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THE DEMOGRAPHIC STATUS OF THE OAYANA INDIANS OF NORTHEASTERN SOUTH AMERICA

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ABSTRACT

The continued existence of the Oayana as a physical and cultural entity is uncertain. Demographic data indicate that the population has stabilized numerically under constant vigilence of medical missions in spite of governmental indifference. As long as the Oayana remain at a low technological level based on subsistence agriculture and environmental exploitation demographic increase is improbable. The absence of collective immunity and the persistence of endemic malaria relegates the Oayana to a status of low reproduction and imminent crises of high mortality.

INTRODUCTION

The fate of most tropical rainforest peoples, upon contact with European and African explorers and settlers, is characterized by rapid population decline or in some instances total extinction, primarily through the introduction, accidentally or intentionally, of communicable diseases to which the Amerindian possesses no immunity. Although physical annihilation is well documented, extinction by acculturation is not uncommon, especially in those populations of sufficient size to withstand the effect of epidemic communicable diseases.

The Oayana of Surinam, French Guiana and Brazil have reached a crises in their tribal history. Once isolated in the interior tropical rainforest of the Guianas, the Oayana are now in frequent contact with Europeans, populations of African origin and remnants of forest Amerindians. Increased frequency of contact with indigeneous and non-indigeneous groups, increased frequency of introduction of disease and accelerated acculturative stresses will determine the eventual fate of the Oayana.

Therefore, unpublished demographic data, obtained for 1971, will serve as a basis for future population analyses of the Oayana. In that the Oayana may confront immediate population decline and extinction should requisite medical assistance and physical protection not be provided by the governments in whose territories they now reside, the demographic data, hereinafter presented, may be utilized by investigators concerned with the survival of rainforest populations.

HISTORICAL REVIEW

The Carib-speaking Oayana (Roucoyenne) currently reside in semi-permanent villages on the upper Maroni River and its principal tributaries, the Lawa, Tapanahoni, Litani and Palaemeu in Surinam and French Guiana, and on the Yari River of the Amazonian drainage (Figure 1).

The Oayana immigrated to the Guianas within recent historic time. Fragmentary evidence places the entrance of the Oayana and the Oayampi, apparently lengthy inhabitants of the Amazonian watershed, near the close of the 18th and the beginning of the 19th centuries (Sausse, 1951). In 1730 the Oayana were located in the Brazilian Amazon near the upper Oyapock River. In the early records of exploration the appelation Oayana included the Roucoyenne (now synonymous with Oayana) and a small allied group, the Poupoulouis (Sausse, *op. cit.*).

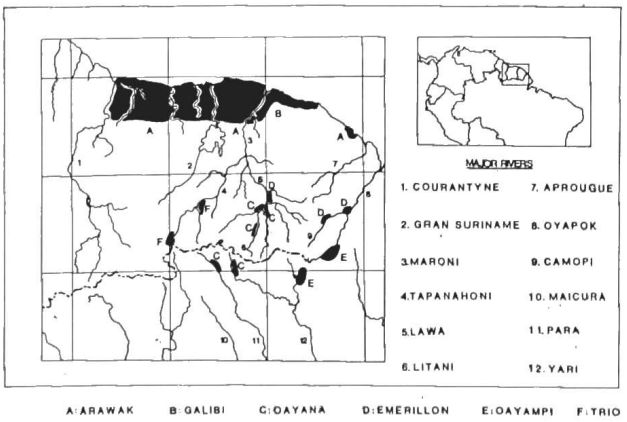

FIG. 1. *Location of the known extant tribes in Surinam and French Guiana.*

Patris (1766 and 1769 *in* Hurault, 1965) first contacted the Oayana in the Guianas on the upper Maroni River. At the time of Leblond's exploration (1788 *in* Hurault, *op. cit.*) the Oayana had expanded throughout the upper Maroni River. Leblond provided the first population estimate (4,000) based on a census of 20 villages. He noted that major grouping yet resided in the Amazonian drainage.

