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Central Place theory of geog.

ANTHROPOLOGICAL STUDIES OF CITIES

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INTRODUCTION

In this paper I will review and expand upon a theoretical and methodological approach to the study of cities that, in my view, has been unduly neglected by anthropologists interested in cities. This approach, usually referred to as regional analysis, is based on the central place theory of geography. I believe that we need to expand our theoretical horizons because traditional theories of cities utilized by anthropologists are both misleading and limited in scope. In order to demonstrate the value of a regional approach to studies of cities, I will first critically (and very briefly) review traditional theories of cities, then offer a regionally based definition of cities and explore some of the implications of the regional approach for explaining the cross-cultural variability and dynamic features of cities and systems of cities.

Perhaps the most prominent feature of traditional theories is that they regard cities as the sources of social change—they are a kind of special environment, almost with a life of their own. These "city-centric" theories have been based on Durkheim's *The Division of Labor in Society* (who, in turn, was influenced by Spencer's *Principles of Sociology*), on the sociology of George Simmel, and the philosophy of Oswald Spengler. Martindale (32) has written a convenient review of the development of these theories, which he refers to as "socio-psychological" theories of cities. Hauser (19), for example, following Durkheim and Spencer, writes that "... aggregative living has produced in the social realm a major transformation the equivalent of genetic mutation in the biological realm." Park, in the classic statement of the "Chicago School" of urban sociology (38), described the city as a "psychophysical mechanism"; Wirth (59), in the same volume, writes of the city that its "... growth is so rapid and its energy so great that it changes its complexion almost daily, and, with it, the character of mankind itself" (see also 60). As proposed by Redfield & Singer (42), the city, whether the center of "orthogenetic change" ("... carrying forward into systematic and reflective dimensions an old culture") or "heterogenetic change" ("... creating of original modes of thought that have authority beyond or in conflict with old cultures and civilizations"), is "... a place in which culture change takes place" (42, p. 58).

Robert Redfield's famous "Folk-Urban Continuum" (41) was developed under the influence of the "Chicago School." This proved to be the focus of anthropological theorizing about cities for years, until gradually the work of a number of people (too numerous to review completely here) demonstrated that not only could the "Folk-Urban Continuum" not be attributed the status of theory, but that it could not even stand as an adequate empirical generalization (cf Hauser 20; Lewis 28, 29).

In spite of the serious criticisms which have been leveled at the Simmel-Wirth-Redfield trio, there is no shortage of "socio-psychological" theories of cities in the more recent literature in anthropology and its sister disciplines. Friedmann (15) writes that cities are "... an active force in the ongoing processes of social transformation," and, according to Epstein (13), most urban anthropologists in Africa assume that "... towns inevitably act as instruments of social transformation" (see also Jacobs 22 and Moore 37). Although many criticisms could be made of these traditional ways of looking at cities, the major objections, as I see them, are: (a) If urbanism is regarded as a way of life, how can one account for the cross-cultural and diachronic variability in cities and in the ways of life within cities? The attempt by Redfield & Singer (42) to differentiate between cities which are the centers of "orthogenetic" or "heterogenetic" change by no means does justice to the wide variety in kinds and functions of cities. (b) As stated by Lewis (28, p. 432), the "... folk-urban conceptualization of social change focuses attention primarily on the city as the source of change, to the exclusion or neglect of other factors of an internal or external nature." The folk-urban continuum fails to aid our understanding of the rates of social change, or when and where change is likely or not likely to occur.

In the remainder of this paper I will attempt to demonstrate that a regional theory of cities, in contrast with "socio-psychological" theories, is explicitly oriented to provide explanations for the cross-cultural differences in cities, while avoiding the fallacy of overemphasizing the role of cities in social change.

CITIES DEFINED

I will assiduously avoid the use of the terms urban and urbanism, for although both these terms have something to do with cities, no two researchers agree on what the association is. Similarly, much ink has been spilled by scholars over what cities are and what they are not, without, to date, a satisfactory resolution of the definitional problem. Instead of reviewing this bulky and frustrating literature here, I refer the reader to two useful summaries by Paul Wheatley (57, pp. 371-99; 58).

