The Origins of the Food-producing Economy [and Comments and Reply]

Author(s): Vladimir Kabo, Gloria Y'Edynak, Gaetano Forni, Kathleen F. Galvin, Dennis L. Heskel, Steven A. Rosen, V. A. Shnirelman, Andrew B. Smith and Trevor Watkins

Source: *Current Anthropology*, Dec., 1985, Vol. 26, No. 5 (Dec., 1985), pp. 601-616

Published by: The University of Chicago Press on behalf of Wenner-Gren Foundation for Anthropological Research

Stable URL: https://www.jstor.org/stable/2743082

The Origins of the Food-producing Economy[1]

by Vladimir Kabo

LIKE ANY OTHER TRANSITIONAL STATE in the history of society and, indeed, any transition from one condition to another, the establishment of the food-producing economy is of outstanding theoretical interest. This transition had revolutionary consequences—the formation of class society, private property, and the state—and the full development of these phenomena would have been impossible without it. The food-producing economy had, in turn, its own prerequisites. Its establishment was a long and complex process. Its potentials were not realized all at once. In keeping with the pace of socioeconomic and cultural development characteristic of the epoch, it was a revolution that extended over millennia. The development of society and culture is a cumulative process. It accelerates over time and eventually reaches proportions that produce a transformation to something qualitatively new. The lower the level of development, the slower and less perceptible the changes that occur within it.

The establishment of the food-producing economy is often, following Childe, called the Neolithic revolution. It is distinguished, however, from the industrial revolution of the 18th and the beginning of the 19th centuries and the current scientific and technical revolution by being initiated from within. This is a reflection of one of the most characteristic features of primitive society, which is that its economy is totally intertwined with its social life. In primitive society the economy is closely tied to social organization and ideology. This is one of the manifestations of primitive syncretism, the amalgamation of basic functions. At higher levels of development, economic activity loses its original comprehensiveness with the increasing differentiation of social, economic, and ideological functions.

The essence of the Neolithic revolution is the transition from one type of economic activity to another—from an appropriative economy to a productive one. The forms of economic activity cannot be the only criterion of primitive society, but they play an important role. The ground for the Neolithic revolution was prepared by the entire development of societies based on an appropriative economy. These societies have many traits which can be seen as prerequisites for the productive economy. Bypassing the prerequisites for animal husbandry and forms of transition to it, which are a special topic treated by a vast literature, I shall examine the preconditions for agriculture, as the dominant form of productive economy and the initiator of the process of transformation of nature and of society. In any case, the establishment of agriculture and of animal husbandry were often closely related processes occurring within the same societies.

The following factors are usually considered basic prerequisites for agriculture: favorable geobotanical background (first of all, the existence of plants suitable for cultivation), a sufficiently high level of development of gathering techniques, the absence of unoccupied territory that would permit the draining off of surplus population, and a crisis of the appropriative economy (*Vozniknovenie* 1967:12). All this is true. Alongside these factors, however, we should be concerned with a problem that has received less attention—the socioeconomic prerequisites for agriculture within the hunter-gatherer community.

Deliberate cultivation of plants was preceded by regular harvesting of wild plants and various forms of more complex gathering. Lips (1928; 1954:103–8), for example, described harvesting peoples (*Erntevölker*) whose economy is based on the planned gathering of one or several sorts of wild plants. The harvest fields of these harvest-gatherers of wild plants are central to their lives, and their communities are concentrated around them. This is not characteristic of typical hunter-gatherers. Communities of harvest-gatherers are significantly larger than typical hunter-gatherer communities, and their structure tends to resemble that of early agricultural societies.

[1] This is a translation, prepared by Peter Skalnik and Ernest Gellner, of an article published in Russian by Nauka Publishers of Moscow in 1980. Copyright is retained by the copyright agency of the U.S.S.R., Vsesoyusnoye Agentstvo po Avtorskim Pravam (6a, B. Bronnaya, K-104 Moscow 103670, U.S.S.R.). The translators are grateful to Lynette Davis and Lorna Weisbecker for their patient assistance with typing of the drafts and the final copy.

VLADIMIR KABO is Senior Researcher at the Institute of Ethnography, Academy of Sciences of the U.S.S.R. (Dm. Ulianov 19, Moscow 117036, U.S.S.R.). Born in 1925, he was educated at Moscow University (D.Sc., 1970) and has been associated with the Institute of Ethnography since 1957. His research interests are the social anthropology of hunters and gatherers, the anthropology and history of Australia and Oceania, the origin and history of religion, and anthropological methodology. He has published (in Russian) *The Origin and Early History of the Aborigines of Australia* (Moscow: Nauka, 1969), *The Tasmanians and the Tasmanian Problem* (Moscow: Nauka, 1975), and *The Primitive Preagricultural Community* (Moscow: Nauka, in press) as well as "Die australische Lokalgruppe" (*Ethnographisch-Archäologische Zeitschrift* 19:583–99), "La communauté chez les prédateurs" (*Etudes Ethnographiques en URSS*, 1982, no. 2, pp. 61–105), and "Die Struktur des urwüchsigen gesellschaftlichen Bewusstseins" (*Ethnographisch-Archäologische Zeitschrift* 23:385–408). The present paper was submitted in final form 23 XI 84.

Lips viewed the regular harvesting of wild plants as an intermediary level between gathering and agriculture. He considered harvest-gatherers, who reap without sowing and whose work is close to the activities of agriculturists, as socially, economically, and psychologically far better prepared for agriculture than typical gatherers. This idea is acceptable provided we recognize that it applies to geographical areas containing plants that offer regular, stable, and abundant harvests (for instance, the wild rice harvested by the Indians of the Great Lakes area). This condition was not generally satisfied in the areas in which agriculture originated or spread.

Maksimov (1929) showed that such peoples as the Australian Aborigines, classic hunter-gatherers of the Mesolithic level of cultural development, came very close to a productive economy, having mastered the arts of caring for plants, harvesting in particular seasons, and processing plants for food in various ways (including detoxification of poisonous plants, threshing, winnowing, milling, and baking unleavened bread). Subsequent researchers showed that the Aborigines in some places came even closer to agriculture than Maksimov had thought. For example, there were primitive forms of irrigation (construction of dams and reservoirs) to prevent the drying out of plots during dry seasons and stimulate the growth of useful plants that attract fish, birds, and animals. Canals hundreds and even thousands of meters long had been constructed from time immemorial, long before colonization. This was an intentional, purposeful influence on nature and even more effective than the attempts at the planting of yams and other plants observed in various parts of Australia (Campbell 1965).

The Aborigines lacked, however, the main thing: the systematic, purposeful cultivation of plants beginning with the preparation of the soil and planting or sowing. The episodic planting of wild plants by the Aborigines, the Semang, the Senoi, and other primitive gatherers is a tentative approach to this and is one of the sources of the productive economy. People began cultivating plants in the process of gathering. Novikov (1959), perhaps somewhat overstating the case, has argued that people created cultivated plants while still gatherers through unintended selection or "precultural selection." Gathering was a more reliable source of food than hunting and therefore a more promising style of economic activity for the development of agriculture, notwithstanding its primitive technology (apart from the methods of processing and preparation of products, which were complicated and varied enough). Nonetheless, the Aborigines did not take the decisive step separating even the most primitive agriculturists from hunter-gatherers. The reason was not that they did not have suitable plants at their disposal, as is sometimes claimed. The same tubers that have been cultivated from time immemorial in New Guinea also grow in Australia, and even the natural conditions of northern Australia are very close to those of New Guinea. Moreover, regular contacts existed for centuries between the agriculturists of Indonesia and Papua New Guinea and the Aborigines of northern Australia, and the Australians borrowed a number of cultural achievements from their more developed neighbors. The reason they never became agriculturists is to be sought elsewhere.

The complex gathering associated with the processing of plant products that has been identified by ethnography among the Aborigines is also observable in the archaeological record of Palaeolithic Eastern Europe. Gathering, like hunting, developed and improved there throughout the Palaeolithic and was important as a form of economy and a source of food.

Women played the same role in these societies that they later did in agricultural societies. Statuettes of women with emphasized secondary sexual characteristics are typical of the late European Palaeolithic. Sometimes they are depicted as engaged in ritual dance, and, like the mother-goddess figurines of the early agriculturists of Eastern Europe, the Near East, and Central Asia, they are doubtless connected with cults of fertility and the renewal of vegetation, the animal world, and humanity itself. It is possible that at the basis of these cults is a common circle of ideas arising in the one case out of advanced gathering, in the other out of early agriculture.

Grinding was the technical base of advanced gathering. Other prerequisites for the development of agriculture were the emergence of the hoe (which first appeared in the Palaeolithic) and the polished axe, which made possible slash-and-burn agriculture. The stick-hoe technique, one of the earliest ways of tilling the soil, developed in the Palaeolithic in close association with gathering. In the Mesolithic, there were harvesting knives, predecessors of sickles. However, neither grinder nor hoe, polished axe, or harvesting knife in itself achieved the Neolithic revolution. The Australians used grinders and polished axes for many millennia as tools of their appropriative economy, which also involved irrigation. Technology is merely a prerequisite, a condition of transformation, not its active mover. People themselves—or, more accurately, societies—are always the active force. To begin actively searching for fundamentally new ways of mastering its environment, a hunter-gatherer society must experience a powerful impulse. This may take the form of a crisis, such as a sudden disruption of its balance with its environment as a consequence of an abrupt change in natural conditions (such as happened in vast areas of the globe in the postglacial epoch), perhaps as a result of human activity (e.g., the extermination of animals), and demographic upheavals, or it may take the form of influence from more developed societies. Bushmen asked why they did not have agriculture answered, "Why should we cultivate plants when there are so many mongongo nuts in the world?" (Lee 1968:33). Moreover, in order to adopt an innovation a society needs to have reached a certain level of development.

The Australian Aborigines experienced no such crisis of the appropriative economy and had no other incentive to borrow agriculture from the Papuans or the Indonesians. In some cases there is a third possibility—a slow, gradual accumulation of developments out of which the productive economy eventually emerges, as if spontaneously, independently of the will of people—quantitative accumulation of new phenomena at last becoming qualitative change. The Australians were on the way to such a transformation. Many early agricultural and early pastoralist societies probably developed in this way. Societies inhabiting the zones endowed with conditions favorable for the cultivation of plants and the domestication of animals were the pioneers of the productive economy. Vavilov established that the main centers of world agriculture were located in mountainous tropical and subtropical zones where the most favorable conditions existed for the geno-formative process and for the life of ancient man. Western Asia, one of the most ancient centers of the productive economy, is one such zone. The significance of ecological upheavals was not great for Western Asia. In contrast, in Ice Age Europe close to the glacier there was a crisis of the appropriative economy as a consequence of ecological cataclysms, and it is possible that Europe borrowed elements of the productive economy from the Western Asiatic center.

Masson (1970:111) suggests three possible models of the Neolithic revolution: (1) the establishment of an agricultural-pastoral economy on the basis of a highly developed hunter-gatherer economy; (2) the emergence of the agricultural economy on the basis of a highly specialized gatherer economy under the conditions of a crisis of hunting caused by paleoclimatic change; and (3) the formation of the agricultural economy under conditions of the predominance of fishing or sea hunting, favoring the emergence of sedentarism. The Western Asiatic and many other societies probably developed in accordance with the first of these models, on the basis of experience accumulated over millennia and increasing mastery of methods of cultivation of plants and domestication of animals. The second model is widespread in other areas of the globe. The third

model has comparatively limited application. A specialized fishing and sea hunting economy usually provides a society with a regular, reliable supply of foodstuffs. For such a society to proceed to an intensive productive economy calls for a crisis of the appropriative economy, and at this point we are in fact dealing with the second model or even the first. Sedentarism is not a precondition for the productive economy, though it eases the transition to it. Lastly, it should be kept in mind that highly developed cultures tend to expand, and the borrowing of elements of the productive economy by societies with appropriative economies complicates the paths of the Neolithic revolution.

