ARTICLES

EXPLAINING THE EVOLUTION OF REGIONAL CENTRALIZATION IN THE HAWAIIAN CHIEFDOM: A SYSTEMS APPROACH

Nancy Arbuthnot
Department of Anthropology
McMaster University
Hamilton, Ontario

ABSTRACT

An explanation of the evolution of regional centralization in Hawaiian chiefdoms, is offered based on the systems approach of Blanton, Kowaleski, Feinman and Appel (1981, 1982). Their approach focuses on certain "core features" of cultural evolution -- namely complexity, integration, and scale. Changes in these three variables are seen as the result of the particular strategies that individuals adopt for coping with new or extreme situations or for achieving specific personal goals. The paper, therefore, begins with an examination of the changes in complexity, integration, and scale between early Hawaiian society, as represented by the proto-Polynesian society reconstructed by Kirch (1984), and historic Hawaiian society. These changes are then related to possible strategies both for coping with the challenges of initial colonization and for maximizing personal prestige and power within the chiefly hierarchy. Finally, the types of archaeological evidence that are available or are needed to support such an explanation are considered.

RÉSUMÉ

L'auteur offre une explication de l'évolution de la centralisation régionale des sociétiés Hawaiennes, qui est fondée sur les théories de systèmes de Blanton, Kowaleski, Feinman et Appel (1981, 1982). Leurs perspectives soulignent certains éléments de base de l'évolution culturelle: la complexité, l'intégration et l'échelle. Les différences de valeures de ces trois variables sont attribuées aux stratégies particulières adoptées par les individus dans les contextes d'adaptation à des conditions de vie nouvelles ou extrémes, ainsi que par ceux qui tentent de réaliser certains buts personels spécifiques. Conséquemment, l'auteur examine d'abord les changements de complexité, d'intégration, et d'échelle séparant les premières sociétiés Hawaiennes, représentées par la société proto-Polynésienne reconstruite par Kirch (1984), de la société Hawaienne historique. Ces changements sont ensuite comparés aux stratégies qui ont été possiblement utilisées en réaction au colonialisme initial pour maximizer le prestige et le pouvoir individuel dans la hiérarchie sociale. Finalement, l'auteur présente les types dedonnées archéologique qui

sont nécéssaires afin de soutenir ce genre d'explication.

INTRODUCTION

As its title suggests, this paper tends to be particularistic rather than general in its approach. It is concerned not with "chiefdoms", but a chiefdom -- the one encountered by the Europeans in the Hawaiian Islands in the late eighteenth century. Moreover, it attempts to explain change not between "evolutionary stages", but within a single "stage." Yet the characteristics and processes of change identified herein are not specific to Hawaiian chiefdoms nor, for that matter, chiefdoms in general. In fact, the paper focuses on what Blanton, Kowaleski, Feinman and Appel (1981, 1982) have described as "core features" of cultural evolution. That is, it will examine the changes in complexity, integration, and scale which resulted in the distinct socio-political organization of historic Hawaii. In addition, it will attempt to relate those changes to possible strategies both for coping with the challenges of initial colonization and for achieving specific personal goals.

AN OVERVIEW

The task of attempting to explain the evolution of regional centralization in Hawaiian chiefdoms is simplified by the fact that we have an ethnohistorically attestable "endpoint" from which to work. Thus, it is possible to delineate the type and degree of complexity, integration, and scale of the entity whose development is to be explained. Scale refers to "the size differences, and usually but not always, refers to differences in numbers of people, density, numbers of units integrated into a single system, or spatial size of units" (Blanton et al 1982:13). Complexity can be defined as "the degree of differentiation, or in other words, the extent to which a society's members are formally divided into positions, ranks, or subunits" (Idem). Differentiation can be either horizontal or vertical. Horizontal differentiation refers to the degree of specialization of parts of equivalent ranks whereas vertical differentiation refers to specialization of parts between which there are rank differences (Blanton et al 1981, 1982). Integration is defined as "the degree to which there are linkages between the differentiated positions, ranks, or subunits" (Blanton et al 1982:13).

