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# Spatial Boundaries and Social Dynamics

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*Case Studies from Food-Producing Societies*

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## 2. Archaeological Considerations on Social Dynamics and Spatial Pattern Development of Traditional Settlements

Kofi E. Agorsah

### Introduction

One fascinating aspect of archaeological analysis is the explanation of the frequency with which material manifestations of man's behaviour are bonded together. The complexity of the interconnections and associations makes it even more challenging and exciting. Areal variations of the relationships between cultural phenomena are so numerous that archaeologists have, over the centuries, looked for regularities or patterning among distributions of these material manifestations. It is not the patterns that are recognised nor the fact that their distribution varies from place to place that is of greatest interest. Rather it is the past behaviour of the society concerned that is of significance to the archaeological analysis. The basic assumption in dealing with patterns consists of convictions related to *recurring modes of human activities or behaviour*. Artifact pattern analysis (South 1977; Armstrong 1987), spatial pattern analysis (Whallon 1973; Clarke 1977; Fletcher 1978; Hillier et al. 1978; Muehrcke 1980; Agorsah 1988; Kuper 1972; Soja 1971), ceramic typology (Soper 1971; Boomert 1980; Crossland 1973), and various kinds of classification in archaeology assume *regularity* in human behaviour.

Throughout history change has been a constant element in human culture. (Social scientists have identified various processes of change such as independent invention, diffusion, acculturation and culture contact.) Without even examining any of these in detail, it is easy and clear to see why one should recognise that human society and all associated modes of behaviour are not static. That is, they are dynamic. As a corollary, spatial pattern can be considered as adapting to this dynamic nature of the social system. Contributing to the social transformation are factors such as the influence of cosmology (Kuper 1972), traditional views of spatial organisation (Agorsah 1988; Holl 1987; Leinhardt 1977) and exploration of space (Sinclair 1985; Tait 1959), concepts of boundaries (Hillier et al. 1978), territoriality and land tenure, perception of the natural environment, as well as folk traditions about ecology and attitudes towards natu-

ral resources. In his study of the morphology of County Durham in England, Roberts (1978:291-322) for example, stated as follows:

A systematic study of Durham villages reveals clear regularities: thus 60% of all plans are variants of local circumstances of the two-row regular village; a further 10% are variants of this type, a single-row plan, while another 10% comprise multi-row plans.

Although Roberts was using these estimates to explain social and structural transformations over a period of one thousand years, he obviously based these on some expectable regularities. The principle of seriation in archaeology (Deetz 1977) uses the frequency or regularity of occurrence of artifacts for chronological schemes. Patterning, therefore, has become and remains a basis for discussing or explaining systems of classification and abstract concepts of human behaviour. Referring to the social sciences or what has been referred to as "sciences of the artificial," Hillier and his colleagues (1978) state: "We cannot understand the flux which constitutes our human experiences unless we realise that it is raised above the futility of infinitude by various successive types of modes of emphasis which generate the active energy of a finite assemblage...." Hillier and his colleagues were also referring to "patterning" of human behaviour.

One of the lessons that archaeologists have come to learn in recent years is the importance of the patterns of social behaviour to which individuals and groups conform in their dealings with one another in space and time (Leach 1976; Keat and Urry 1975). In fact, some scholars have attempted to demonstrate summary mathematical rules which govern social relations between individuals and groups (Cartwright and Harary 1977). Also, objects or artifacts of archaeological significance are considered as behaving within certain rules (Agorsah 1983, 1988) because they were the products of past human social behaviour. Therefore, the study of artifacts is the study of human behaviour (social, economic etc.) that produces them. However, owing to changes in the size and composition and needs of social groups as well as

increased development of survival strategies with time, one cannot expect the products of human behaviour to remain static. Similarly, human activities may occur in various places during different times and according to different needs. The structure of the social group also then tends to be affected by the new order. This accounts for the significance of the dynamic nature of the social factor in the explanation of human behaviour.

