Foreword

"Commerce is the great civilizer. We exchange ideas when we exchange fabrics."—R. G. Ingersoll

The importance of trade has long been part of our economic philosophy, but, as Ingersoll has suggested, trade also carries with it a crossfertilization of ideas. Only recently, however, has trade's dynamic role in the growth of early civilizations begun to be a matter of detailed interest to the anthropologist. The papers in this volume examine this intriguing subject from the vantage points of archaeology, economics, social anthropology, and cultural geography. The chapters are beautifully balanced; we have conceptual and analytical presentations on the one hand, and case studies pointing to broader considerations on the other. Together they provide an excellent insight into the role of trade in the growth of civilization, and the problems surrounding the study of this relationship.

Colin Renfrew's lead article provides an excellent conceptual framework for the total volume, weaving central-place theory, the concepts of early state modules, information flow, and a typology of modes of trade and their evolution into a provocative discussion of the development of early civilization.

George Dalton follows with a valuable and stimulating analysis of Karl Polanyi's consideration of long-distance trade. In addition, Dalton provides an excellent short background on the history of economic anthropology and its basic questions, offering an overview of its paradigms and

the current status and the changing universe of economic anthropology in relation to Polanyi's contributions. In essence, Dalton lays a base for the development of a new paradigm in economic anthropology.

Karl Polanyi's article, published posthumously, on trade and the trader follows with a masterly and systematic review of the classes of trade, kinds of goods, categories of traders, motives, and transport, and the "two-sidedness" of the institution of trade. Malcolm Webb examines the change from the chiefdom to the state. His most useful review of the origins of the state—using the examples of Egypt, lower Mesopotamia, the Indus and Yellow river valleys, highland Mesoamerica, and coastal Peru—puts particular emphasis on military conquest and population growth in relation to trade. K. C. Chang examines certain procedural and conceptual problems relating to trade as seen through the material remains of the Shang civilization. Gregory Johnson uses fourth millennium Uruk Period Mesopotamian material to provide an important discussion of locational analysis and central-place theory as analytical tools for the archaeological investigation of local exchange systems.

C. C. Lamberg-Karlovsky examines the modes of exchange and production of the resource chlorite (steatite) in early third millennium Mesopotamia in terms of access, time-space systematics, supply and demand, quantitative control, and place and mode of production activities. This analysis of a single exchanged material provides a view of the complexity the archaeologist faces in dealing with a prehistoric trade situation. Jeremy Sabloff and David Freidel look at another aspect of the trade facilities that expedite the transfer of goods, using as a case study a trading center off the coast of Yucatán on the island of Cozumel. William Rathje then views this same situation from the point of view of general systems theory to hypothesize trends in resource management and production-distribution systems.

All of these papers, as Robert McC. Adams suggests in his overview, do illustrate the search for new formulations and analytical approaches that were part of a "highly exploratory symposium." This volume does indeed forcefully record that "trade has become a . . . productive focus for research on the development of ancient complex societies."

Douglas W. Schwartz

School of American Research

Preface

This volume is a result of a School of American Research Advanced Seminar held in Santa Fe from October 28 through November 2, 1973.

The participants included Robert McC. Adams; K. C. Chang; Gregory A. Johnson; C. C. Lamberg-Karlovsky, cochairman; William L. Rathje; Colin Renfrew; Jeremy A. Sabloff, cochairman; Malcolm Webb; Paul Wheatley; and Henry Wright. All these participants, with the exceptions of Adams and Chang, circulated their papers in advance of the seminar. Revised versions of these papers appear in the present volume. Adams and Chang served as discussants and wrote their papers after the completion of the seminar. George Dalton was unable to attend but circulated his paper prior to the seminar. Professor Dalton also obtained the previously unpublished paper of the late Karl Polanyi. Through the kindness of Ilona Polanyi and Professor Dalton, this paper has been included in this volume. Finally, because of problems with his computer programs, Professor Wright unfortunately was unable to include his paper here. It is to be hoped, however, that he will be able to rectify this situation in the near future so that his important and stimulating work on computer simulations of trade can be read by the profession as a whole.

The possibility of holding an advanced seminar on ancient civilization and trade was first suggested to J. A. Sabloff by Dr. Douglas W. Schwartz, director of the School of American Research, in the spring of 1972, while he was visiting the excavations of the Cozumel Archaeological Project in Mexico. The project, which is directed by Sabloff and

W. L. Rathje, is concerned principally with understanding the role of long-distance trade in the development of ancient Maya civilization. Dr. Schwartz noted that the Cozumel Project's general interests were becoming widespread and that it might be worthwhile and productive to bring together a group of archaeologists who shared these interests, along with scholars who had backgrounds in cultural geography and economics, to discuss new research directions in archaeological studies of trade and ancient civilizations. Back at Harvard University, Sabloff found that C. C. Lamberg-Karlovsky, whose long-term project at Tepe Yahya in Iran was investigating the role of long-distance trade in cultural developments from ancient Mesopotamia to the Indus area, also had been considering organizing a conference on archaeological trade studies. After discussion of their mutual plans, they decided to pool forces and jointly organize an advanced seminar on ancient trade.

The success of the seminar was due to the efforts of many people. In particular, the enthusiasm, generosity, and support of Doug Schwartz made the seminar and this volume possible. The friendliness of many members of the School of American Research also helped make the stay of the seminar's participants in Santa Fe very pleasant. David Noble and Jeton Brown made all the arrangements which enabled the seminar to flow so smoothly. Last, but certainly not least, the cheerful service and aid of Ella Schroeder and the staff at the seminar house was greatly appreciated by all the participants.

To conclude, it is hoped that the papers in *Ancient Civilization and Trade* will give the reader a useful view of different archaeological approaches to the study of trade. Varied methodologies for investigating trade are illustrated, and the theoretical significance of studies of trade is explored. In addition, a number of dynamic roles that trade and trading networks may have played in the growth of civilizations are illuminated. If this work leads to a greater appreciation of the potential importance and utility of research on ancient trade and helps to stimulate new, imaginative, and innovative studies of trade, then the editors and all the participants will feel well rewarded.

Jeremy A. Sabloff
C. C. Lamberg-Karlovsky

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PART I

INTRODUCTION

1

Trade as Action at a Distance: Questions of Integration and Communication

COLIN RENFREW
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In recent years, trade has become one of the principal foci of archaeological research. There are two reasons for this. The first is pragmatic: trade can be studied. The objects of trade, or at least the imperishable ones, can frequently be found, modern analytical techniques allow the determination of the source, and quantitative methods inspired by geography permit generalizations about distribution patterns. The second reason is theoretical: in the past, the development of human culture and cultures has often been seen primarily in material terms (subsistence, technology, economy—for instance by Childe) or primarily in spiritual

terms (social relations, religion, knowledge of the world—for instance by Frankfort). Recently the relationship between these two arbitrarily separated areas has been more fully appreciated, as we have become aware of their total and integral interdependence.

Trade is an activity which closely relates these two groups of subsystems; it requires organization as well as commodity, and it implies criteria of value and measure. The crucial importance of the study of trade today is that it offers a practical way of investigating the organization of society in social terms as well as purely in economic ones.

Trade, a term synonymous with exchange, has been defined as "the mutual appropriative movement of goods between hands" (Polanyi 1957:266). The movement need not be over any great distance, and may operate within social or spatial units (internal trade) or between them, across cultural boundaries (external trade). In what follows, the notion of *movement*, in the sense of change of location, is crucial as the generator of spatial distribution. And *between hands* introduces at the outset the theme of human interactions.

This is why trade offers one of the most convenient approaches to the origins of civilizations or of states. For however these terms are defined, they imply an organization, a specialized administration, which regulates human activities both in terms of procurement (movement of goods including raw materials) and of social relations (human encounters with exchange of information and goods). "The essence of a social system is interdependence, and the essence of interdependence is men's investment of themselves in other men" (Coleman 1963). The degree of organization and its evolution, and of the evolution of civilization itself, may be understood in the light of the exchanges within a civilization. In this chapter I should like to examine more closely some of these interactions, of which trade is among the most important, and to suggest that we have not yet understood their complexity, nor the range of interpretive uses to which the archaeological record may be put.

In the first part of what follows I shall outline a general approach to civilizations and their formation, and discuss the role of interactions within and between them. The second part of the chapter is concerned with the pragmatic archaeological problems involved in the study of trade.

INTERACTION AND ORGANIZATION

Trade as Local Interaction

Marcel Mauss (1954) was the first fully to stress that in circumstances of relative self-sufficiency, many exchanges of goods take the form of gifts, and that such gifts have far more than a purely economic significance. They are social acts, prestations, in which the material aspect may have a subsidiary importance. Anthropologists from Malinowski to Sahlins have held this view, stressing the embeddedness of the economy within a social matrix among communities of band or tribal organization. An exchange of goods in such communities is primarily an act reinforcing a social relationship, and material exchange is an important aspect of the adjustment of the individual's relationship with others in his social environment, and in the adjustment of the band's or tribe's relationships with its neighbors.

Sociologists have taken the idea of exchange further to describe all interpersonal contacts, viewing all social behavior as an exchange of goods, nonmaterial as well as material (Homans 1958). In this perspective, the cohesiveness of a group, defined as anything that attracts people to take part in a group, is a value variable, referring to the degree of reinforcement that people find in the activities of the group. Communication or interaction is seen as a frequency variable: a measure of the frequency of emission of valuable and costly verbal behavior. The more cohesive a group is, and the more valuable the sentiment or activity the members exchange with one another, the greater the frequency of interaction among its members.

The anthropologist studying trade can profit from this approach, although he will interpret value rather differently and will broaden the discussion from the primarily verbal interactions which the sociologist may have in mind. For all human action may be viewed at a distance as exchange, both of material and of nonmaterial goods. We can measure the intensity of the interaction either in terms of frequency, as Homans suggests, or in terms of quantity of goods transferred. This is a simple enough concept for material goods, a more difficult but potentially useful one in the field of information. When the exchange habitually takes place at a specific location, we may describe that location as

a central place, which will then take on a special significance for the cohesiveness of the group.

Let us for the moment divide the totality of "goods" exchanged over a given period into material goods (among which "energy"—i.e., work or services—is here included) and information, defined as a constraint or stimulus upon present or future behavior. The total interaction, A, between two individuals is then the sum of the exchanges of goods, G, and information, I.

$$A = A_{12} + A_{21} = G_{12} + G_{21} + I_{12} + I_{21}$$

And the total interactions in a group of N individuals is

$$A = \Sigma A_{ij} = \Sigma G_{ij} + \Sigma I_{ij}$$

This approach leads us to contrast two extremes: exchange of goods without a wide range of accompanying information, and exchange of information without goods. The first is clearly the intention of "silent trade" (although even here information bearing on the future conduct of the trade itself is transmitted, for instance in the acceptance or not of the goods laid out). It is also a feature of market trade, where contacts can be at their most impersonal. The second extreme applies to any contact which we may identify as purely social or purely religious, although on examination many which we might so describe involve the exchange of material goods.

Information is not being used here in the special sense used in information theory. Yet the observation holds in that sense also. For quantity of information there indicates the magnitude of the set of possibilities of different messages: information conveyed is not an intrinsic property of the individual message. As Weaver (1949:12) remarks, "The word information relates not so much to what you *do* say, as to what you *could* say." In this special sense the silent trade and its modern equivalent, the supermarket, are also devices which restrict information.

For the archaeologist, the study of trade is central to the study of society because of the association of goods and information in most exchanges, an aspect of the embeddedness of the economy. Indeed, one might go a step further and claim that this association of material and social, of goods and information, this embeddedness, is the *normal* state

of society, that is to say the basis upon which human interaction functions in the absence of special mechanisms. From this standpoint the introduction of money and the use of markets are devices of some sophistication to allow the separation of functions, a differentiation overcoming the "normal" association or embeddedness. Coinage is a further sophistication, as are deferred payment, credit facilities, and the like. The associative embeddedness can only be avoided by the formulation of specific rules and conventions, both in the economic field and in the socioreligious one, where the renunciation of material things allegedly practiced in some sectarian groups completes the dissociation, with separate renditions on the one hand to God and on the other to Caesar or to Mammon.

It is appropriate now to set these interactions in spatial terms. In a uniform plain, with a dispersed settlement pattern, we can visualize each nuclear family as a point. If his home is fixed and his economy sedentary, the movements of the individual may be restricted to forays of a few kilometers' distance. Since the plain is uniform he may have minimal contact with his neighbors in adjacent territories. Such an individual or family, living alone, independent and self-sufficient, isolated from other humans, is the antithesis of civilization. Our interest is in the interactions that can make this individual, without change of local residence, a part of a functioning civilization. (Sedentary settlement is here under discussion: the position of mobile groups, including nomads and transhumant pastoralists may require a different treatment. For convenience a sedentary settlement will be defined as one in which no less than 90 percent of the annual man nights of the population are spent at home, in the permanent residence, or in fields not more than a few kilometers from it.)

