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**LEVANTAMENTO: SITUAÇÃO ATUAL DAS  
POPULAÇÕES INDÍGENAS NO BRASIL  
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*Abstract* Primitive groups of people, living in complete isolation, are rarely encountered these days. In fact, the process of 'approximation', or contact, depends upon decisions made on both sides—that representing the civilized world and that representing the group called by us 'primitive'. The isolated group, however, can never perceive the tremendous risks its members will inevitably encounter once the barrier of isolation, by which they are protected, has been broken. Civilized man has the means of persuasion and attraction at his disposal and also knows the risks involved. It must therefore be his responsibility to protect and preserve the group right from the initial contact.

In spite of the medical resources available, primitive man has paid heavily in human lives through contact with the civilized world. This raises two equally important questions: (a) have medical resources been thoroughly applied to protect these groups? And (b) are the existing medical resources sufficient to ensure the survival of primitive man once his state of isolation has been broken? Without any definite answers to these questions, we are limited to describing our experiences with the Kren-Akorore Indians, recently contacted in Central Brazil. We also present data on the biological characteristics of these Indians, collected two years after the first contact.

It had been known for many years that a hostile Indian tribe was living in isolation in the region of the River Peixoto de Azevedo, tributary of the River Teles Pires, in the north of the State of Mato Grosso, near the State of Pará. The first reports had come from the Caiabi Indians in about 1949, when one of their villages had been attacked by that tribe. Later reports came from the Txukarramãe Indians who were contacted by Claudio and Orlando Villas Boas in the region near Von Martius Falls, Xingu River, in 1953. The Txukarramãe told of frequent skirmishes with the Indians of the River Peixoto de Azevedo, identifying them by the name 'Kren-Akorore', meaning 'people with short, shaped hair', the name by which they have since been known.

Indians are accustomed to describing their adversaries as being fierce and

physically superior. This was how the Caiabi and Txukarramãe described the Kren-Akorore. Among the Txukarramãe, the Villas Boas brothers encountered a young adult Kren-Akorore Indian who had been captured as a child. He was notable for his unusual height of 2.03 metres. From this had sprung the belief that the Kren-Akorore were much taller than all the other Indian tribes, and consequently were frequently referred to as 'giants'.

Although there was sufficient evidence that there were Indians living in isolation in the region of the River Peixoto de Azevedo, there were no particular reasons for entering into contact with them. This remained the situation until 1961, when Richard Mason, a young English doctor, was killed by the Kren-Akorore near the Cachimbo air base, in the south of Pará, close to the border with Mato Grosso State (Cowell 1974). Then, some years later, in 1967, when a group of Kren-Akorore suddenly appeared at the Cachimbo air base, this provoked panic among the personnel of the base, who fired shots into the air to disperse the Indians. The crew of an aeroplane which was about to land was alerted and the pilot flew low over the air-strip to scare off the Indians. The Kren-Akorore, alarmed at this reception, sought refuge in the jungle and disappeared.

As a result of this episode, Claudio and Orlando Villas Boas were given the responsibility of undertaking the search for the Kren-Akorore, in order to contact them. These dedicated men, with 30 years of experience with the Indian population of Central Brazil, had had considerable previous success in contacting isolated and hostile tribes. With the cooperation of Indians from varied linguistic groups from the Xingu National Park the Villas Boas brothers organized an expedition. The presence of the Xinguan Indians would be invaluable in the attempt to contact the Kren-Akorore, a tribe of unknown tongue. They would also prove their worth by their adeptness in moving through the jungle, their skill in building canoes and so on.

Past experience with hostile groups had taught the Villas Boas brothers to be cautious. Their expeditionary group was therefore relatively large, about thirty people. They hoped the size of their group would discourage the Kren-Akorore from attacking. A clash between the two groups would have disastrous consequences, not only because of the possibility of injury or death on both sides, but the flight of the aggressors, fearful of repercussions, would make the work of establishing contact even more difficult.

The expedition set off from the Xingu National Park, descended the River Xingu, penetrated its tributary the River Maritsaua, and continued overland through a jungle trail of 90 kilometres until it reached the River Peixoto de Azevedo. A Kren-Akorore village had been located by plane, and the expeditionary group went down the river to its vicinity. During this period, planes

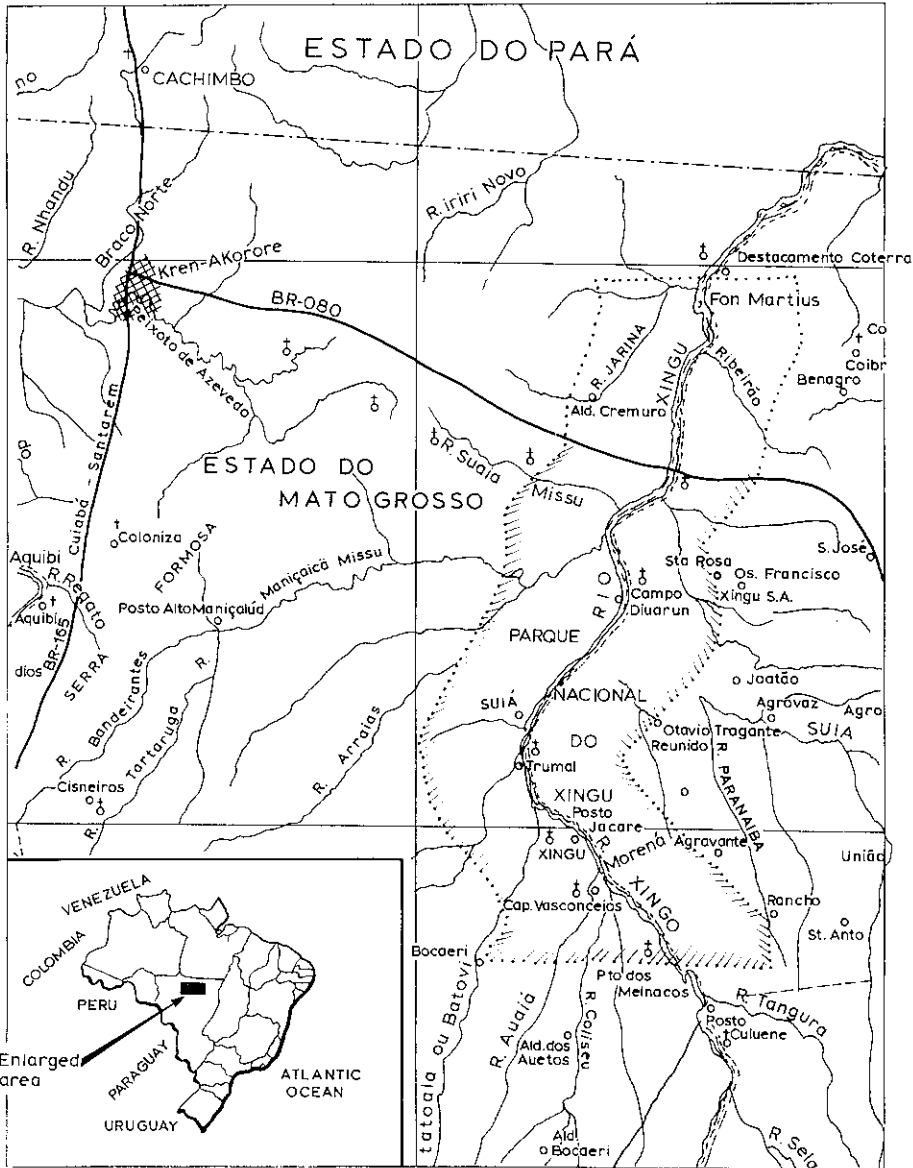


FIG. 1. Map of part of Brazil, showing the former Kren-Akorore territory, the Xingu National Park and the new roads.

dropped presents (such as large knives, hatchets, pans and aluminium bowls, and toys) in various parts of the jungle, to demonstrate to the Indians the conciliatory intentions of the 'invaders' and to attract them to a mutual encounter.

