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A Change in Sex-
Ratio

HENRY PITTIER

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A CHANGE IN SEX-RATIO

Overwhelming Preponderance of Male Births Among Certain Tribes of Costa Rican Indians—Females in Great Majority Among Adults—Tribes Rapidly Disappearing

HENRY PITTIER

Bureau of Plant Industry, Washington, D. C.

IN 1903 I published in the *Berlin Zeitschrift für Ethnologie* a short note on the Tirub, or on what is left of that once powerful tribe, dominating the plains and mountains bordering on the present boundary line of Costa Rica and Panama. The abode of these remnants is now restricted to the upper reaches of the Tararia or Changuinola River, included in the territory of the latter republic.

In the above mentioned contribution, there were given some statistical data showing the rapid decrease of the Tirub and the unusual numerical disproportion of the sexes, the great majority of children being males.

I visited these natives in 1898 and the statistical information reproduced about five years later from my diary was given as a résumé of the complete census made during my expedition, the originals of which had been mislaid.

Not very long ago, these detailed sheets of my census were found. They cover not only the whole Tirub tribe, but also the larger part of the Bribrí of the Costa Rican Talamanca. In view of the numerous researches and publications referring to sex determination and control, these data appear so interesting that I now undertake to prepare them for publication. I do this also in justice to the readers of my former article and because such information may throw some light on the process of disintegration of a race.

The above cited paper dealt with a

portion only of the Tirub, and showed a proportion of thirty-six females to 100 boys among the children. It further stated that since the first known census, in 1700, when the tribe numbered about 2,300, there has been among them a steady and rapid decrease in the natality until in 1898, there were left fifty-seven individuals, among whom were fourteen boys and five girls under marriageable age. The real figures at that time as shown below should have been given as eighty-nine individuals with thirty-one boys and eleven girls, and a slight predominance of the males among the adults. Among the children, however, the given sex ratio remains the same with the new totals.

It was shown further that the same process of rapid extinction, indicated not only by a lesser natality but also by a great exaggeration of the sex ratio, existed in another Costa Rican tribe, the Guatusos, living at the headwaters of the Rio Frio. In 1896, Bishop Thiel found it to consist of only 203 individuals, seventy of whom were females, the ratio being fifty-two of these to each 100 males.

In the same expedition during which the Tirub information was gathered, I made also, as stated above, an extensive survey of the inhabitants of the valleys and mountains of Urcú in the Costa Rican Talamanca. These people belong to the Bribrí tribe, another part of which inhabits the district of Ararí, which I did not visit at the time. There

¹ Similar disproportionate sex-ratios are said to have been found among the Indians of Guatemala and Nicaragua, and parts of South America, but in no case has the state of affairs been described by such an accurate census as Mr. Pittier was able to make. R. Westernmark cites the travelers' accounts in his "History of Human Marriage," Chapter XXI. Among other primitive peoples, it would appear that the proportion of girls born is sometimes equally excessive. In civilized countries there appears an extraordinarily steady ratio of something like 105 boys to 100 girls born.—The Editor.

is also a small settlement of the same Indians in the Cabagra Valley, on the southern watershed of the cordillera.

The results of both the Tirub and Bribri censuses are now given in full, as follows:

I. Census of the Tirub Tribe.

Name of locality.	Adults.		Children.		Totals.		Grand totals.
	Males.	Females.	Males.	Females.	Males.	Females.	
Brusik 1st house.....	1	1	3	0	4	1	5
Brusik 2d house.....	1	1	2	0	3	1	4
Brusik 3d house.....	1	3	2	0	3	3	6
Urustin.....	2	4	5	0	7	4	11
Iabola.....	1	3	3	0	4	3	7
Surtsik.....	5	5	5	0	10	5	15
Ararbo.....	3	5	3	3	6	8	14
Peksó.....	1	2	3	2	4	4	8
Unia.....	1	4	2	3	3	7	10
Ternisik (Songsó).....	2	1	3	3	5	4	9
Houses 10.....	18	29	31	11	49	40	89

II. Census of Part of the Bribri Tribe.

(a) Bribri Mountains, Talamanca.