This picture of minimum interaction is the very antithesis of civilization. Nor is the presence or absence of dispersed or agglomerate settlement in itself the crux of the matter. For agglomerate settlement does not in itself define civilization, although it must bring with it some measure of interaction. Indeed, we can visualize an agricultural population, every family of which is entirely self-supporting, in which the houses are clustered. This is in fact approximately the case in many early farming villages, some of which reach almost urban size without reflecting an urban organization. Çatal Hüyük is an example. The size of such

communities is limited by two parameters: the carrying capacity C (expressed as number of persons per unit area) and the maximum distance from the center of land that is farmed, given the available transport facilities. The maximum population P is 320 R^2C, where R is in kilometers and C in persons per hectare. A radius of 5 km. and Allan's figure of 0.5 for C in modern Anatolia (Allan 1972:225) gives a notional population of 4,000. This figure is indeed exceeded by the agricultural "towns" of southern Italy (Chisholm 1968:114), and both early neolithic Jericho and Çatal Hüyük may have housed comparable populations. There is no justification for taking a population figure of this order as an indication in itself of civilization or of cities: degree of interaction is not determined by population density or size of settlement unit, although both are among the determining factors.

High population need not be permanently associated with a central place, and indeed at periodic central places there is frequently no population. The Siassi-Gomlongon market described by Harding (1967:150) is at one extreme here; purely religious centers, such perhaps as Stonehenge, are at the other; and between is the whole range of periodic tribal central places which are distinct from residential locations. Residential locations can of course themselves be periodic central places; examples are the circulation markets of the Yoruba or in China, or at the other extreme and in our own society, a circus traveling from village to village.

These different interactions or exchanges, with their flow of goods and of information, are what remove the individual in his Crusoe-like isolation, suggested above, from a condition of brute independence, making him part of a functioning society of a kind we term civilization, with a high degree of interaction and specialization.

It was Karl Polanyi who made a fundamental distinction, about human affairs in general as well as about the economy, when he isolated for discussion both reciprocity and redistribution. Their importance can be tabulated as follows:

Perspective	*Reciprocity*	*Redistribution*
Configuration	Symmetry	Centricity
Geographical	No central place	Central place
Affiliation	Independence	Central Organization
"Solidarity" (Durkheim)	Mechanical	Organic

Reciprocity can of course work as a distributive mechanism, even with specialist manufacture. If we imagine village A making water jars and fine pottery, village O producing fibers and poultry products, and village Z salt, flowers, and maize we can imagine each exchanging its products for those produced by the other. If the number of production points is N, each producer will need to visit or be visited by $(N - 1)$ village representatives from other villages to effect full distribution, with a consequential $\frac{N.N-1}{2}$ journeys.

If, on the other hand, a system of redistribution operates, and one village functions as a central place as well as a small production location, inhabitants of the surrounding villages will have to travel only to the central one, and its inhabitants will not need to travel at all, so that the total of journeys will be $N - 1$. (fig. 1). As the number of participating production centers increases and also the proportion of the

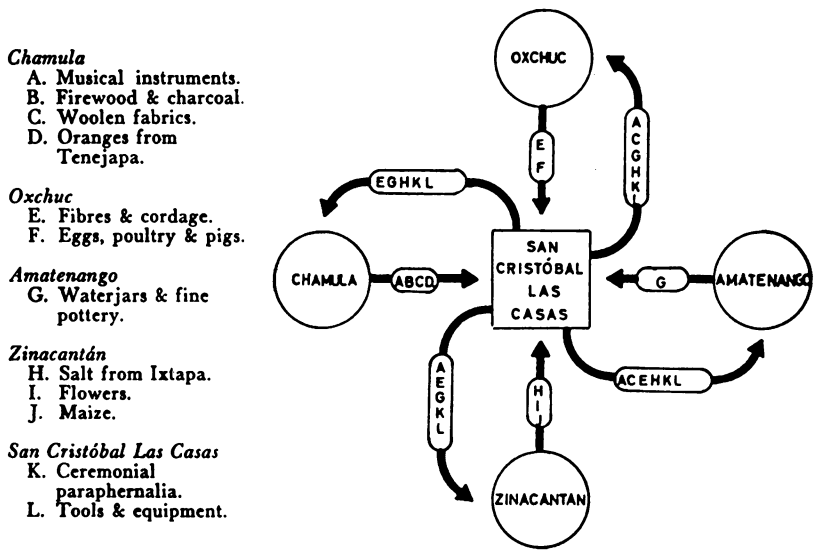

FIGURE 1. TRANSFER OF GOODS BY REDISTRIBUTION. In spatial terms this does not differ from market exchange, and the example is based on the market center of San Cristóbal las Casas, south Mexico. Reproduced from Siverts (1969).

produce of each that is exchanged, the institution of the central redistributive agency becomes overwhelmingly more efficient in terms of transport cost.

This, then, is a purely economic reason for the emergence of central places as the exchange of goods develops. In cases where there is also marked local diversity, with ecological variations within the region, a desire to obtain the products of a neighboring niche will inevitably promote exchange, which in turn will favor the development of central places.

The counterpart of the exchange of goods, namely the exchange of information, is no less important. And underlying any analysis of human society must be the recognition that public meetings take place in nearly all cultures, whether or not they are viewed as adaptively useful in stimulating solidarity and in reducing conflict. One convenient solution is for meetings to take place at each village in succession, which brings some of the benefits of centricity without long-term loss of symmetry. This solution has indeed been adopted by many band and tribal societies, of which the Kyaka of New Guinea are a good example (Bulmer 1960). But the provision of an impressive permanent facility for the occasion, such as a magnificent temple, becomes prohibitively expensive if it has to exist at each settlement. Again a central place is an obvious solution, this time for the exchange of information.

Just as craft specialization offers advantages in quality of product and in economics of scale, so specialization in communication, by priests and leaders controlling a central administration, is efficient and offers an attractive product. These full-time specialists at the center of redistribution are paid for by the goods of those who come to interact: it is an exchange of information against material goods. Redistribution is therefore simply an exchange of this kind, which, like the exchange of purely material goods, operates most efficiently at a central place.

This perspective allows us to see market exchange, Polanyi's third category along with reciprocity and redistribution, more clearly. For market exchange, seen in spatial terms, does not differ from redistribution. Indeed, figure 1, used above to illustrate redistribution, is taken from an article on market exchange in south Mexico (Siverts 1969:106), and the central place is not a redistribution center but the market of San Cristóbal las Casas in Chiapas. The difference, of course, is that accompany-

ing the exchange, in the case of redistribution, is a central organization within whose functioning the economic function is embedded. In the physical sense, redistribution implies the physical reception and disbursement of the goods by the central authorities and hence the provision of considerable storage facilities, as in the Minoan-Mycenaean palaces (Renfrew 1972:291–97). But increasingly sophisticated devices make possible a system of redistribution, involving the bulk of the produce not consumed by the producer, without its physical possession—first by nominal possession, although not under the direct control of the central authority, and then by more complicated accounting procedures. There is thus some formal equivalence between redistribution and market exchange which may make it difficult to distinguish between them in archaeological terms.

Moreover, Polanyi did not sufficiently stress that all marketing implies some kind of order, of security—ultimately, indeed, in the case of permanent markets, of jurisdiction. So that while the economic activity is to the fore, there *is* a social relationship (although not necessarily much active interaction) between those exchanging and the central authority ordering the central place. In this sense, market exchange may be regarded as redistribution with a dissociation of the central authority from the material transaction. Market exchange cannot take place without such order, either reigning precariously as in some tribal market exchange, or maintained by central authority, itself normally sustained by taxation (a monetary form of redistribution). The position of the port of trade, originally discussed by Polanyi and more recently by Rathje and Sabloff (cf. Rathje and Sabloff 1972; Sabloff et al. 1973), is an interesting one, for where the trade is at a level of fairly sophisticated market exchange, order is maintained by what may be viewed as reciprocity.

The foregoing discussion makes clear why there can be no civilization without permanent central places. The city has been well described as a "communication engine," and this description applies as much to low-population central places, such as some of those of Egypt or Mexico, as to great cities like Warka or Tenochtitlán. In studying the origins of civilization we are considering the rise of such central places. The consideration of exchange, of both information and material, reveals why population size is a secondary parameter.

In this section the rise of civilization has been equated with the devel-

opment of interpersonal interactions among the population of an area, many of these persons being necessarily at a distance from each other. It has been suggested that with the development of such interactions central places arise and that these need not be large centers of population. Before examining alternative models for the formation of civilization, it will be useful to consider some features of the spatial organization of many early civilizations.

The Administrative Module in Early Civilizations

A permanently functioning central place is a feature of every civilization. The central place may also be a major population center, or it may not have a large resident population. It serves as a focus for the material and informational exchanges that make up the interactions characteristic of civilization, and the permanent existence of the central place and its function as such is one of the features distinguishing civilizations from chiefdom societies, such as those of Polynesia. For even in the most stable of these chiefdoms, with a center functioning as the permanent seat of a chief, the central place actually operated as a major redistributive center—for both material and social exchange—only on one or two occasions during the year. (The ceremonial center of Mu'a in Tonga is a good example [McKern 1929:95], for major redistribution took place there only on one or two occasions during the year, notably at the great *inasi*, the annual first-fruits ceremony.)

I would like to suggest that in most, possibly in all, early civilizations a pattern can be discerned which has not clearly been distinguished hitherto. Perhaps this is because it is a spatial pattern, while the state and civilization (and even urbanism) are generally defined in terms of human specialization and organization, rather than spatially. But of course spatial order is an inescapable aspect of all organization, and the rise or origin of civilization can profitably be considered in terms of the genesis of that spatial organization. The recognition of this general pattern allows a discussion of the question which is not predicated upon an analysis of "cities" or "urban centers," since the central places in question are not necessarily of a character which would universally be accepted as urban. A firm distinction must be made here between the "civilization"—viewed as a "culture" (possessing a distribution in space

and time) of a certain complexity—and the organizational units ("states") which comprise it.

1. In most, perhaps all, early civilizations there function a number of autonomous central places which, initially at least, are not brought within a single unified jurisdiction. It is such autonomous territorial units, with their central places, which together constitute what we would all term a civilization. They may be recognized as iterations of what I propose to call the *early state module* (*ESM*).

If the territorial extent of any early civilization is marked on a map, the higher-level organization pattern will take the configuration seen in figure 2—fairly evenly spaced autonomous central places set in territories

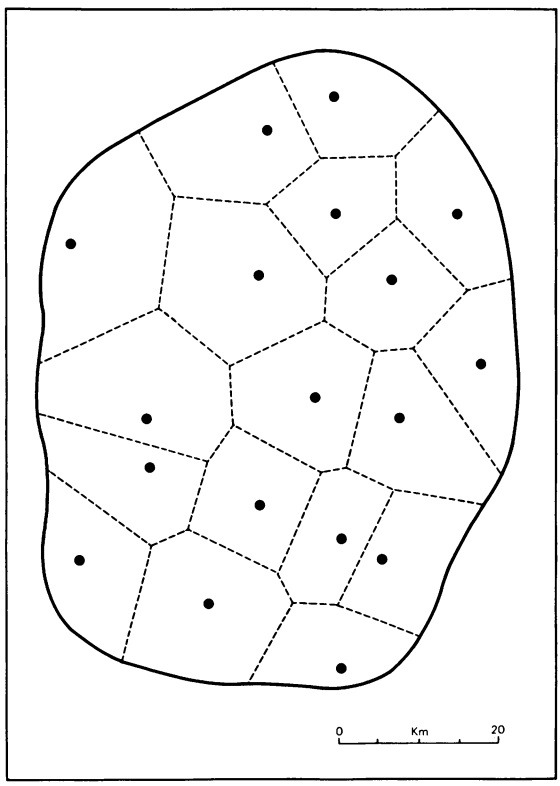

FIGURE 2. IDEALIZED TERRITORIAL STRUCTURE OF EARLY CIVILIZATIONS, showing the territories and centers of the ESMs within the civilization (i.e., area of cultural homogeneity).

which may notionally be indicated by means of Thiessen polygons. At the level of the early civilization or early state, these are the largest central places found. And when archaeologists claim to speak of the origins of early civilizations, they are usually found to be speaking of the development of these ESMs and of the less permanent and less active central places which preceded them. A central place, as considered here, is not, of course, merely an agglomeration of population; indeed its population may be small. This point is considered further in the next section.

2. The early state module apparently falls within a restricted size range. Frequently the modular area is approximately 1500 sq. km. with a mean distance of about 40 km. between the central places of neighboring modules. Special environmental or social factors may reduce this distance to about 20 km., while intervening parcels of uncultivable land may increase it to at least 100 km.

3. Many early civilizations comprise, before subsequent unification, about 10 of such early state modules, although the number may vary by a factor of at least 2, and cases are known where the number is higher.

Mycenaean Greece may be taken by way of example (fig. 3). The results of site survey (Hope Simpson 1965) indicate 14 palaces or major fortresses, of which perhaps 2 (Gla and Mideia) may not have been permanently occupied. Unweighted Thiessen polygons (Dirichlet regions) have been drawn to show the notional boundaries of the ESMs. Taking only adjacent territories (with a common terrestrial boundary), the centers have a mean separation of 76 km., partly in consequence of the rugged terrain between some of them. Minoan Crete offers a similar picture (Renfrew 1972:258), with a mean separation of 35 km., but the restricted size of the island allows room for only 5 or 6 palaces. In both cases the terrain imposes severe restrictions on the spatial distribution.