At last, when the Kren-Akorore village was reached, it was found to be deserted. Its inhabitants, faced with the prospect of encountering the intruders, had decided to take flight. They had abandoned their belongings and plantations and sought refuge in the jungle. Claudio Villas Boas and some companions stayed camped nearby for a further five months, even though it was the rainy season. They hoped that the villagers would return, but they waited in vain. The expedition, which began in May 1968, was terminated in January 1969.

Three years later, a new situation arose which would profoundly transform the life of the Kren-Akorore; namely, the preliminary plan of a project for the opening of a highway (BR. 165) to join Santarém in the north and Cuiabá, the capital of Mato Grosso State, in the south, showed that the road would cut through the area inhabited by the Kren-Akorore (Fig. 1).



FIG. 2. The first Kren-Akorore to be contacted, in February 1973.

A new expedition was organized. Another attempt was now imperative to prevent the disastrous effects of the impact of contact with 'frontiersmen'—the construction workers who would soon be penetrating the area. An expedition set off from the Cachimbo base at the beginning of 1972. Claudio Villas Boas and 28 Indians from the Xingu National Park undertook the arduous and precarious task of contacting the Kren-Akorore. After four months of cutting through the dense jungle they reached the River Peixoto de Azevedo and the first signs of the Kren-Akorore were found. A clearing was made in the jungle as an air-strip for small planes. The expedition camped near the river and set up an 'attraction post'.

At this point a setback occurred: a worker from the advance group constructing the BR. 165 was shot by an arrow of a Kren-Akorore and seriously injured. After this incident the Kren-Akorore retreated, stopped collecting the presents and, as was observed by plane, burned and abandoned one of their villages.

A further three months of patient watching and waiting finally brought fruitful results. Small groups of Kren-Akorore began to appear, shouting out, on the bank across the river from the encampment. Claudio, with a few Indians to assist him, crossed the river by canoe to meet the Kren-Akorore. However, the Kren-Akorore gradually backed away and once more disappeared into the jungle. Following these meetings 'at a distance', the Kren-Akorore began to pick up the presents once more.

Finally, on February 8th, 1973, about thirty Kren-Akorore Indians appeared on the opposite bank of the river and, going ahead alone, Claudio Villas Boas was able, after several attempts, to give presents personally into the hands of one man (Fig. 2). With this symbolic act, the rest of the Indians approached. The long-awaited contact was realized, brought about by the exchange of gifts. During the following weeks, new contacts took place as the Kren-Akorore, still rather apprehensive, appeared in small groups. One group visited the camp on the opposite bank and stayed several hours.

Throughout this period a doctor was always on hand and measures were taken to prevent the access of anyone suspected of having a contagious infection. Everyone going to the area was obliged to pass through the Xingu National Park and no one with the slightest symptom of infection was allowed to proceed on his journey.

The village of the Kren-Akorore Indians was made up of seven or eight irregularly placed huts of extremely primitive construction: broken branches, interwoven and covered with banana leaves. The Indians slept on banana leaves placed on the ground and used mounds of earth as pillows. During the night, each Indian slept near a small fire to keep himself warm. The lack of utensils was noted; they had no ceramic pots whatsoever. Water was carried in banana

stalks and sections of bamboo. They used stone hatchets and pieces of sharpened wood to cut through the jungle and dig up edible roots. The most abundant food found was the sweet potato, baked, cut into slices and dried in the sun. Another food found in profusion was the banana, followed by peanuts, maize and manioc, the last two being more rare. Food was sometimes grilled over an open fire, but more often it was wrapped in banana leaves and baked between hot stones. They did not use salt to prepare the food. Near the village circular clearings were found surrounded by banana plants, forming a plantation in which crops were planted in symmetrical designs. For arms, there were bows and arrows, the latter made of bamboo with feathers attached. They had two types of clubs, one thick and heavy with the roots of the sicupira still attached to its end, and the other well-shaped from palm. Sometimes small monkeys and quatis (raccoon-like animals) were seen among the Kren-Akorore. However, no dogs or cats were found. They did not possess any boats and they were poor swimmers, although they showed no fear of entering the water. Their paths, like those made by other tribes, were trails almost always made by hand (by breaking off branches) and defined through constant use.

The Kren-Akorore were nude and some were entirely painted with the blue-black juice of the genipapo fruit. There were symmetrical scars running lengthwise down their trunks to their abdomen and thighs. Their height was comparable to that of other tribes.

After numerous contacts with groups of Kren-Akorore the Villas Boas brothers left the area, which then continued under the routine assistance of the Brazilian Indian Service (Fundação Nacional do Índio, FUNAI) whose members tried to find the best way of avoiding any lack of resources for the area. The relationship between the Kren-Akorore and the members of the expedition continued satisfactorily. The Kren-Akorore invited expedition members to visit one nearby village and later another situated more to the South.

In December 1973 the Santarém-Cuiabá highway was opened to traffic. The Kren-Akorore, attracted by the passing vehicles and by the presents they were being given, established themselves along the edge of the highway.

Personnel of FUNAI, assisted by some Kren-Akorore, constructed a new village in a region further away, beside a northern branch of the River Peixoto de Azevedo. The village consisted of four houses, one for each 'clan' or existing group of the tribe. There was also a 'men's house', situated in the centre, to be occupied by the bachelors, in accordance with tribal customs. Land was cleared near the village and the customary plantation made, to assure the villagers of sufficient supplies of food. However, this effort to re-unite the Kren-Akorore in a new village failed. The attraction created by the new highway was too strong, only ten months had passed since their first meeting with 'civilization', and the

Kren-Akorore were indiscriminately entering into contact with the frontiersmen penetrating into a new area of Central Brazil.

In the following year the situation gradually became more serious. It was evident that if the Kren-Akorore were to survive they had to be moved from that area. The Xingu National Park was chosen. This reserve was inhabited by fifteen Indian tribes, some that had been in the area since remote times (Von den Steinen 1894) and others that had been taken there when their lands had been occupied by 'pioneers' seeking to 'advance civilization'.

In January 1975, with the coordination of the Brazilian Air Force and FUNAI and orientation from Claudio and Orlando Villas Boas, the Kren-Akorore Indians were taken by aeroplane to the Diauarum Post in the Xingu National Park (see Figs. 3, 4 and 5). Seventy-nine Kren-Akorore Indians entered the reserve, three others having been taken to Cuiabá for medical treatment. Two years previously, when first contacted, between 135 and 140 Indians had been counted. However, according to data obtained from Richard H. Heelas (personal communication 1976), the decimation had been considerably greater. During 1968, when the first attempt at contact was made, the Kren-Akorore had abandoned one of their villages and plantations. They later suffered great hardship from the lack of food supplies, and when a flu epidemic attacked them



FIGS. 3-5. The removal of the Kren-Akorore to the Xingu National Park.



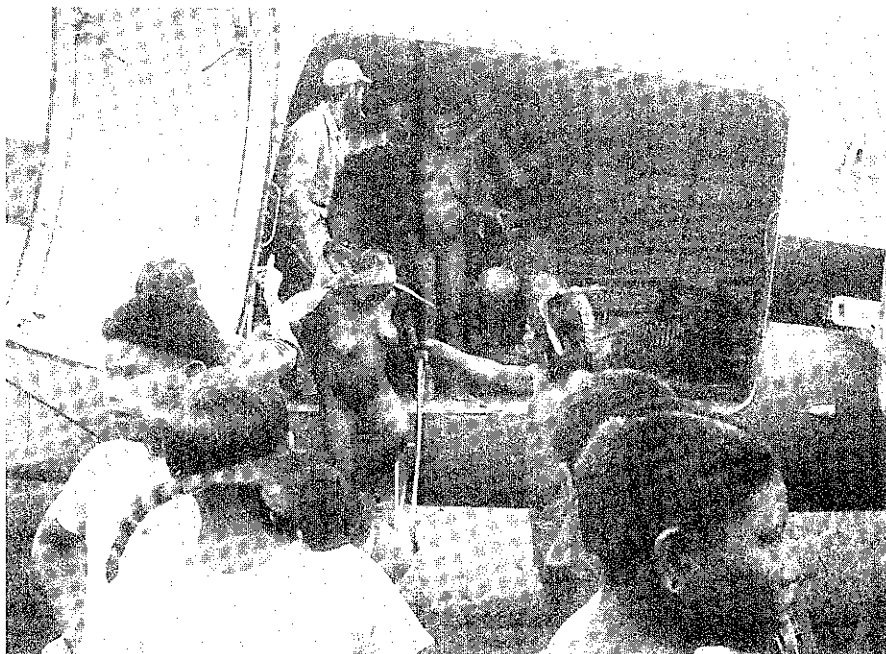


FIG. 4

their resistance was so low that many died. The memory of this tragic episode, plus the scarcity of food and privation that they were again suffering, must have been deciding factors which brought the Kren-Akorore to accept the process of contact used for the second time by the Villas Boas brothers.