Name of locality.	Adults.		Children.		Totals.		Grand totals.
	Males.	Females.	Males.	Females.	Males.	Females.	
Stutuk.....	5	5	6	3	11	8	19
Sinitz.....	2	2	2	0	4	2	6
Ukabeta.....	2	2	0	2	2	4	6
Dutsabeta.....	3	3	3	2	6	5	11
Akutz.....	4	3	4	3	8	6	14
Beribeta.....	3	7	1	1	4	8	12
Depuk.....	3	4	2	2	5	6	11
Durinu.....	2	2	2	1	4	3	7
Bóbrí.....	2	5	2	3	4	8	12
Tsukuñak.....	3	0	3	1	6	7	13
Skarúbitsa.....	2	4	0	9	2	13	15
Dutz.....	2	3	1	2	3	5	8
Suriski.....	1	3	0	0	4	3	7
Betsuokir.....	1	4	0	1	4	5	9
Butz.....	3	2	3	0	6	2	8
Dutsabete (2).....	5	3	2	1	8	4	12
Dutsasura.....	2	7	2	2	4	9	13
Uritska.....	1	3	2	1	3	4	7
Tuki.....	4	6	3	1	7	7	14
Bisbeta.....	3	4	2	1	5	5	10
Tsurikur.....	3	4	3	2	6	6	12
Korimbeta.....	2	3	0	0	2	3	5
Torókkitsa.....	2	3	0	1	2	4	6
Puribeta.....	2	4	2	3	4	7	11
Torókdipe.....	2	4	2	3	4	7	11
Nemu-ú.....	2	3	0	3	2	6	8
Mokri.....	7	5	2	1	9	6	15

Name of locality.	Adults.		Children.		Totals.		Grand totals.
	Males.	Females.	Males.	Females.	Males.	Females.	
Burúbeta.	3	3	1	0	4	3	7
Amókitsa 1st house.	2	6	1	0	3	6	9
Amókitsa 2d house.	3	1	2	0	5	1	6
Tsambri.	3	3	1	0	4	3	7
Tsukátz.	2	3	3	0	5	3	8
Surébeta.	3	5	0	3	3	8	11
Dekó-ú.	4	5	1	0	5	5	10
Surúk.	5	5	1	1	6	6	15
Xkurdzú.	2	3	0	0	2	3	2
Kúko.	1	3	0	1	1	4	5
Seús.	3	3	2	0	5	3	8
Buráburábeta.	2	4	5	0	7	4	11
Trútuk.	2	2	0	1	2	3	5
Urúbeta.	4	6	1	3	5	9	14
Kátsibeta.	3	2	2	3	5	5	10
Neuós.	4	2	2	1	6	3	9
Surítuk.	2	3	1	1	3	4	7
Karkádzeua.	1	1	2	1	3	2	5
Bikatz.	2	2	0	3	2	5	7
	130	166	74	58	204	224	428

(b) Inner plain of Talamasca.

Tsáki.	1	1	3	1	4	2	6
Tsimukurki.	1	1	4	1	5	2	7
Konó-uoripe.	5	6	2	3	7	9	16
Sauskurki.	1	1	0	0	1	1	2
Sausbeta.	0	1	2	0	2	1	3
Bekitsa.	1	2	2	3	3	5	8
Datsi-kurki.	1	1	1	0	2	1	3
Skúkote.	3	3	3	1	6	4	10
Dicóte 1st house.	1	3	5	1	6	4	10
Dicóte 2d house.	2	4	0	0	2	4	6
Dicóte 3d house.	1	1	2	1	3	2	5
Dicóte 4th house.	0	2	2	1	2	3	5
Dicóte 5th house.	1	2	3	0	4	2	6
Dicóte 6th house.	2	1	0	1	2	2	4
Tea.	5	6	5	4	10	10	20
Bekurki.	2	2	1	2	3	4	7
Kitákitsa.	1	1	0	0	1	1	2
Kokbliñak.	2	3	5	3	7	6	13
Skarábkitza.	2	3	2	0	4	3	7
Dutsákurki.	2	4	2	0	4	4	8
Tsanáki.	3	5	3	3	6	8	14
Bekátsuó.	3	3	1	0	4	3	7
Korbliñak.	1	1	2	0	3	1	4
Hacienda.	2	2	1	0	3	2	5
Tsurfikurbri 1st house.	3	4	1	1	4	5	9
Tsurfikurbri 2d house.	1	0	1	0	2	0	2
Murusikho.	2	2	3	1	5	3	8
Ogdi.	6	7	2	2	8	9	17
Tsurkornñak.	4	4	3	3	7	7	14
	59	76	61	32	120	108	228
Mountain Bribri.	130	166	74	58	204	224	428
Plain Bribri.	59	76	61	32	120	108	228
Grand totals.	189	242	135	90	324	332	656

Males and females to each 1,000 of population.