The pattern is seen again in the Maya area (fig. 4) where, in the southeast Petén, Hammond (1972:784) has identified "realms" (ESMs) approximately 1600 sq. km. in area. In Mesopotamia a similar modular organization can be identified; here the predynastic and early dynastic city-states are the central places of the modules, of which more than a dozen have been identified. A similar pattern may be recognized among the Hausa states of northern Nigeria (Magobunje 1968:51, fig. 3). For classical Greece, Doxiadis (1971) has proposed an area of 1471 sq. km.

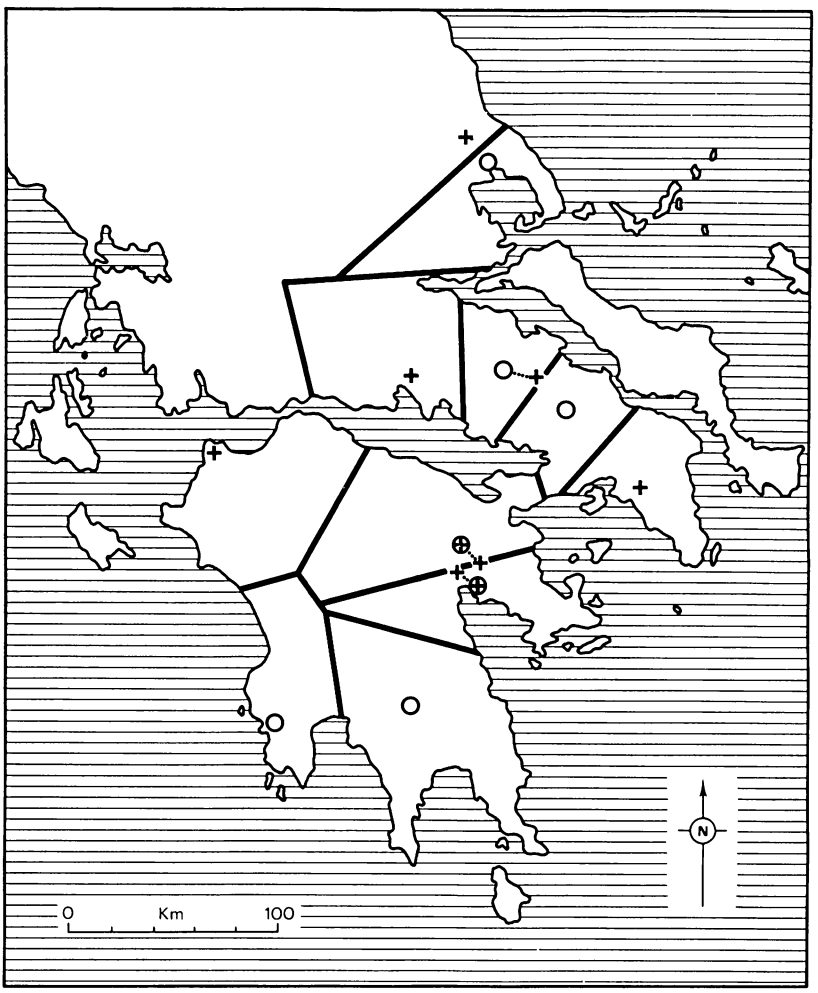

FIGURE 3. THE EARLY STATE MODULE IN MYCENAEAN GREECE, showing palaces (circles), major strongholds (crosses), and hypothetical territorial boundaries.

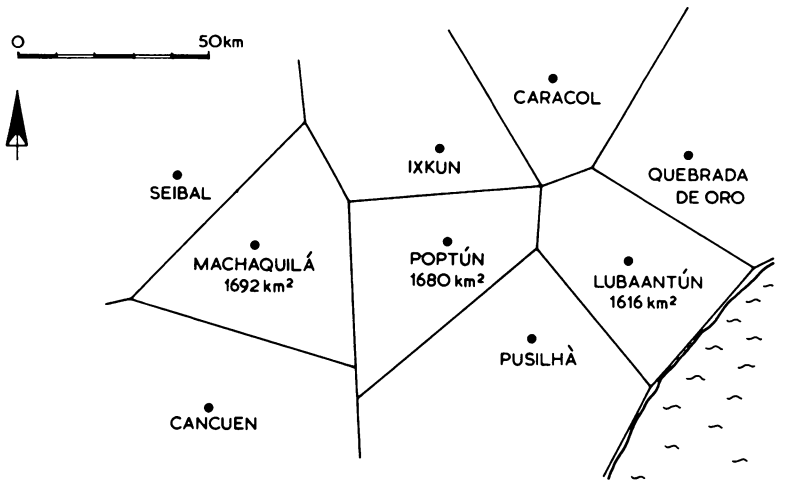

FIGURE 4. THE EARLY STATE MODULE IN THE MAYA LOWLANDS: realms in the southeastern Petén. Reproduced from Hammond (1972).

for the territory of a city-state. Early Etruria (fig. 5) offers another instance of an arguably "pristine" civilization, which emerged into history as a hegemony of 12 city-states. The mean distance between neighbors (with common terrestrial boundaries) is 56 km. Egypt, of course, is something of an exception to this schema, since the Nile imposes a linear arrangement, and little is known of the settlement pattern or administrative organization before the unification at the outset of the Old Kingdom. The discussion here, furthermore, is restricted to sedentary agricultural societies; more mobile units are discussed later.

The possibility of some uniformity in the size and spacing of these ESMs is particularly interesting, since the central places of one civilization are evidently different in size from those of another, as are the population densities. Brush and Bracey (1955) have, however, made a similar observation, although at a lower administrative level, in their comparisons between modern southwestern Wisconsin and southern England, where they found a spacing of about 21 miles between higher-order centers, about 7 miles between lower-order ones, and about 5 miles between the lowest-order centers. The interest here lies not in the abso-

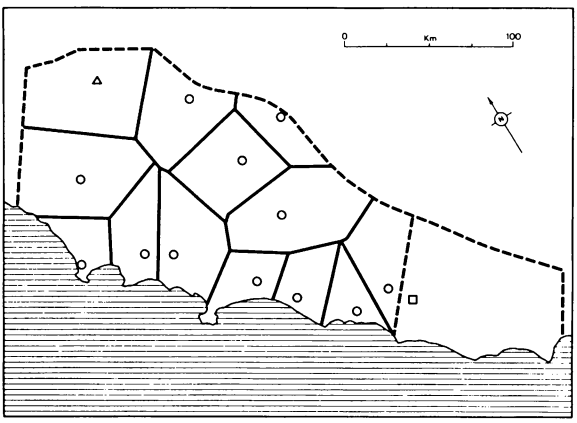

FIGURE 5. THE EARLY STATE MODULE IN ETRURIA: the 12 cities of ancient Etruria (circles) with hypothetical territorial boundaries. Rome is indicated by a square and Fiesole by a triangle.

lute figures but in the existence of modular units which appear in this case also to be of the same order in quite unrelated rural regions.

Settlement hierarchies have been recognized in a number of early civilizations, but the mean distances between adjacent centers of autonomous units have not been reported. Hodder (1972), writing of the hierarchy of settlement in Roman Britain, reports a distance of 6.5 miles between minor settlements, of 13 miles between major unwalled settlements, and 26 miles between walled settlements. His interest, however, is in the Roman period, and not in the pre-Roman Iron Age, when south Britain was composed of effectively autonomous tribal units. The Roman cantonal capitals approximate those of the previous period, and using Rivet's map (1964, fig. 9) I have calculated the mean distance between centers with common territorial boundaries in south Britain. For this purpose a line was drawn between the Wash and the Bristol Channel, and all civitates or *coloniae* south of the line, other than London and Glevum, were included. This gave a mean distance of 52 Roman miles, or approximately 76 km. Iron Age Britain was not of course organized at the state level, but it has been widely recognized that the major hill forts and oppida were central places which one might term proto-urban, although the Roman conquest radically altered

the course of subsequent development. It would be particularly interesting to know how this mean distance changes during the transition from chiefdom to early state; my suspicion is that it decreases more often than it increases. I have not attempted any detailed cross-cultural survey of early civilizations that would test the extent to which (a) the cellular pattern of ESMs and (b) their modular size are universal. But certainly many other early instances could be found: Wheatley and Chang have both (in seminar comments) discussed the spatial organization of Shang China in this way, and the forerunner of the Hittite Empire is amenable to similar treatment.

If this concept of ESM is accepted, it throws into relief a much-neglected feature of early civilizations. For while the external, long-distance trade of such civilizations is much discussed, and the internal trade, within the modules—that is to say the redistributive organization, with some residue of reciprocal exchange—has been well considered, the flow of goods and information *between* the ESMs, what we may term the *intermediate trade*, is rarely discussed. Yet this is the exchange whose effect must have been to produce and maintain the uniformity of culture or civilization as a whole. This question of uniformity or similarity has never been adequately considered for the state or civilization level of organization. D. L. Clarke (1968: chap. 9) has given an interesting discussion of spatial similarity patterns among tribes, but nowhere in the literature is there a careful investigation of the exchange mechanisms underlying them, other than vague reference to "pan-tribal sodalities" and the like.

Here one aspect of exchange must be discussed for its substantial impact on information flow: exogamy with respect to the territorial unit. There is no doubt that the most influential form of interaction at a distance takes place when the "distance" is permanently negated by change in place of residence. This simple truth underlies much older migrationist reasoning, but only in a few studies, such as those of Deetz (1965) and Hill (1966), has it been applied to a "steady state" situation. One can see that any perceived division into "them" and "us" is likely to lead, within the restrictions of the society's marriage rules, to a higher degree of intermarriage among "us" and hence a greater information flow, leading to an effective, operational difference in the culture of "them" and "us" which will reinforce the perceived

distinction. The extent to which ESMs function as exogamous entities is relevant, therefore, to an understanding of the homogeneity of the culture of the ESMs within the civilization as a whole, although it does not diminish the significance of other kinds of exchange.

The initial autonomy of the ESMs implies that trade between them will be reciprocal, primarily between the major central places. Indeed, when there is a shift from reciprocity to redistribution, implying the emergence of a higher-order central place, the civilization is consequently unified to form an empire. Alternatively, when the reciprocity breaks down, giving rise to hostility, unification may again be the consequence. This is the phenomenon implied in Julian Steward's term "Era of Cyclical Conquests" (Steward 1955:196). (Attack from outside may bring a measure of unification, very much like that seen in a segmentary lineage system [Bohannan 1954].) On occasion such unification processes have been identified with state formation itself (c.f. Krader 1968: chaps. 3, 5, and 6), but there is in such cases a confusion between organization and perceived ethnic identity over a wide area. My focus here is on aspects of organization and interaction without which no civilization or state can function, and on sedentary rather than nomad societies.

The ESM for various early civilizations clearly falls within a limited size range, and the maximum distance from center to territorial boundary must be related to the means of transport available. For the Etruscan city territories the maximum is about 50 km.; for the Mycenaean centers, with their uncultivable intervening terrain, about 70 km. In none of the early civilizations we are discussing was the horse widely used (although horses were ridden in Etruria); the ox-drawn cart was significant in some. So the boundaries of the module were generally no more than one or two days' march from its center. The distance from chief center to boundary for a civilization-empire could clearly be much larger, and effective military control must have been a crucial factor, implying a military hierarchy, with local governors and often local garrisons, and with the development of the totalitarian structure that some authors consider typical of the state. I suggest, however, that effective control—if less obviously militaristic—will have come first at ESM level.