Subsequent to victorious conflicts with the Dutch, the Boni and the Djuka, of African descent, established villages along the middle and upper Maroni River. These populations, hostile to the Oayana, forced them to retreat to the headwaters of the Maroni River. Most of the tribe returned to the Yari River. The Djuka and the Boni successfully opposed European penetration and settlement of the interior until 1961. Thus, the Oayana were effectively isolated from coastal populations, a contributary factor to their survival (*vide infra*).

By 1850 the indigeneous peoples of the Guianese coast were decimated by introduced disease of European and African provenance. Some tribal entities became extinct and others were near extinction. The geographically isolated Oayana declined less precipitiously than other tribes. Coudreau (1893) reported their number at 1,500 and deGoeje (1941) estimated that 1,000 Oayana (1907) lived in the Guianas. Later estimates and censuses noted a continued population decline. Sausse (1951) approximated the Oayana population at 300 and Hurault (1959) censused 300 individuals. The Surinamese populations of Oayana and Trio were estimated at 300 (Schaad, 1960). Hurault (1966) ascertained that 240 Oayana were resident on the Maroni River (1961-62) and Kloos (1972) censused 176 Surinamese Oayana. Duchemin (1972) concluded that the tribal population did not exceed 300. Medical records of the Dutch Evangelical Mission (1971) enumerated 301 Oayana resident in the Guianas.

Diseases of the Oayana

The tropical rainforest populations of the Guianas and of other regions of South America were decimated by communicable diseases of epidemic proportions immediately after European contact. The Oayana attempted, in the last years of the 18th century, to approach other tribes on the Oayapok River, but experiencing high mortality from epidemics, resettled on the Brazilian Yari and Parou Rivers. The Oayana and the Emerillon, isolated from the coastal tribes and Europeans, survived because of relative isolation from epidemic decimation (Sausse, 1951).

Fungal infections, ulcers, leprosy, syphilis and tuberculosis were unknown among the Oayana (Sausse, *op. cit.*) although Schaad (1960) reported a positive tuberculin reaction among 32 (59%) males and 30 (44%) females. The frequencies were not significantly divergent from those of the Djuka and the general Surinamese population. Histoplasmin tests administered to 56 Oayana and 113 Oayana and Trio yielded a greater percentage of positive reactions than in the Djuka (Schaad, *op. cit.*): 61% of males and 54% females positive. Examination for filariasis (51 smears) was negative (Schaad, *op. cit.*).

Sausse (1951) detected splenomegaly in 33 of 37 (89%) adult Oayana. Sausse (*op. cit.*) further commented that 87.3% of the infants evidenced splenomegaly and Schaad (1960) observed that all Oayana evidenced marked splenomegaly.

Fugler and Acevedo (1973) enumerated the intestinal helminth fauna of the Lawa population. The greatest incidence, in general, obtains in the 0-9 year age cohort.

The tribes of the Surinamese hinterland exhibit a high rate of immunity to yellow fever (van der Kuyp, 1958). In 1945-46, of 15 Oayana examined, 47% were immune. In 1952, 18 males (71% immune) and 10 females (40% immune) were tested.

Diarrheas and dysenteries, rare in adult Amerindians, are of frequent occurrence with grave consequences in infants (Sausse, 1951). The onset of gastroenteric disease unquestionably occurs in the transition from nursing to independent consumption of food resulting in significant infant mortality.

Although the Oayana and the Boni of the upper Maroni River occupy essentially identical environments the pathologies of the two groups are divergent. The Oayana are highly susceptible to malaria and epidemic viral pulmonary diseases. The Boni are particularly susceptible to cutaneous diseases, especially leprosy (Sausse, *op. cit.*).

The susceptibility of the Amerindian, possessing no immunity to epidemic viral pulmonary diseases of European and African origin, is the principal biological factor responsible for the extinction of autochthonous populations (Sausse, *op. cit.*).