The view of hunter-gatherers as leading a miserable existence under almost constant threat of death from hunger has deep roots in both the foreign and the Soviet literature. This view, however, needs revision. Grey (1841:262), one of the first students of Australia, called it "absurd"; on his own land, Grey reported, the Aborigine "knows exactly what it produces, the proper time at which the several articles are in season, and the readiest means of procuring them. According to these circumstances he regulates his visits to the different portions of his hunting ground; and I can only state that I have always found the greatest abundance in their huts." With the exception of relatively short periods of the year, the hottest and the rainiest, in which the Aborigines really do suffer from hunger, he said, "they can obtain, in two or three hours, a sufficient supply of food for the day" (p. 263). This description is in full harmony with reports by other 19th-century investigators (Curr 1886:240; Eyre 1845:250–55) and is equally apt for communities of Aborigines leading a traditional way of life in our time. Adult members of two local groups studied in 1948 by McCarthy and McArthur (1960) worked on average only four to five hours per day. This was enough time to secure all members of the group sufficient food according to the U.S. National Research Council's standards. Data collected by Lee (1968, 1969) among the !Kung Bushmen indicated that to secure sufficient food for all members of the group every adult had to work only two and a half days a week (six hours a day), an average of two hours and nine minutes a day. The time needed for the preparation of food and the making of tools is not counted here, and if it were added the final figure would be close to that established by McCarthy and McArthur. The observations were performed in July and August, a part of the year that is transitional from more favorable conditions to less favorable ones and therefore sufficiently representative. Calculations show that one person hunting and gathering could supply four to five persons with food and that 61.3% of the population was able-bodied. Woodburn (1968:54) reports that Hadza hunter-gatherers spend on average no more than two hours a day in obtaining food. In the opinion of Sahlins (1972:1–39), these data indicate that the means at the disposal of primeval preagricultural society were fully sufficient for the satisfaction of its needs and that the living conditions of our Palaeolithic ancestors were even better.

The reality is, of course, more complicated and contradictory than this. Many hunter-gatherers in areas with extreme ecological conditions suffer from periodic starvation (and this is equally true of agriculturists). The living conditions for Palaeolithic societies in different parts of the world and in different epochs, glacial and interglacial, were varied and heterogeneous. For the majority of hunter-gatherers, however, the picture just drawn is in principle correct. That life in primeval society was spent in a cruel struggle for survival is an exaggeration, and this means that the transition to a productive economy is to be explained not only by the contradiction between the vital needs of people and the low level of development of the productive forces, as is often supposed (*Politicheskaia ekonomiia* 1973:36), but also by other factors. Among these the cumulative, summative process of development of culture occupies an important place.

Culture has a capacity for development in accordance with its own internal laws on the basis of already accumulated values. Cultural values are created by society, which feels them as needs, but the needs themselves are created by culture. For example, nomadic hunter-gatherers have no need of long-term settlement, pottery, large reserves of foodstuffs, and so on. All this would make them uneasy and would stand in their way. A certain minimum of needs is typical of them and conditioned by their way of life. Needs for these and many other things appear only with sedentarism and the transition to a productive economy. Even during this transition, these needs will not emerge as long as the requirements of society are satisfied by the appropriative economy.

Hunter-gatherers offer numerous examples of the gradual accumulation of features leading to the productive economy—instances of conscious, purposeful manipulation of nature. The data drawn from the Australian Aborigines are typical. No less interesting in this context are the Tasmanians, the only society that persisted at the level of the late Palaeolithic right up to the beginning of European colonization. Even the Australians were somewhat more highly developed than the Tasmanians. Both the Tasmanians and the Australians deliberately burned dry grass on their hunting territories in order to corner kangaroos, which they hunted as the animals grazed on fresh green grass. At the same time, they ensured that the clusters or groves of trees in which the animals hid remained unburned. All this attracted herds of kangaroos to such places and contributed to an increase in their numbers. This reflects the conscious concern of hunters with the maintenance of the meat supply at an optimum level (Kabo 1975:116–19). This spontaneous perception of certain laws of nature—a comprehension of the connection between causes and effects separated from each other by considerable time gaps—is remarkable for primeval hunters; Jones (1969) even calls it "fire-stick farming." It does not, of course, constitute agriculture, but it may be called primitive animal husbandry, and in its consequences and effects on nature it is in a sense comparable to agriculture. A new, artificial environment is formed spontaneously as the fruit of the will and the labor of the people, and this happened long before the appearance of agriculture.

Mitchell (1848:412), one of the first explorers of Australia, wrote: "Fire, grass, kangaroos, and human inhabitants, seem all dependent on each other for existence in Australia, for any one of these being wanting, the others could no longer continue." Though an exaggeration, this assertion nevertheless highlights the existence in Australia of a sort of ecological balance in which the primeval hunter himself is an active factor. Part of the ecosystem, he acts with vigor within it, regulating in his own interest the interaction of its other parts. However, the active and systematic influence of people on the ecosystem sooner or later affects the ecological balance. The Tasmanians' burning of grass was the cause of periodic fires that covered enormous areas, replacing humid forests with bushes and open savannas and altering the climate and the character of the soils. Fire freed whole regions of impenetrable forest (which was a great advantage for the Tasmanian hunters), destroyed the vegetation cover in significant areas, and increased erosion. All this indicates that, even in this early stage of socioeconomic and cultural development, people did not just passively adapt to the natural environment but also actively influenced it. In pursuit of their own interest, and often quite consciously, they effected far-reaching changes in it the consequences of which could not, of course, be foreseen.

However people mastered agriculture in various parts of the world (as a consequence of the presence of favorable natural-geographical conditions, a crisis of the appropriative economy,

or some other factor), it surely emerged from gathering practices that had reached a high level of (often specialized) development.

Sedentarization is often seen as one of the important prerequisites of the transition to the productive economy, and it does indeed facilitate the emergence of a productive economy in the spheres of both agriculture and, perhaps to an even greater extent, animal husbandry. There are, however, seminomadic forms of agriculture that themselves lead to sedentarization. Ziber (1899:40) noted that "this kind of original nomadic agriculture equally fits both the hunting-nomadic way of life and the beginnings of agriculture." The transition to the productive economy and the gradual sedentarization of society are interrelated and mutually conditioning processes. Sedentarization, full or periodic, is possible with an appropriative economy only under exceptionally favorable conditions. Such conditions, obtained, for example, for the sedentary fishermen and hunters of the Far East and the Northwest Coast of America and probably for the late Palaeolithic hunters of Europe. Under conditions of relative plenty, however, hunters, fishermen, and gatherers do not experience the need for a transition to a productive economy. Their domestication of animals (dogs, deer, camels) does not determine the basic direction of their economy, which as a whole remains appropriative and is sometimes rather affluent. An affluent appropriative economy can reproduce itself for generations without taking the decisive step toward productive forms of economic activity. This was probably the case with both the sedentary and the semisedentary hunters of Europe in the late Palaeolithic. Only sharp changes in ecological conditions in the Mesolithic led to the transformation of the economy and the whole way of life of now already seminomadic hunter-gatherers. These changes led, in the final analysis, to the crisis of the hunting economy that conditioned the transition to the productive economy.

Ethnography has at its disposal rich materials characterizing societies that are, as it were, on the brink of the productive economy—no longer entirely hunters, fishermen, and gatherers but not yet fully agriculturists. Many of these societies are found in South America, where tribes completely ignorant of agriculture are very rare and most display rudimentary forms of agriculture without fully excluding appropriative forms of economy. One of these tribes is the Nambicuara of Brazil. Some Nambicuara groups are unfamiliar with the construction of permanent settlements and pottery making. They move in small collectives, generally of five or six families each but sometimes consisting of only a single nuclear family—in other words, economic groups typical of hunter-gatherers. Depending on the season of the year, gathering with hunting or agriculture plays the basic role in the Nambicuara economy. In the course of the five rainy months they live in communities along the banks of rivers and cultivate small plots of land. During this time gathering and hunting have secondary importance. In the dry season, they roam the savanna in small groups engaged exclusively in gathering and hunting. As is typical of many hunters, men occupy a dominant position in Nambicuara society; every group has at its head a good hunter, and marriage is virilocal (Boglár 1972; Lévi-Strauss 1963:109–10). Essentially, the Nambicuara are semisedentary hunters for whom primitive agriculture is a temporary occupation.

The Sirionó, who inhabit the forests of eastern Bolivia, are a society in which hoe agriculture is weakly developed and hunting and gathering play a dominant role. They live in seminomadic communities numbering from 30 to 120 members (Holmberg 1950, Needham 1961). The Indians of Amazonia studied by Carneiro (1969), familiar with agriculture since 1500 B.C., even today have not come over to it entirely. Differences in the degree of importance of agriculture may be observed in different tribes. For example, the Amahuaca obtain about 50% of their livelihood from agriculture and about 40% from hunting; fishing and gathering provide the rest. It appears that in the past, before the introduction of metal tools, the energy expenditure in hunting (per kcal) was not much greater than in agriculture. The advantages of agriculture alone are not sufficient here to lead to its complete predominance. The main bulk of the protein consumed is secured by hunting, which is incompatible with sedentary life in villages. Both the Amahuaca and the Sirionó have to move in the search for food, and this determines their way of life. The tribes living along the great rivers are relatively sedentary fishermen, and sedentarization facilitates the development of their agriculture. Such, for example, are the Kuikurú of the upper Xingú in central Brazil. Fishing satisfies 15% of the food needs of the Kuikurú, and no less than 80% is supplied by agriculture (the growing of cassava). Whereas Amahuaca communities may have 15 persons, a Kuikurú village may have 145 (Carneiro 1969:273). The slash-and-burn agriculture of Amazonia does not imply a purely sedentary type of economy, even for fishermen such as the Kuikurú. Settlement near a river does, however, increase the roles of fishing and agriculture, and this contributes to sedentarization and concentration of population. By contrast, settlement away from the river leads to a strengthening of the roles of hunting and gathering and to the atomization of society. Here, as anywhere else in the world, the transition to the productive economy is to a considerable degree determined by ecological factors.

Slash-and-burn agriculture combined with fishing, hunting, and gathering was the basis of the economy of the majority of Brazilian Indians. Many had only recently begun to master agriculture. At the end of the 19th century the Bakairi still remembered that their grandfathers "did not know anything about maize and manioc," and the Bororo hunters treated the crops of their agricultural neighbors like other gifts of nature: at every opportunity they pulled the young manioc up by the roots, baked it in the fire, and ate it (Steinen 1894). Agriculturists cleared the forest with stone axes, broke up the soil with sticks, and used sharp poles to make holes in the ground for planting; both tools and production technology were retained from the period of gathering. Every six to eight years communities moved to new places because the soil near the settlements had been exhausted. The role of appropriative forms of economy was still considerable. Both in agriculture (especially in the clearing of the forest) and in fishing and hunting, collective forms of labor occupied an important place; all the men of the community took part in them (Fainberg 1975:8–11). In its division of labor and forms of collective work, the transitional economy of the Brazilian Indians was similar to that of typical hunters, fishermen, and gatherers. The predominance of patriclan organization among them is probably connected with this. Land belonged to communities, but plots were tilled and exploited by small families. The place of the family in the economy is characteristically more conspicuous among early agriculturists than among hunters. Consumption, however, often has a collective, communal character (Fainberg 1975:13–14). As is the case with many peoples whose economy is appropriative, communities consisting of representatives of different lineages remained typical for the Brazilian Indians along with local clan communities.

Among the Indians of the upper Xingú, the community was the basic unit of production and consumption. Collective labor in agriculture was important here as elsewhere in Brazil. However, toward the end of the 19th century and perhaps even much earlier, the community was subdivided into households of three to eight nuclear families that played an important socioeconomic role. According to Fainberg (1975:90), the distinction of households within the community is a sign of disintegration of the matriclan. In reality, the households of these early agriculturists are a transitional form between the unstable economic groups of hunter-gatherers and the more stable kinship-based work units of agriculturists. The transition from

the appropriative economy to the productive one was not yet complete.

The functions of the household (one of which is tillage of land in common) make plain how the dominance of agriculture determines the character of the socioeconomic structure. The household becomes the basic productive collective (Fainberg 1975:91) and tends to replace the community. This was not and could not be the case in the hunter-gatherer community. Fainberg is therefore mistaken in supposing, because of the outward similarity in form of life, type of settlement, and security of livelihood of late Palaeolithic hunters and hoe agriculturists, that the hunter-gatherer communities of the past can be reconstructed on the basis of data on communities of hoe agriculturists (Fainberg in *Pervobytnoe obshchestvo* 1975:76–77). These two types are not only separated by a chronological gap but also, and much more important, fundamentally distinct in their structure. One can confront Fainberg with Khazanov's words: "The transition to the productive economy and the development of the productive forces connected with it engendered qualitative changes in the life of the societies that achieved it" (Khazanov in *Pervobytnoe obshchestvo* 1975:88).