The exchange situation implied by this model is seen in figure 6. Within an ESM, the internal exchange is by redistribution with some

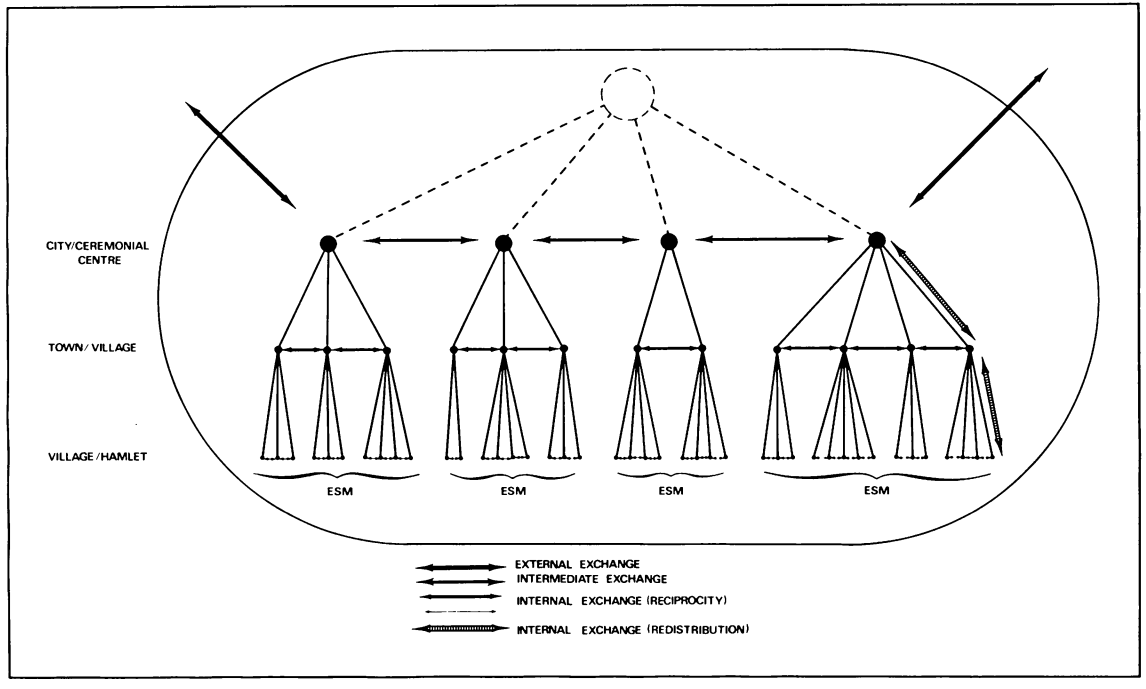

FIGURE 6. MODES OF EXCHANGE FOR AN EARLY CIVILIZATION, indicating the place of the ESMs within it and the scope of internal, intermediate, and external trade. Dotted lines indicate the organizational unification occurring when the ESMs of the civilization merge to form a single empire or civilization-state.

reciprocity (redistribution including the possibility of market exchange). Among ESMs there is intermediate exchange on a basis of reciprocity. And between ESMs and the outside world there is external exchange. Dotted lines indicate the possibility of the amalgamation of the ESMs into an empire, with the development of a higher-order central place (or the emergence as such of the center of one of the ESMs).

Trade as Remote Interaction

The archaeologist has traditionally been interested in trade less for its role in the internal organization of society than for its importance as a proof of "diffusion." The frequent and widespread use of the term *diffusion* is open to objection not so much because it is not appropriate (although this has been the case in a large number of misguided applications) as because it does not, as used by the archaeologist, have any explanatory content. Archaeologists generally use it to mean simply that contact with areas outside the system may be documented, and that, on the assessment of the observer, "independent invention" is to be denied. Rarely is the nature of the contact analyzed or any consideration given to what "invention" would mean in the context, whether "independent" or not. The term *diffusion,* used in this general sense, is best avoided.

Diffusion as a spatial process has been analyzed usefully by geographers (e.g. Hägerstrand 1967), and their work no doubt still offers many insights for the archaeologist. In their analysis, however, they are generally required to assume precisely those matters which, for the prehistoric case, are here in question: how the diffusion process works, in personal as well as spatial terms; the homogeneity or lack thereof of the spatial field; and precisely what is being diffused.

The interactions associated with exchange within the system, specifically within the ESM, have already been mentioned, with redistribution taking a major part (with or without the agency of market exchange), reciprocity a subsidiary position, and marriage exchange a significant role. Intermediate exchange between ESMs, but within the culture or civilization, still awaits adequate analysis. But again marriage exchange must be an important factor. It is now exchange across the boundaries of the culture or civilization—external exchange—that concerns us.

Our interest is in the effects of this exchange upon a culture which, in terms of organization, of hierarchy, of volume of internal exchange, is *less* highly differentiated than its neighbor. The possible effects of the internal organization arising with the development of an export trade are indicated in the next section; our interest focuses here not so much on purely economic organization as on the effects upon the system of the flow of information reaching it from its more highly organized neighbor, the process numbered 6, *Emulation*, below (p. 33).

It should be explained at this point that exchange between major regions with very different resource patterns has not been singled out for special mention. For I take it as axiomatic that any early civilization must control, normally within its boundaries, such resources as are altogether essential for its survival. In cases where there is a very heavy interdependence between them, developments may occur as in process 3, *Intraregional Diversity* (p. 29 below), and the boundaries of the civilization may develop (as a consequence of the strong interactions between the regions) so that the ecological diversity is an internal one.

Our interest in remote interactions was well expressed by Flannery (1972:135): "It might provide a great deal of unexpected fun if future studies used such exchange as a window into each society's explosively evolving ability to collect and process information about neighboring societies."

Exchange of goods between A and B through intermediary or intermediaries C can effect the transmission of information in three ways:

1. *Commodity*. The traded material itself, at its place of receipt, and independent of the means by which it reached that place, may convey meaning. In information theory terms it can be both signal and message (whether or not the transmitter or the receiver had a prior intention of transmitting or receiving). In what it *is*, if this is something new, it is a message with appreciable semantic content. A cup made of gold, to a person who has not previously seen gold, imparts information about the world. From the standpoint of the receiver it is a message.

Secondly the object itself may function as signal, which requires decoding before yielding any recognizable semantic content. Let us take as an example here the remarkable steatite carvings of Tepe Yahya (Lamberg-Karlovsky 1972b). In the hands of a person (destination)

who is familiar with the symbolism involved, these carvings are, for instance, religious scenes making sense to a participant in Sumerian civilization: he can decode the signal. In the hands of someone who does not have the code, they are just odd carvings.

The extent to which meaning and hence information is conveyed by objects is a complicated one. The complexity arises, as so often in the attempt to apply information theory in an unrestricted human context, because many channels of communication are in operation, and more are continually being opened. The process does not easily lend itself to analysis, since the bandwidth can never be regarded as fixed.

Objects themselves, in isolation, can convey information, and this process is precisely what Kroeber (1940) meant by the term "stimulus diffusion."

2. *Association with commodity.* Inherent in the act of exchange between intermediary C and recipient B is a complex of mutual understandings, which have to be common to B and C and which will be conveyed from B to C or vice versa before the transaction can be completed. Some, in turn, may have been transmitted to C on the occasion of his interaction with A. These understandings include concepts of number and of unit of measure (weight, capacity, and so forth), as well as the means of measuring these (scales, graded capacities, and the like). Inherent in the exchange is the very concept of exchanging the two commodities in question, as well as the valuation systems by which quantities are established. (Here, after all, was what motivated much of early European trading endeavor in the Middle Ages: the search for El Dorado, where the streets would be paved with gold bricks, was the search for a land not only with a supply of the desired commodity but also with a favorable value system.) Accompanying the exchange also may be the concept of currency, and possibly some system of recording. It is within this constellation of information types that the regulating effect of exchange over the supply of desired commodities operates (Wright and Zeder in press; Rappaport 1967).

Accompanying the exchange, moreover, even in a "silent trade" situation, are modes of communication formally extraneous to it. The dress of the intermediary, the form of transport he uses, and other features all offer channels of potential communication.

3. *Verbal exchange.* The intermediary C can tell the recipient B what

he knows of A and of his culture. A large quantity of information can be transmitted in this way.

The trade situation is an exchange situation, and an exchange situation is an information flow situation. For this reason the analogy seen in figure 7 between a communication system (Weaver 1949) and a trading system is only in part analogy; in part it is descriptive. The reciprocal nature of all trade and exchange is indicated, or more strictly the cyclical nature.

The enormous complexity of the communication of information during trading exchanges makes it understandable that in the past the whole process has been swept under the carpet by using the term *diffusion*. Progress, however, will only come when different categories of information, conveyed by different channels, are distinguished.

Alternative Models for Civilization Formation

The origin of the early civilization or the state, whatever its subsequent career, has been identified above with the emergence of early state modules, each with a stratified organization for exchange. This central place exchange, and the permanency and permanent functioning of the central places, underlie the interdependence of ESM society, in contrast to the relative independence of local units linked only by reciprocal exchanges.

One obvious concomitant of central places, not yet discussed here, is *central persons*. These are the individuals upon whom the exchange of goods and of information focuses. The hierarchy of central places thus carries with it a hierarchy of central persons, who may themselves be singled out by great prestige and wealth. While this may be the case, however, it is not a necessary part of their function (even if display, sumptuary rules, and conspicuous consumption often have an adaptive role in facilitating that function). Archaeologists often assume that a pronounced hierarchy of personal wealth and conspicuously asserted prestige is a necessary accompaniment of early civilizations. This, however, is not so. In both the Greek city-states and Republican Rome, a different set of values soon developed—although it could be argued

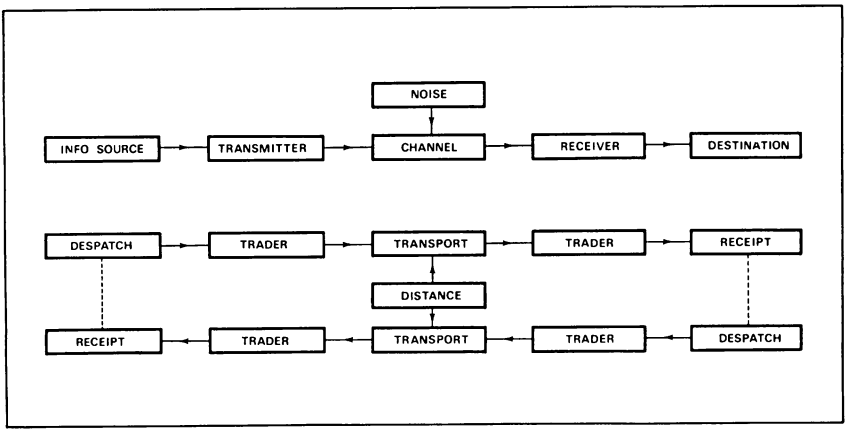

FIGURE 7. EXCHANGE AS INFORMATION FLOW: the structural homology between the transmission of a signal and the trade of goods.

that these democratic, antiroyal values were not a feature of the first emergence of the ESM.

I have often thought how singular the Indus Valley civilization is in this respect. For it possesses very large urban centers with a rectangular layout more impressive than any in Early Dynastic Mesopotamia, and worthy of comparison with Teotihuacán. The centers have "citadels" with large granaries which were clearly the nub of a complex redistributive exchange system. A range of traded materials is seen. Yet nowhere, on the basis of the archaeological record at present available, is there the superabundant personal wealth so characteristic of the early civilizations of Egypt, Mesopotamia, and China. Nor has there been found the exceedingly complex and monumental religious symbolism characteristic of the Mesoamerican early state modules. Nor yet, despite the existence of a script, is there the vainglorious assertion of personal power, expressed in colossal monuments of inscription, that we see in Egypt and Mesopotamia. The Harappan civilization does not reveal to the world any Ramses, any Hammurabi, nor yet any Gudea of Lagash. Indus exchange evidently functioned without such emphatically assertive statements about the prestige and power of the central person.

I should like to identify now six different *processes* which may lead to

the formation of central places serving ESMs. In most real instances a number of these processes will be in operation, but they can be separately distinguished. Indeed, different "mixes" of these processes can be seen to generate a typology of early centers which approximates the range recognized by archaeology today. All of these processes center upon exchange "at a distance"—at a central place—whether of information or of goods. The first three involve internal exchange, and only one of these calls for marked ecological diversity within the ESM. The three processes of internal exchange will first be outlined.

ENDOGENOUS GROWTH

1. *Social and religious exchange predominating.* With an initial distribution of dispersed settlement in farmsteads, hamlets, or small villages, a *periodic* central place emerges, for seasonal ceremonies related either to the identity of the community (i.e. the common affiliation of the participants), in some cases focusing on the person of the chief, or to projections of the seasonally changing world, or both. The Kyaka meetings of New Guinea are instances of such functioning at tribal level, and nearly all chiefdoms have such periodic central places. Mention has already been made of Mu'a on Tongatapu, which was the scene of the annual presentation of first fruits to the Tu'i Tonga. Sahlins and others have stressed the material redistribution of such occasions, which was certainly impressive, but an annual feast can have little long-term impact on subsistence. The importance of the occasion was in terms of information—as a meeting. The ceremonial center of Orongo on Easter Island is particularly interesting because the business of awaiting the migratory arrival of the sacred bird necessitated the prolonged occupation of the site. It seems likely that some of the central places of the British Neolithic (Renfrew 1973) were periodic central places of this kind.

At the point that such a periodic central place becomes a permanent central place, the territorial unit may be regarded as an ESM. It is not sufficient, however, that the location be inhabited throughout the year; it must continue to fulfill its central function as well. And the specialists who control that function must be full-time specialists. This implies, of course, that the exchange includes a measure of foodstuffs and other

goods to sustain these central persons, in return for the information they impart.

A multiplier-effect interaction is here possible between the subsistence and projective systems. For the calendric expertise offered at the central place may be of real significance in the scheduling of subsistence activities in relation to the seasons, and the successful development of the subsistence subsystem may thus be linked to that of the projective one.

Naturally such central places become the foci also of other types of exchange. Yet the process described may be seen in operation. I suspect that this exchange model is applicable to a number of Mesoamerican developments. Prototypes for the ESM center are to be seen in many chiefdom periodic central places. The population of the central place on this model need be very small—little larger than that of the various residence units which it serves.