	Males.	Females.
Tirub.....	Adults 202	326
	Children 348	124
	General 550	450
Bribri.....	Adults 288	369
	Children 206	137
	General 494	506

Tribe or part of tribe.	Females to each 100 males.		Males to each 100 females.	
	Adults.	Children.	Adults.	Children.
Tirub.....	161	36	62	262
Bribri (Mountain).....	128	78	78	128
Bribri (Plain).....	129	52	78	191
Bribri (General).....	128	67	78	150

The known history of the Tirub shows that during the seventeenth century, they constituted a powerful nation, which extended its sway over all the neighboring tribes. They made frequent raids on these, plundering, killing the men, carrying away women and children. The fact that at that time and as long as they were able to maintain their supremacy, they were essentially exogamous, and also polygamous, should perhaps not be overlooked when studying the probable causes of their decadence. The existence at one time of both conditions is proved not only by repeated documentary mention of the abduction of females of all ages, but also by tradition and actual occurrence. The Terraba Indians still speak of a time when each man was allowed several wives, and also of the punishment inflicted by the friars when the monogamic rule imposed by them was infringed. On the other hand, during my residence in Terraba, one of the former Tirub colonies in the Diquís Valley, I became acquainted with several natives who had taken their wives from among the Bribri and Cabécar of the northern slope. Asked about the reason why they had gone so far to find their matrimonial mates, one of these men tried to explain that such wives were more "recatadas," *i.e.*, modest or shy, than those of his own surroundings, but others referred to the fact that such was the practice among their forebears and that this was encouraged by the missionaries.

Notwithstanding all the evidences of the practice of exogamy before the advent of the Spaniards, I must not omit to mention that there are also vague indications of the tribe having been at one time organized in two clans between which marriages took place exclusively, as will be explained in connection with the Bribri.

The decadence of the Tirub started with their subjection by the Spaniards at the beginning of the eighteenth century. The persuasion of the missionaries and the fear of a bloody repression put an end to the inroads on their neighbors and to the practice of exogamy. A considerable part of the tribe was led away to the several colonies founded by the friars in other parts of the country and no small number were driven to the Spanish settlements to become the slaves of their conquerors. Worse still, smallpox, pulmonary and catarrhal infections, almost always fatal among them, and other imported diseases took a heavy toll among the once strong and warlike nation.

Heretofore, they had roamed freely over mountains and vales, spending the dry season fishing and hunting in the extensive plains along the coast and retiring with the accumulated provisions for the rainy winters in the sheltered fastnesses of their hinterland. In the plains were also their extensive plantations, built up for each family by the common work of the community with the accompaniment of eating and drinking revelries, as is still the custom

among the Talamanca Indians. Their crops consisted mainly of cassava and plantains, to which squashes and red peppers were probably added. Maize was hardly cultivated and beans were certainly unknown, since up to the present day they are found but seldom among the aborigines of the Atlantic coast of Costa Rica.

DRIVEN FROM THEIR HOMES

While this simple diet remained plentiful, the nation continued to thrive, until strangers began to invade the more accessible parts of their territory. Year after year these came in growing numbers, settling themselves in the fields of the hapless natives, who were thus robbed of their subsistence and frightened back into the narrow valley of the Tararia. The climax of the spoliation came about the time of my visit, when speculators grabbed what was left of the rich lands of the plains in prevision of future operations by a large banana concern.

These changes took place gradually, and gradually too, the living conditions of the natives became more impaired. The narrow talweg of the valley, swept year after year by the torrential freshets of the larger streams, could not be tilled profitably, and the slopes are everywhere too steep for permanent cultivation. So the crops were forcibly reduced to a scanty minimum. The fish which abound in the lower course of the river, become scarce in the upper reaches and, at the time of my visit, the forest game had practically disappeared. All this necessarily resulted in a slow starvation of the Tirub, with the corresponding lowering of the vitality of the race. The resistance to diseases and other adverse conditions became less, the rate of mortality increased and with a diminished number of births came also the disturbance of the ratio of sexes as vividly shown in the above tables.