On entering the Xingu National Park the Kren-Akorore were examined by a medical team from the São Paulo School of Medicine (Fig. 6). The clinical and laboratory findings will be presented later (p. 189). When a medical record of each Indian was being made, and his lineage established, it was confirmed that many people had died and that there were many orphans. This proved that the Kren-Akorore tribe had suffered great loss of life in coming into contact with the new world.

The Kren-Akorore remained at the Diauarum Post for only a day, during which they were inoculated with BCG intradermally and Sabin polio vaccine orally; they had almost all been previously vaccinated against measles. They were then transferred by boat to the village prepared for them. It was a small-holding, inhabited by a Caiabi family, on the right bank of the River Xingu, about two hours beyond the Diauarum Post.

Two big houses had been specially built to house the Kren-Akorore, who immediately showed difficulties in adapting to their new environment. Fishing was a problem, for canoes had to be used and the Kren-Akorore were inex-



FIG. 5

perienced boatmen. The wide, formidable River Xingu contrasted too sharply with the narrow, clear, rapid streams of their home region and limited the movement of the Kren-Akorore. Hunting in the vicinity of the village was difficult, especially without rifles. When all the crops from the nearby plantation were exhausted, they needed to use canoes to fetch supplies. FUNAI had to intervene, by providing supplementary food. The delicate situation, aggravated by the deterioration in the health of the population and by the passive, resigned attitude of the members of the tribe, brought about the decision that the Kren-Akorore should be moved from this locality, only two and a half months after arrival.

Although the Txukarramãe had been legendary enemies of the Kren-Akorore, time had tempered their feelings. Under the moderating influence of the Villas Boas and with the acquiescence of the Txukarramãe, the Kren-Ako-

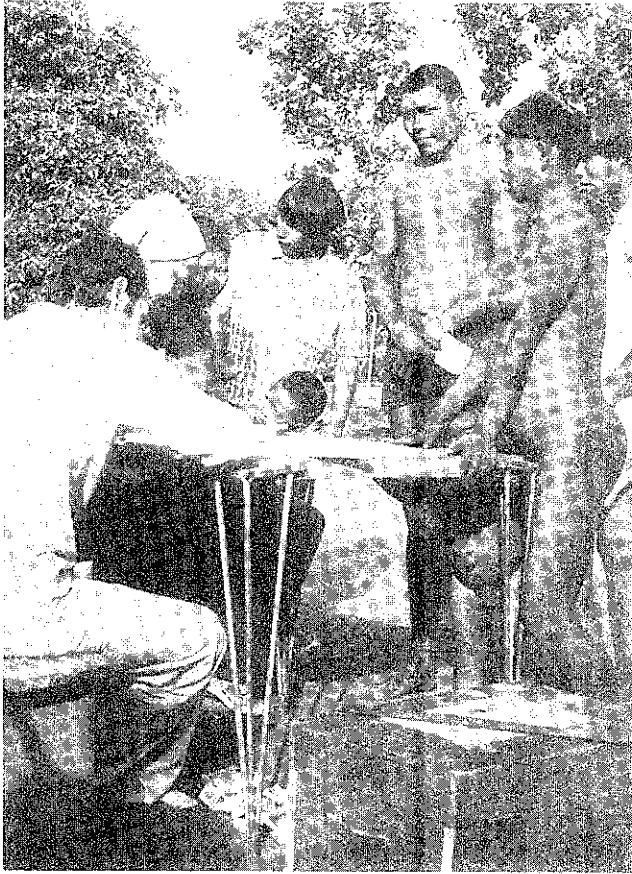


FIG. 6. Medical examination.

re Indians were transferred to the Txukarramãe village of Kretire in March 1975. Kretire is on the left bank of the River Xingu, two hours by boat from the Diauarum Post. But only two small houses had been built for the visitors and as these were insufficient for all the Kren-Akorore, a number of them were distributed among the Txukarramãe.

In this region, rich in food, the Kren-Akorore could have recuperated from the chaotic situation into which recent circumstances had led them. However, as a result of the excessive paternalism which the Txukarramãe expressed in many ways, a state of growing apathy continued to spread among the Kren-Akorore. Because of the dispersal of the group and the discontinuation of its customs, tribal individuality was threatened. Once more FUNAI had to inter-

vene, this time to preserve the group as an autonomous entity. It was decided to transfer the tribe again, eight months after their arrival at Kretire.

The new locality chosen for the Kren-Akorore was near the Suiá tribe, by the River Suiá-Missu, a tributary of the River Xingu, and only one hour by boat from the Diauarum Post. The Suiá were asked to welcome the Kren-Akorore but to avoid a paternalistic attitude towards them and to leave them to look after their own plantations and organize their own fishing and hunting. The Kren-Akorore village now has four houses where the inhabitants are distributed according to 'clan'. Because of the comparative nearness of the Diauarum Post, the Kren-Akorore are able to receive medical attention more regularly.

EVALUATION OF THE KREN-AKORORE INDIANS' STATE OF HEALTH ON ADMISSION TO THE XINGU NATIONAL PARK IN JANUARY 1975

1. *Population data in January 1975*

The data in Table 1 refer to the 79 Indians admitted to the National Park on January 12th, 1975. It was not possible to include three Indians who, as already mentioned, were in Cuiabá for medical treatment.

TABLE 1  
Kren-Akorore Indians, by sex and age group, January 1975

Age (years) <sup>a</sup>	Male	Female	Total No.	%
0- 2	2	2	4	5.1
3-10	12	9	21	26.6
11-20	11	14	25	31.6
21-30	10	9	19	24.0
Over 30	6	4	10	12.7
<b>Total:</b>	<b>41</b>	<b>38</b>	<b>79</b>	<b>100%</b>

<sup>a</sup> Estimated age.

2. *Height and weight of adults*

The heights and weights of 27 adult Kren-Akorore Indians are shown in Tables 2 and 3.

3. *Findings at the physical medical examination*

At the general medical examination of 79 Indians, four appeared to be in a

TABLE 2

Height of Kren-Akorore Indians over 20 years of age according to sex, January 1975

<i>Sex</i>	<i>Mean height (cm)</i>	<i>s.D.</i>	<i>Range</i>
Male ( <i>n</i> = 15)	167.9	5.06	161–180
Female ( <i>n</i> = 12)	156.5	4.73	148–163

*n*, number of individuals; s.D., standard deviation.

TABLE 3

Weight of Kren-Akorore Indians over 20 years of age according to sex, January 1975

<i>Sex</i>	<i>Mean weight (kg)</i>	<i>s.D.</i>	<i>Range</i>
Male ( <i>n</i> = 15)	64.2	8.61	50.0–84.6
Female ( <i>n</i> = 12)	56.7	4.40	50.0–64.0

*n*, number of individuals; s.D., standard deviation.

fairly poor physical condition, one was in bad health and the rest were in satisfactory health. It was observed that 37% of the men, 23% of the women and 6% of the children under 12 years of age had deficient weight (more than 10% in relation to height). Skin examinations showed that almost all had symmetrical, raised scar lesions (made by sharp objects) on their trunks and thighs. Four Indians had hypochromic and irregularly shaped lesions with fine desquamation on their trunks and limbs. Jaundice was observed in one Indian who was in a poor state of health. Pallor of the mucous membranes was noted in 36 Indians, and 17 were found to have axillary temperatures above 37°C.