2. *Population agglomeration and craft specialization.* On this model, the population accumulation, at a local agricultural village/town location, of an agglomerate population distribution makes possible economies of scale. It was indicated above that in parts of the Old World, villages of up to 4,000 persons are possible, without any of these being supported in exchange for the discharge of central-person functions. In reality, of course, 4,000 persons living together at one location do interact and do participate in exchanges, even if theoretically they could live as independently as if their settlement pattern were dispersed.

Population size itself may lead to the development of specialist occupations—potter, leather worker, weaver, and so forth—so that the society becomes differentiated, and a redistributive system develops. This is possible without any marked ecological diversity in the territory.

With the emergence of a redistributive system, some central regulation or control is likely to develop. And this can actively *organize* aspects of the specialization. For instance, irrigation works can be regulated centrally with far greater efficiency than that of persons acting together on an essentially reciprocal basis of mutual agreement.

As the benefits of specialization are seen, the center becomes a point of attraction for a larger territory and can act as an exchange center for goods made elsewhere. For instance, if one neighboring village is effective at pottery manufacture, and another at weaving, the center will become the locus of exchange of these products (fig. 1).

It should be noted that specialization of this kind need not rely in any way upon diversity of resources; it can arise simply from the local development, over a long period, of specialist skills. For instance, in the well-organized—but not central place–based—trading system of the Vitiaz Strait, the production of some goods is, of course, environmentally determined. For other products, however, this is not so. "For example, Sio lacks neither the resources nor skills required to produce mats, ornaments of cowrie shell, and tambu shell as sago. Why import these goods from Siassi?" (Harding 1967:54).

An answer to this question can be offered at several levels. At that of personal motivation may be the desire for prestige through the ownership of goods, which are obtained through successful trade. Wright and Zeder (in press) have stressed a suggestion by Rappaport (1967) that the real, operative function of the trade of some "ritual" artifacts may be to regulate exchange systems of goods essential to the maintenance of life. Harding's question may perhaps be answered along these lines. In any case, devices such as those described by Harding and Rappaport do ensure the existence of a permanent trade at a tribal level, rather than the periodic exchange occurring in the earlier stages of model 1 above.

The central place of the ESM likewise regulates such exchange, whether or not by the use of prestige commodities. In the long term it is to the advantage of a village entirely independent in terms of subsistence commodities and with a temporary sufficiency (or "surplus") of others to go on trading. For to fail to do so would endanger the survival of trading partners who are not self-sufficient in subsistence terms and would hence jeopardize the long-term supply of the imports currently in surplus.

Of course in most real cases prestige commodities will also be involved, their prestige deriving from an ascribed value in the social or projective subsystem. The case which does not rest heavily on prestige commodities is, however, worth stressing so that the validity of this second model can be recognized, even if it usually works in association with other processes.

Prototypes for such ESM centers may be recognized in such early population centers as Jericho and Çatal Hüyük. The central-place activi-

ties here outlined, in the absence of ecological diversity, are very much those of classical central-place theory.

3. *Intraregional diversity.* Consider a region no more than 1,000 sq. km. in area with four subregions, in each of which the same four different crops may be grown but with differing yields per unit area. Suppose that each subregion can grow one of these crops with a higher yield per unit area than the three other subregions. Clearly it is possible for an individual in one region to live independently and have a supply of all four crops, homegrown. His total yield, however, will be increased if he can specialize in the one crop at which he is most efficient and exchange a portion of his harvest for supplies of the other three crops.

The advantages of redistribution over reciprocity, in terms purely of efficiency, as indicated above, when a large proportion of the total per capita produce is to be exchanged, are considerable. In such a case a redistributive center is to be expected, located at or near the point of intersection where three of the four, or if possible all four, subregions meet.

The same arguments apply with even greater force when key resources are very highly localized, as in the case of metals, precious stones, and other minerals.

These ecological circumstances thus favor the development of a major exchange center, the subsistence subsystem developing a multiplier effect with the communications subsystem. Flannery and Coe (1968) have described this process in their discussion of the development of social organization in symbiotic areas of ecological diversity. I have similarly stressed the crucial significance for early Aegean civilization of Mediterranean polyculture (Renfrew 1972:297–307). The development of viticulture and the cultivation of the olive made effective what was formerly only a potential diversity in the environment, and led in the third millennium B.C. to the formation of small proto-urban settlements, which were succeeded in the second millennium by the palace centers of the Minoan-Mycenaean civilization (fig. 3). Yet the population of many of the ESM central places was no larger than Early Neolithic Çatal Hüyük.

These three entirely endogenous processes can be imagined as work-

ing in isolation, but in reality each carries with it something of the others. The process of city formation in terms primarily of these three processes is seen schematically in figure 8. The starting point is a small, noncentral place with small population—a hamlet. The three processes are seen at work, generating (1) a proto-urban center indicating a periodic central place (Stonehenge, perhaps); (2) a center of population with few urban functions (such as Jericho); and (3) a redistribution locus regulating intraregional diversity (such perhaps as Early Bronze Age Lerna in the Aegean, with the central store, the House of the Tiles, and associated sealings).

If these processes continued unchecked they would reach more extreme situations (now shown on fig. 8). For instance, process 1 would result in colossal ceremonial centers without any sizable permanent population or any significant role as an exchange center for goods. Probably Monte Albán or Angkor Wat come as close as any human center to this extreme. Process 2 would result in massive urban centers of population, with limited social or religious significance and without much local diversity. The Indus Valley cities could be caricatured to fit this role, but there is probably no real case to fit it. Process 3 would result in centers for local redistribution, or in markets, which have only a low population and little symbolic or socioreligious function. Again it would be difficult to find real cases to fit this extreme—ports of trade are excluded here since they do not exist until well after the development of ESMs. But one of the main points of the earlier argument was that redistributive functions imply central persons, and hence usually social actions centered upon them.

Figure 8 indicates six paths by which the three notional forms of urban center which reflect the working of two of these processes may be reached. The circle labeled 1 + 3 designates those centers where redistribution and social and religious functions take place but which have a limited permanent population. This is the well-known phenomenon of "civilization without cities," where the degree of urbanization (calculated on the basis of the number of "urban" dwellers) is much lower than in an agglomerate population distribution whose centers nonetheless lack urban functions.

The final stage envisaged is the emergence of the city with its full complexity. In reality few cities have emerged without a contribution

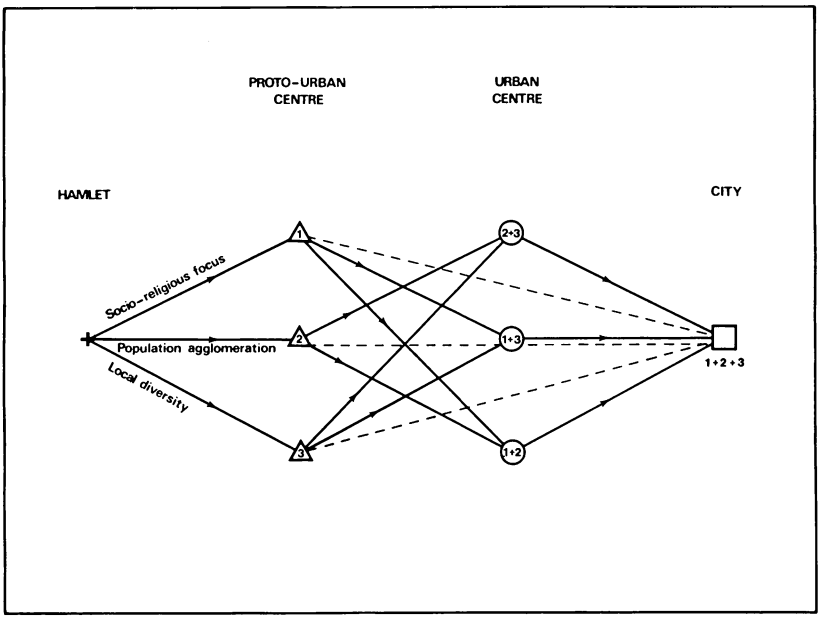

FIGURE 8. ALTERNATIVE PATHS FOR THE FORMATION OF THE URBAN CENTER AND THE CITY. Three processes, all endogenous, are singled out: increase of population, exchange arising from local diversity, and the development of a social or religious focus. In each case the proto-urban center will be of a different type. The city is always the product of the operation of all three processes.

from all three processes, and ultimately the systemic model which considers all three at a time, mutually operating, is closer to reality. To distinguish discrete paths, as in figure 8, may not be entirely warranted, but it does allow a typology of central places to arise, generated by the varying operation of these processes.

In discussing such endogenous change, no mention has been made of the operation of external trade or of other input from outside the civilization territory. Yet external factors can play a significant role in morphogenesis without making the process itself an exogenous one; an exogenous civilization, that is one that is secondary or derived, can only arise through contact with an existing earlier civilizaton. But neither

external trade nor conflict at the borders of the civilization need imply contact of this kind. Such factors are:

(a) External trade. When conducted with *less* centralized communities, external trade may nonetheless play a significant role: the goods traded may be such as will readily appear prestigious within the civilization boundary. Central persons who control the supply of these goods may thus achieve added power and status. This is not, however, the process described by Flannery (1968), where trade was heightening a hierarchy of a *less* ordered society, in trading contact with a *more* highly ordered one. And in the instance from the central Maya lowlands discussed by Tourtellot and Sabloff (1972), it was again supposed that a ranked society emerged, partially as a consequence of trade in prestige goods, these being supplied by a more highly ranked society whose values were in some way adopted along with the goods.

(b) Hostilities. Armed conflict has not been considered here as a major process leading to the formation of central places. It may indeed favor aggregation behind a wall, as at Jericho, but that is little more than a preliminary for process 2. A Çatal Hüyük or a Jericho need display no more than a mechanical solidarity. Similarly, conflict on the fringes of the civilization may act in this way as an agglomerative factor, but this need not imply that the external disruptive force is as organized as the culture under attack.

EXOGENOUS GROWTH

There are three evident ways in which civilization can grow up in a region as a consequence of interaction with an existing, more highly structured civilization nearby.

4. *Urban imposition.* As noted earlier, one of the most efficient forms of communication among humans is change of location. When this is accompanied by armed conflict, the entire information-carrying system of one area can be imposed upon the other. This may not result in instant urbanization, but centralizing processes can then be initiated which will be self-sustaining. The Roman conquest of the British Isles is a good example. The early Roman centers were primarily military, but they soon developed the other features of centrality described. Even

after three centuries of continuous functioning, however, they collapsed when the external contact with Rome came to an end.

5. *Implantation.* A colonial enclave is conceived here as an intrusive community—one whose inhabitants are foreigners with respect to their neighbors—which continues to interact strongly with its parent community. A major component of this interaction is frequently an intensive trade. This intensive trade has a major effect on the activities of the indigenous inhabitants, amongst whom an economic organization develops with increasingly more intensive interactions. This can lead to the development of civilization without any extensive adoption of the technology, customs, or beliefs of the colonial newcomers.

6. *Emulation.* External trade brings exotic prestige artifacts which confer status on those individuals controlling the supply. A prominent hierarchy can thus emerge in what was formerly only a partly stratified society. In this case the society supplying the goods is already highly organized and stratified, and with the goods comes information, a set of values and social procedures which are more readily adopted because of the sophistication of the source society's products and the prestige in which they are held. This process had been admirably described by Flannery (1968) and by Tourtellot and Sabloff (1972). It contrasts with the process of external trade (a) discussed above, for there the information component of the exchange was not a significant one. Here, ideas, values, and technological innovations are being transmitted from the parent society. This is the process which earlier writers termed *diffusion.*

In reality, once again, processes 5 and 6 are not readily separable. For in most real cases, the structurally significant economic effects (of 5) are indeed accompanied by the adoption of the technology and values of the more "advanced" colonists (of 6). Yet the processes can usefully be distinguished.

Gordon Childe, the most systematic and persuasive advocate of "diffusion" in recent decades, used a compound of these two processes, which I have termed *implantation* and *emulation,* to explain the diffusion of civilization in the Old World outside the "primary centers" of Egypt, Mesopotamia, and the Indus. His argument is so coherent that it is worth repeating at length (Childe 1936:169–70):

> But once the new economy had been established in the three primary centres it spread thence to secondary centres, much like Western capitalism spread to colonies and economic dependencies. First on the borders of Egypt, Babylon and the Indus valley—in Crete and the Aegean islands, Syria, Assyria, Iran and Baluchistan—then further afield, on the Greek mainland, the Anatolian plateau, South Russia, we see villages converted into cities and self-sufficing food-producers turning to industrial specialisation and external trade. And the process is repeated in ever widening circles around each secondary and tertiary centre. . . . The second revolution was obviously propagated by diffusion; the urban economy in the secondary centres was inspired or imposed by the primary foci. And it is easy to show that the process was inevitable. . . . In one way or another Sumerian trade and the imperialism it inspired were propagating metallurgy and the new economy it implies. . . . These secondary and tertiary civilisations are not original, but result from the adoption of traditions, ideas and processes received by diffusion from older centres, and every village converted into a city by the spread became at once a new centre of infection.

