

SUMMARY OF THE SYMPOSIUM

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As stated in the Preface, this volume has been completed on the basis of a tape recording of the symposium entitled "Papua New Guinean Life and Nutrition". This symposium consisted of three reports and overall discussions after the reports.

The introduction was my report under the title "A Review of the Studies of Subsistence Life in Papua New Guinea" and is as follows:

Interest in ecological studies of subsistence life has been increasing all over the world in the past few decades. As a result of such studies, quantitative data in various aspects of subsistence life have accumulated. In regard to the Asian and Oceanian region, Papua New Guinea is the prime survey area where such data have been collected, mainly by cultural anthropologists, human geographers, and agricultural and medical scientists. As a typical and classical study of Papua New Guinean subsistence life, reference was made to the book, "Pigs for the Ancestors" by R. A. RAPPAPORT (1968; Yale Univ. Press, New Haven, Connecticut).

In this book, the author claims that the cyclic pig festivals widely popular in Papua New Guinean Highlands are observed when the total biomass of the inhabitants plus their pigs is going to overrun the ecological carrying capacity. During those occasions, most of the adult pigs in a village are slaughtered. Although one cannot tell whether his interpretation of the pig festivals is true, his quantitatively precise field data to support his conclusion should be considered quite useful and informative. Much quantitative data in the studies of people's subsistence lives are obtained from man-to-man observations and the following three types of information are particularly sought by most researchers of such studies:

- (1) demographic data not on the basis of official statistics, but through actually counting one by one,
- (2) quantitative data as to the mode of subsistence activities, and
- (3) qualitative and quantitative data of foods actually ingested by the inhabitants.

The reporter also referred to the cases of *kuru*, a viral disease affecting the human nerve center, as an example of the noteworthy discoveries during the course of such studies. At first, pathologists could not elucidate the cause of this disease. The first-step clue for solving its etiology was found by cultural anthropologists who had been carefully observing the villagers' behavior for a long time.

In addition, the reporter pointed out that, because Papua New Guinean highlanders had been living Neolithic lives until the 1930s, studies of their subsistence systems help us to imagine the states of the Neolithic era in other regions of the world and at earlier times. In other words, those studies must be archaeologically significant.

After the report, some problems were discussed among the participants. Especially, the topic

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of the relationship between the cyclic pig festivals and the battles at RAPIAPORT'S survey village soon after the festivals were over provoked an interesting debate. Some participants were dubious as to the logical connection between them.

The second report in this symposium under the title "A Study of Population Ecology of the Papua New Guinean Lowlanders" was made by Dr. Ryutaro OHTSUKA (Associate Professor, Department of Human Ecology, School of Health Sciences, Faculty of Medicine, The University of Tokyo) as follows:

The nation of Papua New Guinea linguistically consists of a great number of small groups, each of which occupies a definite area and tends to form a mating sphere. Therefore he regarded a linguistic group and a biological population defined by ecologists and population geneticists as being the same. From this viewpoint, the reporter and his associates made a survey of the Gidra group, 1,850 people in number.

The people of the Gidra reside in an area of about 4,000 km² which extends from the coast to the interior in Western Province. Of their 13 villages, one lies on the coast, four are located near rivers, and eight are inland. These 13 villages represent different natural and social environments. The different micro-environments of a population's territory must bring about differences in subsistence systems, morphological features, physiological functions, population dynamics, and so forth. Plant and animal ecologists claim that such variety in a population will aid in its survival. However, we have neither systematic studies supporting nor rejecting the application of this theory to human populations.

Dr. OHTSUKA and his associates obtained the data on the Gidra concerning population dynamics, subsistence activities, food intakes, physical measurements, and physiological examinations. The results of their study can be summarized in the following outline:

- (1) On one hand the analyses of blood types and mating webs for the past 100 years support the identity of the Gidra as a population, yet such factors as the accessibility and quality of drinking water, and the diversity of food intake patterns do not allow us to lose sight of the noticeably different features among the villages.
- (2) The estimation of net reproduction rate has led to the conclusion that the annual increase of the Gidra population is approximately 0.1% on the average for the past several decades and has been very stable. The most apparent reason for this stability is that a high ratio of females have had no descendants surviving to reproductive ages.
- (3) Their food sources depend on the village locality. In inland villages, nearly one hundred percent of the animal protein consumed is derived from wild game. By contrast, in coastal and riverine villages, most of the animal protein comes from fish and other aquatic animals and a small amount is supplemented by canned fish purchased in the provincial capital. As for energetic quantity from plant foods, in inland villages more than fifty percent is provided from starch in the stems of wild sagopalm. In coastal and riverine villages, the bulk of energetic quantity is derived from tuberous crops in swiddens and purchased flour and rice. And,
- (4) the results of physical measurements have revealed that the increase of body weight is not steady after the weaning and a striking increase during adolescent ages cannot be clearly

recognized. As the people become old their weight tends to decrease. The survey area traditionally produces no salt. Although a small amount is now purchased in the town, the intake of salt is still remarkably low particularly in inland villages.