Lung auscultation showed crepitant and subcrepitant rales in 13 Indians. No abnormal heart sounds were found and blood pressure was not above normal in any individual (Table 4). Hepatomegaly was observed in 11 Indians and all but three of those examined had enlarged spleens; sometimes the splenomegaly was considerable (Table 5 and Fig. 7).

#### 4. Laboratory tests

The results of biochemical analyses of the blood serum of Kren-Akorore Indians are shown in Tables 6 and 7. Blood haemoglobin measurements and mean corpuscular haemoglobin concentrations are shown according to age group in Tables 8 and 9.

TABLE 4

Arterial blood pressure (systolic and diastolic) of Kren-Akorore Indians over 20 years of age according to sex, January 1975

Sex	Systolic (mm Hg)		Diastolic (mm Hg)	
	Mean	S.D.	Mean	S.D.
Male (n = 16)	110.2	8.8	68.3	8.6
Female (n = 13)	97.2	8.2	61.1	6.0

n, number of individuals; s.d., standard deviation.

TABLE 5

Kren-Akorore Indians classified according to age group and splenomegaly index (Hackett's classification), January 1975

Spleen index	Age groups (years)					Total	
	0-2	3-10	11-20	21-30	> 30	No.	%
0-1-2	3	14	14	12	6	49	62.0
3-4-5	1	6	12	7	4	30	38.0

TABLE 6

Serum biochemical tests in 65 Kren-Akorore Indians, January 1975

Serum test	Mean	S.D.	Normal values <sup>a</sup>
Total protein (g/100 ml)	7.8	0.6	6.0-8.0
Albumin (g/100 ml)	3.3	0.3	4.0-5.0
Gamma globulin (g/100 ml)	3.0	0.7	1.2-1.8
Cholesterol (mg/100 ml)	99.5	20.0	150-250
Uric acid (mg/100 ml)	4.5	1.1	4.0-6.0

<sup>a</sup> For standard White populations.

s.d., standard deviation.

TABLE 7

Serum albumin levels in Kren-Akorore Indians, January 1975, according to the criteria of the Interdepartmental Committee on Nutrition for National Development (USA)

Albumin concentration (g/100 ml)	Number of individuals	%
Deficient: < 2.8	4	6.2
Low: 2.8-3.4	42	64.6
Acceptable: ≥ 3.5	19	29.2
Total:	65	100.0



FIG. 7. A Kren-Akorore woman with a greatly enlarged spleen.

TABLE 8

Haemoglobin levels of Kren-Akorore Indians according to age group, July 1975

<i>Haemoglobin concentration (g/100 ml)</i>	<i>Age groups (years)</i>				<i>Total</i>	
	<i>0-2</i>	<i>3-10</i>	<i>11-20</i>	<i>&gt; 20</i>	<i>No.</i>	<i>%</i>
<i>&lt; 8</i>	1	2	2	4	9	14.6
<i>8-10</i>	1	13	14	14	42	63.6
<i>≥ 11</i>	1	—	8	6	15	22.8
<i>Total:</i>	3	15	24	24	66	100.0

TABLE 9

The mean corpuscular haemoglobin concentrations (MCHC) of Kren-Akorore Indians according to age group, July 1975

MCHC (%)	Age groups (years)				Total	
	0-2	3-10	11-20	> 20	No.	%
< 30	—	7	10	6	23	39.6
30-33	1	8	10	9	28	48.3
34-36	—	—	3	4	7	12.1
Total:	1	15	23	19	58	100.0

### 5. Blood groups

The blood groups of 18 Indians were determined. All belonged to group O of the ABO system and all were rhesus (Rh)-positive.

### 6. Serological survey for evidence of infectious organisms

The Indians were tested for the presence of antibodies to a wide variety of viruses, as shown in Table 10. Titres of antibody to the antigen of *Plasmodium vivax* were measured as evidence of malaria (Table 11). Sixty-seven Indians were also tested for evidence of toxoplasmosis, as indicated by positive reactions in the fluorescent antibody test for immunoglobulin G (IgG) (Table 12).

TABLE 10

Serological survey for several virus antibodies in Kren-Akorore Indians, January 1975

Virus	Test <sup>a</sup>	Minimum positive titre	Number tested	Positive (%)
Hepatitis B	HP	—	68	23.5
Poliovirus I	NT	8	42	14.2
Poliovirus II	NT	8	42	0
Poliovirus III	NT	8	42	0
Epstein-Barr virus	FA	5	68	88.2
BK (papovavirus)	HI	10	68	36.7
Adenovirus	CF	8	47	44.6
Rubella	HI	8	68	0
Respiratory syncytial virus	FC	8	49	8.1
A/N.J./76 <sup>b</sup>	HI	10	68	0

<sup>a</sup> HP, passive haemagglutination; NT, neutralization; FA, fluorescent antibody; HI, haemagglutination inhibition; FC, complement fixation.

<sup>b</sup> Influenza A/New Jersey/76 (Fort Dix 1976).



TABLE 11

Fluorescent antibody titres to malaria (*Plasmodium vivax* as antigen) in Kren-Akorore Indians, January 1975

Serum titre	Number of individuals	%
< 1:50	0	0
1:50	1	1.4
1:250	4	5.7
1:500	12	17.1
1:1000	22	31.4
1:2000	12	17.1
> 1:2000	19	27.1
Total:	70	100.0

TABLE 12

Distribution of IgG fluorescent antibodies to *Toxoplasma gondii* in Kren-Akorore Indians, by age group, January 1975 (Leser *et al.* 1977)

Age (years)	Number tested	Titres of reactions (1:) <sup>a</sup>						Positive reactions	
		16-64	256	1000	4000	8000	16 000	No.	%
2-10	15	1	6	—	1	2	1	11	73.3
11-20	24	—	1	3	6	5	7	22	91.7
21-30	18	—	—	1	3	7	7	18	100.0
Over 30	10	—	—	—	5	1	3	9	90.0
Total:	67	1	7	4	15	15	18	60	89.6

<sup>a</sup> Minimum positive titre, 1:16.

The 67 samples of serum were also examined by the haemagglutination technique. The results of the two reactions, fluorescent antibody and haemagglutination, were fairly similar, the titres coinciding in the majority of cases or with a difference of only one or two dilutions, and they indicated a high prevalence of infection by toxoplasma in the Kren-Akorore Indians.

The presence of IgM anti-toxoplasma antibodies was investigated using the immunofluorescence technique. The results were positive in 41 serum samples (61.2%), of which 35 gave high titres, of 1:256 or greater. These results suggested the presence of acute toxoplasmosis in 41 Indians. However, after adsorption of the sera with polymerized gamma globulin, the repeated tests gave negative results in 29 sera and a great reduction in the titres of the remaining 12. The false positive fluorescent reactions for IgM were therefore due to the presence of

antibodies to human gamma globulin (rheumatoid factor) (Camargo *et al.* 1972). The latex test for these antibodies was positive in 61 Indians (91%), with high titres (1:64 to 1:512) in 34 sera.

### 7. Examination of faeces

The examination of the faeces of 35 Indians for protozoa and other parasites was positive for one or more intestinal parasites in 34 cases (97%). The results were as shown in Table 13.