This is a powerful model, an evocation of the way a new, secondary civilization can be "called into being" (Childe 1958:163) through trading contact with an existing primary civilization. The distinction between the purely economic effects and the impact of new activities and ideas has been drawn above. The latter will be examined further in the next section. The magnitude of this impact in some cases cannot be denied, although the mechanisms are sorely in need of elucidation so that the meaningless term *diffusion* can be circumvented.

At this point, however, what must be stressed is that Childe was demonstrably wrong in many of his applications of this impressive model. Elsewhere (Renfrew 1972) I have established at length that the situation in the Aegean was almost the converse of the one which Childe described, and that the Aegean civilization must be explained primarily in local terms. More recently, the widespread application of his model to other aspects of European prehistory has been criticized. In my view, the distinctions which in practice have been drawn between many "primary" or "pristine" civilizations, and others which are supposedly "secondary" or "derived," are totally without value. Many discussions of the origins of civilization have been cripplingly limited in scope by their restriction to some received list of *the* five or six, or whatever, "primary"

civilizations. I do not doubt, as the preceding discussion will have shown, that the origin of some civilizations can be seen as fundamentally modified through contact with another civilization. But with the exception of a few recent writings about Mesoamerica, there has been no adequate attempt to consider mechanism, or to set up valid criteria by which "primary" and "secondary" can be distinguished. If *total* absence of contact were a condition for primacy there would only be two "primary" civilizations in the world, or perhaps only one, and the course of Human History would be very much as Elliot Smith, with his Egyptocentric belief in the absolute primacy of a single civilizing center, described it (1930).

Trade and the Culture System

Civilization implies the development of a highly structured and differentiated society, with specialist production (craftsmen), a permanent controlling organization disposing of a significant proportion of produce (government), and a developed, explicit set of shared beliefs (cognitive structure), sometimes with large aggregations of population. (Partial or periodic manifestation of these features is characteristic of chiefdom society.)

Complex societies of this kind cannot be characterized in terms of a single variable, whether it relates to population, subsistence (e.g., irrigation), technology, social organization (e.g., palaces), or the cognitive structure (e.g., writing). In much of what I have written above, human culture is being viewed from the standpoint of trade. The choice of perspectives for the investigation of culture change is, of course, entirely up to us, but when all the variables in the inquiry are interdependent, to single out any one for heuristic purposes as the independent variable is obviously arbitrary. To do so, however, need not imply any reliance on monocausal explanations, and I suggest that it is useful to have in mind some general model of society to cope with its multivariate complexity. At present a systems model does allow a rounded, qualitative view, and the framework offers the possibility of eventual quantification.

The spatial boundaries of the culture, archaeologically defined, or in some cases the boundaries of the administrative module, are convenient bounds for the system. Its components are the persons within the unit,

the artifacts they use, and those elements of the "natural" environment with which they interact. (The natural environment is included: to regard the human population alone as constituting the system enforces a needless division between "man" and "nature," making any ecological approach difficult.)

The culture may arbitrarily be divided into subsystems defined by human activities. Each individual operates simultaneously in several subsystems. The following have been used in an analysis of the prehistoric Aegean (Renfrew 1972) and are generally applicable:

subsistence subsystem
technological subsystem
social subsystem
symbolic or projective subsystem
trade or communication subsystem

Using such a model, population and population density do not constitute a subsystem, but are parameters of state, relevant to all the subsystems.

The stable persistence of the system through time, with limited change in the values of the state variables of the subsystems, is the consequence of negative feedback. Human culture is largely conservative in nature, and the stability of the system may consequently be described in terms of homeostasis.

Growth and culture change, however, cannot adequately be described in these terms, simply as homeostatic responses to change outside the system, as participants at an earlier School of American Research seminar have erroneously held (Hill 1970). Culture change involves fundamental and irreversible changes in structure, and the process of morphogenesis cannot be explained simply by means of negative feedback. On the contrary, growth cycles imply positive feedback, so that the growth is sustained. The term *multiplier effect* has been proposed for the positive mutual interaction between subsystems which alone can result in growth and in the deep structural changes involved in such basic transformations as the genesis of cities or the emergence of civilization.

This general model for the growth of civilization is relevant here in offering an insight into the importance of trade in early civilizations. For it emphasizes that trade will only be a major force for change if it

enters into this kind of positive relationship with another subsystem of the society.

Both the explanation offered by Flannery (1968) for the growth of trade between the Olmec and the Valley of Oaxaca and the analysis by Tourtellot and Sabloff (1972) of the development of trade in the Maya lowlands can be seen in these terms. In each case the interaction between the two subsystems produced coupled development through the multiplier effect.

It is important to note that such interaction is possible only when the traded commodity achieves a value or importance in the social system, often in terms of prestige. This is an instance of the symbolic equivalence of material and social values (Renfrew 1972:496–500) which lies at the root of many applications of the multiplier effect. For not all trade works this way. The obsidian trade in the Aegean, for instance, involved transport by sea already in the seventh millennium without striking social consequence, and declined dramatically when a more useful and more prestigious commodity—bronze—came into use.

Through the operation of the "law" of supply and demand, an equilibrium will normally be reached whereby the flow of a given commodity settles down to a stable rate. The development of a social system is just one of the ways, however, by which sustained growth in the volume of trade may occur. Multiplier-effect interaction can occur with other subsystems: in the third millennium Aegean, the technological interaction was particularly strong. There the innovation of bronze metallurgy (which did not take place overnight, and can itself be analyzed in these terms) naturally resulted in a trade in bronze goods. The bronze trade did not, however, stabilize at a given level, with a steady supply of daggers or axes. For at each stage the increasing flow of trade, related to increasing production, seems to have produced a spin-off of innovation. The new forms of artifact thus produced (such as metal vessels and swords) became new commodities for trade without necessarily competing with the older ones. Again, the increasing bulk of material manufactures seems to have led both to economies of scale and to further technological innovation. A period of technological and commercial growth ensued which lasted for well over a millennium (fig. 9) and terminated only when other factors (probably demographic and social) brought about a system collapse and the Greek Dark Age.

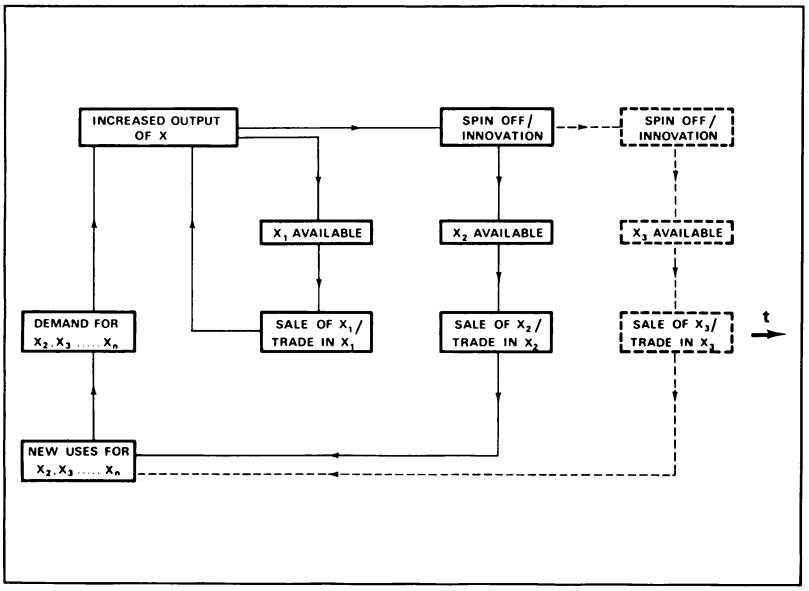

FIGURE 9. THE DEPENDENCE OF SUSTAINED GROWTH UPON THE INTERACTION BETWEEN SUBSYSTEMS: the multiplier effect. In this example growth in trade is related to technological innovation, and vice versa. (Note that *demand* and *new uses* relate also to the social subsystem.)

In general terms, therefore, the importance of trade for the development of early civilization will be understood fully only in the context of its impact upon other subsystems of the culture system.

QUESTIONS OF ARCHAEOLOGICAL ANALYSIS

Hypothetical analyses such as those drawn in the last section, and considerations of information flow, can be of practical use to the archaeologist only if they allow him to seek and find (or disconfirm) patterns among the real data. Progress has been made in this direction; there is scope for much more.

Documentation of Action at a Distance

The most striking advance of the past decade in the study of trade has been the development of characterization studies reliably establishing, by scientific means, the source of traded materials found far from their origin. Generally speaking, this can most readily be accomplished for minerals, but techniques exist also for organic products such as amber (by infrared absorption spectroscopy: Beck et al. 1965) and marine shells (by oxygen isotope analysis: Shackleton and Renfrew 1970). In general, however, the spatial discrimination that can be achieved by these means for plant and animal products is no finer than the spatial discrimination arising from their differential distribution in different ecological zones or niches. The most obvious such ecological distinction is sea versus land, allowing firm although rather unspecific conclusions to be drawn from marine finds on land.

Among the discriminatory methods listed in an earlier survey (Renfrew 1969) were examination of thin sections by the petrological microscope, X-ray diffraction, trace-element analysis by optical spectroscopy, trace-element analysis by X-ray fluorescence spectroscopy, and trace-element analysis by neutron activation. Other well-established methods are atomic absorption spectroscopy and analysis by gamma-ray backscatter. Descriptions of these and other techniques will be found in the periodical *Archaeometry*.

Other characterization methods recently employed include fission track analysis (Durrani et al. 1971), cathode luminescence (Renfrew and Peacey 1968), Mössbauer spectrography (Pires-Ferreira 1973), and mass spectrometry for metal isotopes (Brill and Wampler 1967).

Among important recent developments based on existing methods have been the characterization of traded objects in the Pacific area (Ambrose and Green 1972) and the much more systematic and effective use of petrological methods (including heavy mineral analysis) to study early ceramics (Peacock 1970).

Finally, the use of explicitly statistical procedures to handle the results of these analyses (e.g. Newton and Renfrew 1970) has made the resulting discrimination both finer and more reliable. In some fields, however—for instance the characterization of metals by trace-element

analysis—problems of interpretation sometimes make the results of doubtful validity.

Spatial Analysis

Until recently the effect of different modes of exchange upon spatial distribution of traded goods has been neglected. In consequence, the possibility of learning about exchange modes from the archaeological distributions recovered has not been explored.

There are three obvious complications. The first is that only some classes of traded commodity are sufficiently durable or distinguishable to be reflected as such in the archaeological record. A trade in slaves, for instance, would be extremely hard to detect.

Secondly, the distributions recovered come in the form of what is found—that is to say in the form of materials that left the trading system. The record covers either use of the goods resulting in burial or loss of goods resulting in burial. The archaeologist studying trade is thus in the same position as the archaeologist using frequencies of tools recovered to gauge frequencies of utilization (cf. Binford 1973). Archaeological recovery results from the ancient civilization's failure to keep things and is therefore not a direct measure of frequency of use. Burial of goods with the dead will, of course, normally be a deliberate act, but does not necessarily give a representative inventory of the full range of the dead person's possessions.

Thirdly, a spatial distribution of finds never represents a situation at a single point in time. It represents a series of events over a definite time span; it is a palimpsest of activities.

All these restrictions imply that the archaeologist cannot use the geographical techniques of locational analysis unthinkingly, despite their potential value. On the other hand, the presence of more than one characterizable commodity within a trading network offers a much wider range of approaches. The work of G. A. Wright (1969), H. T. Wright (1972), and Pires-Ferreira (1973) makes pioneering steps in this promising direction.

One of the problems bearing on the analysis of trading distribution is that it must be quantitative in nature, and this places greater weight on the recovery techniques of excavators than many are able to sustain.

For instance, no meaningful figure for the absolute weight of a commodity found at a site or part of a site, whether expressed in weight or in weight per unit volume, can be given without an efficient sieving (screening) procedure. Recent studies have shown how vulnerable such results are to variations in mesh size. An alternative is to use dimensionless quantities—i.e., ratios (for instance sherds of one fabric per 1,000 sherds recovered, or number of pieces of obsidian against number of flint)—in the hope that recovery of the two classes compared will be efficient or inefficient to approximately the same degree.

MODES OF TRADE: SPATIAL ASPECTS

In what has been said so far a number of different modes of exchange are implied, each differing as to where the transfer of goods takes place, and between whom. Our interest here is in the extent to which they may differ in *operational* terms, that is to say in their impact upon the flow and distribution of goods, and hence upon the pattern of artifacts discovered. An implicit and dangerous assumption here, already questioned above, is that there is a close linear relationship between intensity of use at a location and intensity of loss or burial and hence of archaeological discovery. This proposition certainly does not hold good in all cases, but I am using it as a simplifying assumption here. In all real cases it requires investigation.