Perhaps the greatest obstacle in the definition of cities as a special type of human community has been the establishment of a set of indispensable criteria which can be applied cross-culturally. In the most widely read work on pre-industrial cities (Sjoberg 47), for example, it is argued that the presence of a literate elite is the single best criterion to distinguish cities from other types of

early settlements, clearly a cross-cultural error of no small magnitude. Wheatley (56) suggests that these definitional problems could be resolved by the use of his concept of "ethnocity." Here attention is paid to "... nodes of concentration of people and shelters in the continuum of population distribution over the face of the earth. Such of these as attain a certain size and perform appropriate functions are designated by the terms appositely translated in English as 'city' or 'town'. . . . These nodes are induced by forces operating within, and sometimes peculiar to, the specific culture" (56, pp. 166-67). This approach is desirable because it avoids the necessity for discovering indispensable criteria, and instead focuses on the hierarchy of central places in a society.

Such a functional definition of cities emphasizes the disposition in space of what might be called central institutions—institutions that mediate between specialized subsystems within a society. In order to optimally service a population, these central institutions are not likely to be randomly dispersed over the landscape. Instead, they will tend to occur clustered in places that become the central places of the society, or, in other words, the cities and towns. Cities (and towns) then are a product of the process called *segregation*, one of the two basic cultural evolutionary processes described by Flannery (14). Segregation, according to Flannery, has to do with "... the amount of internal differentiation and specialization of subsystems . . ." (The other basic evolutionary process described by Flannery, *centralization*, refers to the "... degree of linkage between the various sub-systems and the highest-order controls in the society . . .", and is less relevant to the discussion at hand). In the present context, segregation refers to the extent to which households or groups of households are independent—in more evolved systems they are less independent, necessitating various kinds of linkages in the society between specialized subsystems. Linkages between specialized subsystems may take the form of transactions in the context of central institutions. Chieftainships, governments, and markets are examples of such central institutions. The general description of central institutions is that they link specialized subsystems by the conversion of inputs to outputs via a set of transactions (cf Meier 34). The kinds of inputs and outputs vary—markets involve mostly material inputs and outputs, while governments more often convert information inputs to outputs in the form of directives.

For our purposes here, the most salient characteristics of central institutions are that they require energy to function, and that the transactions take time. Energy is supplied by subsystems of producers, who must work more than would be necessary in the absence of such institutions. The fact that there is always a finite amount of energy in the environment of any society, and that producers can be pushed or otherwise encouraged to produce only so much surplus, means that central institutions always have a maximum size and are always limited to a finite number of transactions per unit of time. These energy-related limitations can be circumvented by technological or organizational changes that bring energy savings or increase the society's ability to capture energy from its environment, but new limits will be reached if central institutions continue to grow.

Time is as important a constraint on central institutions as energy. Participants may attempt to minimize the amount of time spent in transactions in order to have time available for other activities, and slowly operating central institutions may fail to meet deadlines. We might expect, therefore, given time and energy constraints, that in all societies we will find the presence of strategies that minimize both the time and energy costs of central institutions. Although there undoubtedly will be considerable cross-cultural variability in the form of these strategies and the extent to which minimization is actually achieved, there is probably no society in which there is complete disregard for the energy and time costs of these mediating central institutions. Such energy and time optimization strategies would become more and more important in evolving systems, since the costs of subsystem intermediation increase rapidly as societies become more complicated (Flannery 14, pp. 411-12).

One of the most obvious energy and time optimization strategies has to do with the disposition of central institutions over the landscape—specifically, we might expect central institution transactions to occur centrally, in localities that allow minimization of the time and energy costs of travel. According to Friedmann, “. . . distance is a physical obstacle that can be overcome most rationally by centralizing certain functions within geographic space” (15, p. 86). This is perhaps most obvious in connection with central institutions that involve exchanges of goods, since these might be heavy to carry and may spoil, but the same will be true for information processing central institutions. For this latter type of institution, there is the additional problem that excessive travel time may increase the probability of “noise” entering the flow of information—that is, information may be lost or confused in transport, or directives may not be fully and accurately transmitted.