TABLE 13

Incidence of intestinal parasites in faeces of 35 Kren-Akorore Indians, April 1975

<i>Parasite</i>	%
<i>Ancylostomidae</i> (hookworm)	97.1
<i>Trichuris trichiura</i>	75.7
<i>Strongyloides stercoralis</i>	29.8
<i>Ascaris lumbricoides</i>	15.1
<i>Entamoeba coli</i>	24.2
<i>Iodamoeba bütschilii</i>	24.2
<i>Entamoeba histolytica</i>	18.1
<i>Endolimax nana</i>	12.0
<i>Giardia lamblia</i>	9.0
<i>Chilomastix mesnili</i>	9.0
Negative examination	2.9

### Comments on medical findings

Supporting the historical report that the Kren-Akorore suffered from some scarcity of food after the first contact was made, many were under-weight and had pallor of the mucous membranes when they were transferred to the Xingu National Park. Of those examined, 71% had low or deficient levels of serum albumin, and the level of haemoglobin was less than the normal value in 77% of the Indians. The anaemia could have been caused by malnutrition, possibly aggravated by hookworm which was present in 97% of the examinations, and by the occasional chronic haemolysis caused by malaria. Malaria antibodies were detected in 100% of the blood samples. By contrast, anaemia is rare among the Xinguan Indians although they have a high incidence of both ancylostomiasis and malaria infection (da Silva 1966).

The presence of a big spleen was verified in 38% of the 79 Kren-Akorore (Fig. 7, p. 192). This finding, together with the high level of gamma globulin found in the majority, and the presence of plasmodium antibodies in all, suggests the

diagnosis of Tropical Splenomegaly Syndrome (Marsden & Crane 1976). This syndrome has recently been shown to occur in the Indian population of the Xingu National Park (Baruzzi *et al.* 1976).

The serological survey for antibodies against various types of virus in the Kren-Akorore group demonstrated an increased incidence of antibodies for hepatitis B virus, which were found in 23.5% of the serum samples examined. This is much higher than the 2.5% observed by Guimarães (1973) in the Xinguan Indians, and closer to that found in a group of Peruvian Indians (Blumberg *et al.* 1968).

The finding of high titres of antibodies against toxoplasma suggests infection of relatively recent acquisition, or more precisely in the post-acute stage, as was shown by the absence of IgM anti-toxoplasma antibodies and also by the similarity between the titres of immunofluorescent IgG and haemagglutinating antibody (Camargo & Leser 1976). We cannot therefore totally reject the hypothesis that infection by toxoplasma occurred after the isolated state of the Kren-Akorore had ended, two years previously. The 89.5% of positive serological reactions for toxoplasma in the Kren-Akorore Indians was greater than the percentage found in an earlier investigation of the population of the Xingu National Park, which was 51.6% (Baruzzi 1970).

#### FOLLOW-UP REPORT FROM JANUARY 1975 TO JULY 1976

##### *Morbidity*

Outbreaks of influenza in February and November 1975 and July 1976 affected practically all members of the Kren-Akorore tribe. Those affected had nasal catarrh, coughs and high temperatures for some days, sometimes with pulmonary complications. During the first outbreak pneumonia was diagnosed in 17 cases. The same symptoms were observed during the epidemic in July 1976, calling for greater medical vigilance and the administration of antibiotics, in view of the risk of pulmonary involvement.

The Kren-Akorore suffered frequent, severe attacks of malaria during the first weeks in the Xingu National Park. The transmission of malaria is intense in the Xingu region throughout the year, although there are seasonal fluctuations. A diagnosis of malaria must therefore always be considered whenever a high temperature is observed, as the malarial infection at times may superimpose on other clinical conditions, making the patient's state worse. On the other hand, the occurrence of acute malaria in those with the Tropical Splenomegaly Syndrome sometimes results in deterioration of the general state of health, prostration and jaundice, with a slow recovery. For this reason prolonged prophylactic

treatment with antimalarial drugs has recently been started on six Kren-Akorore with considerable hepatosplenomegaly, and an improvement of the clinical picture is expected (Stuiver *et al.* 1971).

#### MORTALITY

Our enquiries into causes of death in indigenous tribes are generally frustrating and fruitless, because of the following facts:

- (a) The absence of medical personnel when death occurs.
- (b) Reluctance on the part of the Indians to discuss facts relating to death, even when asked to give information about the conditions in which the death occurred.
- (c) The tribal habit of attributing death to malaria, as much because of the natural lack of specific knowledge as of the desire to terminate what seems to them to be a disagreeable subject.

Taking these limits into consideration, we have listed the deaths that have occurred since the Kren-Akorore entered the Xingu National Park (Table 14).

TABLE 14

Deaths among the Kren-Akorore since their entry into the Xingu National Park in January 1975, to July 1976

No.	Sex	Age (years)	Time-lapse between entry to the Park and death	Probable cause of death
1.	Male	38	20 days	Pneumonia
2.	Male	23	50 days	Pneumonia
3.	Female	9	60 days	Malaria
4.	Male	22	70 days	Malaria
5.	Male	15 months	75 days	Malaria
6.	Female	30	6 months	Not known
7.	Male	9 months	7 months	Not known
8.	Female	20	7 months	Malaria
9.	Male	22	8 months	Malaria
10.	Male	9	9 months	Accident
11.	Male	19	10 months	Drowning

The first five deaths occurred while the Kren-Akorore were in the Caiabi village, after arriving at the Xingu National Park. The other six deaths took place after this, when they had been transferred to the Txukarramãe village.

*Births*

Two baby girls were born after the tribe entered the National Park, but one died five days after birth. Only one woman has become pregnant since entering the reserve, but she had a miscarriage during the fourth month of pregnancy.

*The situation in July 1976*

In July 1976 the Kren-Akorore tribe was reduced to 64 members, living in their new village near to the Suiá tribe. Their number demonstrates that the tribe has suffered a great population loss, either if it is considered that they numbered between 135 and 140 in February 1973 (shortly after the first contact), or in relation to the total of 82 in January 1975. There are no details on their health, in terms of either morbidity or mortality, for the first period (February 1973 to January 1975). In the second period (January 1975 to July 1976) the Kren-Akorore tribe was reduced not only by death but also by the integration of some of its members with the Caiabi and Txukarramãe tribes. These members were afterwards rejected by the Kren-Akorore.

The general state of health of the Kren-Akorore Indians shows no appreciable difference from that of January 1975. A retrospective analysis verifies that in the space of eighteen months, since their admission to the Xingu National Park, the Kren-Akorore have had three epidemics of influenza, a serious illness for recently contacted groups. They have also had several serious attacks of malaria, suffered food scarcity for some months, and encountered difficulties in adapting to a new environment. In view of these repeated setbacks, the Kren-Akorore have presumably not had sufficient time to recover their health.

## FINAL CONSIDERATIONS

It was expected that the Kren-Akorore, like other indigenous groups, would be considerably reduced in the course of encountering and making contact with non-Indian people. Owing to the drastic and unforeseen circumstances, this process of contact, once started, became uncontrollable, and led to the removal of the tribe to another region two years after the first contact. The Kren-Akorore group that entered the National Park had been decimated beyond the most pessimistic calculations. They were profoundly socially disorganized and there was not the necessary cohesion among them to resist the hostile forces of the new environment. A growing apathy affected their already weakened state of health.

In spite of this, there are now reasons to believe that the Kren-Akorore can

enter into a medical and social 'convalescence' in the near future. This optimism is justified by their having their own village organized along the lines of the social structure of the tribe; by the facilities for agriculture, fishing and hunting; and by a return to their own cultural habits, now that they have the prospect of being established in a definite region. These conditions may reawaken the will to fight and live, indispensable for health. Regular medical assistance, now developed, will also allow better surveillance of the health of the population, which should minimize the risk of further deaths if epidemics threaten again.

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## Discussion

*Hamilton:* With five deaths out of 11 due to malaria, the significance of this disease is obvious. Further, the distribution of Hackett gradings of spleen size which you demonstrated, with the very high proportion with persistent large grade-four spleens (below the umbilicus), is reminiscent of the distribution in the Watusi tribe of New Guinea. This distribution was associated with the syndrome known as Tropical Splenomegaly Syndrome, to which you referred. Its aetiology is not fully understood but exactly similar conditions have been found in many parts of the world, always associated with malaria. However, it is not due to one particular species of malaria parasite nor just to malaria *per se*, but to some other factor (Marsden & Hamilton 1969). Have you any comments on a possible change in the environmental or malaria pattern in these people, as a result of the move?