In figure 10 an attempt is made to indicate the spatial implications of ten of the various modes of trade frequently discussed by archaeologists and anthropologists. The purpose of this classification is not to set up a typology for its own sake but to clarify the implications of some of the concepts in use and to examine how they differ in spatial terms. The modes of exchange to be distinguished are:

1. Direct access. *B* has direct access to the resource at *a* without reference to *A*. If a territorial boundary exists, he can cross it with impunity. There is no exchange transaction.
2. Home-base reciprocity. *B* visits *A* at *A*'s home base (*a*), and exchanges the special product of *b* for that of *a*.
3. Boundary reciprocity. *A* and *B* meet at their common boundary for exchange purposes.
4. Down-the-line trade. This is simply reduplicated home-base or

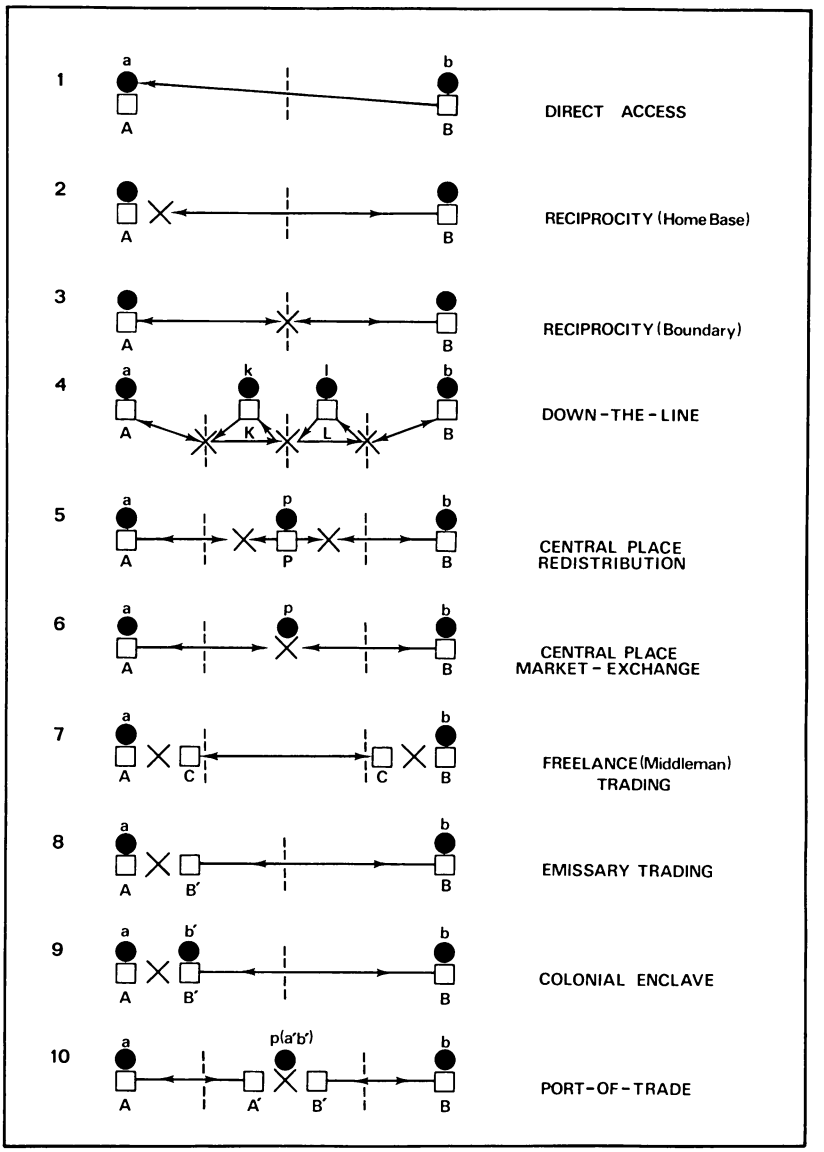

FIGURE 10. MODES OF TRADE AND THEIR SPATIAL IMPLICATIONS. Circles *a* and *b* indicate respectively the point of origin and the place of receipt of the commodity, squares *A* and *B* the person at the source and the recipient. Circle *p* is a central place, square *P* a central person. Exchange transactions are indicated by a cross, and territorial boundaries by a broken line.

boundary reciprocity, so that the commodity travels across successive territories (k, l) through successive exchanges.

5. Central place redistribution. A takes his produce to p and renders it to P (no doubt receiving something in exchange, then or subsequently). B takes his produce to p and receives from P some of A's produce.
6. Central-place market exchange. A takes his produce to p and there exchanges it directly with B for produce from b. The central person P is not immediately active in this transaction.
7. Middleman trading. The middleman C exchanges with A at a and with B at b. C is not under the control of A or B.
8. Emissary trading. B sends his emissary B', who is his agent and under his jurisdiction, to a to exchange goods with A.
9. Colonial enclave. B sends his emissaries B' to establish a colonial enclave b', in the close vicinity of a, in order to exchange with A.
10. Port of trade. Both A and B send their emissaries A' and B' to a central place (port of trade) which is outside the jurisdiction of either.

It should be noted that under 7, 8, 9, and 10, place b is itself likely to be a central place, since organization of this kind implies that place b will operate a distribution system for some of the goods acquired, although the mechanism implies that place a is not within the jurisdiction of its own system of redistribution.

Five of these modes, numbers 4, 7, 8, 9, and 10, transport goods over very great distances.

Although there is no prescription which says that one of these modes will develop from or give rise to another, the sequence as listed can be an evolutionary one. Mode 1 is a very simple one, where A does not have territorial jurisdiction over the produce in his own neighborhood. It has been suggested that the early obsidian trade of the island of Melos in the Aegean was of this kind (Renfrew, Cann, and Dixon 1965). Strictly this is not trade or exchange, but simply transportation.

As soon as the people at place a were prepared to assert their right to locally produced materials, mode 1 would develop into mode 2. There are many ethnographic instances of inhabitants of one village visiting another for the purpose of trade. It may be more satisfactory that an

intermediate place be chosen (cf. Harding 1967:150), in which case mode 3 applies.

When the produce acquired by the people of *b* is further exchanged with their other neighbors (down the line), mode 4 applies. It has been suggested that the obsidian trade in the Near East was of this form (Renfrew, Dixon, and Cann 1968).

As discussed earlier, central-place trade is in some senses more efficient than reciprocal trade. Regional diversity, for example, will favor the development of a redistributive system (mode 5). With the development of more sophisticated exchange mechanisms, including money, the exchange becomes less embedded, less integrally related to the social organization. This differentiation allows the growth of market exchange (mode 6).

The increasing importance of long-distance trade, and the increasing bulk, implies that mode 4, with its many changes of hands, is inefficient. The number of changes of hands can be reduced if one carrier or middleman has the means of transport (and can assure security over intermediate territories) to cover the entire intervening distance between *a* and *b* (mode 7). Both security and transport are facilitated by riverine or marine travel, and waterborne trade was a favorite mode for ESMs. Trade between the Aegean and the East Mediterranean in Middle Minoan times may have been of this kind (Renfrew 1972:468–70), as was the trade in Homeric times described by Hesiod (Knorringa 1926: 2–15).

The increasing external trade of ESMs made desirable a closer control over the activities of traders, so that much of the trade became state organized (mode 8). This was apparently the mode which developed in early dynastic Mesopotamia (Mallowan 1965). As the bulk of trade increased and the power of the ESM was assimilated within the greater power of the empire capital, remote trading stations could be set up, colonial enclaves in a distant land (mode 9). The famous Assyrian settlement at Kültepe in Cappadocia is a well-known example. Finally, at this much more highly organized level, where we are speaking of exchange between ESMs or empires, higher-order central places again emerged, analagous in some ways to mode 6. But in mode 10 we are dealing with long-distance trade between more powerful and highly or-

ganized units, so that the port of trade has its own special characteristics (cf. Revere 1957; Chapman 1957).

In historical terms it is probably fair to present this as a possible evolutionary sequence. In terms of interaction, however, some modes allow a much greater flow of information than do others. For instance, in spatial terms there is a close formal similarity between modes 2, 9, and 10. In each case persons from *b* travel to *a*. These persons will learn far more about *a*, and communicate it to *B* more efficiently, than under any other mode. Moreover, in mode 9, the population of *a* stands to learn much more about the culturally patterned activities of *b* from the colonial population living at *b'*.

There is likewise a formal similarity between modes 3, 6, and 10, where the exchange takes place on the borders of or outside the territories of both *a* and *b*. As indicated earlier, the silent trade (which operates under mode 3), market exchange, and the port of trade are all devices which maximize the flow of goods while minimizing the flow of information that accompanies the exchange.

These different modes of trade are distinguished here in spatial terms. But there are, of course, other criteria indispensable to the generation of an adequate typology of trading types.

In the first place, absolute distance and the transport facilities available are of central relevance. Marine trade virtually excludes certain modes, such as mode 4, and it is a truism that rivers or seas, or indeed deserts, may be regarded either as barriers or as easy channels of communication according to the transport available.

The distinctions made here carry with them some implications for the organization of the trade, but none for the nature of the commodity carried. It may be transported in bulk or in smaller quantities; it may be productive, in the sense of facilitating subsistence or technology, or unproductive (this is the same distinction as that drawn by Tourtellot and Sabloff [1972] but avoids the paradox of using *functional* as the antithesis of *useful*). It may be destined for circulation freely or only among a segment of the recipient population; and it may or may not have ascribed to it high value, or confer prestige upon its owners.

This last is an important distinction, since in a society where currency is not used in all cases, it may be that certain classes of goods are

not exchanged for other classes. Such distinctions apply even in our own monetized society: invitations to certain social functions may not be acquired even in exchange for dollars. Certainly in Britain the sale of honors, such as peerages, for mere money, even in large quantities, has always been deplored, and occasional suggestions that such traffic has taken place have been met with passionate denials. These are different "spheres of conveyance." Firth (1939:340) describes three "spheres of exchange" among the Tikopia, and Malinowski (1922) earlier indicated the different commodities appropriate to the kula (ceremonial) and *gimwali* (barter) exchanges of the Trobriand Islanders. Evidently these different kinds of exchange involve not only different goods, but also different exchange partners at different distances and differing attendant circumstances governing the flow of information in the exchange.

The information-minimizing aspects of some modes of trade have already been emphasized. It is clear also that the number of exchange transactions between *A* and *B* has an attenuating effect on the flow of information between them: each intervening exchange transaction is a source of "noise."

The distinctions drawn here, carrying with them certain spatial implications, should to some extent be reflected in archaeologically recoverable artifact patternings. The next sections make some suggestions in this direction.

RECIPROCITY

The obsidian trade in the Near East has been examined spatially in terms of distribution (Renfrew, Dixon, and Cann 1968), and Ian Hodder of the University of Cambridge is currently making quantitative studies of the distribution of other commodities traded in early times. The Near Eastern obsidian showed that within a "supply zone" radius of 200 or 300 km. from the source, the proportion of obsidian in the total chipped stone industry fell only gradually, to a figure above 80 percent. The suggestion offered to explain this was that mode 1 was in operation, or mode 2, or 3 *within* a culture region; this is conceived as an internal trade with high frequency of interaction. Outside this radius, in the contact zone, the proportion fell off rapidly, falling to around 0.1

percent at a radius of 600 km. The device of plotting the percentage on a logarithmic scale (the distance remaining linear) showed the fall-off to be exponential (fig. 11).

It was further suggested that this pattern was the result of down-the-line trade, mode 4, the result of a large number of exchanges. It can be shown (Renfrew 1972:466) that precisely this distribution, described by the formula $y = k^{x/l}.N$, will occur with a village spacing of l, where y is the percentage of obsidian in the chipped stone industry received at distance x from the edge of the supply zone, N the proportion at the edge of the supply zone, and k the proportion of that which it receives passed on by each village. However, a regular spacing of villages or exchanges is not a necessary part of the theory; the crux of the theory is a long series

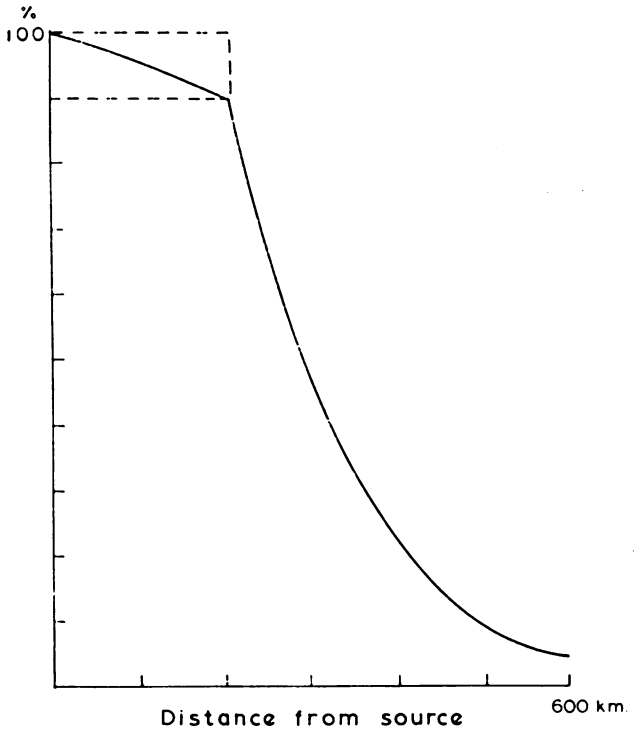

FIGURE 11. DOWN-THE-LINE TRADE: fall-off in abundance of commodity with distance from source.

of successive exchanges of material from a point source. Comparable distributions for coins have been obtained using the theory of random flights (Hogg 1971). In both cases, however, reciprocal exchange as shown in mode 4 is envisaged. An excavation at any location should thus yield a lower proportion of the traded commodity than at any point closer to the source. Points equidistant from the source should have the same proportion, thus maintaining the symmetry which Polanyi suggested was a basic feature of reciprocity.