The process of time and energy optimization will have as a product the growth of a place or places which become the foci of central institution transactions (called central places). It is at this point that we begin to borrow from the central place theory of geography, a theory that is largely the work of Christaller (10), with some recent modifications (Berry & Garrison 6, Berry & Pred 7). Following this theoretical approach, we may refer to the range of central place functions, or the area beyond which a given function at a given place will not operate because of the friction of distance and/or competition from other central places offering the same function. Low-order central place functions have small ranges, and therefore will tend to be widely and frequently distributed over the landscape in order to maximally service the population. High-order functions have large ranges, so that only a few places in a region will offer these. In a simple society such as a chiefdom with few central institutions, usually one community serves as the focus of central transactions. In more evolved systems, there may be both more kinds of central institutions and a hierarchical division of labor within central institutions. These will produce a hierarchy of central places in a region, ranging from communities which have a wide range of central place functions, including high-order functions, to a series of small, scattered places with fewer functions, and functions of smaller range. The

population size of central places, as geographers have shown (e.g. Gunawardena 16, Stafford 53) will tend to vary depending on the number of central place functions present. In a society with a hierarchy of central places, cities are those communities in the highest range of the hierarchy, while towns are those communities occupying the middle and lower ranges of the hierarchy. Where the researcher draws the boundary between what are called cities and what are called towns is always arbitrary and will vary from society to society.

The regional approach to the definition of cities is not peculiar to Wheatley, myself, or others who have borrowed from central place studies in geography. Wolf (61), for example, has written that the city is “. . . a settlement in which a combination of functions are exercised, and which becomes useful because in time greater efficiency is obtained by having these functions concentrated in one site.” And, according to Arensberg (3), the city “. . . is a permanently massed, large concentration of people in a community having nodal function or functions, somehow providing for the lacing together (not necessarily the subordination) of some hinterland of the other, perhaps lesser communities of a society.” My only complaint with Arensberg’s definition is that it includes the caveat that a city must have a “large” and “massed” concentration of people. This begs the question of how large is large enough, and how massed is massed enough for a community to be called a city. The advantage of the functional definition of cities I presented above is that any community that is a central place is a city or town (depending on its place in the central place hierarchy of the society), irrespective of its form or population size. Central places in societies smaller and less segregated than our own may lack large or massed central places, but they still have what Arensberg refers to as “nodal functions,” and so should be referred to as cities and towns.

I should point out in concluding this section that while I have borrowed from central place studies in geography in developing this definition of cities, I have tried to word it to avoid the overemphasis on the movement of goods through systems, or, in other words, the economic functions of central places that, in my opinion, characterize this field (cf Haggett 17). Part of Christaller’s original work on the geometry of central place systems had to do with what he called the “administrative” or “ $K=7$ ” principle (10), which I will discuss in more detail below. Unfortunately, more recent work by geographers has dealt almost exclusively with the “marketing” and “transport” principles, both concerned with tertiary economic functions. The kinds of transactions I am referring to in the context of central institutions involve the movement of goods and/or information. The overemphasis on economic functions of central places has led, in my view, to some confusion in the literature. Coe (11), for example, wrote that interior Cambodian and lowland Classic Maya civilizations had no “true” cities. His argument is that since both geographic areas lacked environmental diversity it is not likely that there was regional economic specialization and trade, and therefore both areas lacked cities. This is not only overly environmentally deterministic (since he has almost no direct archaeological evidence for the lack of specialization and trade), but it also overlooks the fact that there were

obviously central places, manifested as large groupings of civic-ceremonial buildings and palaces. Even if it were true that these were not economic centers, they were clearly centers of information processing and so should be referred to as cities as defined above. Donna Taylor (54) has demonstrated for a group of East African middle range hierarchical societies a "... close positive relationship between settlement hierarchy and political-jurisdictional hierarchy ...," and that "... in hierarchical societies the relative size of the centers of higher rank is closely related to the extent of centralization in decision-processing" (54, p. 13). Interestingly, this set of East African chiefdoms and simple states, unlike those portrayed in the generalized descriptions of societies of this type by Service (46) and Sahlins (44), "... were not typically redistributive societies. ... Local groups tended to be largely self-sufficient in material ... needs, and the organized collection and redistribution of regional production specialties is described for only one of the most centrally organized societies examined" (54, p. 81). From the same perspective I must add a criticism to Wheatley's contention that the early "cult centers" (as he calls them) that evolved in regions of primary state formation were centers of redistribution (57, p. 389). The presence or absence of redistribution in ancient central places must always remain hypothetical until demonstrated by direct archaeological evidence.