In North America the first step toward the productive economy was taken by those groups (Ojibwa, Assiniboin) that not only harvested wild rice but also were familiar with methods of cultivating it. Plots of land were the property of the families living on them, and it is not surprising that among the Ojibwa families began to stake claims to plots of wild rice (Jenks 1900). This phenomenon is rather characteristic of early agriculturists, but here we are dealing with a society just on the threshold of the productive economy. Early steps toward the productive economy were also registered among the Coast Salish. Traditional fishing combined with gathering made it possible for them to live in a fairly sedentary way, half the year in one place and half in another two days' walk away. This in turn allowed women to care for planted potatoes, recently introduced, without its being an obstacle to the previous way of life (Suttles 1951).

The Ik of northern Uganda, under pressure of external circumstances, abandoned the nomadic way of life of hunter-gatherers and turned to unstable agriculture (Turnbull 1972). Extensive seminomadic slash-and-burn agriculture was until recently characteristic of some Bantu groups of equatorial Africa. A temporary settlement would be established beyond the limits of exhausted land, next to a new field, and after a time the community would move there altogether (Morett 1951:93). Some of the sedentary groups of Vedda hunter-gatherers of Sri Lanka have reached the threshold of slash-and-burn agriculture, possibly under the influence of their more developed neighbors, the Sinhalese. The beginnings of cultivation—the planting of fruit trees and wild yams—have been observed among the hunter-gatherers of the Malay Peninsula—the Semang, Sakai, and Senoi (Semenov 1974:15–16). Hunting among the agriculturists of Papua New Guinea and Melanesia, though not vitally necessary, nevertheless occupied a very important place in their lives (Bulmer 1968). The Maori of New Zealand combined cultivation of *kumara* (sweet potato) with the gathering of the roots of wild ferns (Shawcross 1967).

All these examples represent various stages of the transition from the appropriative to the productive economy. What happens in the social sphere, in the structure of society? Unfortunately, the data available to us are not very rich. Some have been introduced above. They show that a society that enters into this process is transformed; the early agriculturist society differs in many respects from the society of hunter-gatherers. According to Watson (1965), the introduction of the sweet potato to New Guinea brought about changes in demography, social structure, technology, religion and magic, mythology, and the nature of male domination. The size of the hunter-gatherer community is limited by the accessible reserve of animal and vegetal resources in its territory. Improvement in food procurement techniques—intensification of hunting—leads to the progressive extermination of wild animals. With the emergence of the productive economy, unexpected possibilities of increase in the quality of food and control over its reproduction emerge, and this leads to demographic changes. The density of population increases sharply, as does the ratio between the size of the group and the territory it occupies. Communities become larger and more stable, although their size is still limited by the acreage and fertility of fields. There is a tendency toward sedentary life which is initially hampered by semisedentary extensive agriculture. The world average size of local groups of hunter-gatherers is 50–100 persons, whereas for agriculturists it is 100–150, with an upper limit of 350–400. The level of social and cultural development rises in direct relation to these processes. Social integration increases with the growth of communities and increase in density of population. Social and cultural interaction of communities increases, and the formation of larger and more integrated ethnic communities advances.

These processes may be observed among the Baining, an early agricultural society of New Britain (Kabo 1964). The Baining practice slash-and-burn long-fallow agriculture, one of the earliest forms of agriculture in the tropical-forest zone, with wood and stone Neolithic technology. They move from one place to another when the land, unfertilized except by ashes from burned brush, ceases to yield a harvest, usually two or three years after a plot is first exploited. The extremely backward character of their agriculture and the low fertility of the soils in their mountainous area prevent the Baining from completing the transition to sedentarism. The plots on which they cultivate tubers (taro, yams, sweet potatoes), as well as bananas and sugarcane, are usually situated not far from the settlement. However, if there is no satisfactory land nearby, they look within the bounds of their territory for a suitable new place, sometimes far from the previous one, and then dismantle their primitive huts and carry them nearer to the new plot. Having found a plot of forest suitable for clearing, the Baining fell the trees on it and then cut branches and stumps, lay them among the felled trees, and leave them to dry. Then they burn the dried brush. After that the plot is cultivated either as a unit or in strips delineated according to the number of huts in the settlement and the size of the family living in each. Though the clearing of the plot and the preparation of the land are carried out collectively, families work and harvest their plots separately. The land is cultivated with a simple stick, an archaic tool characteristic of the preagricultural, gathering economy.

Slash-and-burn agriculture in its earliest, primeval form, as observed among the Baining, was practiced in the middle Neolithic in many forested areas of the world. This irrational, destructive mode of cultivation was widespread in the recent past in Southeast Asia (from where it probably penetrated into Oceania), Madagascar, Africa, and South and Central America. The forest was cleared and then burned at the end of the dry season, and at the beginning of the rainy season crops were sown on the ash-covered plots. After three years the fertility of such a plot decreased rapidly, and the agriculturist went on to another place. One of the probable causes of the disappearance of ancient Maya civilization in Yucatan is the exhaustion of the tropical soil as a consequence of the dominance of slash-and-burn agriculture. Not long ago this extensive form of land use fed some 20 million of the world's people (Conklin 1961).

Territorial groups are the main owners of land among the Baining. Within the limits of the territories of these groups, land is divided among communities composed of one or more extended families and existing more or less in isolation from one another. Each extended family can at its own discretion

choose an empty, unoccupied plot, clear it, and use it, but its right to the plot is recognized only as long as it continues to cultivate it. When the plot ceases to produce and the family or community abandons it, it becomes available to the whole territorial group. Density of population among the Baining is very low. Burger (1913, 1923) tells us that he had to climb for hours in the mountains to visit the scattered settlements of extended families belonging to a single community. An extended-family settlement may consist of one or several huts, each housing one or several nuclear families. Usually each family has its own fire, the center of family life. Some settlements consist of ten to twelve huts, and all the inhabitants of such a settlement make up the extended family (Rascher 1909). Members of extended families maintain contact in all their movements and thus form a community (Laufer 1946–49).

The Baining, autochthonous inhabitants of the Gazelle Peninsula and speakers of one of the so-called Papuan languages, had been pushed by the Melanesians into the mountainous interior. Neither hunting with primitive weapons such as spears and clubs nor the gathering of wild plants could secure them sufficient food, and this created a crisis of the hunter-gatherer economy. Having become acquainted with the simplest methods of agriculture through their Melanesian neighbors, they gradually became agriculturists. Hunting became a secondary, auxiliary branch of their economy. According to Parkinson (1907:156), the Baining were in their cultural development the most primitive people of all those he met in Oceania. This applies not only to the poverty of their cultural inventory—lacking the bow and arrow and including only the simplest spears—but also to their social organization. Their small local groups, low density of population, amorphous social structure, and lack of tribal organization are all reminiscent of the Tasmanians and other hunter-gatherers. The territorial groups of the Baining—clusters of communities linked only by closeness of language and territory, common self-applied names, and collective participation in warfare—are typologically very close to Tasmanian tribes (Kabo 1975:142–49). The Tasmanians differ only in their periodic gatherings of members of the tribe for collective hunts, rituals, or other activities. Neither the Tasmanian tribe nor the Baining territorial group acts as a corporate body in any organizational sense. These are social formations typical of one of the early stages of the process of the establishment of the tribe as a social institution. The character of relationships of landownership also links the Baining to the hunting peoples. For both, a family's right to land exists only as long as the land is used (cultivated or hunted) and subsequently reverts to the community.

There were and are, of course, substantial differences between the Baining and the Tasmanians, e.g., Neolithic stoneworking technology among the former and Palaeolithic among the latter. The most important difference, however, is agriculture. The Baining had barely attained the level of the productive economy, but this step had transformed their society. A relative sedentarism emerged that was not typical of hunter-gatherers in their geographical area, and with it came more permanent dwellings, in some cases even long houses each inhabited by an extended family. Agriculture and relative sedentarism preserved the isolation of communities fostered by the mountainous environment and the low density of population; the tendency toward social integration and rapprochement characteristic of agriculturists is for the Baining a matter of the distant future.

As I have said, the only difference between the Tasmanian tribe and the Baining territorial group is participation in collective hunts, rituals, and other shared activities. The agricultural Baining did not organize collective hunts, and members of territorial groups gathered only for warfare. They are perhaps more individualistic than hunters. The Baining community survives but in contrast to hunter communities seems amorphous. Its importance disappears, and the extended family replaces it as the main land user, the center of social reproduction. In some places, extended families themselves have become independent communities.

On the basis of agriculture and the consequent possibility of surplus product, in other words, on the basis of material differentiation, the first signs of social stratification appear among the Baining. The heads of the wealthiest extended families become influential not only in their communities but also beyond their limits. This process, completely alien to hunter-gatherer society, is characteristic of early agriculturists.

The emergence of a primitive social structure is one of the most important prerequisites of the productive economy. The catalyst for substantial social transformations, the productive economy itself emerges from a certain level of development of the social base. Whereas sedentarism is not indispensable for the transition to agriculture, a certain stability is prerequisite: a firmness of social structure, a close link between the society and a definite territory, an adaptation of economic activity to the natural cycle. All these phenomena, without which the transition to the productive economy would hardly be possible, are provided by the typical structure of hunter-gatherer society on the brink of the transition to agriculture. Basic elements of this structure are the community, a relatively stable and permanent localized group and the locus of landownership and the main production functions, and economic groups consisting of one or more families. The community, while controlling a certain territory that provides it vital resources, periodically splits into economic groups according to ecological conditions. The totality of economic groups is in fact the community in action—in the process of active adaptation to the conditions of economic activity. The economic group is inconstant in its size, and its dynamics are ecologically conditioned. This is a form of active adaptation of primitive society, still in the stage of the appropriative economy, to the changing conditions of place and season. An extended characterization of these basic elements of the social structure of hunter-gatherers on the brink of the transition to agriculture has appeared elsewhere (Kabo 1968; 1975:125–42, 151–52). The preagricultural community is, moreover, divided into collectives according to age and sex criteria. Its leading productive functions are based on a natural, age- and sex-based division of labor. Finally, the tribe is both an aggregation of communities and the supreme owner of the territory controlled by all these communities. Basically an ethnic commonwealth, it nevertheless displays some socioeconomic traits, the main one being landownership.

All these elements of the structure of hunter-gatherer society in their totality constitute the social or, more exactly, socioeconomic basis of the productive economy in the making. In this complex of phenomena, the significance of which is ambiguous, it is necessary to define the community. The community is the fundamental productive unit of preagricultural society, optimally adapted to ecological conditions. This social institution, inherited by early agricultural society from preagricultural society, is one of the most important prerequisites of the productive economy. The whole social structure gradually changes with the transition to agriculture and the change in forms of social adaptation, and these qualitative upheavals are visible first of all in the community.

The social structure of the Nambicuara hunter-agriculturists preserves some characteristics associated with the appropriative economy. Their communities split at certain times of the year into mobile, unstable economic groups similar to the communities of typical hunters. The so-called households of the Indians of the upper Xingú are a transitional form between the economic groups of hunter-gatherers and the productive associations typical of early agricultural society. The system of economic groups as a mode of adaptation of the primitive preagricultural community to changing conditions disappears with the final transition to agriculture. Its place is taken by other forms of productive organization based on the internal

division of the community according to age, sex, and family criteria. Economic groups are also based on the subdivision of the community into individual families. However, unlike the productive associations of early agricultural society, these are not simply productive associations but, taken as a whole, constitute the community itself in action. The individual family plays an ever more visible role in the structure of agricultural society, as a consequence of the disappearence of the economic groups characteristic of preagricultural communities. This is why families in early agricultural societies tend to be larger (extended families) than in hunting societies.

The most important precondition for the productive economy is the development of collective ownership of the basic means of production—land. The hierarchical structure of relations of landownership (tribal ownership, ownership by particular communities) typical of preagricultural society is inherited by the early agriculturists and then transformed, along with the social structure itself and the process of social differentiation. The character of relations of production and exchange, the division of labor, the roles of men and women in social, economic, and religious-ritual spheres, and the relative mobility of the population all change with the transition to the productive economy. However, the prerequisites for all these changes were already present in the preceding epoch.