Historic Hawaii

A. Socio-Political Organization

At the time of initial European contact, Hawaiian society displayed a great deal of vertical differentiation. Its members formed two endogamous "classes" (Sahlins 1958; Earle 1978; Kirch 1984). The maka'ainana, or commoners, were "an undifferentiated stratum ranked below, and cut off from the chiefly elite" (Earle 1978:14), which formed a genealogically separate group. Unlike the maka'ainana the ali'i, or chiefs, were internally ranked into seven or eight grades (Kirch 1984). Rank was determined,

according to the principles of the conical clan, by genealogical distance from the senior line. In the Hawaiian case, however, this distance was traceable not only through males, but females as well. As a result, it was often possible for several individuals to lay claim to a single position (Earle 1978). As Goldman (1970) has argued, this ambiguity created intense status rivalry. The chiefs were also set apart from the commoners by their mana, or supernatural power. The paramount chief, as mediator between the people and the deities, had the most mana and was, therefore, imbued with sanctity or tapu (Kirch 1984). Thus, the degree of vertical differentiation in historic Hawaiian society is reflected in both the separation between chiefs and commoners and the extent of ranking within the chiefly hierarchy (Fig. 1).

The political or administrative system was embedded within the system of social organization. Moreover, the economic system was integrated within the administrative system. The latter was based on four overlapping levels of land management: the chiefdom or island (moku), the district ('okana), the local community division (ahupua'a), and the unit of land worked by an extended family (kihapi). The system of land division is diagrammed for a hypothetical island chiefdom in Figure 2.

The paramount, as residual "owner" of all the land, was entitled to live off the produce of his chiefdom. He distributed stewardships to the district and ahupua'a chiefs who were also entitled to personal support from their land division. These chiefs, however, were seldom directly involved in production activities. They held rights to food produced by the commoners either on the maka'ainana subsistence plots or on ko'ele land which was set aside specifically for the support of the chiefs. The commoners, on the other hand, received use rights to a small parcel of land to be used for their own subsistence (Earle 1978).

As Earle points out, in this system of land tenure and management "rights to a land unit were contingent on the fulfillment of obligations to higher levels in the hierarchy. This principle applied equally to commoner and to chief" (1978:15). The commoner's holding was dependent upon his labour on ko'ele land and payment of tribute, whereas a chief's stewardship was subject to his ability to meet the expectations of higher level chiefs.

Each ahupua'a ali'i delegated the managerial responsibility for his land division to a konohiki who regulated the production of goods for the chiefs by 1) mobilizing corvée labour for use on ko'ele lands as well as the construction and maintenance of irrigation systems and pondfields, and 2) mobilizing goods during periodic ceremonial collections (Earle 1978; Kirch 1984).

B. Production and Distribution

At the time of initial European contact, a dual economy existed in the Hawaiian Islands. Subsistence production, which was primarily agricultural, formed the basis of a "domestic economy." Surplus production, on the other hand, which also involved non-agricultural products, formed a "political economy." Within both economic spheres, however, the source of goods was the same -- the commoner producer (Earle 1978).

The focus of both subsistence and surplus production was the ahupua'a or local community division. Although ahupua'a displayed a number of windward-leeward contrasts in terms of permanent streams, soil type, and rainfall, each was largely economically self-sufficient (Earle 1978; Tuggle 1979; Kirch 1984). Wherever possible, taro was grown by irrigated methods. Traditional Hawaiian irrigation systems consisted of a short irrigation ditch which fed water from a permanent water source into a series of pondfields (Earle 1978). Dryland agriculture, on the other hand, was practiced primarily in areas where the lack of permanent streams made irrigation impossible. Taro and sweet potato were the dominant crops. As Earle (1978) points out, the latter was an

extremely important crop because it could be grown in areas of restricted rainfall where taro was not a viable staple crop. In addition, yam, breadfruit, bananas, and other famine foods were grown between fields. Fish, pigs, and dogs were the main source of protein, although the keeping of pigs and dogs was more closely associated with dryland field systems, while simple aquaculture was practiced along with wetland cultivation.

Both dryland and wetland cultivation were intensive in terms of labour and yield. For example, annual yields of irrigated taro are estimated to have ranged from thirty to as many as sixty metric tons per hectare (Kirch 1984). Although similar figures are not available for dryfield systems, the traditional techniques of dryland planting were certainly labour intensive, requiring group labour for the initial clearing of all vegetation, the mounding of soil, and the quick planting of fields after the rain (Earle 1978). Irrigated systems also required organized group labour for the construction and maintenance of hydrologic facilities (Earle 1978; Kirch 1984). Yet, both Earle (1978) and Kirch (1984) argue that at the time of European contact, the productive systems had not reached their full potential for development.