### Spatial Patterns in Archaeology

The consequences of human behaviour in terrestrial space have posed challenges not only to cultural geographers, but to archaeologists, especially when it comes to explanation of the means by which human societies encounter different phenomena in space and time, as well as various ways in which they interrelate. Human groups have, since prehistoric times, faced the reality of space, but the strategy for coping with it is a cultural variable. Similarly, because human settlements are placed in the natural landscape, they reflect in varying degrees the interrelationships established between human factors such as history, social structure, and physical space (Agorsah 1986). The significance of the social factor, with its dynamic nature, for the understanding and explanation of spatial pattern has been demonstrated elsewhere (Agorsah 1988) and emphasises the contribution of the social group as a whole to the matrix of archaeological evidence (Schiffer 1977; Agorsah 1983, 1986). However, it cannot be assumed that societies, especially prehistoric ones, have a concept of spatial pattern equivalent to that of the social scientist or that of the ethnoarchaeologist. The marriage of the "social" to the "spatial" is so indispensable to archaeological interpretation that considerable attention has been given this marriage in recent years (Clarke 1977; Hodder 1976; Hillier et al. 1978; Leach 1976; Fletcher 1978; Agorsah 1985, 1988; Sinclair 1987; Ucko et al. 1972; Chang 1968).

Writing on the "Archaeology of place" Binford (1983) has stated that "The processes which cause site patterning are long-term repetition of patterns in the "positioning" of adaptive systems in geographic space." Site patterning derives from the repetition or lack thereof in the spatial positioning of systems. In addition to attempting to demonstrate the validity and importance of this statement for archaeological reconstruction and interpretation, this chapter attempts to go a little further (Hodder and Horton 1976; Earle 1976). At the same time, it has been recognised that the socio-spatial consequences of human behaviour vary according to the level of human settlement

in space at the macro or micro level. In a recent exposition (Agorsah 1988a), a model of spatial behaviour—the "Local Rule" (LR) model—has been proposed that can help determine the trend of development, depending on an assumption about the state of the social system as the dynamic factor that creates the repetitive patterns that accommodate the bulk of the evidence of human spatial behaviour at archaeological sites. Data from the Volta basin of Ghana has been used to illustrate the patterning at various levels of settlement development. Contemporary cultural phenomena are also invoked in this chapter to demonstrate, in dynamic terms, the factors behind the spatial patterning that we often attribute to past societies. This, in essence, is the basis of the ethnoarchaeological enterprise (Atherton 1983; Donnan and Clewlow 1974; Stiles 1979; Agorsah 1985, 1988).

When Binford (1983) discussed his economic zonation of settlements, he emphasised the "home base" as an important factor built on social patterns of relationships. Although not directly indicated, his example of mobility patterning, the results of which are his so-called economic zones, consists of a direct consequence of social relationships between groups in Nunamiut Eskimo society. Binford's study of within- and between-site variability—as well as variability in site utilisation—also supports the view of the dynamic nature of social systems in shaping the use of space.

Environmental features change over time in various ways, the most important being the state of the features as well as in their spatial positions. For example, structures erode away, which creates problems that call for human reaction (social, technological, etc.), some structures disseminate offspring while others are moved by external forces such as humans and animals as means of adaptation. The result of all this is continual environmental change as well as change in the adaptive behaviour patterns of societies. Also, changes in the nature of things and in their positions produce varying rates of change or adaptation, as well as change in patterning. In addition, adaptive trends may be cyclical or non-cyclical. The interrelationship between the continual adaptation of natural and social phenomena creates a complex situation that presents interpretative difficulties to the archaeologists (Shinnie 1985). Understanding and explanation of archaeological material to reflect this complex situation requires methodological approaches that accept and recognise the reality of this dynamic interaction.

The significance of social factors for spatial interpretation in archaeology has been demonstrated by many scholars (Agorsah 1988b; Bailey 1982; Doby

1967; Mills 1985; Leach 1978) and in one case (Agorsah 1986) it was clearly emphasised that the form of spatial relationship within settlements or archaeological sites must be described in terms of the patterns of social behaviour to which individuals and groups conform in their dealings with one another. But because of the impossibility of observing the social behaviour of past societies we have to rely on models drawn from modern social behaviour patterns. It is well known that the conformity of individuals to localised social patterns of behaviour is formulated in rules which in modern societies are recognised as rules of etiquette or moral rules. It is these rules, especially where they are related to man's use of space, that can be utilised to formulate models that can be applied to the prehistoric situation, and which combine both spatial and social factors in one package. Such models have often been related to settlement pattern analysis (Agorsah 1988; Willey 1972; Sinclair 1987; Zubrow 1975; Hodder 1978).