The transition to the productive economy transforms the traditional society of hunter-gatherers in different ways depending on the type of productive economy. Two Indian tribes of Arizona, the Pima and the Papago, for example, combined agriculture with hunting and gathering even before European colonization. The agricultural economies of these tribes depended in the one case on irrigation and in the other on rainfall. Consequently, they developed different forms of social order: the Pima had large settlements with a tendency toward political unification, depending on a single irrigation system, the Papago smaller villages and amorphous political organization. Some groups of Papago continued to practice primitive seminomadic agriculture for a long time (Hackenberg 1962). Consequently, the social organization of the Papago, unlike that of the Pima, who had a different relationship to the environment, preserved many traits typical of the social organization associated with a transitional economy. The elements that combine to form economic-cultural complexes—hunting and gathering, harvesting of wild plants, agriculture—vary, and the system of social links crystallizes around these elements in different ways and functions differently.

Some peoples have managed to achieve a comparatively high level of social and cultural development on the basis of an appropriative economy. Among these are the Indians of the Northwest Coast of America and of southern Florida, the Aleuts, the Itel'men, the coastal Chukchi and Koryaks, some groups of Eskimo, and the Gilyaks. In some places the development of property and social stratification went rather far, and one may speak of the disintegration of primitive communal relations and the beginnings of the process of class formation. This allows us to place these peoples on the same level as the representatives of early forms of the productive economy. This is explicable in terms of a special form of economic activity: settled fishing and the hunting of sea mammals. It is their exceptional ecological conditions that explain why only these peoples attained the level of property and of social stratification, in general not characteristic of the appropriative economy. Periodic surplus of the products of fishing and winter storage here play a major role. These conditions also produce firm sedentarism, possible for hunters only under exceptionally favorable conditions. The Europeans of the late Palaeolithic were entirely or periodically sedentary hunters, and the Ainu of Hokkaido provide a contemporary example of an appropriative economy of the mixed type, based on fishing and hunting not of sea but of forest animals (bears, deer). Salmon, the staple food of the Ainu, the Gilyaks, and the Northwest Coast Indians, swam periodically in great numbers up the coastal rivers.

This periodicity and plentiful supply can perhaps be compared to the periodic harvests of agricultural products. The technology of fishing among these peoples reached a high level of sophistication, placing their fishing on an immeasurably higher level than, e.g., the primitive fishing of the Australian Aborigines. The Indians stored for the winter up to 1,000 salmon per family. One Gilyak family, according to Kreinovich (1973:465; *Narody Ameriki* 1959:155), prepared up to 3,840 pieces of salmon-type fish for the winter; each family member got 400 pieces of fish, leaving some 2,000 pieces for the dogs. These peoples were virtual gatherers of a "harvest" of salmon, and the "harvest" swam into their traps by itself. By contrast, the primitive fishermen who constitute typical representatives of the appropriative economy assemble no such stores. This high level of development of production and consumption, comparable only to that of peoples with a productive economy, was the main precondition for property and social differentiation, an early form of slavery, and vigorous exchange. Moreover, these Indians cultivated tobacco, raised dogs for their pelts, and made some of their tools of copper, all of which also sharply distinguish them from typical representatives of the appropriative economy.

Sedentary fishermen and hunters of sea mammals developed socioeconomic structures of a special type, and it is impossible not to differentiate them from typical hunter-gatherers such as the seminomadic or nomadic fishermen represented, for example, by some groups of Eskimos or Australian Aborigines. In their form, the societies of sedentary fishermen closely resemble those of peoples with a productive economy. Productive fishing and hunting of sea mammals under conditions of sedentarism, on the basis of a highly developed fishing technology, with a substantial surplus product—all this conditioned property and social stratification among the Northwest Coast Indians. Under the conditions in which societies with appropriative forms of economy usually lived, these were simply impossible. It should, incidentally, be recognized that in the past this type of appropriative economy was probably far more widespread than it is today. This is documented, for instance, by archaeological cultures of the Northern Neolithic—the culture of the sedentary fishermen and sea-mammal hunters of the North. There also, a surplus product was created in considerable quantity, and on this basis social differentiation developed.

Taking all this into account, it is apparently correct to speak of two basic lines of development of the appropriative economy. One is the usual one; the other emerges only under special conditions. The first contains more prospects because it leads in the final analysis to the establishment of a productive economy and hence to new social forms. The second is a sort of blind alley. It exhausts its potential, as it were, without leading to the next stage of socioeconomic development.

Archaeological research in various parts of the world permits us to trace the main line of development from hunting and gathering to agriculture and productive animal husbandry through the observation of concrete societies. Ethnography and archaeology alike show that the preconditions for this transition were present in the stage of the appropriative economy.

The excavations of MacNeish (1964, 1965, 1966) in the Tehuacán Valley of Mexico have uncovered, in a number of caves, cultural strata dating back to the 12th millennium B.C. and documenting an uninterrupted development of Mesoamerican civilization from its birth in the midst of seminomadic hunter-gatherer populations to its flowering from the 1st millennium B.C. to the 1st millennium A.D. Its heyday de-

pended on agriculture, which, the excavations show, was born here in the 7th–6th millennium B.C. on the basis of highly developed specialized gathering. The gatherers and hunters of Tehuacán moved about in a certain relatively limited area. Most of the sites were occupied only seasonally and covered no more than 30 square meters. Where two hearths were found on a site, MacNeish concludes that no more than two or three families occupied it simultaneously. Some sites were occupied by as many as three to eight families. In the dry season people departed in small groups for the part of their territory in which the most food was found. Otherwise they led a sedentary existence.

All this changed with the beginnings of agriculture. The mere tillage of plots ties people to certain places. The last seasonal camps in caves are from the 7th millennium B.C., and their inhabitants were still hunter-gatherers. In the next stage (7th–5th millennium B.C.), signs of cultivation of plants appear, and people gradually, in the course of a long evolution, move from caves to open, permanent, sedentary agricultural settlements. Even up to the 4th millennium B.C., however, gathering and hunting played a predominant role in their economy as before. The establishment of the productive economy in Mesoamerica took from three to four millennia, from the 7th till the end of the 3d millennium B.C. (Guliaiev 1972:48–50; *Konferentsiia* 1974:94–99; MacNeish 1964, 1965, 1966).

In contrast to the Old World, where animal husbandry played an enormous role from the very beginning of the productive economy and the set of cultivated plants was comparatively small, the New World had an immense variety of cultivated plants and little animal husbandry. This had great importance for the development of Mesoamerican civilization. The discoveries of archaeologists show that the high civilization of Mesoamerica owes its origins not to mythical inhabitants of Atlantis or visitors from outer space but to a slow, gradual, and uninterrupted development from the primitive situation that was conditioned by agriculture. An original combination of fishing, sea hunting, and gathering with agriculture (mainly maize cultivation) in the 3d–2d millennium B.C. has been uncovered by archaeologists on the coast of Peru. Here again a productive economy gradually developed out of an appropriative one (Berezkin 1969; Masson 1970: 130–33).

The archaeological investigations of Masson (1970) in Central Asia have produced evidence of ancient agriculturists among whom elements of the preagricultural economy still played a significant role. Excavations at Dzheitun revealed a sedentary community consisting of small families in which archaic forms of agriculture and animal husbandry were combined with hunting.

At Jericho (7th–6th millennium B.C.), Eridu (Sumer, 5th millennium B.C.), and other places in the Near East, an analogous type of early agricultural community was discovered. The sedentary agricultural economy of Çatal Hüyük (7th–6th millennium B.C.) developed a complex economy combining hunting, gathering, and agriculture. The birth of a productive economy combining animal husbandry and agriculture emerges from the excavations at Shanidar and other sites of that region that had belonged to hunter-gatherers of the 10th–8th millennium B.C. The Mesolithic Natufians of Palestine and Jordan (10th–9th millennium B.C.), sedentary fishermen and hunters, regularly harvested wild grains (emmer, barley) with flint knives and possibly sowed grain themselves. They stood as it were on the threshold of the productive economy. Like the hunter-gatherers of Tehuacán, they lived in caves, but they were evidently more sedentary. The epoch of semiagricultural, semipastoral economy with a major input of hunting and gathering lasted for 3,000-4,000 years in this region. Palaeolithic hunter-gatherer groups in the Near East comprised 15-20 persons, and the density of population was less than 0.1 per square kilometer. In the early stage of agriculture, cave dwellings persist, but along with them, as in Mesoamerica, open, permanent settlements of earthen huts emerge. Such settlements have 50-100 persons, and the density of population is greater. The beginnings of pastoralism compelled these groups to move to temporary sites separated from the main settlements after the harvest. Such temporary living sites were often in caves that had served the earlier hunters as dwellings (Semenov 1974:34).

The excavations of Gorman (1969) in Spirit Cave in northern Thailand permit us to trace the gradual transition there from hunting and gathering to early agriculture in the 10th–6th millennium B.C. The lower cultural layer yielded remains of plums, beans, peas, betel, and other plants and signs of their cultivation. This layer has been radiocarbon-dated 9,180 ± 860 years B.C. and contains stone tools of Mesolithic, Hoabinhian type. In more recent layers, seeds of other useful plants were discovered. Thus the productive economy in mainland Southeast Asia is no later than that of the Near East or Mesoamerica. This coincidence in time of initial stages of the productive economy in three widely separated regions of the world is remarkable.

The processes I have been discussing took place in Europe as well. "Agriculture in Europe, especially in its northern regions, is preceded . . . by a long cumulative stage of slow ripening and the emergence of culture from the depths of an age-old way of life of hunters of the glacial zone" (Semenov 1974:96). Here have been discovered archaeological cultures with an economy of mixed type in which productive forms did not yet play a leading role and in which intensive hunting, gathering, and fishing were combined with the beginnings of agriculture and animal husbandry. The transition to predominance of the productive economy in Europe took about 3,000 years (*Konferentsiia* 1974:18–19).

Excavations of the Neolithic agricultural settlement of Köln-Lindenthal, on the banks of the Rhine near Cologne, have shown that its inhabitants originally only visited their fields to plant and harvest grain. Granaries were erected next to the fields; settlements were situated somewhere else. Later, along with granaries, temporary, semisubterranean dwellings appeared, and subsequently the whole community of 150–200 persons moved there (Semenov 1974:98–99). The Danubian tribes of Central Europe chose fertile, light loess soils for their settlements and fields. As the fertility of fields was exhausted over time, they abandoned them for new ones. When all the suitable land around a settlement was used up, people founded new settlements in new places (*Vozniknovenie* 1967:19). We have here the typical picture of early seminomadic agriculture, the socioeconomic foundations of which are still close in many respects to the preceding stage based on an appropriative economy. *Schwende* was the initial form of agriculture in Scandinavia; in it fields moved from year to year in the midst of the forest. In the early stages of the Tripolyan archaeological complexes of southeastern Europe, agriculture and animal husbandry were combined with hunting, which, as in the Near East, Central Asia, and Mesoamerica, still played a considerable role.

The prerequisites for the productive economy are not limited to the material and social spheres. They also include the gnoseological sphere—the vast store of knowledge possessed by primeval people of the surrounding world. By organizing social experience and bringing order out of the chaos of phenomena, this system of representations about the world in its formation and development helped society to master the world in a practical way. Marshack's (1972) studies have shown that people started to accumulate systematic knowledge on the plant and animal worlds tens of thousands of years before the

Neolithic revolution. As early as 15,000 years ago, and perhaps earlier, primeval hunter-gatherers were acquainted with the cyclical life of plants and animals and observed it meticulously. This provided a necessary preparation for agriculture and animal husbandry. Primitive people knew the rudiments of writing and counting (Frolov 1974). The formation of the productive economy cannot be considered as lacking a conscious relationship with nature and its processes and with the eternal round of life. Archaeological sites document the understanding by early people of some of the laws of nature, and ethnographic data do the same if we recall what we know about the Tasmanians and the Australian Aborigines, who represent one of the earliest stages of social and cultural development known to ethnography. People entered upon the productive economy already well equipped with systems of knowledge about the surrounding world that concentrated thousands of years of observations, experience, and practice.