Hurault (1966) recognized a high correlation between the environment and the demographic status of Amerindian populations. In highland South America demographic increase continues, while demographic decline is pronounced in the tropical lowlands. Malaria, an identified causative agent of demographic reduction, is absent in highland populations but it is endemic among forest Indians who are highly susceptible (Hurault, *op. cit.*). The coastal Galibi and Arawak, inhabiting an unusual malaria-free area, demonstrate high fecundity (Hurault, *op. cit.*). Low fecundity is a contributory cause to the extinction of the forest Indian, non-immune to malaria. Hurault (*op. cit.*) emphasized that the Amerindians of French Guiana inhabit a relatively benign environment, evidenced by the relatively excellent health of the Boni. In the absence of medical intervention differential mortality of the two racial entities is explicable as differential receptivity to disease, particularly to differential immunity, unless racial differences are invoked (Hurault, *op. cit.*)

Prior to initiation of the mosquito-control program (1950) the Creole population of French Guiana, as susceptible to malaria as the Amerindian, exhibited a low birth rate and negative population increase (Hurault, 1966). The birth rate has since significantly increased. The notable acceleration in natality among the Oayana (1962-64) is unquestionably attributable to medical intervention. Hurault (*op. cit.*) contended that malaria is the primary cause of low natality among forest Indians who also have not acquired, nor can they acquire in the immediate future, a collective immunity to other introduced diseases.

Voluntary abortion, frequently practiced by the forest Indian, is perhaps more commonplace among the Oayana (Hurault, 1966). Voluntary abortion has increased with the stresses of acculturation, dissolution of familial structure and sexual amorality. It is considered a secondary factor in Oayana demography (Hurault, *op. cit.*).

Duchemin (1972) commented that the medical condition of one group of Oayana, induced to settle near the French administrative post of Maripasoula, is serious. He noted high levels of introduced diseases (tuberculosis and syphilis) and an increased frequency of malaria and intestinal parasitism.

The Recent Demography of the Oayana

Sausse (1951) censused three villages on the French Guianese bank of the Maroni River in which sexual disequilibrium favored males (33 to 28). Few individuals greater than 50 years of age were encountered. Although the 0-10 year age cohort was well represented the 10-20 year age cohort contained proportionately few individuals although no abnormal adolescent mortality was evidenced in the latter cohort. The birth rate, 35 infants less than 14 years of age per 100 persons, is insufficient to maintain the population given the mean life expectancy of 35 years.

Hurault (1966) reported, in the period 1959-62, 31 births, 38 deaths by disease, thus an annual natality of 3.4% and an annual mortality of 4.2% among a population sample of 240 Oayana. In 1963-64 the demographic status of the Oayana, for the first time, was favorable. Based on 270 individuals the birth rate (6%) exceeded the death rate (3%) indicative, at least temporarily, of a positive demographic projection.

The survivorship rates of the Oayana and the Oayampi are similar. The life expectancy of the Oayana is 31.5 years and that of the Oayampi 30.5 years. The Oayampi and Emerillon, until recently, were declining but, because of greater fecundity, at a lesser rate than the Oayana (Hurault, 1966).

The Oayana of the Maroni River exhibited an accumulated fecundity of 3.7 infants, a life expectancy of 31 years at birth, an annual mortality of 3.8% (1948-58), an annual natality of 3.2% (1948-58) and a reproductive rate of 83/100 in 28 years. The population is decreasing at a rate of 17% per generation of 28 years (Hurault, 1966).

The Oayana villages of the Lawa River were censused in 1971 by Fugler *et. al.*, the primary data supplemented by medical records obtained from the Dutch Evangelical Mission in Paramaribo, Surinam. Pertinent age and sex data are presented in Table 1.

The sizes of the semi-permanent villages vary widely ranging from four to 47 individuals. The villages are typically constituted of one or more biological or extended families although always consanguinally related. The relatively primitive technological level of the Oayana unquestionably mandates the comparatively large number of geographically separated population aggregates. The number and size of the villages are organizational responses to the technological limitations of the Oayana (subsistence agriculture and hunting and fishing) within environmentally imposed limits (environmental carrying capacity). It has been argued that the relatively small populations of tropical forest Amerindians is a function of the environment (abundance of fish and game and agricultural productivity) (Meggars, 1971).