Among the Bribri, the process of attrition has been about the same, though perhaps a little slower. These were among the people subjected to the dire oppression of the Tirub during the period preceding the arrival of the

Spaniards. At that time also they were more or less obliged to seek the seclusion of their mountains, their enemies extending over most of the beautiful inner plain of Talamanca. Besides they paid tribute, according to tradition, to the Misquito Indians, who at that time dominated the coast from Gracias a Dios in the North to beyond the Chiriquí Lagoon, as is indicated still by numerous local names. A tradition gathered from the old men in Bribri has it that each year, the flotilla of the warring Misquitos would appear at a certain time at Cahuita Point, and a slave runner was dispatched to the Bribri bearing the insignia of command, a cane made of the cacique wood. This put the whole tribe on the way to the coast, every man and woman loaded with propitiatory presents. After the Spanish occupation, this dependency came to an end, though very much against the will of the Misquitos, who tried by every means to maintain it, and even penetrated once far into the Talamanca Valley with their dugouts after they had succeeded in crossing the dangerous bar at the mouth of the Tarire. On this occasion, however, they were not satisfied with provisions and cotton clothes, the usual tribute levied on the Bribri, but a number of women and children were carried away into captivity.

After the last appearance of the Misquitos and the retreat of the Tirub into their own valley of the Tararia, the Bribri enjoyed a relative quiet and attained some prosperity under the easy rule of the friars. Not that they submitted altogether meekly, for there were times of open revolt, when missionaries and colonists were pitilessly massacred and the churches and incipient towns destroyed. These outbursts were of course followed by bloody reprisals, but on the whole the tribe maintained itself in a relatively prosperous condition even to the last days of the past century.

MARRIAGE BETWEEN CLANS

With relation to marriage, their customs were very different from those of the Tirub. While polygamy was the

rule, the wives were taken from inside the tribe, according to a system which we might call semi-exogamic. The whole tribe was divided from the oldest times into two clans, each one of which was considered by the other as its "contrary." The men of one clan could marry only in the opposite clan, to which the children would also belong, the head of the family being not the husband, but the eldest brother of the mother. This custom was still rigidly enforced at the time of my exploration of Talamanca (1891-1898), when I succeeded in obtaining the complete list of the families forming each clan of the Bribri.

Owing to this arrangement, the inner life of the tribe was not perhaps so deeply disturbed by the advent of Spaniards as was the case among the Tirub, and this is one of the explanations of the reason why the decadence of the Bribri has proceeded more slowly, as shown by the above tables.

One of the first facts which draws the attention when studying these is the reversal of the ratio of sexes when we pass from the adult to the child generation. Among the former the number of females is far above the normal in all cases, while among the children the male element is overwhelmingly preponderant. It would seem, therefore, that the change has been a very sudden one, and this puts more difficulties in the way of a satisfactory explanation. That the adverse circumstances under which these natives live have been rapidly on the increase during the last years is an evident fact. The question is whether it would be sufficient argument to explain both the decrease in

nativity and the great disturbance of the sex ratio.

It has been suggested that certain native tribes limit the number of females by killing part of the baby girls at their birth. This, however, would not explain the present case and furthermore it certainly does not apply with regard to the Bribri Indians, among whom I lived for nearly three years and into whose more intimate life I pried almost at will. Not being an admissible explanation for the Bribri, this could not be used as to the Tirub, whose case is more or less identical.

On the other hand it is generally admitted that there is an automatic correlation between the birth rate and sex ratio on one side and the general vital conditions of the race on the other. The only apparent exception to that law is the presence of artificial conditions as produced by abuse of wealth and excessive physical refinement, as are known to exist in great cities and which lead so surely to race suicide. Under normal conditions, a strong, healthy stock tends to increase and with a higher rate of birth there is also a surplus in the number of females. Under adverse conditions, the facts become reversed. For instance, in a nation depleted of men and resources by war, natality is less and the proportion of males considerably larger. While statistical proof of these facts is inadequate, there is some evidence to support them, and they formed the base of the explanation given in my former paper.

Whatever this explanation, it is evident that factors have been in operation among these Indians that have resulted in a definite and pronounced alteration of the sex ratio.

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Brusik 2d house.....	1	1	2	0	3	1	4
Brusik 3d house.....	1	3	2	0	3	3	6
Urután.....	2	4	5	0	7	4	11
Iabólu.....	1	3	3	0	4	3	7
Surtsik.....	5	5	5	0	10	5	15
Ararbo.....	3	5	3	3	6	8	14
Peksó.....	1	2	3	2	4	4	8
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Houses 10.....	18	29	31	11	49	40	89

II. Census of Part of the Bribri Tribe.

(a) Bribri Mountains, Talamanca.