Although the productive economy, once it has emerged, gradually transforms the society itself and its culture (and this is what we call the Neolithic revolution), it is hardly correct to oppose peoples with appropriative and productive types of economy categorically. The idea that primitive peoples do not bring anything to the treasury of nature and only use its ready gifts is out of date. Plant cultivation, initially spontaneous, was present in the stage of the appropriative economy, and the same is true of the domestication of certain animals. But even if this were not so, in the strict sense of the word there has never been a "purely appropriative" economy because people, by their very social nature, are productive beings. They make tools, which do not exist ready-made in nature, and with the help of them gain the means of subsistence. The main difference between human society and animal societies is in production. We have seen that even the Tasmanians and the Australian Aborigines did not simply use the gifts of nature but also fully consciously tried to act upon it. What I have in mind here is not magic, which was indeed one of the most ancient means of such action, but action that was fully rational both in its aims and in its implementation.

Human society differs from societies of other kinds in its characteristic ability for generalization of its adapting and adaptive capacities. This is why it has been able to adapt to all ecological environments, to settle almost the whole of the planet. This was already true in the stage of the appropriative economy; there is no fundamental difference between the appropriative and the productive economy in this regard. The general mechanisms of social adaptation are the same in both.

The establishment of the productive economy began in the era of the dominance of appropriative forms. In turn, there are agriculturists for whom preagricultural forms of economy still play a significant role. Finally, there are also peoples in whose economies whether hunting-gathering or agriculture plays the major role depends on the season. All this supports the idea that no chasm exists between societies based on appropriation and on production. The origins of the productive economy lie in the appropriative economy. The process of the establishment of the productive economy begins in the Palaeolithic and continues in the Mesolithic and Neolithic. The investigations of archaeologists help to reveal the basic stages of this process. Ethnography gives us materials for the modeling of social structure on its various levels in various sociohistorical and natural-geographical conditions. It helps us understand what happens with the community—the fundamental structural unit of the appropriative society and its main production collective. Combination of ethnographic and archaeological data gives us the means of throwing light on one of the greatest revolutions in the history of humanity, one that begins with barely visible changes in the economic activity of primitive hunters, fishermen, and gatherers and ends in a substantial transformation of the whole socioeconomic structure.

Comments

by GLORIA Y'EDYNAK
Harvard Ukrainian Research Institute, Cambridge, Mass. 02138, U.S.A. 5 VI 85

It is a pleasure to have a summary article by a Soviet colleague. I only wish that Kabo had drawn on the vast richness of the Mesolithic and Neolithic sites in Ukraine and other Soviet republics. Certainly, the preconditions of the productive economy appear to exist among the prehistoric fishers, gatherers, and hunters of the Iron Gates, comprising the Romanian and Yugoslavian banks of the Danube. Here a semisedentary lifestyle was possible because of the abundance of fish. These people built trapezoidal foundations of pink limestone for dwellings that contain a hearth, flat stones, fish and animal bones, and human burials. Domestication of the wolf is documented at Vlasac (6300–5300 B.C., uncalibrated C^{14} dates) (Bökönyi 1978). The question remains whether the Vlasac people innovated a food-producing way of life or acquired ideas and elements of the new economy from the Near East. Our research on the dental characteristics of the Yugoslavian Iron Gates populations suggests that the fishers and food producers were biologically the same group; fishers were not replaced by Near Eastern farmers (y'Edynak and Fleisch 1983).

by GAETANO FORNI
Via Keplero, 33, Milan, Italy. 6 V 85

Kabo's paper is interesting and useful in that it informs cultural anthropologists elsewhere in the world about the ways in which evolutionary theories on the development of civilisation have been revised and improved in the author's country. Some components of these theories are indeed unexceptionable; others call for some comment:

1. It is not true that "the main difference between human society and animal societies is in production." In fact, it is well known, for example, that some societies of ants (*Iridomyrmex humilis*) are breeders in the fullest sense of the term (Forni 1964) in that they rear other animals—aphids and cochineal insects (Grandori 1947:373–76). Other ants (*Atta sexdens*) raise mushrooms (*Tyridomyces formicarum*) by complex sowing and manuring techniques.

2. Kabo rightly remarks that "the idea that primitive peoples do not bring anything to the treasury of nature and only use its ready gifts is out of date. Plant cultivation, initially spontaneous, was present in the stage of the appropriative economy." His reference here, however, is only to the stage immediately preceding agriculture, for example, that of "harvest-gatherers." To set his theory out in a more integrated way, he should consider that—as modern ecology explains—all the components of an ecosystem affect each other. As a consequence, each plant and animal species, each population, that is part of an ecosystem is shaped through the millennia by the contemporary presence of other species and populations. From this point of view, plant and animal domestication are universal processes *sensu lato,* although taking different forms at different levels. The processes carried out by man are particular instances of an intensive kind. In eating fruits, man, through his excrement containing their seeds, is behaving as a sower at a biological—that is, unconscious—level, in the same way as thrushes spread the seeds of *Viscum album.* Hunter-gatherers influence their environment (that is, unconsciously become cultivators and breeders) by burning to warm themselves and spreading rubbish and excrement, thus originating anthropophilous (nitrophilous, pyrophilous, etc.) plants and animals (Forni 1983).

3. One must also reconsider the old idea that quantitative development in the end determines qualitative evolution of civilisation and welfare if, among populations at an elementary technical level such as the Australian Aborigines, individuals worked "on average only four to five hours per day" and "this was enough to secure all members of the group sufficient food." Kabo rightly points out that "the reality is, of course, more complicated." After having widely illustrated the use of fire in hunting, animal husbandry, and cultivation, however, he does not distinguish between its use in the appropriative economy to find game and its use in the productive economy to increase herbaceous vegetation for breeding (as among the Australians) or directly for human nourishment. Thus, in the use of fire (the most determining event in the evolution of the prehistoric economy) the change in quality depends on the difference in purposes rather than on its increased use. That is, the collateral effects become the main.

4. Logically, the productive economy is that stage in which work is directed towards cultivation and/or stock breeding. Therefore, it is contradictory to exclude the Aborigines from this economic level. In fact, the behavior of the Tasmanians and the Australians aimed at attracting kangaroos and contributing to increase in their numbers that Kabo cites amounts to kangaroo breeding. Bay-Petersen (1978:40) points to "marked similarities between the buffalo exploitation of the North American Indian and the subsequent extensive cattle ranching in the same area." Thus the attribution to a population of a productive economy or an appropriative one is often subjective. In the same way, Childe's concept of the "Neolithic revolution" seems out of date.

5. Kabo emphasizes the use of fire for economic aims, first by hunter-gatherers and then by cultivators, but, along with many archaeologists and paleoethnologists, he fails to recognize that fire is not simply used in both economies but the link between them. In fact, as Mellars and Reinhardt (1978:261) point out, within a hunting-gathering economy based on the use of fire,

> burning has the capacity to increase both the total productivity of the environment in terms of the production of basic food resources and also the relative efficiency with which these resources could be exploited. Some indications of the potential importance of these changes in the Mesolithic economy may be gauged by the fact that the occurrence of fire in at least certain types of woodland is likely to have increased the overall productivity of the environment in terms of the yields of animal protein by as much as 500–900 per cent. . . . The effect of burning on the productivity of plant foods is more difficult to estimate, but in the case of certain vegetable resources (for example, hazelnuts) it is likely that the improvements in the level of annual yields were no less impressive than those achieved in the production of animal food supplies.

More important, Lewis (1972) emphasizes the pyrophytic character of cereals and their ancestors, which indicates a pyroclimax (Kuhnholtz-Lordat 1939:31–34) matrix for their domestication. Linguistic paleontology confirms this in showing that the earliest names for cereals emphasize their pyrophytic characteristic (Forni 1983). As I have argued elsewhere, the cultivation of plants and the breeding of animals and consequently their domestication are the result of observation of the advantages of natural burning by lightning and its intentional extension.

by KATHLEEN F. GALVIN
L. S. B. Leakey Foundation, Pasadena, Calif. 91125, U.S.A. 13 VI 85

The basic point of Kabo's paper is that much can be learned from the study of modern hunter-gatherers with respect to modeling the process of transition from collecting to food production. While this is quite legitimate, there is much in his method of using ethnographic data that seems to fall short of the standards of modern science. I would like to develop one point concerning data and a second concerning theory.

Cross-cultural comparison is an essential tool for a science dedicated to understanding the similarities and differences in culture in space and time. Yet for many reasons it is often difficult to make those comparisons or even to know if similar data elements are in fact comparable, particularly when accounts and behavior of living informants are to be correlated with archaeological data. This does not seem to bother Kabo when he makes such confident linkages as calling the Australian Aborigines "classic hunter-gatherers on the Mesolithic level." Which culture of that complex and varied time loosely referred to as the Mesolithic is he referring to? I am also amazed at the way he flings out numbers for population density for the Near East before the beginning of food production and after. Lastly, I have never been convinced that the presence of female figurines indicates that women are important in gathering or farming, yet in typical 19th-century fashion we see the same old tired figurines trotted out to the defense. Are we to assume that if a hunting-and-gathering society lacks figurines, then men must have done the gathering?

There is a strong teleological element in Kabo's ideas of how cultural development proceeds. He implies that the firing of brush and primitive irrigation are signs that the Australian Aborigines were on the brink of developing food production. The same is implied for the Indians of the Northwest Coast, who as hunter-gatherers even developed social ranking. I have no confidence that, left to its own devices for another thousand years, either group would have independently invented agriculture. There is evidence that *Homo erectus* used firing techniques 750,000 years ago, but it took a while to get to the brink. Kabo also implies that cultural development is in part the result of a cumulative buildup of knowledge and skills. I doubt that any preliterate society keeps a reservoir of information much more than a few hundred years or that any literate society actually uses much of what it has documented. There seems to be some evidence that societies with no buildup of knowledge are capable of very rapid experiment and learning in conditions favoring revolutionary change.

Concerning the point that the transition to food production may have occurred among highly developed, specialized hunter-gatherers or just gatherers, if anything it seems that just the opposite was the case in the Near East. Flannery (1969:77) has pointed to a shift away from specialization in large mammal hunting to a subsistence base in which fish, crabs, turtles, birds, invertebrates, and a wide variety of plants were important. Early food production arose on the basis of a very generalized form of hunting and gathering. It is a long-standing principle of cultural evolutionism that a major advance arises not from the most specialized but from the backward and generalized, where there is less energy expense in change.

Ethnographic data from modern hunter-gatherers are vital to the understanding of cultural evolution and human behavior. Despite the fact that all modern groups are to some degree altered by association with more advanced societies, hypotheses concerning problems such as the one under consideration here, carefully operationalized, can be made testable. Kabo's article seems to be aiming in the right direction. He has identified the importance of the community in organizational change at the time of the transition. What is needed now is a refined analysis of elements of that change not by casual citation of examples from the literature but by the examination of data gathered to test operationalized hypotheses.

by DENNIS L. HESKEL
Department of Anthropology, University of Utah, Salt Lake City, Utah 84112, U.S.A. 30 V 85

Kabo discusses several of the changes in human societal organization associated with the shift from an appropriative to a

productive economy. He provides supporting evidence from a series of ethnographic cases and a few archaeological examples to illustrate the range and correlation of these factors but makes little attempt to incorporate these observations into a unified approach. Therefore, he provides no explanation why, in some areas and times, a process that begins with "barely visible changes in the economic activity of primitive hunters, fishermen, and gatherers . . . ends in a substantial transformation of the whole socioeconomic structure." This lack of focus creates a number of problems in interpreting the available evidence.

There is no explicit definition of agriculture presented, although it seems to be based on the presence of domesticated species. The three possible causes for the development of agriculture are an unintended shift in societies that regularly sow and harvest wild plants in regions where these plants provided a regular, stable, and abundant harvest; the presence of a crisis in the appropriative economy connected to population pressure, environmental stress, or both; and a gradual development over time where the changes emerge "as if spontaneously . . . at last becoming qualitative change." These summarize the basic views on agriculture currently extant in the discipline, although how the first and third could be distinguished in the archaeological record is unclear.

Unfortunately, the examples presented only highlight the problems of this descriptive rather than analytical approach; no direction is provided that enables us to determine why, for example, the prehistoric occupants of the Owens Valley (Lawton et al. 1976) and elsewhere did not become dependent on domesticated species of plants despite use of irrigation and other techniques of cultivation. Answering these questions calls for an approach that emphasizes behavior, not typology; it is the contrast of intensive versus extensive food acquisition that is important to examine (Higgs and Jarman 1972 and, e.g., Harris 1977). With this type of approach we can understand the benefits derived from extensive food storage by the Northwest Coast Indians, from the burning of forests to encourage the growth of grasses by the Indians of California, or from the reliance on both by the Natufians and the early agriculturalists of the prehistoric Levant.