In the definition of "settlement patterns" Gordon Willey (1956) indicated the above link when he wrote that:

It refers to dwellings, to their arrangement, and to the nature and disposition of other buildings pertaining to community life. These settlements reflect the natural environment, the level of technology on which builders operated, and various social interaction and control which the culture maintained.

The main concern of settlement pattern analyses during and after Willey's Viru valley study up to the early seventies demonstrated an awareness of theoretical and methodological considerations and relied to a large extent on the use of various techniques and approaches such as central place theory (Johnson 1972), point pattern analysis (Hodder and Orton 1976; Thomas 1972), quantification of archaeological distribution maps (Hodder and Orton 1976; Laux 1971), Thiessen polygons (Hodder and Hassel 1971; Lössch 1954), nearest neighbour analysis (Earle 1976; Hodder and Orton 1976), behavioural chain analysis (Schiffer 1977), as well as archaeological sampling (Willey 1956; Parsons 1972) and theory of space syntax (Hillier et al. 1978). Many of the studies lacked models in the real sense that place emphasis on the interplay of social and spatial factors.

The most recent developments in settlement pattern studies have more emphasis on the interaction between the two dynamic factors—spatial and social. The Local Rule (LR) model of spatial behaviour (Agorsah 1988) is one of the models that have been recognised as not only considering spatial and social factors in a single package in the reconstruc-

tion of settlement pattern development, but also one that has cross-cultural applicability.

### **The Local Rule Model**

This model is based on the conviction that the activities that create the matrix of archaeological features are a result of human <sup>activities</sup> ~~societies~~. Also, it is argued that the location and distribution of structural features in settlements affect human behaviour; that moving them from one place to another makes a difference; that changing the spatial configuration or pattern or social arrangements alters their functions, and that physically separating two interacting objects affects the degree of the interaction. But the strategy in traditional societies (including prehistoric ones) of space and social dynamics is a cultural variable. Also, as noted earlier, the concept of space of the archaeologist in analysing the material may not be equivalent to that of the society being studied. All these lead to a single conclusion that spatial behaviour cannot be understood apart from its social context, because geographical space constitutes a reflection of social meanings about how the space is used (Kuper 1962; Soja 1971; Gonzales 1973). The LR model deals with decisions about the choice of location in space. It explains that social groups locate themselves in space such that they are either close together (clustered) or far apart (dispersed). The decision of human groups to locate in nearby areas is considered to constitute an indication of closer relationship. Members of the group or groups thus recognise that they are able to share the same geographical space without causing deviation from desired goals (Agorsah 1988b). The decision that results is a clustered distribution or positive rule. Conversely, when members of a group or groups are unable or unwilling to share the same space the result is a dispersed distribution or negative rule.

This model is particularly applicable to traditional societies that do not consider landscape as a <sup>commodity</sup> ~~commodity~~ that can be cut into pieces and sold as parcels. Land is seen in terms of social relationships (Bohannan 1971; Agorsah 1982, 1985, 1986; Gould 1968, 1969; Kuper 1972; Fletcher 1977; Klepper 1988). Although these relationships may change over time in any given situation, the structural and other cultural features such as houses, storage facilities, burial grounds, and other fixed structures become marks that remain in the archaeological record. On the ground one may recognise the formation of distinctive areas (clustered or dispersed) of features within the settlement. Mathematical (graph theoretical) rules governing social relations between individuals

or groups have also been used by Cartwright and Harary (1977) to discover that some non-obvious spatial features that result from a group's social relationships possess a certain spatial organisation. Their approach emphasises the fact that when social relations are balanced (on the basis of the theoretical rules) a group can be characterised as either a single homogeneous unit or two opposing units. This is equivalent to the positive and negative rules of the LR model. Cartwright and Harary's model implies that we should be able to take a sociogram and put all groups who "like one another," as seen by their relationship, into one group (positive local rule) and place all those who do not share common social resources into another (negative local rule).