CENTRAL-PLACE REDISTRIBUTION

The existence of a central place will fundamentally distort this picture. For if we make the necessary assumption that the quantity recovered at any location bears some regular relationship to the quantity passing through it, the high intensity of interaction at a central place destroys this symmetry, producing the centrality which Polanyi recognized in central places, and which, as I have suggested above, is also a feature of places of market exchange.

If the vertical axis in figure 12 now indicates total quantity recovered, rather than proportion, the asymmetry surrounding the central place at location *B* is clearly seen. This corresponds to modes 5 and 6. Indeed figure 12 could be modified so that, within the territory served by the central place, the fall-off with increasing distance from it could be exponential but much less steep than the generally prevailing fall-off. (It should be noted, however, that the *proportion* of the commodity under consideration recovered at the central place will be higher in this way only if that commodity is more intensively traded there than elsewhere with respect to the commodities with which it is compared. This assumption may well hold when the commodity is brought by long-distance trade and the others are widely and locally produced.)

FREE-LANCE TRADE

Spatial analysis can be expected to reveal a futher trading mechanism: free-lance (middleman) trading. For the effect of a middleman trader is to make much more affect the distribution of the commodity than would affect it under down-the-line reciprocal exchange, *within the locus*

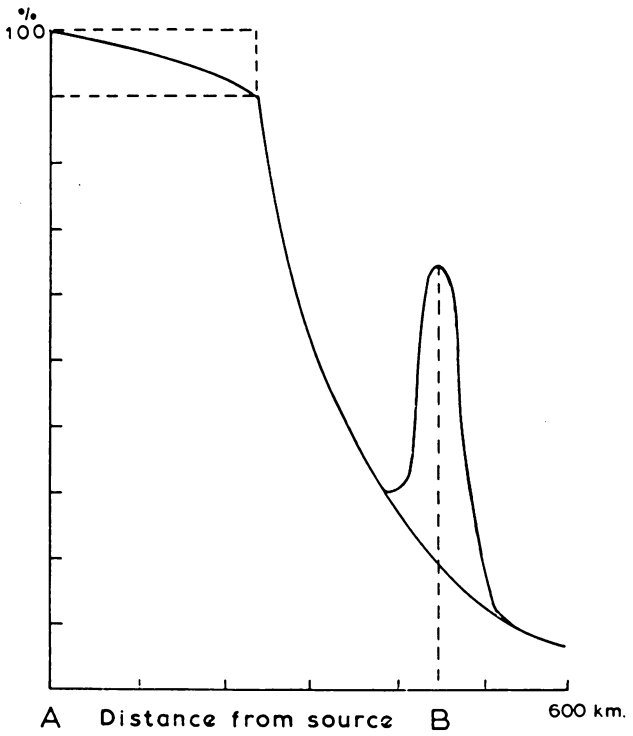

FIGURE 12. DIRECTIONAL TRADE (redistribution): fall-off in abundance with distance from source.

of his activity. Any middleman has an effective area of operation, outside of which he does not normally travel. Within this area, in the absence of any preferential service for central places, the fall-off of the commodity with distance from source will be much less rapid (fig. 13, where point C represents the outer boundary of the region served by the trader). This corresponds to mode 7.

These suggestions, at least in favorable cases, allow the distinction of modes 2, 3, and 4 from modes 5 and 6, and of both these groups from mode 7. Modes 8–10 and the distinction between modes 5 and 6 will be considered in the next section. (Mode 4 is, of course, simply the aggregation of repeated transactions of the type seen in modes 2 and 3: I see no way of distinguishing archaeologically between 2 and 3 if the place of

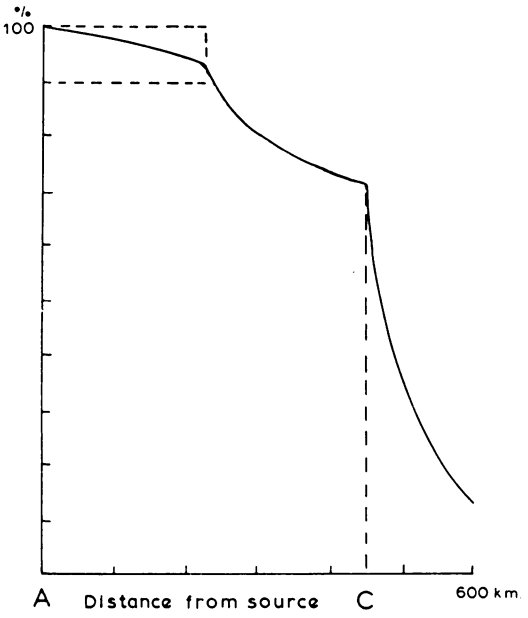

FIGURE 13. FREE-LANCE TRADE: fall-off in abundance with distance from source.

exchange under 3 is always a different one.) Mode 1 could presumably be recognized by the dearth at place *b* of objects originating at place *a*, since the transaction works only to the favor of *a*.

Once again, no consideration has been given here to the nature of the commodity traded or the manner of the exchange. I have suggested, however (Renfrew 1972:467), that goods carrying high prestige or value and exchanged reciprocally under mode 4 may in fact produce a distribution differing in one respect from figure 11 (fig. 14). In such "prestige chain" exchange the effective parameter l is lengthened, and the fractional parameter k is closer to unity. In the first place, the transfer of prestige goods often takes place between specific notable persons, and it is likely that exchange partners at this level will, on the average, reside a greater distance apart than the average for ordinary (*gimwali*) exchange. Secondly, these goods are not expended or utilized in daily life but are frequently handed on in subsequent exchanges—Malinowski's fundamental point about the kula ring. Both these effectively in-

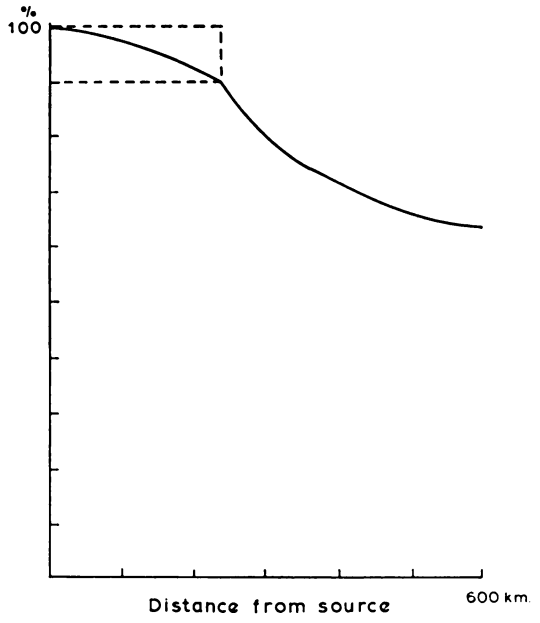

FIGURE 14. PRESTIGE-CHAIN TRADE: a modification of down-the-line trade (see fig. 11).

crease k to a figure nearer unity. This has the result of making the exponential fall-off more gradual, and thus of increasing the detectable range of travel of the goods. It seems likely that the great distances reached by the Spondylus trade of neolithic Europe (Shackleton and Renfrew 1970) were the consequences of the prestige-chain variant of mode 4.

Evidence of Organization

The most neglected feature of prehistoric trade is organization, in its nonspatial aspects. Not until the emergence of written records in Mesopotamia and Crete, which give explicit (cognitively predigested) information on this count, has the evidence been systematically exploited by archaeologists. So it is that, despite the thousands of seals and hundreds of sealings from Crete and mainland Greece which archaeologists have studied from the standpoint of typology and style, there remains to be

written an article systematically considering their use and the implications they hold for the organization of Minoan society. I suspect that the same applies for the numerous cylinder seals found in Mesopotamia dating from as far back as predynastic times.

The two obvious fields of investigation are central places of exchange and central authority. The former may in themselves be difficult to recognize, but clearly large storehouses offer prima facie evidence of redistribution—as indeed does any evidence from craft specialization. The investigation of large storehouses necessitates excavation at a particular spot within the settlement, so that negative evidence has little force. Craft specialization, however, may be deduced from a wide range of artifacts. Craft specialization in itself, and the extent to which it can be inferred from specific products, is another of the much-neglected fields of prehistoric research.

Fortunately, however, size of settlement is not independent of centrality, although, as discussed above, they are very far from the same thing. Archaeologists are now starting to study spatial distributions of settlements with particular reference to their size and the existence of fortifications (e.g., Hodder and Hassall 1971), and such studies can certainly give evidence for the existence of central places. In doing so they need not imply any adherence to "Central Place Theory" in its more abstruse forms, where a determination to find hexagons where none exist approaches the fervor of Ptolemaic astronomers adding epicycles to "save the Phenomena" of the celestial spheres. As Hodder justly remarks (1972:889): "It is the various characteristics of spatial behaviour that underlie the model that are really being considered." Evidently the study of settlement distribution can give clues about the organization of trade, even if these will need corroboration by other evidence of organization and by the traded goods themselves.

Central authority, crucial to the understanding of trading organization, may be revealed in the first place by any insignia or symbols of authority. Seals, sealings, and bullae fall in this class. Wright (1972) based his rejection of the hypothesis that interregional exchange alone causes state development on the find of a bulla at his site in levels prior to those indicating a transformed exchange network. His major conclusion is no doubt correct, as indeed may be his interpretation of the

crucial bulla; my point is simply to emphasize its critical value and, indeed, the value of all such finds, which reveal the informational component of the exchange.

A further field, sadly neglected by economic anthropologists, is the archaeological evidence for currency. Recent studies have at last begun to study minted coinage from the anthropological rather than the numismatic standpoint (Collis 1971). The presence of coins in a civilization is a crucial one, and Collis has shown convincingly in one case that while gold and silver coinage might there have had a prestige value, being employed in conditions of reciprocity, a bronze coinage was employed for market exchange. I think one can risk the generalization that the existence of any low-denomination coinage, used within the jurisdiction of the issuing authority, is an indication of market exchange. Indeed Polanyi, with his skepticism concerning early market exchange in the Old World, very nearly implied the converse, that there was no market exchange without coinage. Certainly market exchange would be unthinkable without some established currency.

Evidence for Information Flow

In this chapter an attempt has been made to stress the importance of trade within the broader meaning of the term *exchange*. All interactions imply information flow, so that continuous spatial distributions of any class of artifact imply repeated interaction and effective information flow. In the past, artifact counts at different locations have been used to give a measure of "similarity" between them. Yet this lumping together of features implies a holistic approach to culture, and there is a risk that to lump all interactions together as an exchange of "information" falls into the same error. For unlike the cyberneticist or the information theorist, the archaeologist must ask, "Information about what?" One of the most significant contributions to archaeology in the past two decades has been Lewis Binford's investigation of this question (cf. Binford 1972:329–41); indeed, all his work could be regarded as just this: the examination of the significance of artifact variability. When we are examining the emergence of early civilizations, therefore, it is particularly relevant to ask wherein lies the unity of the particular

civilization which justifies the use of the term *civilization*. And when using Joseph Caldwell's helpful term *interaction sphere* (1964) we must ask what kind of interaction this embraces, and what it includes.

The consequence of this line of thought is that it will be profitable to examine—together with the distribution of traded materials documenting commodity exchange—the distribution of stylistic and symbolic materials indicating information exchange. In terms of the discussion here, the former should extend across cultural boundaries, the latter be more intense within them. Finds like the steatite carvings of Tepe Yahya (Lamberg-Karlovsky 1972a, 1972b) take on a crucial significance, since they document an exchange both of commodity (originating near that site) and of information (apparently originating in Mesopotamia). If the information did originate in Mesopotamia, I wonder whether the exchange had any great relevance for the emergence of civilization (itself here conceived as an exchange organization) *within* Mesopotamia; clearly it has many implications for Iran. Can this have been trade of mode 9—was there a Sumerian colony at Yahya? If not, how do we explain Sumerian symbolism on its products?

Attention to the role of trade in early civilization has so far focused upon three areas—Mesopotamia, Mesoamerica, and the Aegean—and the present volume reflects these interests. But what about the Indus, Egypt, China, and Peru? And what indeed of those second-class citizens, separate but not equal, the "secondary" civilizations? If our interest is in the working of culture process, why arbitrarily exclude a major part of the available sample? In each case it is the nature of the interactions between members of the civilization which is crucial, whatever the influence of outside forces upon these internal interactions. Trade, because it is at once the motive and the indication of such interactions, offers a most promising field for their investigation.

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