As a result of the economic independence of the ahupua'a, the movement of agricultural and non-agricultural goods within the socio-political system was "vertical" rather than "horizontal." Although the chiefs had direct access to the produce of ko'ele lands and fishponds, they also appropriated manufactured goods (tapa), raw materials (feathers and dye), and some agricultural produce (taro) through a ritualized system of taxation. The collection of tribute (ho'okupu) took place in conjunction with the makahiki which is believed to have its origins in first fruits rites (Kirch 1984).

Redistribution of the ho'okupu, however, was limited to the chiefly hierarchy. Thus, the makahiki served as a political vehicle for the paramount to reward his supporters within the chiefly class (Earle 1978; Kirch 1984). The fact that goods were rarely redistributed to the commoner producers, and the observation that ahupua'a were largely economically self-sufficient bring Sahlin's (1958, 1972) and Service's (1975) concepts of redistribution in chiefdoms into question.

Despite the social, political, and economic "distance" between the chiefs and the commoners, the chiefs were greatly dependent on the commoners. The commoners, however, were also dependent on the chiefs, particularly the paramount. As mediator between the gods and the people, the paramount conveyed mana to the latter and assured the productivity of the land and the sea in return for ho'okupu (Kirch 1984). Moreover, in times of shortage (resulting from periodic droughts or following a natural disaster), the chiefs were expected to provide the commoners with food from their storehouses. They were also expected to provide protection against raiding during warfare.

C. Political Succession and Competition Among Chiefs

In historic Hawaii, competition among chiefs for political power as "an explicit aspect of social existence" (Earle 1978:174). As Earle suggests, "competition was implicit in the complex and ambiguous social organization of Hawaiian chiefs" (idem). As a result of bilateral inheritance and multiple marriage, it was often possible for several individuals to lay claim to a single position. The ability to assume office, however, depended on an individual's capacity to gather material support and often to take the office by force (Earle 1978). Moreover, "because of the system of land tenure, competition among individuals ramified into major confrontations between elite factions whose rights to land and office rested on the outcome of the dispute" (Earle 1978:174).

D. Summary

1. Competition for political power among chiefs was an important aspect of Hawaiian

social existence. 2. Political and economic power were legitimized and extended through ritual sanction such as mana, ho'okupu, and makahiki. 3. Despite a great deal of vertical differentiation, Hawaiian chiefdoms display little horizontal differentiation between what Flannery (1972) would describe as the various "subsystems". In fact, the social, political and economic "subsystems" are collapsed into a single hierarchical organization. 4. Vertical integration tends to outweigh horizontal integration within a sphere, particulary the economic sphere. There appears to have been little interaction between units at the same level in the hierarchy, given the economic, political, and religious obligation. 5. With respect to scale, at the time of contact Hawaiian chiefdoms were among the largest in Polynesia. They ranged in size from 40,000 to 100,000 people and from 6,000 to 10,000 km^2 of land (Tuggle 1979).

Thus, the Hawaiian chiefdoms first encountered by the Europeans in 1778, represented a highly stratified, highly centralized society. This society contrasts with the prototypical Polynesian one from which Kirch (1974) and Earle (1978) argue it emerged.

Prototypical Polynesian Society Reconstructed

A. Social Organization

Using comparative data on present day Polynesian cultures as well as the evidence from historical linguistics, Kirch (1984) has attempted to reconstruct a model of Prototypical Polynesian Society (PPS). He proposes that the social organization of PPS was that of the local lineage embedded in the conical clan. The local lineage was a land-holding descent group, ranked externally with respect to the conical clan, and internally. The reconstruction of the Proto-Polynesian term *kainanga meaning "land-holding descent group under the authority of a chief", supports Kirch's model. Lexical reconstructions for "chief" (*ariki), "first born son of a chief" (*ga-diki) as well as junior-senior distinctions between sibling of the same sex (Kirch 1984), suggests not only that hereditary chieftaincy was present in PPS, but that succession was by patrilineal primogeniture. In addition, lexical reconstructions for mana and tapu indicate that these chiefs were sacred leaders (ibid).