An emphasis on behavior also allows for a more fine-grained examination of the ecological variables that support more intensified resource use. This does not argue against the identification of the listed prerequisites for agriculture but rather would help enable an understanding of the conditions in which agriculture will occur. For example, Kabo's discussion of the practice by the Maya of "primitive" slash-and-burn agriculture and its corollary of collapse ignores the obvious contradiction between successful large settlements like Tikal and the ecological limitations of slash-and-burn cropping. Starting instead with the specific set of behaviors represented by a site like Tikal has opened new avenues of investigation that have resulted in the discovery of a set of intensive and sophisticated Mayan agricultural techniques using swamp land, raised fields, etc., and completely altered our reconstruction of this society.

The implicit assumption of demographic and/or environmental stress as cause for the shift to more intensive exploitation of resources, including food production, is coupled here with a seemingly contradictory gradual development of agriculture. A potentially exciting way out of this bind is the use of an evolutionary approach that views societies as populations whose survival and success vary with the specific ecological conditions of specific time periods. The shift in paradigm would not only allow tests of proposed relationships between, for example, population increase and the intensive use of storable resources but also permit the determination of cost/benefit ratios for different economic systems in specific environments, for example, when and where agriculture, mixed farming, or pastoralism would form the primary subsistence base in the Middle East (see Russell n.d.)

A major thrust of Kabo's paper is the identification of the socioeconomic changes associated with agriculture—the shift from community ownership of the basic means of production to family ownership of land, with a concomitant change in all areas of the forces of social relations. The approach taken, however, allows only for a brief generalized discussion of the factors involved and a description of anomalous societies like the Northwest Coast Indians and the Ainu. Kabo's conclusion is both descriptive and incorrect. He suggests there are two forms of development of the appropriative economy, one that leads to the establishment of a productive economy and hence to new social forms and the other a sort of "blind alley." Aside from the erroneous idea of a direction inherent to history, Kabo is unable to provide an understanding of why the important socioeconomic changes associated with agriculture, including expanded trade in a variety of goods such as obsidian, turquoise, etc., cooperative defense (seen in the towers and walls of Pre-Pottery Neolithic Jericho), and larger families occur. It is in this failure to establish testable problems and suggest avenues of research for solutions that the methods of investigation used by Kabo create frustration. His article is well crafted and includes information on the pieces of the puzzle but offers no way of using these pieces to create a picture that increases our understanding.

by STEVEN A. ROSEN
Archaeological Survey of Israel, Institute of Archaeology, Hebrew University, Jerusalem, Israel. 13 V 85

No anthropologist interested in the origins of domestication economies would claim that the "Neolithic revolution" sprang out of a nothingness unconnected with Mesolithic, Epipaleolithic, or Late Paleolithic adaptations. Nor would anyone deny that the introduction of food-producing economies initiated major changes in all aspects of human culture and society. As main theses, these seem not only somewhat mundane but old hat. Research on the origins and nature of Neolithic society has progressed far beyond what is presented here, and the article suffers considerably from apparent lack of acquaintance with important theoretical and substantive advances made in the last 20 years (e.g., Bar-Yosef 1975, Binford 1968, Boserup 1965, Flannery 1973, Hassan 1977, Hole, Flannery, and Neely 1969, Mellaart 1975, Reed 1977, Struever 1971, etc.)

Beyond these general comments, several specific points should be raised. The terms "appropriative" and "productive" are nowhere well explained and seem to be merely substitutes for "hunting-gathering" and "food-producing," with a greater theoretical loading of questionable significance. Given the demonstrated continuum between the two types of economies, theoretical terminology needs to be carefully defined.

The broad use of ethnographic analogy seems a debatable methodology at best. Modern transitions from hunting-gathering to agriculture or pastoralism must be viewed as secondary occurrences which do not necessarily bear any processual relationship to the primary occurrences which took place in the late Pleistocene or early Holocene. Modern primitive societies do not develop domestication; they adopt it from societies in which it is already present. The same is certainly not true of the first such societies.

Some factual errors need to be corrected. The Pre-Pottery Neolithic A horizon at Jericho and in other parts of the Levant can be dated to the late 9th and 8th millennia B.C., not the 7th–6th. Agriculture clearly played a significant part in the subsistence systems of this period. The Natufians, as well as other Epipaleolithic societies, were not primarily cave-dwellers, and there was no such general movement out of caves into open-air sites with the first agriculturalists as is implied.

Finally, the author speaks of "two basic lines of develop-

ment of the appropriative economy. . . . The first contains more prospects because it leads in the final analysis to the establishment of a productive economy and hence to new social forms." This is reminiscent of unilineal, deterministic views of social evolution. While the comparative perspective is imperative for a general understanding of the processes which led to food-producing societies, this perspective must take into consideration the great variability in all of these societies.

by V. A. SHNIRELMAN

Institute of Ethnography, Academy of Sciences of the U.S.S.R. 19 Dm.Ulianov, Moscow 117036, U.S.S.R. 13 V 85

The issue of the Neolithic revolution raised by Childe (1937) has now become considerably more complex. The concept of "Neolithic revolution" has itself become polysemantic. Some writers (Cole 1963, Hawkes 1963, Brentjes 1968, Feustel 1971), following Childe, regard it as a fundamental transformation resulting from the transition to production and affecting all aspects of social and cultural life. Braidwood (1960) restricted it to economic revolution. Other researchers (Bashilov 1984, Koltzov 1984) consider it in essence the emergence of the regular production of a surplus and entertain the possibility of a Neolithic revolution among highly developed hunters, fishermen, and gatherers.

Despite much research during the past 20 years, the issue of the Neolithic revolution is still alive, and Kabo's article is timely. Today it is no longer sufficient to write about the Neolithic revolution in general terms. First, it is necessary to examine the transition to production from a number of different standpoints, identifying regional differences. A strict distinction should be made between primary and secondary centers of the development of production (Bender 1977, Shnirelman 1980). Secondly, the emergence of production should be regarded as one of the ways in which more effective economic systems arose in postglacial times (Adams 1965, Harris 1977). Thirdly, analysis is required of the influence of the emergence of various highly effective economic systems on the development of social organisation.

This third question is the least researched, and this leads to mistaken notions of the prospects for the social evolution of mankind. Some writers, following Childe (Service 1971, Sahlins 1968), consider that the emergence of clans, age-classes, etc., is caused first and foremost by the development of production. Kabo is correct in indicating a group of societies of settled fishermen and hunters of marine mammals possessing these institutions. Parenthetically, some gatherers (isolated groups of California Indians and sago gatherers in eastern Indonesia and New Guinea) were close to them in level of development. In some coastal regions of New Guinea, 70% of the diet derives from the sago harvest. The productivity of sago gatherers is equal to and sometimes even greater than that of neighbouring farmers. Whereas agriculture requires regular work throughout the year, labour expenditure in the gathering economy consists entirely of gathering and processing the harvest. The quantity of labour required per unit of food is more or less the same for wild and cultivated sago; all this did nothing to stimulate the development of agriculture.

Sago gatherers are sedentary. Population density (1 per square kilometre) and community size (50–200, sometimes up to 1,000–2,000) are certainly no lower and sometimes even higher than amongst many farmers in New Guinea. Furthermore, there are no basic differences in social organisation. Of particular interest is that, whereas plots of land were not inherited by early farmers, certain plots of sago thicket were passed from father to son (Shnirelman 1983). Thus the links between types of economy and levels of social development are not inflexible. This is because social organisation correlates not so much with forms of economy as with their effectiveness—in other words, with the level of development of productive forces and relations of production. Thus one and the same form of economy may serve as the basis for societies of entirely different levels of development.

Several important conclusions can be drawn from this. First, a unitary approach to hunter-gatherers should be avoided. It is particularly necessary to distinguish higher hunters, fishermen, and gatherers, whose socioeconomic development is much closer to that of early farmers and livestock breeders than to that of nomadic hunter-gatherers (Grosse 1896). From this point of view, Kabo's notion that "the early agricultural society differs in many respects from the society of hunter-gatherers" requires some amendment.

Secondly, taking into account the similarity between higher hunters, fishermen, and gatherers and early farmers and livestock breeders, the periodisation of primeval history identifying as one of the most important stages the transition to production should be reconsidered. The emergence of posttribal social organisations within societies with both productive and highly effective appropriative economies is the most essential stage in the development of social organisation and the formation of strata within societies. It is with this emphasis that many Soviet ethnographers have long approached questions of periodisation (*Istorija pervobytnogo obshchestva* 1983–85).

The author is absolutely right in observing that in former times societies of higher hunters, fishermen, and gatherers were quite widespread. From this, we can draw a third conclusion: that the transition to production in these societies was not accompanied by essential changes in social organisation, which was already well developed. This is one of the features of the secondary center of development of agriculture, in which the skills come from outside; Kabo has shown this with the example of the Salish. Under these circumstances, plant cultivation played a secondary role for a long time. The transition to agriculture as the main type of economy was accomplished under conditions of crisis in which, despite its effectiveness, the appropriative economy had reached the limits of its resources and consequently become an impediment to the further development of the society. This was the case, for instance, on the coast of Peru, where cultivated plants adopted from the mountain people from the beginning played a secondary role in the economy.

by ANDREW B. SMITH

Department of Archaeology, University of Cape Town, Rondebosch, Cape 7700, South Africa. 29 IV 85

On the surface this paper appears a bit of an anachronism. It is written in a style reminiscent of the turn of the century, with its wide-ranging cultural comparisons within a typological framework and its "stages of socioeconomic development." Comparisons of Tasmanians "at the level of the late Palaeolithic" and the "Neolithic" Baining indicate a unilinear evolutionary scheme implying that these modern peoples were going through the same processes of development as prehistoric societies. This fails to take into account the idiosyncratic nature of these individual societies and their development and makes the typing of social groups meaningless.

Kabo describes several "appropriative economies" and criticises the view of hunter/gatherers as almost always threatened by death from hunger. While he recognises the complications of accepting the opposite "original affluent society" view, he still partially subscribes to it, relying on Lee's description of the !Kung. He does not see that Lee's picture is a restricted one, the details of his study coming from only a short period, July-August 1964 (Lee 1979:257). The amount of time needed for the food quest varies from season to season. A contrasting view can be seen in Silberbauer's study of the G/wi (1981:200), who are further disadvantaged by not having access to mongongo forests.

Regardless of these criticisms, important social processes are described. The transition from hunter to agricultural society is seen as having to pass through preagricultural community development revolving around collective landownership. There are some fundamental principles here that deserve attention. Not only agricultural but also pastoral societies differ from hunting societies in having a future orientation in the accrual of surplus in the form of either plants or animals. The important point is that in the transition to what Kabo calls a "productive economy" there is a shift away from immediate use of resources to conservation and planning. Kabo suggests that the existence of "the community, a relatively stable and permanent localized group and the locus of landownership," is necessary for this to happen. It is possible that the size of the group also has something to do with this. As Johnson (1982) has shown, with increasing group size restructuring of the social organisation occurs and some form of leadership becomes necessary. In contrast, Schrire (1980) and Elphick (1985) believe that hunters could easily become herders because the economic boundary was a simple one to cross.

I would agree with Kabo that, without the necessary social preconditions, becoming a food producer required a significant leap and that both community structure and the means of production would have had to be included in the transition. Hierarchies and class structure appear only with a "productive economy." I would add, however, that deliberate genetic manipulation of plants and animals by selection has to occur before a fully "productive economy" can develop. While the Tasmanians may have had some control over the kangaroo, I would reject Kabo's claim that they were practising "primitive animal husbandry," since there was no intentional breeding or genetic control.

One might argue that all hunting societies would eventually have developed "productive economies." Even some San groups in South Africa were probably controlling eland for ritual purposes to a certain extent (see Lewis-Williams 1981:107). Since the domestication of plants and animals occurred independently in the Holocene in Thailand, the Near East, Mesoamerica, and possibly Africa, it is probable that manipulation of the environment and all the organisms in it are part of human cultural and economic growth. Domestication can just be seen as a logical outcome once the necessary preconditions are met.

by TREVOR WATKINS
Department of Archaeology, University of Edinburgh, Edinburgh, U.K. 20 V 85

My factual knowledge is more or less confined to the area of southwestern Asia and the eastern Mediterranean, and my approach is that of the empirical prehistoric archaeologist. My comments are therefore restricted to the lack of cohesion between the explanation as Kabo sees it and the facts from that area as I see them. Kabo simply correlates the advent of sedentism, the appearance of relatively large, distinctly structured communities, and the emergence of a strictly defined sense of territory and property within the group with the adoption of agriculture, in which transformation the change in the means of obtaining the food supply is straightforwardly considered the independent variable, the causative factor. The evidence from the Near East belies this explanation on simple chronological grounds.