TABLE 1: *Demography of the Oayana Villages of the Lawa River*

Name and Location of Village	Total	Adults	Population Numbers			
			Children	Males	Females	Sex Unknown
French Guyana						
Alatie	26	16	10	10	14	2
Alowike	17	11	6	8	9	0
Emelion	12	10	2	5	5	2
Epoja	32	22	10	16	15	1
Mekuwanale	13	8	5	6	7	0
Palanaiwa	9	5	4	6	3	0
Sampati	15	10	5	7	8	0
Suriname						
Idipi	23	12	11	14	8	1
Kawemhakan	47	21	26	22	22	3
Koemakapan	11	6	5	4	6	1
Peleike	15	12	3	9	5	1
Islands of Lawa River						
Galukana	4	4	0	1	3	0
Malawat	44	31	13	23	20	1
Pelejakali	4	2	2	1	3	0
Pilima	12	7	5	5	7	0
Tuwanke	17	11	6	6	11	1
Total	301	188	113	143	146	12

Mean size of villages = 18.81

Demographic data obtained in 1971 (Table 2) provided empirical information permitting limited inferences and speculation. The data permit comparison with those of the coastal Galibi and Arawak and the Oayana of the past decade.

TABLE 2: *Population and Percentage Distributions for Five-Year Ranges of Males, Females and the Total Population of the Lawa Oayana*

Age Ranges	Numerical and Percentage Distribution of the Population		
	Males	Females	Total
0-4	13(8.3)	17(11.2)	30(9.7)
5-9	21(13.4)	17(11.2)	38(12.3)
10-14	17(10.8)	24(15.8)	41(13.3)
15-19	15(9.6)	10(6.6)	25(8.1)
20-24	12(7.6)	9(5.9)	21(6.8)
25-29	14(8.9)	16(10.5)	30(9.7)
30-34	17(10.8)	11(7.2)	28(9.1)
35-39	13(8.3)	13(8.6)	26(8.4)
40-44	12(17.6)	10(6.6)	22(7.1)
45-49	8(5.7)	5(3.3)	13(4.2)
50-54	7(4.6)	7(4.6)	14(4.5)
55-59	4(2.6)	6(4.0)	10(3.2)
60-64	2(1.3)	4(2.6)	6(1.9)
65-69	1(0.6)	1(0.7)	2(0.7)
70-74	1(0.6)	0(0.0)	1(0.3)
75-79	0(0.0)	2(1.3)	2(1.7)
Totals	157(100.7)	152(100.1)	309(100.0)

Sex Ratio of Total Population = 103.29; Ages 0-14 = 87.9; Ages 15-64 = 114.3; Ages 65+ = 66.7
Mean Ages: Males, 25.75, Females, 25.68; Total, 25.72
Percent of population: Ages 0-14 = 35.3; Ages 15-64 = 63.1; Ages 65+ = 1.6
Percent of Females in the hypothetical childbearing-age-range- (15-44) = 45.70
Child-Woman (Fertility) Ratio = 43.5

In general, the high total population sex ratio, the low population mean ages and the patterns of age distribution conform to the experiences of populations with subsistance or near subsistence technological levels. Such populations characteristically demonstrate substantial infant and child mortality. Recent studies (Smith and Zopf, 1976) indicate that a number of national societies existing at low levels of technological development have total population sex ratios in the 102-104 range. Other populations, especially those of the Old-World tropics (United Nations, 1971), exhibit a population-age distribution similar to that of the Oayana (Figure 2).

Fertility (infant-female) ratios of the Oayana suggest a high level of infant mortality, child mortality or both. The ratio is determined by the number of infants (0-4 years of age) per 100 females in the theoretical reproductive ages (15-45). It was noted hereinabove that infant and child mortality among coastal and forest populations is great, primarily due to the absence of immunity to contagious viral respiratory disease, dysenteries and diarrheas. The fertility ratio of the Lawa Oayana (43.5) is significantly inferior to other subsistence-level societies in which the fertility ratios are

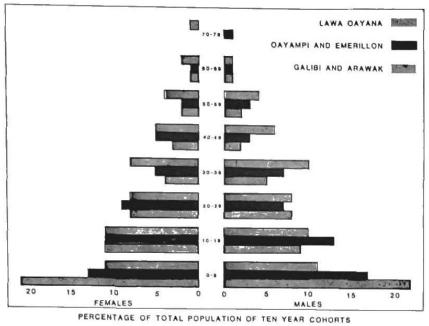

FIG. 2. *Age pyramid of the major tribes of Surinam and French Guiana.*

greater than 80.0 (Smith and Zopf, 1976). In that the Oayana practice limited systematic fertility control the low fertility ratio may be the result of extraordinarily high infant mortality (0-4 years of age).