It is much more difficult, however, to determine the extent of ranking within the local lineage or whether any of the possible status levels were associated with territorial administration. Although ethnographic analogy suggests that ranking was minimal and that the lineage chief was probably the only territorial administrator (Kirch 1984), there is no archaeological data to support such an hypothesis. It would be interesting to determine whether or not the Hawaiian terms "ahupua'a" and "konohiki" have PPS reconstructions. If not, it is unlikely that PPS was characterized by extensive ranking. This seems to be confirmed by Kirch's (1984) observation that the chiefs were not yet structurally or economically separated from the rest of the group. He derives support for such a statement from both ethnographic analogy and historical linguistics.

B. Spatial Organizations

Kirch (1984) and Earle (1978) argue that with population growth the colonizing population (assumed to represent one lineage unit) expanded, leading to fissioning of local subgroups or ramages which moved into unoccupied resource areas near the parent group. This created the type of social organization outlined in section A. Archaeological data on the size, distribution and dates of the earliest sites appear to support a pattern of dispersed, spaced expansion (Tuggle 1979; Kirch 1984). Although such a pattern may be the result of sampling techniques, there are two other important pieces of information

considerable costs, creating a new source of stress (ibid). Finally, it is possible for coping structures to become institutionalized:

> A common response to extreme fluctuations may be the formation of an organized group (a structure) charged with the responsibility of resolving the problem. This may result in evolutionary change if, after conditions return to normal, the new group persists... [and/or] ...the conditions favouring the formation of the group are becoming more frequent, warranting the maintenance of the structure. (Blanton et al. 1981:16)

These institutions may change from being "system-serving" to "self-serving" (Flannery 1972:413), thereby creating additional stress.

The advantages of this type of systems approach for explaining the evolution of regional centralization in Hawaiian chiefdoms are perhaps self-evident. Since it does not deal with social, political, and economic organization in terms of interacting "subsystems" (cf. Flannery 1972), the systems approach of Blanton and his co-authors can more aptly explain evolutionary change in Hawaiian society where all three types of organization are embedded in a single hierarchical system. Moreover, their approach emphasizes the role of individuals in cultural evolution. This is of particular importance in chiefdoms where individuals rather than institutions occupy various positions in the hierarchy.

Applying the Approach

In this section, a series of hypotheses concerning the emergence of a "class" distinction and the elaboration of the chiefly hierarchy are generated in an attempt to explain the evolution of regional centralization in Hawaiian chiefdoms. The types of evidence which are available or are needed to support such an explanation are taken up in the final sections.

A. The Emergence of a "Class" Distinction

It is suggested that the emergence of a class distinction took place early in Hawaiian prehistory. The basic principles of social inequality were already present in ancestral Polynesia. The chiefs were "elite" members of the local community by virtue of their role as mediator between the deities and the rest of the local group, but not as representatives of an elite class. These chiefs were essentially sacred leaders who conveyed mana to the community and received tribute in the form of first fruits to assure the productivity of the land and the sea. Thus, there was already an ideological link between the chief and a responsibility for the "economic" well-being of the people.

In response to the challenges of initial colonization and the occupation of new resource areas by segmenting populations, the chiefs became invested with secular authority. That is, the chiefs were charged with the responsibility of resolving the "problems" posed by the environment. For example, periodic droughts and cyclones, in addition to less frequent tsunami and volcanic eruptions, no doubt created a great deal of stress within the subsistence sector. Natural perturbations such as these, as well as certain aspects of the basic subsistence pattern, particularly marine collections, would have necessitated the mobilization of organized group labour.

By a gradual process of what Simon (1944) calls "identification" the chiefs became more closely linked to one another than to the lower levels of the lineage group. This separation was amplified by changes initiated in the newly emerging organizational sphere--the chiefly hierarchy. These changes increased both the extent of vertical

differentiation and the degree of interaction within the sphere.

B. Elaboration of the Chiefly Hierarchy

Within the newly emerging organizational sphere, the predominant strategy was the maximization of personal prestige and power. This could be achieved by simply acquiring greater personal "wealth" in the form of status items, or by recognizing the status of females. With respect to the latter, it would therefore be possible for both males and females to achieve a higher position in the social hierarchy by marrying a high-ranking individual and assuming their status. This practice, accompanied by a shift to bilateral inheritance, would create a tremendous amount of ambiguity within the social hierarchy, leading to intense competition among individuals laying claim to a single position.

An individual's ability to assume a particular office, however, would depend on his capacity to attract and reward supporters with either foodstuffs or status items. Thus, both the demand for greater personal wealth and competition for high-level positions would place a great deal of stress on the productive sector by creating a demand for surplus goods. Such a demand would lead to the development of a "dual economy" (Earle 1978) in which the members of lower levels of the social hierarchy were forced to produce goods not only for their own subsistence, but for the support of the chiefly "elite" and its political activities. The means for appropriating these goods could be found in the religious system. First fruits rites thereby became a ritualized form of taxation.