As has been explained elsewhere (Agorsah 1988) the LR model places emphasis on social resources defined as the opportunities offered to individuals or groups and not the relationship per se. Lorraine and White (1977) describe such a situation as a system of binary relations in which social groups are viewed in a network of mutual role relations and sets of reciprocal expectations. Because such roles impose constraints on the behaviour of individuals or groups, there is a tendency for rules of spatial behaviour to be generated as a result. These considerations should be clearly expectable among societies (prehistoric ones included) which, as part of the natural environment, are intimately linked with the land. In such societies, to belong to a territory or place is a social concept which requires first and foremost belonging to a social unit. The northern Volta basin of Ghana provides useful data for further discussion of relationships between social and spatial factors discussed above.

### Test of the Model

#### *The data base*

The northern Volta basin of Ghana in West Africa is inhabited by several ethnic groups, the major ones being Gonja, Krachi, Nawuri, and Nchumuru. Some of these groups have been in the Volta basin since prehistoric times (Agorsah 1983, 1985a). They are identified today by the linguistic terms that refer to their individual sub-languages (Dakubu 1976; Hall 1983), but all these groups are considered to belong to one major linguistic group called the Guan (Fig. 1). Occupying the southeastern section is the Krachi group, which, oral tradition says, originated from present Akwapim areas of southern Ghana (Kumah 1964) and share the tradition of the great god and oracle *Lente*, now known by the corrupted name *Dente*, with the Nchumuru presently located to the north

and west of the Krachi. The Nchumuru, located in three administrative districts, are also said to have migrated from southern Ghana to their present locations along the banks of the Volta and the Daka rivers (Brukum 1979). The Gonja occupy areas to the north and the west of the Nchumuru. Oral tradition (Brammah and Goody 1967) supported by Arabic documents (Johnson 1965) indicates that they have a long-standing cultural connection with the Mande-speaking country of the Sahel regions of West Africa. The Nawuri, the smallest of the four groups, occupy the area to the north-west of the Nchumuru and also probably migrated from Mande country (Daaku 1969; Kumah 1964).

Archaeological and ethnological evidence indicate that the northern Volta basin constituted a significant catchment area for the ancestors of these four and other (West African) ethnic groups which inhabit the basin and adjoining areas today.

Geographically, the northern Volta basin, the area of this test, consists of shallow-water sediments that were deposited in the subsiding area of pre-Cambrian rocks (Wills 1962). The area is topographically uniform and the topsoil is generally red-brown, well drained, porous, and friable. Soil nutrients are concentrated in this top organic matter, which has little capacity to retain them. The deeper soil over the Voltaian sandstone is admirably suited to the production of yams (*Dioscorea* sp.), guinea corn (*Sorghum guineense*), millet (*Pennisetum cenerum*) and cassava (*Manihot utilissima*). The distribution of these crops is quite uniform northward until the drier (more northern) country is encountered. The uniform topography is cut through by the dense drainage pattern consisting of the Volta, Sene, Oti, and Daka rivers. Because of the seasonal nature of the rainfall, some of the stream beds of this seemingly dense drainage system are dry in the dry season and flood in the wet season. Also, water loss is quite high and is worsened by surface run-off during thunderstorms or rainstorms, which occur in June–July and reach a maximum in August–September. The two regimes of wet and dry seasons caused by the north-south movement of the Intertropical Convergence Zone (ITCZ) has created a remarkable east-west bonding of climate and vegetation zones, which grade from the coast of Ghana with increasing latitude from thick equatorial and semi-deciduous forests to the savannah zone, where a greater portion of the northern Volta basin lies. Environmental and other studies (Asibey 1969, Wills 1962) indicate an irretrievable decline in wildlife population since prehistoric times. Squire (1962) has recorded 186 species of mammals in the geographic area, 52 of which are known to be