The appearance of stable, sedentary, relatively large communities antedates the first evidence for the practice of mixed farming by a very long time. Kabo seems unaware that Natufian harvesting and hunting communities in the southern Levant and contemporary groups in inland Syria could be large, might occupy open settlements, and might remain stable and sedentary long enough (several centuries?) to create an appreciable stratigraphy of building levels, and all this in the 10th to 9th millennia B.C. The available evidence tends to show that the general shift to reliance on agriculture and complete control of domesticated herd animals in fact occurred *during* the period which is conventionally called the aceramic Neolithic, as late as the middle of the 7th millennium B.C.

The cultural elaborations of some of these early sedentary societies are well-known (e.g., the cult of the dead and the town walls of PPN-A Jericho), but whether they signify the particular traits of the class society that Kabo believes to be an essential component of the transformation remains at present as debatable in the Mesolithic, preagricultural societies as it is among the communities of the full Neolithic period.

Kabo seeks to oppose and contrast "appropriative" and "productive" economies, suggesting that combination economies are somehow only transitional and unstable forms. But the categories are ours, not theirs. In fact "mixed" economies were clearly relatively stable and may have been the rule rather than the exception throughout the Mesolithic and Neolithic periods and into the Chalcolithic of the Near East. The whole of Kabo's essay assumes that agriculture is a self-evident goal to which any human group will aspire, given that certain vague preconditions have been fulfilled. In fact we still need to discover why groups which had stabilized in sedentary village- and townlike communities in the Near East later turned to agriculture.

While it is clear that sedentism and the growth of large, stable communities antedates the practice of mixed farming rather than being consequent upon it, this is not to deny the importance of the development of agriculture in the Near East. In one sense Childe's "Neolithic revolution" is alive and well: agriculture, once adopted, provided a portable and artificial ecosystem, as it were, which allowed communities to expand and intensify their take from the environment or to colonise new territory, transporting their farming practice and their crops and herds to new zones and thereby spreading the revolutionary community type and settlement pattern ever more widely.

Reply

by VLADIMIR KABO
Moscow, U.S.S.R. 12 VII 85

The comments of colleagues from different countries on my article are of great interest to me. It is a pleasure to see scientists in various parts of the world trying to solve common problems, demonstrating once again that science is an international affair. I very much appreciate the news of recent investigations contained in the comments and the opportunity to become acquainted with new literature and fresh facts on the subject that have been inaccessible to me up till now. I find the commentators' remarks stimulating and fruitful for the most part, but I cannot fully agree with all of them.

First, I would like to draw readers' attention to the main aim of my article: to describe the direct social consequences of the change to a productive economy. My intention was to underline the fact that that change took place within and on the basis of the social structure typical of hunter-gatherers and itself caused the gradual transformation of that structure. In other words, I was interested in the factors that facilitated the Neolithic revolution and the social basis of that process. I made no attempt to consider all aspects of the process; in my opinion this is not something that can be done in a journal article. Rather, I focused on an aspect that has so far received little attention—the social one. The social basis of the change to a productive economy was the social structure of hunter-gatherer society, first and foremost the community, the basic

and universal social unit of that society. This structure is described in detail in my forthcoming book *The Primitive Preagricultural Community*. The subsequent stages of the change and its other aspects were beyond the scope of my article; I was concerned with identifying the main trends of the initial stage of the process.

Contrary to Heskel's opinion, I do try to "incorporate these observations into a unified approach." There is a dominant conception in my article. As I have pointed out, it was not my intention to present all the aspects of the process and comment on every individual case, as Heskel insists—for example, to explain expanded trade in turquoise or the towers and walls of Jericho. My aim was to draw attention to the social aspects and prerequisites of the transition, and in this regard there is much to be thought over and rethought.

It has escaped Rosen's attention that the "main theses" of my article go beyond the trivial statement that the Neolithic revolution "sprang out of . . . Mesolithic, Epipaleolithic, [and] Late Paleolithic adaptations." As I have said, the little-studied social factors in this process were my concern, and the works he cites give them no special attention.

Forni is of the opinion that production does not distinguish human from animal societies. He reminds us of the ants, which breed aphids and raise mushrooms, and many analogous cases might be added. As Marx pointed out, however, "The bee may put some human architects to shame in building its cells of wax, but at the same time the worst architect differs from the most skillful bee in that, before beginning construction, he has the structure in his head" (Marx 1961 [1867]:189).[1] One must not blur this important difference between purposeful human activity and instinct-based animal activity even when the two phenomena are superficially similar. The same criticism may be applied to Forni's assertion that man's behavior in the ecological system is equivalent to the behaviors of animals. It is true that when relieving himself man is not much different from animals, but his production and use of tools to alter the environment are a different story.

When I wrote that "plant cultivation . . . was present in the stage of the appropriative economy," I was not, as Forni asserts, referring only to "the stage immediately preceding agriculture." More important, in speaking of the contribution of primitive peoples to the treasury of nature I did not mean plant cultivation alone. All of this, it seems to me, argues that "the old idea that quantitative development in the end determines qualitative evolution" ought not to be dismissed. The development of nature and society demonstrate the truth of this idea. Still another argument in its defense is the gradual accumulation of changes leading to the productive economy and the eventual transformation of the social structure. For the same reason, the concept of the Neolithic revolution is not out of date. Like good wine, such things last a long time without losing their value. In contrast to Forni, Rosen sees the Neolithic revolution as having "initiated major changes in all aspects of human culture and society." Rather than being "old hat" as he suggests, however, this concept has not yet fully realized its potential. Prerequisites for the productive economy in hunter-gatherer society are no more than that; they do not give the economy a productive character in the strict sense of the term. Consequently, there is nothing subjective or contrary to fact in assigning this society to the appropriative economy.

Galvin's assertion that "early food production arose on the basis of a very generalized form of hunting and gathering" does not contradict but rather confirms one of my main points—that the transition to food production was the result, as she puts it, of "a cumulative buildup of knowledge and skills."

[1] "Pchela postroykoy svoikh voskovykh yacheyek posramlyayet nekotorykh lyudey-arkhitektorov. No y samyy plokhoy arkhitektor ot nailuchshey pchely s samogo nachala otlichayetsya tem, chto, prezhde chem stroit' yacheyku iz voska, on uzhe postroil eye v svoyey golove."

Despite the objections of Galvin, Heskel, and Rosen, I think that my conclusion about the two forms of development of the appropriative economy holds true. It is in harmony with historical facts, and there is nothing teleological or deterministic about it. I know of no successful early-class civilization based on an appropriative economy, but if any exists it is certainly rather exceptional. This is not armchair theory but a matter of facts.

Rosen considers "the broad use of ethnographic analogy . . . a debatable methodology at best." This problem is too complex to be discussed here. It has been broadly debated over the last 20 years, and my position is presented in the collection entitled *Ethnography as a Source for Reconstruction of the History of Primitive Society* (*Etnografiya* 1979). It goes without saying that no serious scholar investigating the origin of the productive economy will model this process on data from contemporary primitive societies that have borrowed elements of this type of economy from developed societies.

It is unjust to reproach me, as Smith does, with unilinear evolutionism. It is clear in my article that I recognize various modes of development of the productive economy and various forms of transition to it. I willingly accept the facts set forth by Watkins and am quite ready to introduce them into my model. They do not contradict my conception, and I always make an effort to take into consideration the idiosyncratic development of individual societies.

Lee's observations, cited in my article, do refer to a comparatively short period of the year, but since it is a period of transition from more favorable to less favorable conditions it is representative enough. The same is true of Woodburn's conclusions with regard to the Hadza and of those of some students of the Australian Aborigines as well. But of course, this model of subsistence in hunter-gatherer societies is not universal, and I said so.

In mentioning the female statuettes of the Palaeolithic and of the early agriculturists of Eastern Europe, I linked them not with the role of women in gathering or farming, as Galvin concludes, but with cults of fertility and the renewal of nature.

Needless to say, Shnirelman's approach to hunter-gatherers is far from my own. The harvesting peoples that he mentions do appear in my model, but this kind of appropriative economy is possible only under favorable ecological conditions. Despite what he says, the transition to the productive economy holds a special place among the periods of primitive history because of its universal character. The basis of this transition is the transformation of the primitive hunter-gatherer community, not the emergence of late-clan social organization, because in contrast to clan organization the community is a universal social institution and the economic basis of hunter-gatherer society. In ethnography as in any other science, theory demands not only abstract thinking but concrete facts, as I think every scholar will agree.

I hope that this discussion has been as fruitful for readers and participants as it has been for me.

References Cited

ADAMS, R. McC. 1965. "The origins of agriculture," in *Horizons of anthropology*. Edited by S. Tax, pp. 120–31. London. [VAS]

BAR-YOSEF, OFER. 1975. "The Epipaleolithic in Palestine and Sinai," in *Problems in prehistory: North Africa and the Levant*. Edited by F. Wendorf and A. Marks, pp. 571–604. Dallas: Southern Methodist University Press. [SAR]

BASHILOV, V. A. 1984. Nekotorye obshchije aspekty "neolititcheskoj revolutzii" (Some general aspects of the "Neolithic Revolution"), in *Problemy zarubezhnoj arkheologii*. Moscow: Nauka. [VAS]

BAY-PETERSEN, J. L. 1978. "Animal exploitation in Mesolithic Denmark," in *The early postglacial settlement of northern Europe*. Edited by P. Mellars, pp. 115–45. London: Duckworth. [GF]

BENDER, B. 1977. *Farming in prehistory: From hunter-gatherer to food-producer.* London: Baker. [VAS]

BEREZKIN, IU. E. 1969. Nachalo zemledeliia na Peruanskom poberezh'e (Beginnings of agriculture on the coast of Peru). *Sovietskaia Arkeologiia,* no. 1.

BIBIKOV, S. N. 1953. Rannetripol'skoe naselenie Luka-Vrublevetskaia na Dnestre: Iz istorii rannikh zemledel'chesko-skotovodcheskikh plemen na lugo-vostoke Evropy (Early Tripolyan settlement Luka-Vrublevetskaia or the Dnestr River: On the history of early agricultural-pastoralist tribes in southeastern Europe). *Materialy i Issledovaniia po Arkheologii SSSR,* no. 38.

BINFORD, LEWIS R. 1968. "Post-Pleistocene adaptations," in *New perspectives in archaeology.* Edited by L. R. Binford and S. R. Binford, pp. 313–42. Chicago: Aldine. [SAR]

BOGLÁR, L. 1972. Indeitsy nambikvara: Marginal'naia gruppa v Brazilii (The Nambicuara Indians: A marginal group in Brazil). *Sovietskaia Etnografiia,* no. 3.

BÖKÖNYI, S. 1978. "The vertebrate fauna of Vlasac," in *Vlasac.* Edited by M. Garašanin. Belgrade: Serbian Academy of Arts and Sciences. [GE]

BOSERUP, ESTER. 1965. *The conditions of agricultural growth.* Chicago: Aldine. [SAR]

BRAIDWOOD, R. J. 1960. The agricultural revolution. *Scientific American* 203:130–41. [VAS]

BRENTJES, B. 1968. *Von Schanidar bis Akkad.* Leipzig: Urania. [VAS]

BULMER, R. 1968. The strategies of hunting in New Guinea. *Oceania* 38:302–18.

BURGER, F. 1913. *Die Küsten- und Bergvölker der Gazellehalbinsel.* Stuttgart.

———. 1923. *Urwald und Urmenschen.* Dresden.

CAMPBELL, A. H. 1965. Elementary food production by the Australian Aborigines. *Mankind* 6(5):206–11.

CARNEIRO, R. L. 1969. Perekhod ot okhoty k zemledeliiu (The transition from hunting to agriculture). *Sovietskaia Etnografiia,* no. 5.

CHILDE, V. G. 1937. *Man makes himself.* London: Watts. [VAS]

COLE, S. 1963. *The Neolithic revolution.* London: British Museum. [VAS]

CONKLIN, H. C. 1961. The study of shifting cultivation. CURRENT ANTHROPOLOGY 2:27–59.