Chiefs who wanted to increase the productive capacity of the economic system under their control could do so by investing in the development of new technologies or by increasing the scale of the system and the amount of labour input. Such initiatives would create additional stress within the system as a whole. For example, by investing personal "income" in technological improvements, the chiefs would further increase the demand for surplus since income is surplus. Moreover, greater demands for labour may lead to an increase in population. That is, households may alter their structure in response to changing economic and social conditions (White 1973). Population growth would, in turn, lead to further agricultural intensification. Finally, larger numbers of people as well as a more extensive, more intensive agricultural base would necessitate the creation of new administrative or managerial positions such as that of the konohiki.

Chiefs could also increase the amount of goods they controlled by recruiting corvée labour to work on land set aside specifically for the support of the chiefly hierarchy. Corvée labour could also be used for the construction of fishponds and new irrigation systems as well as shrines, temples and burial complexes; the latter three being a visible testimony to the economic efficacy and social distinctiveness of the chiefs. The organization of corvée labour, however, would also contribute to the need for a new managerial or administrative position. The costs of adding such a position would place still further stress on the productive sector for it would then be necessary to support an additional level within the sociopolitical system.

Finally, chiefs could increase their personal power and wealth by expanding their chiefdoms militarily, to include more local communities. Such action would perpetuate the changes discussed above by again increasing the demand for surplus goods. These goods were needed not only to maintain a standing army but to attract and reward political supporters.

To briefly summarize then, the particular strategies adopted by the chiefs to maximize their personal power and prestige would create a number of positive and negative feedback loops in which vertical differentiation would be increased through the addition of new managerial positions and military domination of previously high-ranking

chiefs. Moreover, integration would be increased through the creation of a network of political and economic obligations.

The Archaeological Record

Although the archaeological record is somewhat sketchy, there is evidence to support the explanation of the evolution of regional centralization in Hawaiian chiefdoms presented in the previous section. In particular, the fact that major changes in the production system, warfare and ceremonial architecture were occurring at roughly the same time suggests an interrelationship among the three variables.

A. Production

As Tuggle points out "two aspects of agricultural change may be postulated on the basis of present evidence from a number of areas" (1979:191). The first is an inland movement of population associated with a greater emphasis on dry cultivation after about A.D. 1200 to 1400. The second change was the conversion of dryfields to irrigation, as indicated by the superposition of irrigation terraces over disturbed, charcoal-flecked subsoils that are thought to have been under swidden cultivation. Data from several sites including Moanula and Makaha, Oahu; Halawa, Molokai; and Honpue, Hawaii (Fig. 3), suggest that this form of intensification was occurring as early as A.D. 1300 in some areas (Tuggle 1979).

Evidence for further intensification comes from Hawaii Island where it appears an effort was made to develop most of the areas with agricultural potential:

> Irrigation complexes were constructed nearly to the head of the 7 km extent of Honokane Nui Valley. In Pololu Valley an irrigation system was built in spite of a poor water source and intermittent water shortage. The intensive use of these two valleys occurred after A.D. 1500. Surveys along the Kohala-Hamaku coast indicate that most irrigable areas, even those in isolated locations or with limited land were developed to some extent for irrigation. At Lapakahi the lower portions of the dryland fields had been pushed into an agriculturally marginal rainfall zone. In barren inland areas of southern Kohala small settlements with agricultural features developed around A.D. 1600 on small alluvial fans of intermittent streams (Tuggle 1979:192).

Tuggle (1979), Kirch (1984) and Earle (1978) all argue, however, that at the time of contact the agricultural system had not yet reached its full potential for development. For example, on the island of Hawaii expansion was possible through mountain terracing. Furthermore, on Oahu and Kauai where production was less intensive, many areas suitable for irrigation were under dry cultivation or were not cultivated at all (Earle 1978; Tuggle 1979).

B. Warfare

The archaeological remains of warfare between competing chiefs are primarily refuge caves and ridge forts. Ridge forts have been found on most islands and are fortified with small terraces which probably served as crude fighting stages (Kirch 1984). Refuge caves were used for hiding. In the Kona, Kohala and Ka'u districts of Hawaii Island, five such caves have been investigated. All have extensive modifications for defense such as walled entrances and narrowed crawlways. Available dating indicates that these structures were being used as early as A.D. 1500 (Kirch 1984).