In the next section I will explore some of the interrelationships between information processing central place hierarchies and economic central place hierarchies. This point of view, I argue, will contribute to an understanding of the nature and dynamic properties of systems of cities and towns.

THE LOCATIONAL PATTERNS

Anthropologists interested in the application of central place theory to problems in peasant marketing systems have found Christaller's (10) original formulation most applicable (cf Crissman 12, Hodder & Hassall 21, Johnson 24, Skinner 48, and Smith 52). According to some geographers (cf 5), the transformations of the Christallerian model proposed by L6sch (30) may prove to be a more accurate representation of reality for modern industrialized societies, but there is no consensus on this point. For these reasons, and because L6sch was relatively less interested in administrative location, I will also depend here primarily on Christaller's formulation. Rather than repeat the assumptions and geometric properties of the Christallerian model, I refer the reader to a recent synthesis by Smith (51).

The major difference between Christaller's two economically relevant locational principles (the $K=3$ "marketing" principle, and the $K=4$ "transport" principle) on the one hand, and the $K=7$ "administrative" principle on the other hand, has to do with the extent to which competition can occur between centers of the same level in the hierarchy. (The K numbers refer to the ratio of low-order places to high-order places, a matter not relevant to this discussion. I use the K designations only as a convenient means of referring to the different locational patterns.) In the case of the two economic principles, centers of a lower level in

the settlement hierarchy are "nested" midway in space between centers of the next highest rank. In the $K=3$ case, such centers are located between three higher-level centers, while in the case of the $K=4$ pattern, such centers are located midway between two higher level centers, on the road between them. Centers of the same level in hierarchy, therefore, compete to service lower-level centers, particularly near the edges of their maximum spheres of influence. As a consequence, all consumers tend to be served equally, without monopolistic pricing. As Christaller correctly perceived, the locations of administrative centers should differ from the $K=3$ or $K=4$ patterns, since they do not compete for "customers"; instead, they should have discrete, tightly bounded ranges, with the center conveniently situated near the center of the servicing region. As Smith (52, p. 98) notes, the $K=7$ principle "... is admirably suited to carving up administrative districts, since each higher-order center controls its dependent centers and hinterland exclusively." Although I will not deal explicitly here with religious-administrative hierarchies (which are usually inextricably woven with political administration), in those cases where they are discrete, autonomous institutions (such as in Medieval Europe), they should exhibit the $K=7$ pattern, since each "parish" is a discrete unit, and competition is not likely to occur.

IMPLICATIONS OF THE LOCATIONAL PATTERNS FOR UNDERSTANDING VARIABILITY IN CENTRAL PLACE HIERARCHIES

In the following sections, I will outline the basic patterns of articulation between economic central institutions and decision-making central institutions, and explore the implications of these patterns for understanding some of the cross-cultural variability in sizes and functions of central places, and certain of their dynamic features. I do this in three sections. The first two sections, which deal with "primate" centers and "disembedded capitals," pertain to the interaction of economic and decision-making central institutions at the upper levels of central place hierarchies, while the last section deals with the patterns of articulation of these central institutions on the lower levels.

Primate Centers

Purely from theoretical considerations, one should not expect locational isomorphism between administrative and economic central place hierarchies, since the two locational patterns are incompatible (cf Skinner 48, p. 31). There are two major exceptions to this general rule.

REDISTRIBUTIVE SYSTEMS In redistributive economic systems, in which exchange is entirely administered, the centers of redistribution are also centers of decision-making.

PRIMATE SYSTEMS In a marketing central place hierarchy in which the range of the highest order functions is equivalent to the maximum extent of the society as a whole, only one highest ranking center will exist, since only that center will

be able to offer the entire range of products in the system. This center can also be the highest ranking administrative center, since the maximum range of these functions is also equivalent to the maximum extent of the whole society. The combination of the widest possible range of economic and administrative functions in one place can produce a "primate" distribution in the settlement hierarchy, i.e. a situation in which the major central place is exceptionally large relative to other centers (Berry 4). A large center of this type can actually retard the growth of lower-ranking centers, thereby intensifying its regional dominance, for the following reasons:

(a) One of the assumptions of Christaller's classical formulation of central place theory is that consumers will always go to the closest market, in order to minimize the energy and time costs of transportation. Crissman (12) has argued that this will not always be true because "... motivations for marketing at one place rather than another are exceedingly complex and vary from one context to another." Specifically, Crissman suggests that "... marketing areas for particular goods associated with given levels in the central place hierarchy, vary significantly in size depending on the level in the hierarchy of the center supplying them" (12, pp. 347, 393). Trips to higher-order centers may be more frequent than theoretically predicted, he argues, because of the possibility of multipurpose trips, "... price differentials between low and high-level centers owing to fewer middlemen at the former . . .", and lower prices in larger centers due to "... competition between multiple firms offering the same goods . . ." Added to these economic considerations, he argues, are a variety of social, political, religious, and recreational reasons for going to one town rather than another. We might expect that the beauty and impressiveness of the massive civic, ceremonial, and palace constructions, manifesting the power of the highest administrative level, would be an added incentive to visit the major political center in spite of the tribulations of travel. For a variety of reasons then, the presence of a primate center could retard the growth of other centers because people will tend to go out of their way to complete transactions in the large center, bypassing better-located places.

(b) Carol Smith (52) has described a situation in highland Guatemala which may add to our understanding of the nature of "primate" settlement distributions. There the massed purchasing power of the Ladino elites, who control the government from a few centers, has resulted in a situation in which rural production is oriented to these large centers alone. Thus all economic networks in the region "... converge on a single center rather than on different nodes of a multi-centered, unbounded system. Because of this convergence, there is no competition among equivalent centers for the commerce of smaller centers" (52 p. 100). The outcome of these processes, she argues, will be the growth of "solar" or "dendritic" market systems in which secondary centers in the region are poorly developed, and most production is geared for the primate center. Such situations lend themselves to poor economic development of the hinterland, since populations far away from the main center cannot participate in the society's economic system as effectively as those closer in (52; see also Johnson 23).

(c) According to central place theory, secondary centers should arise far away from the major center, where the "pull" of the major center is weakest due to the friction of distance. This is not realizable in some cases, however, because secondary centers far enough away from the major center to effectively compete with it may be near the borders of the society. Because their market ranges are therefore distorted and smaller than necessary to support higher level functions, they will tend to remain poorly developed, the demand being met for higher-order goods only at the main center. According to Johnson (23, p. 131), border "... cities are inherently fragile economically since national borders artificially cut up geographically complementary regions" (see also 51, p. 179).

(d) Because long-distance exchange is often directly administered or is at least under some degree of political control, high-ranking administrative centers are often also the foci of interregional exchange activities, and this, too, could add to the already overbearing domination of a region by a primate center (cf Vapnarsky 55).

Disembedded Capitals

In cases where the highest-order goods in a society have a range which is less than the extent of the society as a whole, there should be multiple highest ranking economic centers instead of the primate pattern. In this case, I suggest, it is less likely that the highest-order place in the administrative hierarchy will be located in one of the commercial central places, for at least two reasons:

(a) The location of any one of the multiple commercial central places, which might be optimal for servicing its region but not the whole society, might not be suitable for the location of central administrative transactions pertaining to the whole society. Suboptimal locations of highest ranking central places in the administrative system, as I mentioned above, increase the likelihood that "noise" could enter into communications with poorly serviced zones, decreasing the effectiveness of the administration.

(b) Merchants in existing high-order commercial central places might resist placement of high-order administrative functions in any existing center (except their own), because of the commercial advantages that would accrue to that center, especially insofar as such placement would increase the prestige of the one center and mass the purchasing power of high ranking elites there.

I predict that in systems with multiple high-order commercial central places of nearly equivalent rank, the political capital will be located in a neutral position, away from existing commercial central places. This situation would also obtain in a region inhabited by a group of autonomous political units joined in a league or confederacy, perhaps for the purpose of taking advantage of their mutual military capabilities in interregional warfare or control of interregional long distance exchange, but where all of the co-joining units are of nearly equivalent power. There are, in other words, situations in which one would expect the highest-order decision-making institution to be spatially "disembedded" from the remainder of the central-place hierarchy. There appear to be several different kinds of "disembedded capitals."

istrative distortions of the marketing hierarchy. This process is well illustrated in the history of Medieval Europe, where the emerging commercial middle class gradually swamped the power of the nobility. To quote Pirenne (40, p. 203), the legal codes of the commercially oriented cities "... not only did away with personal servitude and restrictions on land, but also caused the disappearance of the seigniorial rights and fiscal claims which interfered with the activity of commerce and industry." This resulted in the elimination of, among other things, market tolls, seigniorial monopolies on ovens and mills, and the right of shelter for the nobility.