The final goal of his research is to clarify the survival and maintenance systems of the Gidra from the viewpoint of population ecology.

After the report, Dr. OHTSUKA answered quite a few questions on the methodology of the determination of the villagers' ages of which they themselves have no idea, methods of his nutritional survey, the present condition of his survey area from political and administrative standpoints, public health conditions of the inhabitants, population movements among the villages in both old and recent times, and the significance and reasons of such movements.

The third report of this symposium was made by Prof. Hideo KOISHI (Laboratories of Food and Nutrition, Faculty of the Science of Living, Osaka City University) and its title was "Life and Nutrition of the Papua New Guinea Highlanders".

His survey was conducted with his associates at Beha Village 80 km to the southeast of Goroka, the biggest town in the Highlands of Papua New Guinea. Beha has a population of approximately 1,000 people and lies on the flanks of Mt. Michael (whose summit is 3,647 m above sea level) from 1,400 m to 2,000 m above sea level. The inhabitants speak their own language which is not understood by people in other villages. The Highlands are ruggedly mountainous and have few roads connecting the villages, which are quite isolated from each other. The air temperature at Beha varies from 25-30°C in the daytime to 14-15°C at dawn throughout the year.

Although the water from a nearby stream is available, the footpaths to the stream are very rugged and steep, so that the villagers make little use of water even for cooking. Wearing clothes is becoming popular. However, this unexpectedly aggravates skin diseases since the inhabitants neither bathe nor wash their clothes and those clothes provide pathogens with favorable conditions for proliferation.

The results of the physical measurements of all the villagers have revealed that both males and females are, on the average, a little shorter than Japanese and weigh about the same, however. Concerning skinfold thickness, the values of both sexes are much less than those of Japanese. This indicates that both sexes are very muscular.

Their diets are composed of sweet potatoes and a small quantity of vegetables. They ingest no salt. They keep pigs as pets and do not usually butcher them. However, they slaughter and eat them at the annual feasts. As a result of a painstakingly exacting survey, Prof. KOISHI made the following conclusion: on a daily basis, a male adult ingested 2,400 kcal of energy with almost zero balance between energetic intake and expenditure, and consumed 35 g of protein. Nearly one hundred percent of the protein was derived from plant foods. Although the villagers' intake of protein was about half in comparison with that of ordinary Japanese, the values of their daily nitrogen balance through their bodies were nearly zero. Two weeks since the villagers consumed far more protein than usual, their nitrogen balance values were noticeably positive. Furthermore, experiments using urea labeled with ^{15}N indicated that considerable quantities of ^{15}N were assimilated into their serum protein.

Prof. KOISHI concluded that Papua New Guineans had adapted to their food environments. As an example he cited their normalized re-utilization of urea for maintaining their necessary amount of body protein.

After the report, Prof. KOISHI answered some questions on the intestinal system of Papua New Guineans such as bacterial flora in their intestines and feces, and the lengths of their intestines. To questions on the causes of deaths and the average longevity of the villagers Prof. KOISHI answered that infant mortality was very high and primarily caused by diarrhea. He also affirmed the difficulty of determining the villagers' ages. Particularly in the case of females, because the social norm bids them work very hard after marriage and they appear much older than they really are.

The main topic in the overall discussions after the three reports was the various aspects of the cyclic pig festivals in the Highlands. Prof. KOISHI contended that they were not for highlanders to recover from their usual lack of protein intake. It was also pointed out that keeping pigs might be regarded as a form of saving surplus products. Another topic was on the division of labor between sexes. Dr. OHTSUKA stated that both hunting and fishing were pursued by males and that agricultural operations and producing starch from sagopalms were mostly carried out by females. In addition, the extent of the penetration of the cash economy was discussed. Prof. KOISHI stated that most highlanders had only a little amount of money and that they did not need much money in their daily lives.