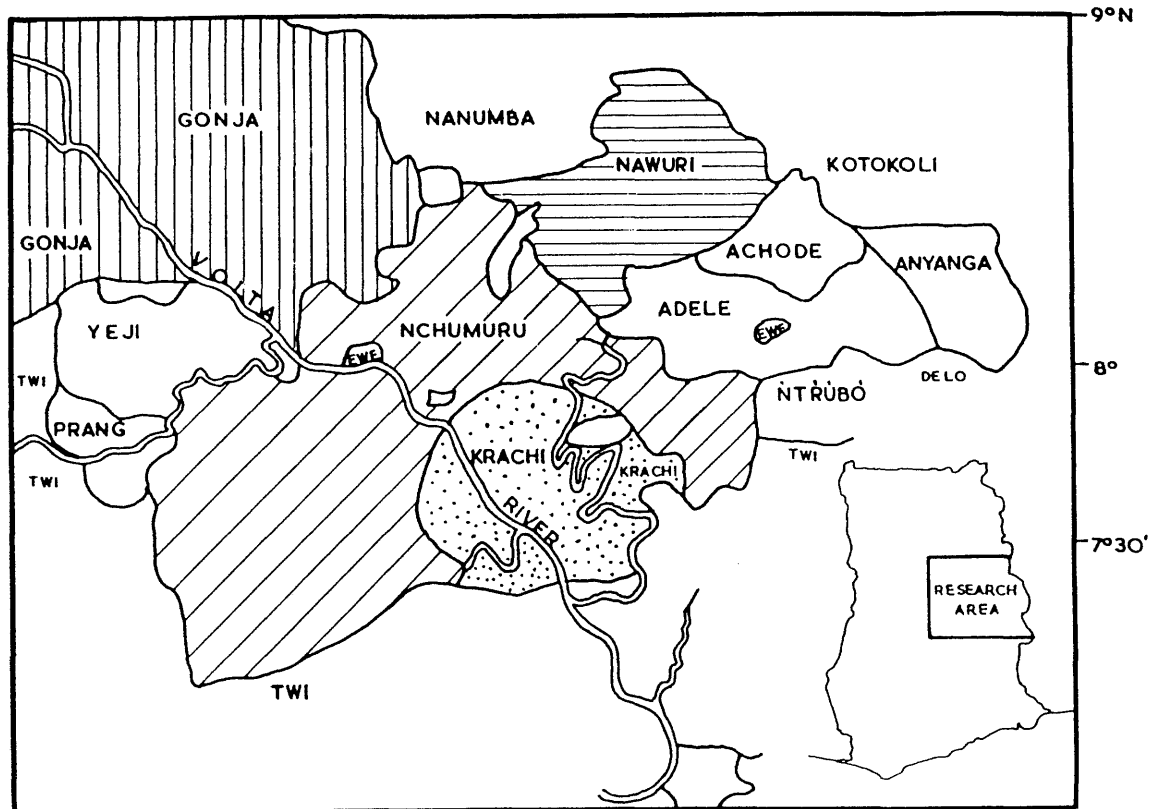


Fig. 1. Distribution of ethnic groups in the northern Volta basin of Ghana.

confined to the area of this study. Adiasé (1969) also confirms relatively abundant aquatic resources in the Volta basin, most of them edible. Overall, plant and animal foods are abundant although sustainable yields, both wild and domesticated, are unpredictable.

*Spatial pattern development*

In his discussions of regional analysis in archaeology, Johnson (1977) clearly stated that a model that systematically analyses the interaction of human groups should consider such variables as the size and the nature of the groups engaged in the interaction, the nature of that interaction, and the physical space over which that interaction occurs. It may be added that in such an analysis one also needs to look at the level of interaction as well as the social resources as defined in this chapter. Obviously, the LR will not be the same at both the regional and the individual settlement levels. Analysis of settlement pattern development in the northern Volta basin of Ghana (Agorsah 1988a) indicates that the rule at the

regional level tends to be less positive than at the level of the individual settlement. It means also that one is likely to find different degrees of the rule, be it positive or negative, at different levels. The section which follows will serve to demonstrate the dynamics of the social factor in the spatial pattern development of settlements at:

- (a) the regional level,
- (b) the individual settlement level, and
- (c) the individual structural feature level (e.g., compound).

