible Indian villages. In Brazil, the rivers of this region are virtually impassable to navigation because of rapids, rendering attempts at malaria control exceptionally difficult, and although I understand the Brazilian Government has had a study team in Boa Vista, the capital of the Roraima Territory in which the Brazilian Yanomama are found, the bulk of control efforts among the Yanomama of Brazil thus far rests on missionary groups. The efforts of all concerned to control the disease are hampered not only by the terrain and inaccessibility of so many groups, but also by the tendency of the Indian under treatment to discontinue medication as soon as he feels somewhat improved.

The pertinent observations of our group can be summarized in two tables. Table 1 summarizes the occurrence of splenomegaly in 10 villages. Because of

smallness of numbers, all ages have been combined. Splenic indices range from 0 to 87%. While in the present state of knowledge we would hesitate to attribute all this splenomegaly to malaria, it seems a reasonable working hypothesis that this is the principal cause. Your attention is especially directed towards the degree of splenomegaly in villages R, S, and T. These are located either at or near the New Tribes Mission at Toototobi; I believe you will agree these are rather impressive findings.

Blood films were obtained in six villages; the findings with respect to malaria are given in Table 2. Thin films drawn on coverslips were utilized for diagnosis; each film was examined an average of 15 to 30 minutes by Miss Floretta Reynolds. There are two aspects of these data to which your attention is particularly directed. Firstly, note the high rate of falciparum positive slides in village D. You will recall that in this group, only 37% had palpable spleens, and these tended to be relatively small. This village is in the region of the Orinoco headwaters but normally lives well off any principal river. We received by messenger word that there was a great deal of sickness in the village, and promised medical aid if they could come out to our base camp. In fact, we went into the jungle to meet them. Their appearance of chronic illness was in marked contrast to the usual vitality of the Indian. We were accompanied on this trip into the jungle by a representative of the Venezuelan Malaria Service, who immediately instituted treatment with aralen to 14 of the more ill. Thick films were prepared on these 14 at the time; 13 were subsequently read as positive for malaria. This was followed up the next day with treatment of the entire village. The preparations from the entire village which

contribute to the data of Table 2 were not obtained until 48 hours after treatment was initiated--we presume that if blood films had been drawn at the moment of contact the percent positive might have been even higher, as indicated by the above mentioned results. (A number of slides will be shown.) We wonder, in view of the modest splenomegaly and high attack rate, whether falciparum had only recently reached this village. Consider, on the other hand, villages R, S, and T. Here there is massive splenomegaly but relatively little parasitemia. We are impressed, especially in those three villages, by the degree of eosinophilia and shift to left of the polymorphonuclear neutrophils in the presence of an apparently normal white count. It is by no means clear that malaria is the entire cause of the splenomegaly, but we have no other explanation.

DRUG RESISTANCE

As is apparent to all of you, the distribution of the Yanomama is within that area in South America in which malaria strains with a relative resistance to chemotherapy have been reported to occur. We have in the field encountered a number of persons who maintain they have contracted malaria while on standard suppressive regimes, and we have anecdoted evidence concerning still more. These matters have been documented by expert teams; there is no need to dwell upon the subject. I mention the fact at this time only to emphasize how difficult control measures, both prophylactic and therapeutic, would be in this region, and in the hope of eliciting discussion from some of our consultants concerning best approaches.

Table 1. Splenomegaly among the Yanomama Indians.

Village	Males				Females				Both sexes	
	No. examined	Palpable spleens < 5.0 cm	Palpable spleens ⩾ 5 cm	% palpable spleens	No. examined	Palpable spleens < 5.0 cm	Palpable spleens ⩾ 5 cm	% palpable spleens	No. examined	% palpable spleens
A	37	8	0	21.6	52	9	0	17.3	89	19.1
B	15	4	0	26.3	23	7	1	34.8	38	31.6
C	30	16	1	56.7	32	13	1	43.8	62	50.0
D	41	10	1	26.8	38	16	2	47.4	79	36.7
K	47	1	0	2.1	31	0	1	3.2	78	2.6
M	16	0	0	0.0	12	0	0	0.0	28	0.0
N	17	0	0	0.0	15	0	0	0.0	32	0.0
R	16	3	8	68.8	19	4	14	94.7	35	82.9
S	12	1	10	91.6	12	2	7	75.0	24	83.2
T	20	6	12	90.0	25	5	16	84.0	45	86.7

Table 2. Occurrence of malaria parasites in six Yanomama villages studied during the dry season. Ages and sexes combined because of smallness of numbers.

Village	Number of films examined	Pl. falciparum	Pl. malariae	Pl. vivax	Combinations	Total positive	% positive
B	38		1	1	(V + F)1	3	7.9
D	65	14				14	21.5
H	46	1	1			2	4.4
R	41			2		2	4.9
S	24			2		2	8.3
T	39/253	15	1/3	5	1	1/24	2.6/9.5