Name of locality.	Adults.		Children.		Totals.		Grand totals.
	Males.	Females.	Males.	Females.	Males.	Females.	
Stutuk.....	5	5	6	3	11	8	19
Sinitz.....	2	2	2	0	4	2	6
Ukábete.....	2	2	0	2	2	4	6
Dutsábete.....	3	3	3	2	6	5	11
Akutz.....	4	3	4	3	8	6	14
Boribete.....	3	7	1	1	4	8	12
Depuf.....	3	4	2	2	5	6	11
Durúnu.....	2	2	2	1	4	3	7
Bóbri.....	2	5	2	3	4	8	12
Teukunak.....	3	6	3	1	6	7	13
Skarúbkitsa.....	2	4	0	9	2	13	15
Dutz.....	2	3	1	2	3	5	8
Suriski.....	4	3	0	0	4	3	7
Betsuokir.....	4	4	0	1	4	5	9
Butz.....	3	2	3	0	6	2	8
Dutsábete (2).....	5	3	2	1	8	4	12
Dutsásura.....	2	7	2	2	4	9	13
Uritska.....	1	3	2	1	3	4	7
Tuki.....	4	6	3	1	7	7	14
Bisbete.....	3	4	2	1	5	5	10
Tsurikur.....	3	4	3	2	6	6	12
Korimbete.....	2	3	0	0	2	3	5
Torókkitsa.....	2	3	0	1	2	4	6
Purfbeta.....	2	4	2	3	4	7	11
Torókdipe.....	2	4	2	3	4	7	11
Nemu-ú.....	2	3	0	3	2	6	8
Mokri.....	7	5	2	1	9	6	15



s to secure the largest returns.
an 200 yards of it. If there is
gather this cotton separately and
ep the seed pure. Have the bale
ar, if possible, so as to learn j
blank for further report will be

terested in the production and ma
cotton, the publications named
l be sent free upon application.

"Cotton Selection on the Farm, b
Leaves, and Bolls.

on Improvement on a Community B

ry respectfully,

O. F. Cook.

Name of locality.	Adults.		Children.		Totals.		Grand totals.
	Males.	Females.	Males.	Females.	Males.	Females.	
Burúbeta	3	3	1	0	4	3	7
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Tsukátz	2	3	3	0	5	3	8
Surebeta	3	5	0	3	3	8	11
Dekó-ú	4	5	1	0	5	5	10
Surúk	5	5	1	1	6	6	15
Xkurdzúk	2	3	0	0	2	3	2
Kúko	1	3	0	1	1	4	5
Seús	3	3	2	0	5	3	8
Buráburábeta	2	4	5	0	7	4	11
Trátuk	2	2	0	1	2	3	5
Urúbeta	4	6	1	3	5	9	14
Kátsibeta	3	2	2	3	5	5	10
Neuós	4	2	2	1	6	3	9
Surítuk	2	3	1	1	3	4	7
Karkádzewa	1	1	2	1	3	2	5
Bikatz	2	2	0	3	2	5	7
	130	166	74	58	204	224	428

(b) Inner plain of Talamancá.

Tsaki	1	1	3	1	4	2	6
Tsimukurki	1	1	4	1	5	2	7
Konó-uoripe	5	6	2	3	7	9	16
Sauskurki	1	1	0	0	1	1	2
Sausbeta	0	1	2	0	2	1	3
Bekitsa	1	2	2	3	3	5	8
Datsi-kurki	1	1	1	0	2	1	3
Sklúkote	3	3	3	1	6	4	10
Dicóte 1st house	1	3	5	1	6	4	10
Dicóte 2d house	2	4	0	0	2	4	6
Dicóte 3d house	1	1	2	1	3	2	5
Dicóte 4th house	0	2	2	1	2	3	5
Dicóte 5th house	1	2	3	0	4	2	6
Dicóte 6th house	2	1	0	1	2	2	4
Tea	5	6	5	4	10	10	20
Bekurki	2	2	1	2	3	4	7
Kitákitsa	1	1	0	0	1	1	2
Kokbliñak	2	3	5	3	7	6	13
Skarúbkitsa	2	3	2	0	4	3	7
Dutsákurki	2	4	2	0	4	4	8
Tsanáki	3	5	3	3	6	8	14
Bekátsuo	3	3	1	0	4	3	7
Korbliñak	1	1	2	0	3	1	4
Hacienda	2	2	1	0	3	2	5
Tsurfikurbri 1st house	3	4	1	1	4	5	9
Tsurfikurbri 2d house	1	0	1	0	2	0	2
Murusikdio	2	2	3	1	5	3	8
Ogdi	6	7	2	2	8	9	17
Tsrarkornak	4	4	3	3	7	7	14
	59	76	61	32	120	108	228
Mountain Bribri	130	166	74	58	204	224	428
Plain Bribri	59	76	61	32	120	108	228
Grand totals	189	242	135	90	324	332	656

Males and females to each 1,000 of population.