C. Ceremonial Architecture

As yet, only two of the larger temples in Hawaii have been excavated. Each of these, one at Makaha, Oahu and one at Honaunau, Hawaii (see Fig. 3) was constructed in a series of stages beginning around A.D. 1450. The increasing size of these structures through successive building phases may, as Tuggle (1979) points out, serve as a measure of greater socio-political power since their construction would require an increasing amount of "capital investment" and organized labour. In fact, Kirch (1984) argues that the rebuilding of Kane'aki heiau around A.D. 1650, which increased its size from 400 m^2 to 1,010 m^2, marked Makaha's incorporation into a larger, more complex socio-political system, for such an event could only have been directed by a paramount.

The fact that the above changes in ceremonial architecture, warfare, and production coincided not only with one another but with the fragmentation of buffer zones and greater homogeneity of style of portable artifacts indicates a relationship between the evolution of regional centralization, agricultural intensification, competition among chiefs and increasing capital investment. The co-occurrence of all five factors does not in itself, however, constitute sufficient support for the explanation offered in this paper. It is also necessary to demonstrate that population growth is both a dependent and an independent variable and not solely the latter. That is, it must be shown that agricultural intensification was not merely the result of population pressure. Until more accurate data on prehistoric Hawaiian populations are obtained and some of the methodological problems involved in estimating carrying capacity are worked out, it is difficult to determine the particular role that population growth played in the development of agricultural systems. It is possible, however, to demonstrate that warfare was not simply the result of population growth in a circumscribed area where emigration was not a feasible corrective mechanism (Carneiro 1979). As Earle points out:

> In order to show that warfare in Hawaii was primarily a response to competition over prime land needed for subsistence [as Carneiro argues], it should be shown that warfare took place between local communities since it is these units which are critical in terms of subsistence production. The outcome of warfare also should be a significant readjustment of population-- the victors should occupy the conquered lands after largely eliminating or at least dislocating the local population (1978:164).

At present, there is no evidence for the dislocation of local communities. Moreover, there is nothing to indicate that these communities were structured in a way which would counter the threat of warfare. In fact, evidence for the very unequal distribution of population between ahupua'a strongly suggests that warfare between local communities was not present (Earle 1978). Thus, it appears that population pressure was, in itself, not great enough to induce "competition over prime land needed for subsistence." Rather, warfare tended to follow a pattern in which local communities were subsumed by the social, economic, and political hierarchy of the conquering chiefdom (Earle 1979), suggesting that warfare was the result of competition for control over surplus production.