CURR, E. M. 1886. *The Australian race.* Vol. 1. Melbourne.

ELPHICK, RICHARD. 1985. *Khoikhoi and the founding of white South Africa.* Johannesburg: Ravan Press. [ABS]

Etnografiya kak istochnik rekonstruktsii istorii pervobytnogo obshchestva. 1979. Moscow: Nauka.

Y'EDYNAK, G., and S. FLEISCH. 1983. Microevolution and biological adaptability in the transition from food-collecting to food-producing in the Iron Gates of Yugoslavia. *Journal of Human Evolution* 12:279–96. [GE]

EYRE, E. J. 1845. *Journals of the expedition of discovery in Central Australia.* Vol. 2. London.

FAINBERG, L. A. 1975. *Indeitsy Brazilii* (The Indians of Brazil). Moscow.

FEUSTEL, R. 1971. *Entstehung und Entwicklung sozialer Verhältnisse in der Urgesellschaft.* Weimar. [VAS]

FLANNERY, KENT V. 1969. "Origins and ecological effects of early domestication in Iran and the Near East," in *The domestication and exploitation of plants and animals.* Edited by Peter J. Ucko and G. W. Dimbleby. Chicago: Aldine. [KFG]

———. 1973. The origins of agriculture. *Annual Review of Anthropology* 2:271–310. [SAR]

FORNI, G. 1964. Nuove luci sulle origini della domesticazione animale. *Rivista di Storia dell'Agricoltura,* pp. 3–32. [GF]

———. 1983. "From pyrophytic to domesticated plants," in *Plants and ancient man.* Edited by W. van Zeist and W. A. Casparie. Rotterdam: Balkema. [GF]

FROLOV, B. A. 1974. *Chisla v grafike paleolita* (The numerals in Paleolithic graphics). Novosibirsk.

GORMAN, C. 1969. Hoabinhian: A pebble-tool complex with early plant associations in Southeast Asia. *Science* 163(3868):671–73.

GRANDORI, R. 1947. *Entomologia agraria.* Milan: Cisalpino. [GF]

GREY, G. 1841. *Journals of the two expeditions of discovery in North-West and Western Australia.* Vol. 2. London.

GROSSE, E. 1896. *Die Formen der Familie und die Formen der Wirtschaft.* Freiburg. [VAS]

GULIAIEV, V. I. 1972. *Drevneishie civilizatsii Mesoameriki* (The most ancient civilisations of Mesoamerica). Moscow.

HACKENBERG, R. A. 1962. Economic alternatives in arid lands. *Ethnology* 1:186–95.

HARRIS, D. 1977. "Alternative pathways toward agriculture," in *Origins of agriculture.* Edited by C. Reed, pp. 179–243. The Hague: Mouton. [DLH, VAS]

HASSAN, FEKRI. 1977. "Dynamics of agricultural origins in Palestine: A theoretical model," in *Origins of agriculture.* Edited by C. Reed, pp. 589–609. Paris: Mouton. [SAR]

HAWKES, J. 1963. "Prehistory," in *History of mankind: Cultural and scientific development.* Vol. 1. London. [VAS]

HIGGS, E. S., and M. R. JARMAN. 1972. "The origins of animal and plant husbandry," in *Papers in economic prehistory.* Edited by E. Higgs, pp. 3–13. Cambridge: Cambridge University Press. [DLH]

HOLE, FRANK, K. FLANNERY, and J. NEELY. 1969. *The prehistory and human ecology of the Deh Luran Plain.* University of Michigan Museum of Anthropology Memoir 1. [SAR]

HOLMBERG, A. R. 1950. *Nomads of the long bow.* Washington, D.C.: Smithsonian Institution.

Istorija pervobytnogo obshchestva (History of primeval society). 1983–85. 2 vols. Moscow: Nauka. [VAS]

JENKS, A. E. 1900. *The wild rice gatherers of the Upper Lakes.* Washington, D.C.

JOHNSON, GREGORY A. 1982. "Organizational structure and scalar stress," in *Theory and explanation in archaeology.* Edited by C. Renfrew, M. J. Rowlands, and B. A. Segraves, pp. 289–421. New York: Academic Press. [ABS]

JONES, R. 1969. Fire-stick farming. *Australian Natural History* 16:224–28.

KABO, V. R. 1964. *Baiingi: Primitivnye zemledel'tsy Okeanii* (The Baining: Primitive agriculturists of Oceania). Strany i narody Vostoka 3.

———. 1968. "Pervobytnaia obshchina okhotnikov i sobiratelei (po avstraliiskim materialam)" (The primitive community of hunters and gatherers [from Australian data]), in *Problemy istorii dokapitalisticheskikh obshchestv,* vol. 1. Moscow: Nauka.

———. 1975. *Tasmaniitsy i tasmaniiskaia problema* (The Tasmanians and the Tasmanian problem). Moscow: Nauka.

KOLTZOV, L. V. 1984. "O spetzifike 'neolititcheskoj revolutzii' v lesnoj zone" (On the specifics of the Neolithic revolution in the forest zone), in *Problemy zarubezhnoj arkheologii.* Moscow: Nauka. [VAS]

Konferentsiia "Formy perekhoda ot prisvaivaiushchego khoziaistva k proizvodiashchemy" (Conference on "Forms of Transition from the Appropriative to the Productive Economy"). 1974. Moscow.

KREINOVICH, E. A. 1973. *Nivkhgu.* Moscow.

KUHNHOLTZ-LORDAT, G. 1939. *La terre incendiée.* Nîmes: Maison Carrée. [GF]

LAUFER, C. 1946–49. Rigenmucha, das höchste Wesen der Baining (Neubrittanien). *Anthropos* 41-44:497–560.

LAWTON, HARRY, PHILIP WILKE, MARY DEDECKER, and WILLIAM MASON. 1976. Agriculture among the Paiute of Owens Valley. *Journal of California Anthropology* 3:13–50. [DLH]

LEE, R. B. 1968. "What hunters do for a living," in *Man the hunter.* Edited by R. B. Lee and I. DeVore. Chicago: University of Chicago Press.

———. 1969. "!Kung Bushman subsistence," in *Environment and cultural behavior.* Edited by A. J. Vayda. New York: Natural History Press.

———. 1979. *The !Kung San.* Cambridge: Cambridge University Press. [ABS]

LÉVI-STRAUSS, C. 1963. *Structural anthropology.* Translated by Claire Jacobson and Brooke Grundfest Schoepf. New York: Basic Books.

LEWIS, H. T. 1972. The role of fire in the domestication of plants and animals in Southwest Asia: A hypothesis. *Man* 7:195–22. [GF]

LEWIS-WILLIAMS, J. D. 1981. *Believing and seeing.* New York: Academic Press. [ABS]

LIPS, J. E. 1928. "Die Anfänge des Rechts an Grund und Boden bei den Naturvölkern und der Begriff der Erntevölker," in *Festschrift für P. W. Schmidt.* Wien.

———. 1954. *Proiskhozhdenie veshchei* (The origin of things). Moscow.

MCCARTHY, F. D., and M. MCARTHUR. 1960. "The food quest and the time factor in aboriginal economic life," in *Records of the American-Australian Scientific Expedition to Arnhem Land,* vol. 2, pp. 145–94. Melbourne.

MACNEISH, R. S. 1964. "The food-gathering and incipient cultivation stage of prehistoric Middle America," in *Handbook of Middle American Indians,* vol. 1. Edited by Robert C. West. Austin: University of Texas Press.

———. 1965. The origins of American agriculture. *Antiquity* 39:87–94.

———. 1966. "Ancient Mesoamerican civilization," in *Ancient Mesoamerica.* Compiled by John A. Graham, pp. 39–45. Palo Alto, Calif.

MAKSIMOV, A. N. 1929. Nakanune zemledeliia (On the eve of agriculture). *Uchenye Zapiski Instituta Istorii* 3.
MARSHACK, A. 1972. *The roots of civilization*. New York: McGraw-Hill.
MARX, K. 1961(1867). *Capital*. Vol. 1. (K. Marx and F. Engels, Collected Works, 2d edition, vol. 23.) Moscow.
MASSON, V. M. 1970. Poselenie Dzheitun: Problema stanovleniia proizvodiashchei ekonomiki (The Dzheitun settlement: The problem of the establishment of the productive economy). *Materialy i Issledovaniia po Arkheologii SSSR*, no. 180.
MELLAART, JAMES. 1975. *The Neolithic of the Near East*. New York: Scribner. [SAR]
MELLARS, P., and G. C. REINHARDT. 1978. "Patterns of Mesolithic land use in southern England: A geological perspective," in *The early postglacial settlement of northern Europe*. Edited by P. Mellars, pp. 243–93. London: Duckworth. [GF]
MITCHELL, T. L. 1848. *Journal of an expedition into the interior of tropical Australia*. London.
MORETT, F. 1951. *Ekvatorial'naia, Vostochnaia i Iuzhnaia Afrika* (Equatorial, eastern, and southern Africa). Moscow.
Narody Ameriki (Peoples of America). 1959. Edited by A. V. Efimov and S. A. Tokarev, vol. 1. Moscow.
NEEDHAM, R. 1961. An analytical note on the structure of Sirionó society. *Southwestern Journal of Anthropology* 17:237–55.
NOVIKOV, IU. F. 1959. O vozniknovenii zemledeliia i ego pervonachal'nykh formakh (On the origin of agriculture and its primeval forms). *Sovietskaia Arkheologiia*, no. 4.
PARKINSON, R. 1907. *Dreissig Jahre in der Südsee*. Stuttgart.
Pervobytnoe obshchestvo: Osnovnye problemy razvitiia (Primitive society: Fundamental problems of development). 1975. Moscow.
Politicheskaia ekonomiia: Uchebnik dlia vuzov (Political economy: Textbook for higher schools). 1973. Moscow.
RASCHER, M. 1909. *Baining (Neupommern): Land und Leute*. Münster.
REED, CHARLES A. Editor. 1977. *Origins of agriculture*. Paris: Mouton. [SAR]
RUSSELL, K. n.d. Camel and wheat, desert and sown: Evolutionary ecology and the origins of food production. Ph.D. diss., University of Utah, Salt Lake City, Utah. [DLH]
SAHLINS, M. D. 1968. *Tribesmen*. Englewood Cliffs: Prentice-Hall. [VAS]
———. 1972. *Stone Age economics*. Chicago: University of Chicago Press.
SCHRIRE, CARMEL. 1980. An inquiry into the evolutionary status and apparent identity of San hunter-gatherers. *Human Ecology* 8:9–32. [ABS]
SEMENOV, S. A. 1974. *Proiskhozhdenie zemledeliia* (Origin of agriculture). Leningrad.
SERVICE, E. R. 1971. *Primitive social organization: An evolutionary perspective*. New York: Random House. [VAS]
SHAWCROSS, KATHLEEN. 1967. Fern root and 18th-century Maori food production in the agricultural areas. *Journal of the Polynesian Society* 76:330–52.
SHNIRELMAN, V. A. 1980. *Proiskhozhdenie skotovodstva* (Origins of pastoralism). Moscow: Nauka. [VAS]
———. 1983. *Sobirateli sago* (Sago-gatherers). Voprosy istorii 2.
SILBERBAUER, GEORGE B. 1981. *Hunter and habitat in the Central Kalahari Desert*. Cambridge: Cambridge University Press. [ABS]
STEINEN, K. 1894. *Unter den Naturvölkern Zentral-Brasiliens*. Berlin.
STRUEVER, STUART. Editor. 1971. *Prehistoric agriculture*. New York: Natural History Press. [SAR]
SUTTLES, W. 1951. The early diffusion of the potato among the Coast Salish. *Southwestern Journal of Anthropology* 7:27–88.
TURNBULL, C. M. 1972. *The mountain people*. New York: Simon and Schuster.
Vozniknovenie i razvitie zemledeliia (Origin and development of agriculture). 1967. Moscow.
WATSON, J. B. 1965. From hunting to horticulture in the New Guinea Highlands. *Ethnology* 4:295–309.
WOODBURN, J. 1968. "An introduction to Hadza ecology," in *Man the hunter*. Edited by R. B. Lee and I. DeVore. Chicago: University of Chicago Press.
ZIBER, N. I. 1899. *Ocherki pervobytnoi ekonomicheskoi kul'tury* (Essays on primitive economic culture). St. Petersburg.