	Males.	Females.
Tirub.....	Adults 202 Children 348 General 550	326 124 450
Bribri.....	Adults 288 Children 206 General 494	369 137 506

Tribe or part of tribe.	Females to each 100 males.		Males to each 100 females.	
	Adults.	Children.	Adults.	Children.
Tirub.....	161	36	62	262
Bribri (Mountain).....	128	78	78	128
Bribri (Plain).....	129	52	78	191
Bribri (General).....	128	67	78	150

The known history of the Tirub shows that during the seventeenth century, they constituted a powerful nation, which extended its sway over all the neighboring tribes. They made frequent raids on these, plundering, killing the men, carrying away women and children. The fact that at that time and as long as they were able to maintain their supremacy, they were essentially exogamous, and also polygamous, should perhaps not be overlooked when studying the probable causes of their decadence. The existence at one time of both conditions is proved not only by repeated documentary mention of the abduction of females of all ages, but also by tradition and actual occurrence. The Terraba Indians still speak of a time when each man was allowed several wives, and also of the punishment inflicted by the friars when the monogamic rule imposed by them was infringed. On the other hand, during my residence in Terraba, one of the former Tirub colonies in the Diquís Valley, I became acquainted with several natives who had taken their wives from among the Bribri and Cabécara of the northern slope. Asked about the reason why they had gone so far to find their matrimonial mates, one of these men tried to explain that such wives were more "recatadas," i.e., modest or shy, than those of his own surroundings, but others referred to the fact that such was the practice among their forebears and that this was encouraged by the missionaries.

Notwithstanding all the evidences of the practice of exogamy before the advent of the Spaniards, I must not omit to mention that there are also vague indications of the tribe having been at one time organized in two clans between which marriages took place exclusively, as will be explained in connection with the Bribri.

The decadence of the Tirub started with their subjection by the Spaniards at the beginning of the eighteenth century. The persuasion of the missionaries and the fear of a bloody repression put an end to the inroads on their neighbors and to the practice of exogamy. A considerable part of the tribe was led away to the several colonies founded by the friars in other parts of the country and no small number were driven to the Spanish settlements to become the slaves of their conquerors. Worse still, smallpox, pulmonary and catarrhal infections, almost always fatal among them, and other imported diseases took a heavy toll among the once strong and warlike nation.

Heretofore, they had roamed freely over mountains and vales, spending the dry season fishing and hunting in the extensive plains along the coast and retiring with the accumulated provisions for the rainy winters in the sheltered fastnesses of their hinterland. In the plains were also their extensive plantations, built up for each family by the common work of the community with the accompaniment of eating and drinking revelries, as is still the custom

among the Talamanca Indians. Their crops consisted mainly of cassava and plantains, to which squashes and red peppers were probably added. Maize was hardly cultivated and beans were certainly unknown, since up to the present day they are found but seldom among the aborigines of the Atlantic coast of Costa Rica.

DRIVEN FROM THEIR HOMES

While this simple diet remained plentiful, the nation continued to thrive, until strangers began to invade the more accessible parts of their territory. Year after year these came in growing numbers, settling themselves in the fields of the hapless natives, who were thus robbed of their subsistence and frightened back into the narrow valley of the Tararia. The climax of the spoliation came about the time of my visit, when speculators grabbed what was left of the rich lands of the plains in provision of future operations by a large banana concern.

These changes took place gradually, and gradually too, the living conditions of the natives became more impaired. The narrow talweg of the valley, swept year after year by the torrential freshets of the larger streams, could not be tilled profitably, and the slopes are everywhere too steep for permanent cultivation. So the crops were forcibly reduced to a scanty minimum. The fish which abound in the lower course of the river, become scarce in the upper reaches and, at the time of my visit, the forest game had practically disappeared. All this necessarily resulted in a slow starvation of the Tirub, with the corresponding lowering of the vitality of the race. The resistance to diseases and other adverse conditions became less, the rate of mortality increased and with a diminished number of births came also the disturbance of the ratio of sexes as vividly shown in the above tables.