CONCLUSIONS

This paper has attempted to offer an explanation of the evolution of regional centralization in Hawaiian chiefdoms in which changes in complexity, integration, and scale are the result of certain strategies both for coping with the challenges of initial colonization and for achieving specific personal goals. Although there is strong evidence to indicate a relationship between socio-political development, agricultural intensification, competition among chiefs, and capital investment, further research is needed before such an explanation can be accepted. More information on the initial colonization phase, settlement size and pattern as well as the degree of social stratification in earlier populations would be of great value. Also needed are research projects which are designed specifically to address problems such as the relationship between population growth and agricultural intensification.
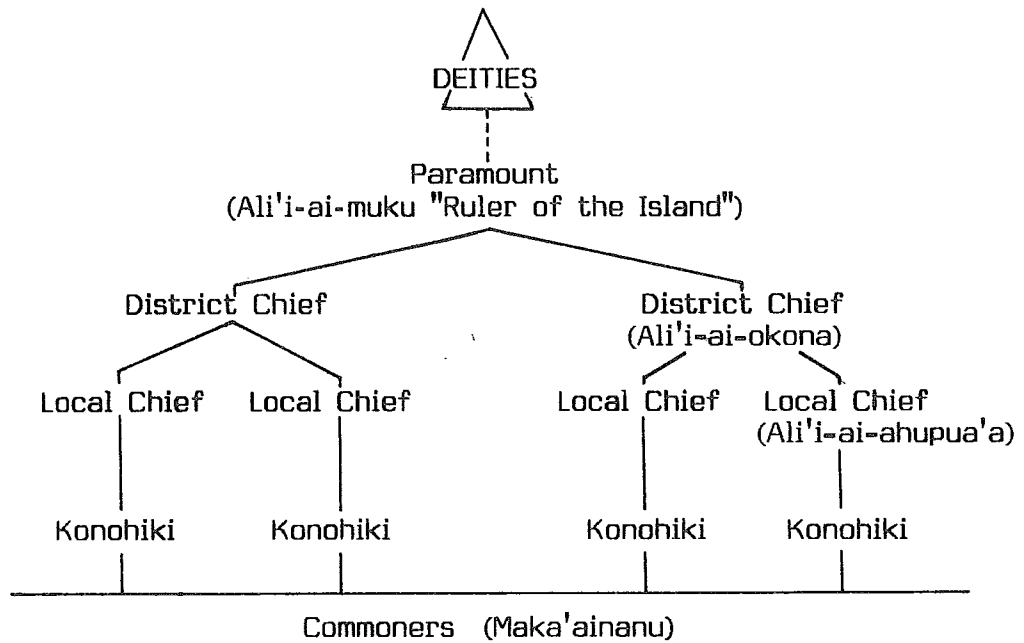
Figure 1. Socio-Political Organization of Historic Hawaii
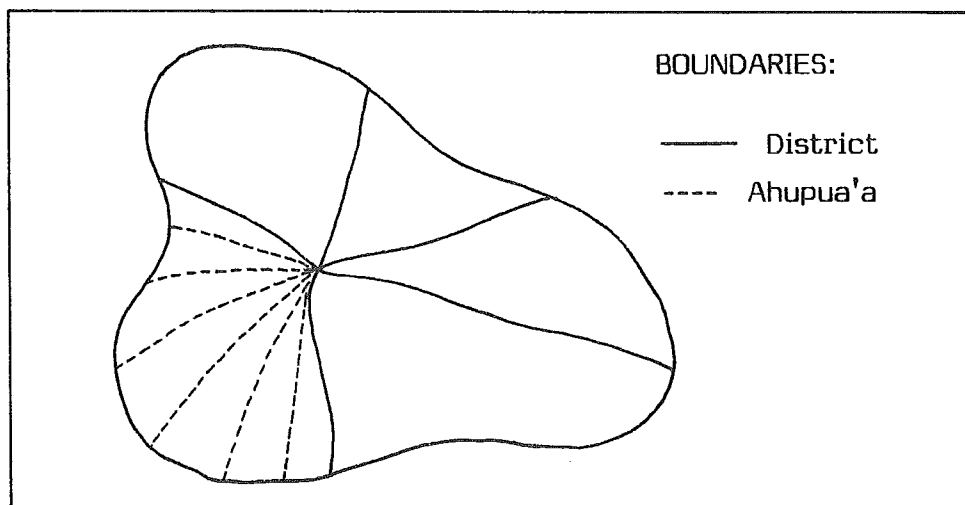(after Kirch 1984:259).