Demographic data for the forest-dwelling Oayampi and Emerillon (1958) and the coastal Galibi and Arawak (1965) permit comparison with the Oayana (1971). Age-structure differences among the three groups, except for the 0-9 year age cohort, are insignificant in that the population sample is statistically small (Figure 2). The aforementioned age-cohort among the Galibi and Arawak, in proportion to the total population, is approximately twice that demonstrated by the Oayana. The divergence is unquestionably the result of excessive mortality among infants (0-4 years of age). As previously discussed the absence of, or limited access of, medical assistance may be the primary factor among the Oayana. The Oayampi, Emerillon, Galibi and Arawak present population pyramids characteristic of pre-demographic societies. Had the Oayana not experienced an excessive rate of infant mortality the age distribution of the population would not significantly differ from the aforementioned populations.

CONCLUSIONS

The limited population data (small total population), the dynamics of accelerated acculturation and the uncertainty of continued medical assistance, particularly in the event of epidemics, permit conjecture relative to the future demographic status of the Oayana.

Unquestionably the Oayana will cease to exist as a distinct cultural entity within the forthcoming decades. At the date of the field study the presence of motorized canoes greatly facilitated the mobility of families. A significant number of adolescent and mature males have entered the Surnamese and French Guianese economy. Other artifacts of material acculturation are evident. Bilingualism (Dutch or French) is widespread among younger males. Although traditional dress (loin cloth and pubic apron) prevails, those individuals returning from European centers adopt western garments.

Physical extinction is uncertain. The Oayana had not

intermarried with either the Djuke, Boni or adjacent Amerindian tribes with the possible exception of the Trio.

If the hypothesis is valid in that the population size and level of cultural attainment is environmentally determined (Meggars, 1971) the Oayana therefore have attained maximum population size. Earlier population estimates and censuses of the Oayana were of geographically widespread tribal subgroups which did not approximate the parameters of environmental exploitation. In that the Oayana are yet in an exploitative and subsistence-level economy, the size of the semi-permanently dispersed villages and the total population residing within a particular geographic area is environmentally determined.

Numerically small populations, especially those not possessing collective immunity to epidemic diseases, are characteristically in precarious situations. Subsequent to the compilation of the demographic data herein presented (1971) the accidental introduction of rubella resulted in the death of eight sub-adult individuals. The casual contact of an Amerindian family with Europeans at the time of the field studies occasioned an epidemic of influenza which, although causing no immediate deaths, initiated a period in which many Oayana were unable to participate in the procurement of essential animal protein, thus resulting in dietary degradation if not malnutrition. Minor decrease in the critical reproductive age-chorts or in infants and children in a numerically small population as the Oayana is of greater significance than in larger populations. Without immediate and constant medical attention the Oayana are incapable of surviving continued epidemics of contagious diseases. In the event of cessation of such attention the extinction of the Oayana is imminent.

ACKNOWLEDGEMENTS

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A CASE REPORT OF SYNPOLYDACTYLY

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ABSTRACT

A familial case of polydactyly Type II is presented. The condition is apparently the result of a single dominant autosomal gene with variable expressivity.

INTRODUCTION

Polydactyly, the relatively uncommon condition in which one or two extra fingers or toes may occur on either hand or either foot, is often used in introductory genetics textbooks as an example of a single dominant-autosomal gene which expresses itself in typical Mendelian fashion. A related malformation is one in which webbed fingers or toes result from a mutant gene that inhibits the normal degeneration of tissues (Whaley 1974), thus resulting in the webbed condition, or syndactyly.

Many published clinical cases of syndactyly are those in which the webb extremities are only a part of a syndrome involving other parts of the body. Examples are acrocephalosyndactyly (Apert Syndrome; Apert 1906) which is transmitted as an autosomal dominant (Blank 1960), and Carpenter's syndrome, which is the result of an autosomal recessive gene (Temtamy 1966). One craniodigital syndrome is the result of a sex-linked