Among the Bribri, the process of attrition has been about the same, though perhaps a little slower. These were among the people subjected to the dire oppression of the Tirub during the period preceding the arrival of the

Spaniards. At that time also they were more or less obliged to seek the seclusion of their mountains, their enemies extending over most of the beautiful inner plain of Talamanca. Besides they paid tribute, according to tradition, to the Misquito Indians, who at that time dominated the coast from Gracias a Dios in the North to beyond the Chiriquí Lagoon, as is indicated still by numerous local names. A tradition gathered from the old men in Bribri has it that each year, the flotilla of the warring Misquitos would appear at a certain time at Cahuita Point, and a slave runner was dispatched to the Bribri bearing the insignia of command, a cane made of the cacique wood. This put the whole tribe on the way to the coast, every man and woman loaded with propitiatory presents. After the Spanish occupation, this dependency came to an end, though very much against the will of the Misquitos, who tried by every means to maintain it, and even penetrated once far into the Talamanca Valley with their dugouts after they had succeeded in crossing the dangerous bar at the mouth of the Tarire. On this occasion, however, they were not satisfied with provisions and cotton clothes, the usual tribute levied on the Bribri, but a number of women and children were carried away into captivity.

After the last appearance of the Misquitos and the retreat of the Tirub into their own valley of the Tararia, the Bribri enjoyed a relative quiet and attained some prosperity under the easy rule of the friars. Not that they submitted altogether meekly, for there were times of open revolt, when missionaries and colonists were pitilessly massacred and the churches and incipient towns destroyed. These outbursts were of course followed by bloody reprisals, but on the whole the tribe maintained itself in a relatively prosperous condition even to the last days of the past century.

MARRIAGE BETWEEN CLANS

With relation to marriage, then, customs were very different from those of the Tirub. While polygamy was the

rule, the wives were taken from inside the tribe, according to a system which we might call semi-exogamic. The whole tribe was divided from the oldest times into two clans, each one of which was considered by the other as its "contrary." The men of one clan could marry only in the opposite clan, to which the children would also belong, the head of the family being not the husband, but the eldest brother of the mother. This custom was still rigidly enforced at the time of my exploration of Talamanca (1891-1898), when I succeeded in obtaining the complete list of the families forming each clan of the Bribri.

Owing to this arrangement, the inner life of the tribe was not perhaps so deeply disturbed by the advent of Spaniards as was the case among the Tirub, and this is one of the explanations of the reason why the decadence of the Bribri has proceeded more slowly, as shown by the above tables.

One of the first facts which draws the attention when studying these is the reversal of the ratio of sexes when we pass from the adult to the child generation. Among the former the number of females is far above the normal in all cases, while among the children the male element is overwhelmingly preponderant. It would seem, therefore, that the change has been a very sudden one, and this puts more difficulties in the way of a satisfactory explanation. That the adverse circumstances under which these natives live have been rapidly on the increase during the last years is an evident fact. The question is whether it would be sufficient argument to explain both the decrease in

nativity and the great disturbance of the sex ratio.

It has been suggested that certain native tribes limit the number of females by killing part of the baby girls at their birth. This, however, would not explain the present case and furthermore it certainly does not apply with regard to the Bribri Indians, among whom I lived for nearly three years and into whose more intimate life I pried almost at will. Not being an admissible explanation for the Bribri, this could not be used as to the Tirub, whose case is more or less identical.

On the other hand it is generally admitted that there is an automatic correlation between the birth rate and sex ratio on one side and the general vital conditions of the race on the other. The only apparent exception to that law is the presence of artificial conditions as produced by abuse of wealth and excessive physical refinement, as are known to exist in great cities and which lead so surely to race suicide. Under normal conditions, a strong, healthy stock tends to increase and with a higher rate of birth there is also a surplus in the number of females. Under adverse conditions, the facts become reversed. For instance, in a nation depleted of men and resources by war, natality is less and the proportion of males considerably larger. While statistical proof of these facts is inadequate, there is some evidence to support them, and they formed the base of the explanation given in my former paper.

Whatever this explanation, it is evident that factors have been in operation among these Indians that have resulted in a definite and pronounced alteration of the sex ratio.