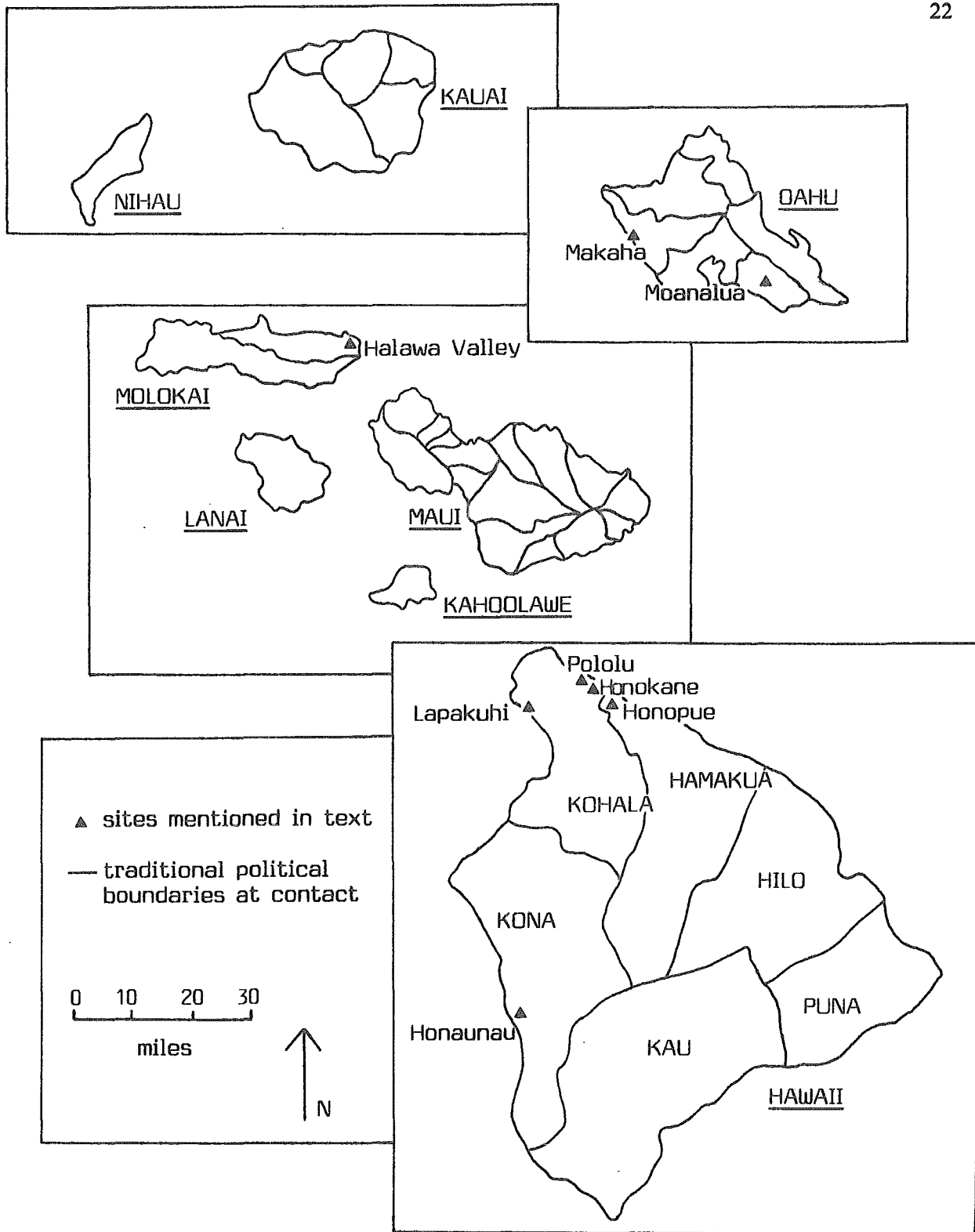Figure 2. System of Land Division for a Hypothetical Island
Chiefdom.

Figure 3.   Archaeological Sites Mentioned and Traditional
           Political Boundaries at Contact.

REFERENCES

Blanton, Richard E., Stephen A. Kowaleski, Gary Feinman and Jill Appel
    1981   Ancient Mesoamerica. New York: Cambridge University Press.

    1982   Monte Alban's Hinterland, Part I: The Prehispanic Settlement Patterns of the Central and Southern Parts of the Valley of Oaxaca, Mexico. Prehistory and Human Ecology of the Valley of Oaxaca. Kent V. Flannery & Richard E. Blanton (General Eds.) Vol. 7. Ann Arbor: Memoirs of the Museum of Anthropology. University of Michigan No. 15.

Carneiro, R.L.
    1970   A Theory of the Origin of the State. Science 169:733-38.

Earle, Timothy
    1978   Economic and Social Organization of a Complex Chiefdom: The Halelea District, Kaua'i, Hawaii. Anthropological Papers, Museum of Anthropology, University of Michigan. No. 63. Ann Arbor, Michigan.

Flannery, Kent V.
    1972   The Cultural Evolution of Civilizations. Annual Review of Ecology and Systematics 3:399-426.

Goldman, I.
    1970   Ancient Polynesian Society. Chicago: University of Chicago Press.

Sahlins, M.
    1958   Social Stratification in Polynesia. Seattle: University of Washington Press for the American Ethnological Society.

    1972   Stone Age Economics. Chicago: Aldine-Atherton.

Service, Elman R.
    1975   Origins of the State and Civilization. New York: W. W. Norton & Company Inc.

Simon, Herbert
    1944   Decision-Making and Administrative Organization. Public Administrative Review. 4:16-30.

Tuggle, H. David
    1979   Hawaii. In The Prehistory of Polynesia. Jesse D. Jennings, Ed., pp. 167-199. Cambridge: Harvard University Press.

White, B.
    1973   Demand for Labour and Population Growth in Colonial Java. Human Ecology 1:217-36.