*Baruzzi:* The Kren-Akorore reported that they had malaria in the past but not very seriously compared to what has happened since they have been in the Xingu Park. I don't know if this was caused by another strain of *Plasmodium*. Certainly the presence of big spleens without any other aetiological factor being recognizable suggests that they had been exposed to malaria infection for a long time—that is, this disease was common among them in their original environment.

*Hugh-Jones:* Did the Kren-Akorore not receive antimalarial drugs?

*Baruzzi:* Yes, they did. They received antimalarial drugs when they suffered from malaria attacks. It was more difficult to provide prolonged prophylactic treatment against malaria. We had the opportunity to use depot injections of antimalarial drugs in the past, and we are not very enthusiastic about the results.

*Hugh-Jones:* The malaria in the Xingu seems remarkably vicious! I was on the Royal Geographical Society expedition and I was careful to see that everyone in the expedition took antimalarials, and I am certain they did, and yet two years later I got malaria. The load of parasites must have been enormous.

*Lozoff:* Were individuals with enlarged spleens symptomatic?

*Baruzzi:* When we examined the Kren-Akorore we found a high percentage of big spleens and most of them were asymptomatic. We had an autopsy on a

man with a big spleen and the hepatic histological picture was described as Tropical Splenomegaly Syndrome.

*Neel:* Were these hard or soft spleens? Is this the picture of chronic splenic enlargement, or a recent development?

*Baruzzi:* The consistency of the big spleens was increased and the picture suggested chronic splenic enlargement.

*Ohlman:* What do you feel is the outlook now for the tribe, Dr Baruzzi? Will they decline, or are they going to survive?

*Baruzzi:* I believe that the Kren-Akorore are now for the first time beginning to achieve a state of better adaptation to their new environment. During the two years after the first contact the population was in decline because of deaths, but now this tendency has been arrested.

*Ohlman:* Was there any relationship between age group and morbidity and mortality? Or were these statistics distributed at random throughout the different ages?

*Baruzzi:* Death occurred at all ages but it was more frequent among the youngest and the oldest. When we did the medical examinations we tried to identify each family and it was possible to recognize frequent gaps in most of them.

*Lightman:* The abandonment of their homes and possessions by the Kren-Akorore at their first experience of contact emphasizes the extreme state of terror the situation must have held for them. I have no doubt that this terror and its resulting social disruption was a major factor in initiating the cascade of problems described by Dr Baruzzi.

Another very interesting situation is well demonstrated by the temporary sojourn of the Kren-Akorore with the Txukarramãe tribe. The rapid appearance of apathy and dependence if the shock of contact is followed by help and 'welfare' is a situation from which we can learn much. Unless the newly contacted group can continue to perform much of its own basic work-load, in terms of food supplies and other basic needs, it will lose much of its 'reason for existence'. The cycle of apathy, cultural dissolution and finally physical destruction will have gained momentum.

*Baruzzi:* It is interesting that the first attempt at contact was made by the Kren-Akorore, in 1967 when they appeared near the Cachimbo air base. Their sudden appearance provoked panic and they were repelled by the personnel of the base, as I described. When the 1968-1969 expedition reached a Kren-Akorore village, it had been burnt down and abandoned by its inhabitants, which suggests that the decision to avoid the contact was taken at the last moment, since the Kren-Akorore left bundles of food and utensils behind them. Their reaction to the second expedition some years later was at times contra-



dictory: sometimes they showed themselves hostile, destroying the gifts left for them in the jungle; at other times they left friendly signs, which encouraged the expedition to continue.

Once contact was established it was necessary to decide whether the Kren-Akorore should be moved to another area or not, taking into account the risks involved in the opening of the new road through the Indian territory. This decision was taken two years later when it became evident that the only chance of survival for the Kren-Akorore was to move them to another area, and the Xingu National Park was chosen. One can ask now whether this should not have been done sooner, but one must remember that it was a difficult decision to make since the Kren-Akorore have lived in that area since ancient times.

The Kren-Akorore experience showed also that once a process of approach and contact is started, it becomes difficult to keep it under control.

*Black:* There are now three members of the Kren-Akorore living with the Mekranoti. In 1969 there was a raid and five Kren-Akorore children were brought in. I have no idea how many adults were killed. I think this is part of the reason for the decline in the Kren-Akorore population between 1969 and 1972 and the context in which they developed their great fear of outsiders.

*Baruzzi:* In fact the Txukarramaë, in 1966, attacked a Kren-Akorore village and killed many of them.

*Gajdusek:* I want, as a devil's advocate, to suggest two other approaches which might have been used in trying to help the Kren-Akorore to survive. The first might have been to have left them where they elected to be, right on the road, and instead of leaving the roadside exclusively to the exploitation of new immigrants, to have built a small hospital and school and an Indian protection service station, right in their own ancestral territory, with assistance and encouragement and, above all, legal protection to assure them freedom to build houses along the road and to work for government or private immigrants along the road, with extreme surveillance over their just reward. They would need legislation assuring that they would keep their own territory and giving them legal title to much of the land along the road in trust for a generation or two later when their offspring would come to understand the title and be able themselves to defend it. This would assure rapid acculturation (or retreat of those who did not want it into the remoter parts of their territory) with assistance from the government towards their integration into Brazilian society as quickly as they could.

The second approach is yet more daring. All 300 Kren-Akorore could easily have been taken to a modern centre of acculturation and education, with expert medical care, on the outskirts or even in the centre of one of Brazil's modern cities. The 'shock' and trauma would have been great—but perhaps less than

the atrocities along the road and the disrupted culture and death toll at the reservation in the Mato Grosso. Surely there would have been far less loss of life and the young could easily have become, especially with extreme and 'un-earned' indulgence, acculturated Brazilians, better able to defend the rights and heritage of their people than those now on the reservation.

*Baruzzi:* The Kren-Akorore history is very much like that experienced in the past by other native groups in many parts of the world. The process of development taking place now in the Amazonian jungle, leading to the opening of new roads, came upon uncontacted Indians tribes who lived in a state of complete isolation, just as in the Stone Age. Though it is difficult to know whether there are other Indians groups still isolated in the Amazonian jungle, it is important to understand the Kren-Akorore experience so that we can minimize the consequences of the process of approach and contact with any other remaining groups.

*Cohen:* There has been much interest in this particular group, but there are also many groups in different parts of the world with very much larger populations who are caught in similar situations. I will comment on a few groups which I know about in different situations and under governments with very different political thinking. Two groups who are liable to be affected, or are already being affected, in the Horn of Africa include firstly a group of 70–80 000 Afar nomads, living in the Danakil desert and Awash valley of Ethiopia. They have not been much studied by anthropologists. They are now being exposed to pressures like the Kren-Akorore in the interest of a road that would pass through their territory. Already their nomadic grazing grounds have been divided by a road up to an oil refinery in the north of Ethiopia and there are plans for another road to be built in the near future. This, coupled with extensive settlement of their area, means that there will soon be a major problem for this considerable group.

A second nomadic group, the Kereyou nomads living in the lower Awash valley of Ethiopia, have already been almost totally displaced from their lands for another related but different reason, namely tourism. Western tourists bringing capital into the country have been encouraged to use a natural park reserve which was these people's grazing ground.

These developments have been taking place in a paramilitary regime; one can point outside Ethiopia for an example from another type of regime, namely the moving of several ethnic groups in Mozambique under the influence of a Marxist–Leninist government, but probably with the same sort of effect on the people. A lot of nomadic groups in the north of Mozambique are being moved, or soon will be, into large village areas. I think this is likely to disrupt their life and to lead to the sort of changes that we have seen with the Kren-Akorore, but we may not be able to document them.

*Baruzzi:* One of the most impressive reports of the decimation of the Indians

in Brazil was at the beginning of this century, at the border with Colombia, when the Indians were engaged in collecting rubber, working in very bad conditions and being cruelly punished when they didn't reach the level of production imposed by the commercial companies.