The possibility exists that there could develop in such cases a kind of market-state dynamic, such that, if for some reason the state begins to lose control over the market institution, an increase in market productivity would result, increasing in turn the power of the marketing institution, which could further exacerbate the power and revenue losses of the administrative institution—a deviation-amplifying, mutual-causal process, in the phraseology of Maruyama (33). Administrative expansion in control of markets, however, will normally be dampened as a result of revenue losses incurred in distortion of the marketing hierarchy, in combination with increased costs of administration.

(c) *The information processing capacity of administrative institutions:* This refers to the extent to which a decision making institution can absorb an increase in the amount of information in the environment, for example, in the context of an expanding, evolving system. Any institution has a finite transactional capacity, limited by energy, personnel, and time, allowing it to respond only to a finite "communications load." According to Meier:

Communications load is best measured as the rate of requests for service or other forms of satisfying response, such as cogent explanations as to why the service cannot be provided. It represents the initiation rate for social transactions effected by the institution. The output, or transaction completion, rate is what generates rewards for the institution over the long run. When the output rate fails to keep up with the initiation rate, some queues and backlogs develop. If all other factors remain equal, the resultant performance of the institution begins to deviate more and more from the ideal as load increases, until a peak in output rate is reached. As certain resources and internal stocks-on-hand are expended, the output becomes less with increasing load. The output rate may drop precipitately [resulting in breakdown] or it may seek a level which is 'good enough to get by.' The *capacity* of the organization for completing transactions will lie somewhere between the peak performance that could not be maintained and the level chosen for 'satisficing'. . . . In this framework the capacity of an institution for completing a flow of transactions is equivalent to the *channel capacity* of a communications system for coding and decoding messages (34, pp. 79-80).

(See also J. G. Miller 35 and Wright 63.)

Several different kinds of institutional responses to communications overload are possible, as Meier points out (including expansion in size if the institution can capture more energy to fund growth), but the kind of response most relevant to this discussion is for the institution to redefine its limits inward. An administrative institution, in the context of stress due to communications overload (for

example in an evolving system), might respond by allowing certain previously administered transactions to operate autonomously. I suggest that in such cases one of the first areas in which control hierarchies would relinquish control would be in the context of exchange-related institutions. This is because economic institutions will tend, in the absence of administration, to exhibit self-regulation, or at least will tend to operate with a minimum of administrative regulation. This response would free energy and personnel for more urgent problems in the areas of offense and defense, long-distance trade, and adjudication. The arguments presented above, based especially on Skinner's analyses, strongly suggest that economic institutions actually do better with minimal administration because of the built-in incompatibilities of the marketing and administrative central place hierarchies. This kind of response to information overload could explain the transition from redistributive economies (the most highly administered exchange systems) to markets, as well as being a possible explanation for why an administration might relinquish control of existing markets.

CONCLUSIONS

I have argued that traditional theories of cities utilized by anthropologists fail because they cannot adequately account for the cross-cultural variability in the nature of cities, and because they are inadequate for dealing with the dynamic properties of cities and the societies of which they are a part. I have suggested that one avenue anthropologists could take to resolve the shortage of adequate theory is to adopt a regional approach to studies of cities, based on the powerful central place theory of geography. This theory focuses attention on the disposition of central institutions over the landscape. Those places that are the foci of central institution transactions are a society's system of cities and towns—its central-place hierarchy. This theory not only provides the means for explaining some of the cross-cultural variability in systems of cities and towns, but also provides a means for dealing with certain of the dynamic properties of societies. To accomplish this, I argued, the regionally oriented researcher should investigate the spatial relationships of the two basic kinds of central institutions, those that are economic and those that pertain to information processing and decision making. I outlined the basic kinds of articulation between these two genre of central institutions, described the patterns in the central place hierarchy which result from these relationships, and explored some of the implications of these varying patterns for understanding social change. The three patterns explored are the following:

(a) The primate pattern obtains in a region in which the major commercial central place is also the political capital. This center will tend to dominate the region in such a way that the development of secondary centers, as predicted by Christaller's economic location principles, is retarded. This can result in a "dendritic" market pattern on the peripheries, such that regions distant from the main center are poorly serviced economically. This pattern is typically associated with the "dual economies" described by Johnson (23), in which great

wealth differentials develop between those populations close to or in the center, and those populations in distant, poorly serviced areas. Such societies, I argued, might exhibit relatively little long-term stability because these wealth differentials could lead to internal conflict, and because poorly serviced peripheral regions might tend to break away politically and economically from the society as a whole.

(b) The second pattern I described is one in which there is more complete development of the commercial central place hierarchy, as predicted by Christaller. The primate pattern is absent, in part, because the political capital is typically "disembedded" from the marketing hierarchy, and so does not artificially distort that hierarchy away from what would be expected on theoretical grounds alone (i.e. following Christaller's $K=3$ and $K=4$ locational principles).

(c) Lastly, I discussed the nature of the lower ends of central place hierarchies. The nature and spatial distribution of low-order central places in a society, I argued, depends largely on the extent to which a decision making institution is able to "distort" the economically desirable $K=3$ and $K=4$ patterns into the administratively desirable $K=7$ pattern, in order to more closely regulate and tax rural production. Following the work of Skinner (50) as an example, it is clear that marketing efficiency depends on maintenance of the $K=3$ or $K=4$ patterns. Administrative meddling in the marketing hierarchy brings a reduction in marketing efficiency, and therefore, overall declines in productivity of participants in the marketing institution. As a result, I suggest, administrative distortions of commercial central place hierarchies should tend to be short-term, since an administration loses revenues at the same time that it is incurring the added costs of market administration.

I hope this brief, and not nearly complete, exercise in central place theorizing will be an inducement to other anthropologists interested in cities to adopt a regional approach as one method for explaining the variability and dynamic features of systems of cities and towns. Relatively few anthropologists have employed such an approach. The prominent works are those I have already described at length, those of Skinner (48-50), Smith (52), and Crissman (12). To this list I can add the publications of Johnson (24-26), Wright (63), Adams (1), and Adams & Nissen (2), for ancient Greater Mesopotamia; Marcus (31), and Hammond (18) for the ancient lowland Maya area; the publications of participants in the "Valley of Mexico Project" (Blanton 8, Millon 36, Parsons 39, Sanders 45, Wolf 62); as well as Blanton (9) and Kowalewski (27), writing about the ancient Valley of Oaxaca. This small but growing movement, I feel, will prove to be a significant new addition to anthropological studies of cities.

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HUMAN ETHOLOGY

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INTRODUCTION

A variety of developments in the biological and social sciences over the last decade have led to an upsurge of interest in the origins and evolution of human behavior. Since the paradigm for much of this enquiry has been that of classical European ethology, the designation "human ethology" has gained some currency; but other claimants are "biosociology" and "biosocial anthropology" (63). "Social biology" has already been appropriated by eugenics and demography, while "sociobiology" has come to be associated with a particular school of evolutionary genetics (171).

The labels are immaterial. What matters is that across a wide area of the social and natural sciences there has been a revival of interest in the phylogenetic approach to behavior under the aegis of the neo-Darwinian synthesis. The spectacular success of ethology proper under Lorenz and Tinbergen has obviously been influential, but equally influential have been the renaissance of primatology under Washburn, the growing importance of ecology, the advances in molecular biology, endocrinology, and the neurosciences, the new wealth of data on fossil man, and the growing sophistication of models for the evolution of complex genetic systems governing behavior. This has corresponded to a growing interest in the analysis of innate mental properties in the work of transformational grammarians like Chomsky and structuralists like Lévi-Strauss and Piaget.

The essence of the ethological approach is the acceptance of the synthetic theory of evolution as the master paradigm for the analysis of all life processes, including such uniquely human processes as language and culture. Human behavior then, like the behavior of any life form, must be analyzed in terms of its evolution and *patterns of adaptation*. This is of great importance to anthropology as a science, since such a holistic approach can serve to reintegrate physical and cultural anthropology, which have drifted even farther apart as a result of too naive an emphasis on culture as "superorganic" (62).