*Woodburn:* I want to stress the unusual nature of the Kren-Akorore instance. I don't think that the degree of disruption and mortality in the Kren-Akorore can be easily matched outside South America in recent times. It is important to recognize that previously uncontacted groups have been contacted in Australia, New Guinea and elsewhere during the past two generations without nearly so many deaths or so much disruption. We are not now in the nineteenth century: such destruction is not inevitable.

*Baruzzi:* In the past, numerous human primitive groups have almost disappeared completely after having been in contact with white people who invaded their territories. Nevertheless, during the last few decades such situations have not been reported in many areas simply because the remaining groups became very rare and had moved to distant and inhospitable areas. Of course, this has not been noted only in South America.

In the specific case of the Kren-Akorore we must remember that measures for their adequate protection were taken during the process of approach and contact. The task of approach was given to very experienced people, the access to the Kren-Akorore territory was under control, and once contact was established a new village was built far from the site where the new road would pass. There was no lack of material and human resources for the process of attraction and contact, at least in the early stages. However, when the road was opened to traffic the situation briefly became chaotic and in the following months the Kren-Akorore suffered considerable human losses. It would be very useful if we could establish what to do if another situation like this arose in the future.

*Weiner:* Is Dr Woodburn talking about episodes where people have been moved to new land, albeit left to fend for themselves, as something that hasn't happened to any extent anywhere else than in South America, or about people being dispossessed and losing their land? When simple communities lose their land, which has frequently happened, demoralization and destitution are almost inevitable.

*Woodburn:* But immediate loss of lands is *not* now the usual situation in the world. It is a peculiar situation that occurs in some instances in South America. Groups contacted in New Guinea, or in Australia in recent times, have apparently not in general lost all their lands. The fundamental question is why, in a country like Brazil, in which the population of Amerindians is now small and where there is, in the Amazon basin, plenty of land for them and for development, the roads couldn't have been built in different places and the Indians

left in possession of their own land and with some chance of determining their own future.

*Baruzzi:* It is very difficult to answer this question. The road was planned to connect Santarém town, in the north, to Cuiabá, the capital of the state of Mato Grosso, in the south, and it runs between two big tributaries of the Amazon river. It is impossible to say whether the road could have been built further from the Kren-Akorore territory.

*Hugh-Jones:* In fact, the road could have gone north of the Falls of Von Martius, where it was originally intended to go. The reason it was built further south was a political one, which weakened the autonomy of the Xingu National Park.

*Cohen:* Clearly these are political questions. If we are talking about the resettlement of tribal groups we have to mention the situation in the Republic of South Africa, where there has been imposed the most massive resettlement of ethnic groups. In fact, resettlement of whole populations organized on such a scale has never been done before except in the USSR. South Africa overall has remarkably well-developed and prestigious health services, but of course these are hardly made available on any effective scale to the poor black populations that need them most. These people are in effect landless and their situation on a day-to-day basis must appear hopeless. The contrasts between the intensity of health care available to the Whites and the meagre resources put aside for the far larger black population is reflected in such basic statistics as appalling differences in mortality and morbidity from infectious diseases and infant mortality (Mahler 1975).

On an optimistic note, a successful move of nomads has been made in Somalia, where several tens of thousands of Issa pastoralists were taken by plane and fleets of trucks to live, as I hear fairly successfully, in fishing communities on the coast. So it can be done if the circumstances are favourable.

*Haraldson:* Some countries, including Iran, Somalia, and the Sudan, have accepted nomads and don't simply speak about 'sedentarization'—the settlement of nomads as farmers or ranchers. Sedentarization can be achieved in a number of ways, in theory at least: (1) voluntary, spontaneous settlement, mostly by marginal groups of nomads; (2) encouraged sedentarization, with advantages promised in connection with settlement, difficulties and obstacles created in feeding grounds, and so on; and (3) forced settlement.

There are a number of consequences of the sedentarization of nomads, many of them harmful. They can be summarized as follows. The nomad is leaving his tribal homeland for a new livelihood and economy. He often experiences social disruption, degrading through the creation of a lower class; disruption of tribal ties; and loss of cultural self-confidence. There is a loss of 'independence'. His

diet is changed, from milk and meat to less protein-rich foods, with hungry seasons. A new pattern of diseases emerges, including degenerative disease and reduced resistance to infections and hardships. New harmful factors include the sedentary life, smoking, alcohol, and a cariogenic diet. Empty areas of land develop.

In some cases nomads have, after years of sedentary life, returned to nomadism, after experiencing new diseases and social discomfort.

*Ohlman:* There have been many such large movements of people. Dr Woodburn said there is no necessary loss of territory, but I think there is *always* some loss of territory; in other words, the group doing the moving takes territory away from the group subject to its whim. If you look at what has happened to the American Indians in the United States, some successfully 'adapted' like the Navajos, even increased in population, perhaps, but some have been wiped out completely, and those that survive are usually left with the least desirable lands.

*Woodburn:* Of course, I am not claiming that tribal groups in Africa and elsewhere have not in recent times been dispossessed of their land or part of it: they have been, very widely, and often with very damaging consequences. Rarely, however, has it been done as casually and as devastatingly as it has in areas occupied by Forest Indians in South America. What really is distinctive about the recent situation of Forest Indians is the loss of land on first contact, the scale of loss of land generally and, above all, the scale of avoidable death, disease and destruction probably unmatched elsewhere in recent times outside war zones.

*Lightman:* In addition to the problem of increased mortality, one of the major medico-social effects of contact is often a marked diminution in fertility. Dr Baruzzi has pointed out that there have only been two pregnancies during the post-contact years with the Kren-Akorore. It is interesting that in this same area in Brazil the Txicão did not have a single birth during the four years after contact.

*Hugh-Jones:* There is something extremely interesting about this. When Orlando Villas Boas was rebuilding the village of the Txicão they openly stated that they weren't going to have any more children, and nobody knows how this was done!

I am sure Dr Baruzzi would agree that now that the Kren-Akorore are near the Suiá, they are much more on home ground, in the sense that they are near a group who are linguistically similar. They are among culturally similar Indians, have large lands around them, and so in those terms they are not badly off now.

*Baruzzi:* For the Txicão it was a tribal decision not to have babies until they were well adapted to the Xingu National Park and had organized their own village and plantations. For the Kren-Akorore, I agree with Dr Hugh-Jones that

in recent months since they have been living near the Suiá there has been some improvement in their general conditions.

*Morin:* Dr Baruzzi's paper clearly illustrates the ethnocide of American Indian populations, long recorded by many anthropologists (Jaulin 1972; Collectif De l'Ethnocide 1972) and by institutions such as Survival International, the International Work Group for Indigenous Affairs, and the Minority Rights Group.

In the name of economic development, modernization and progress, Brazilian policy for the development of Amazonia has resulted, since 1970, in major road construction projects. According to the estimates of FUNAI (the National Indian Foundation), these affect the territory of some 30 Indian societies which have until now escaped the 'ravages of civilization'. The Kren-Akorore are part of this population. At the Manaus-Brasília/Santarém-Cuiabá cross-roads, they are, like many other groups, an obstacle to the colonization of this Amazonian area. Consequently they have to be integrated into Brazilian society. In the name of 'national security' and 'regional development in the national interest' (Article 36 of the Indian Statute) the deportation of a group becomes legal. It can therefore be assumed that the removal of the Kren-Akorore was not only for the medical reasons mentioned by Dr Baruzzi, but as part of this political integration.

As a result of this deportation—and in spite of thorough medical care—some ten Kren-Akorore died and the rest of the group is 'apathetic' and not adapted to their new environment in a village of the Xingu Park. As a social anthropologist I am not surprised by the reactions of the Kren-Akorore, for if, according to Dr Baruzzi, the displacement has allowed 64 members of the group to survive, he will also have witnessed the destructuring of their way of life and thought—in other words, the ethnocide of the Kren-Akorore. Two main factors are involved:

(1) Their relation to space, to the land and to the habitat. If these forest societies do not normally have a sense of land ownership similar to that of peasant groups in our societies, who think in terms of 'their land', they do have an image of the world, of space and of their own existence as a function of the environment in which they live. For the Tatuyo (Tucano Indians, Pirana; Bidou 1972), for example, the river is the centre of the universe, the point of communication between people, the place of culture, as opposed to the forest which is the wilderness and the world of the animals. Inside the Tatuyo tribe's territory, clans and lineages occupy specific areas according to a segmented and hierarchical structure; that is to say, high-ranking groups live on the main river and the tributaries are reserved for the lower ranks.

If the Amazonian forest is seen as uniform and wild (virgin forest) in western

eyes, for the Indian it is highly differentiated, socially structured and symbolic in other cultural terms.

If we take the habitat as the yardstick, for the Bari (Motilones Indians, Venezuela-Colombia; Jaulin 1966, 1969; Pinton 1972) it is the main point of reference. Like many other Amazonian groups, the Bari live in large communal houses, shaped like the bottom of a ship turned upside down. Each house contains ten to thirty family units, arranged on the alliance principle, so that the neighbours of each family unit are people with whom it is possible for a member of that unit to intermarry. Within the living space of each unit the family's hammocks are suspended in a vertical pattern, ground level being for the women, the next level for their husbands and children, with the bachelors at the top. This is also in order to keep the latter as distant from the earth as possible, on the fertility principle. Within the communal house the Bari develop and define a whole system of social relations and it is from and around this system that the land for agriculture is patterned (every family exploits the piece of land which forms an extension of its residential area) and guides the individuals (the man goes hunting in the direction which is linked to his habitat). The house is thus the key point of the social structure and for the Bari the guiding principle of the world.

In view of these two examples, which illustrate the social and symbolic importance of the land and the habitat, it is easy to understand why the Kren-Akorore, moved to a village in Xingu Park—that is to say, to an environment and a habitat with which they can no longer identify—shows signs of psychopathological behaviour, including apathy and death.

(2) The second factor and a corollary to the first is one on which I will not elaborate, as it has been extensively studied by anthropologists during the last 20 years. I refer to the importance of the 'We' to the 'I'. The individual in this type of society exists above all as an integral part of the group. From early childhood he is socialized to the rules of the residence, kinship, and alliance, which the group has created for itself and which correspond to certain attitudes, taboos, and so on. The principles of identity are thus based on lineage, clan and filiation. The Kren-Akorore do not differ in this respect. What form of social organization did they have before they had contact with the outside world? Has the deportation affected men and women differently, or elders differently from the younger? Since more than half of the group died, the 64 survivors are not only obliged to face up to the shock of their displacement but also to the destruction and disintegration of their social forms. In the face of this ethnocide will they be able to reorganize themselves, and in accordance with which rules? These are the questions I asked as I studied the psychosocial effects of three centuries of ethnocide among the Shipibo of the Ucayali (Pano Indians, Peruvian Amazon; Morin 1972, 1973). (See also pp. 314–316.)

To sum up, it seems to me that the psychopathological disturbances of the Kren-Akorore illustrate that it is not sufficient to save the Indians from physical death, to vaccinate them and to regroup them in a national park. Their reactions indicate the price of the assimilation policy practised by a number of states, which necessarily leads to the ethnocide of these living cultures. In order to become a Brazilian citizen, the Kren-Akorore must cease being an Indian and give up his ethnic identity.

*Baruzzi:* Other tribes in the past, like the Kren-Akorore, suffered very much after making the first contact with white people. Usually, these tribes underwent a great population decrease in the months after the first contact. It took some time for them to reach a new state of relative equilibrium and only some years later was there slow population growth. We hope that the Kren-Akorore, in spite of the great population decrease they have suffered, will follow the same course.

An anthropologist, accompanied by his wife, has been living with the Kren-Akorore since December 1974; that is, a month before the transfer of this tribe to the Xingu National Park. From this anthropologist's report and our own observations we can add that the Kren-Akorore had periods of great apathy, with deterioration of their already poor state of health. Now they are living near the Suiá, a tribe with a culture similar to theirs, they show signs of better adaptation. Nevertheless, it is difficult to predict whether eventually they will be as well-adapted to their new environment as they were to their original one.

I do not know if men and women reacted differently to the effects of the transfer to the Xingu National Park.

*Neel:* There is something strange about the response of the Amerindian to first contact: after the early Conquistadors' contact, the Indian populations often died out quickly, and yet imported black populations did as well as a population can do under these conditions. There is some kind of cultural interaction here that we don't understand. The issue is extremely complex.

*Hugh-Jones:* As you say, it is too complex for us to compare conditions in New Guinea, say, with South America. I would also agree very much that we should study the psychological effects on this particular group.

*Baruzzi:* As a final conclusion, perhaps we can accept that the best course for an isolated people, previously uncontacted, is to let them remain in their state of isolation. Up to now, we have not been able to give them the necessary protection, even in medical terms.

*Haraldson:* I would like to follow up Dr Cohen's earlier comments (p. 203) on nomadic people with some points on their health and on what we can offer them medically. The majority of tribal people in the world today are nomadic (by which I mean people depending on migration for their livelihood and with no



fixed dwellings; semi-nomadic people make use of fixed houses to some extent). There are about 50 million nomads in the world, which makes them the world's largest minority! We usually count only the pastoral nomads as nomads. They are all part of a scattered population, and this scattering and low population density makes it necessary to think carefully when designing health services for them.

It has to be remembered that nomadism is always an ecological consequence; people are living in dry areas where there is no alternative to nomadism. It is actually the animals who are nomads, and their owners must follow them. Under the hard conditions with little rainfall, people cannot settle and farm. In some cases nomads have not deliberately chosen the area where they live, but intertribal fighting may have forced them to occupy inhospitable regions, where they have adapted to a unique ecology and developed nomadic cultures. Many marginal groups of nomads are now leaving their migratory life and have settled down, mostly as farmers or rangers.

One question asked about nomads is whether there are special nomad's diseases, and we have found that there are not. Nomads as a whole are healthier than the settled people around them, mostly because of better nutrition, with milk and meat available. If they get trachoma it is milder than that of the settled people, as seen in Kenya. Nomads have made themselves largely independent of the outside world and have their own doctors, medicine men, healers and herbalists; they are not always eager to have health services from us. Incidentally, there is no place in the world where people do not have some kind of health system of their own, just as there seems to be no place where there is no religion.

Many governments provide the most isolated pastoral areas with simple health stations. They are primitive, and may not always do good although they may be of psychological importance. They have antibiotics but the dresser often misuses them. Furthermore, there is no communication and there are no transport facilities.

There are other less primitive ways of giving health services to mobile people. The most important point in doing this is to have someone trained who has double loyalty—to his or her own tribe, which selected him or her for training, and also loyal to the people who trained him and who assist him continuously in his work and back him up morally. This double loyalty solves half the problem, as has been seen in Alaska and in New Guinea. In Iran, a woman is selected for short midwife training. In Alaska, one Eskimo girl is selected for training from each village. Back in her village she is connected by radio telephone with a doctor, so she is the prolonged arm of the health service. She is also visited regularly by the district nurse and by the doctor. Communication of this kind

is a relatively expensive tool for health services. Air transport is even more expensive: health services cost 2000 times more per head for Alaskan and Canadian Eskimos than for the Ethiopian nomads. But infant mortality has been reduced from 100 to 20 per 1000 newborn among Alaskan Eskimos in 25 years, the same level as in the entire USA as an average. But one must ask whether there are places in the world where we suggest that people do not live, because the last link in dispersed health services, the air transport, sometimes costs more than half the total health budget.

As I mentioned earlier, the pattern of diseases changes with a more modern or westernized life. On the positive side, diseases like tuberculosis can be controlled, as in the Lapps and Eskimos; it is mainly a question of enough money being spent. Accidents take over to some extent in the disease and mortality pattern and also the chronic and degenerative diseases. Social diseases such as alcoholism and suicide are today increasing in isolated, tribal populations as symptoms of acculturation. Research wrongly and traditionally concentrates on physical factors such as height, and on genetics, but psychosocial problems and community planning are becoming increasingly urgent in these groups. (See Haraldson 1975.)

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