*Regional Spatial Pattern Development*

Archaeological and linguistic evidence (Davies 1967, 1971; Andah 1979; Dakubu 1982; Hall 1983; Painter 1966) indicate that settlement in the northern Volta basin could date back several millennia to the Stone Age. The first wave of settlers probably occurred within the confluence of the White and Black Volta. Archaeological survey of the area has revealed several sites with surface material attributed to the Early and Middle Stone Ages. The main artifacts

include rolled pebble tools (choppers?), quartz pebbles, and broken Acheulean handaxes (Davies 1967, 1970). Although microlithic and Sangoan cultural material from various sites outside but adjacent to the basin has been recovered, suggesting a date around 50,000 years ago, we cannot generalize and use this as conclusive evidence for the presence of these same early cultural traditions in the basin. However, available evidence indicates that at least 4,000 years ago, and probably earlier, some parts of the Volta basin were inhabited by early food-producing people, although the extent of occupation cannot be definitely determined (Flight 1967; Danes 1970, 1971; Stahl 1985; Agorsah 1976; York and Calvo-coressi 1967). The evidence of increase in the number of settlements in the basin is not complemented by adequate chronological data that can be used to demonstrate the actual sequence of the growth of the individual settlements.

The location and distribution of the settlements indicate that many of the early ones in the northern Volta basin developed in valleys, flood plains, fans, confluences, and pediments with soil that receive periodic alluvial deposits (Agorsah 1988a). The streams, springs, and seepage of groundwater probably provided water for permanent settlements in a savannah country with inconsistent rainfall (Wills 1962). The preferred areas were those overlooking valleys (Dombrowski 1976). Evidence has been adduced that points to a second wave of movement of groups into the Volta basin in the early part of the second millennium A.D., which coincides with the familiarity of people with the use of metal, an event which seems to have speeded up the pace of population movements. The two waves of movement of people and settlement in the basin have been discussed in greater detail elsewhere (Agorsah 1988a), which clearly supports the view that early settlement of the basin was environmentally and culturally determined.

Identification of the social factor in the location and the distribution of settlement in prehistoric Volta basin is important but clearly an arduous task. The question is, which social groups settled where in the basin? Linguistic evidence has been a great complementary source to archaeological evidence in African archaeology (Ehret and Posnansky 1982), and this has been useful to some extent in identifying generally the groups which still occupy most of the northern Volta basin. The languages by which we identify the ethnic groups are known to belong to the Niger-Congo linguistic family whose diversification in the area has been dated back some 10–12 millennia (Painter 1966). In the Volta basin specifically, the

major languages identified belong to what is known as the Volta-Comoe (Dakubu 1982) which includes Akan, Bia, and Guan, the last one being the most widespread in the Volta basin. The linguistic speculations on the movement and settlement of the Guan group in the Volta basin (Dakubu 1982; Painter 1966; Steward 1960) extend into the Stone Age and indicate gradual increase in the occupation of the basin over time. It is therefore assumed that the present Guan-speakers are the same people who have occupied the basin since prehistoric times, which were the groups that developed the social system that we observe in the area today.

Using their present distribution on the basis of the above (Fig. 1), it appears that the social groupings as they are today generated the spatial distribution that we observe today. One important conclusion of the study of the settlement history of the basin was that cultural and historical variables, land shortages and restrictions, as well as clan attachments may have defined the aggregation of people and thus the production of small scale segmentary societies, and then of larger societies. The social structure in prehistoric times may, also, have been a function of ecology. This does not seem necessarily to apply to later developments, particularly at the single settlement level. Although not directly related to the Volta basin, Mills (1985) has derived a similar generalisation from his study of social structure and function of settlement space in northern Namibia. Mills' study gives important consideration to the "social" as a crucial factor in determining the dynamics of spatial patterning of Ovambo settlements.

#### *Spatial Patterning at the Individual Settlement Level*

The first test of the LR model of spatial behaviour was conducted in relation to the archaeological evidence of the origins and the development of traditional settlements in the Volta basin of Ghana. The ethnographic data relates to the Nchumuru ethnic group. Each Nchumuru settlement in the Volta basin belongs to one of its major groupings or phratries: Banda, Chachai, Nchenke, Kpentanai, or Sunwiae. These groupings are traditionally referred to as *nsuro* (*Kasuro*, sing.), each with a male head, its own ancestral shrine, secrets, properties, and relationships with other villages and adjoining areas. Inheritance is by a homogeneous transmission either male or female to the next oldest in the *kabuno* (clan). There are five *mbuno* (Brenaise, Dapoeta, Kpenwiae, Ntrapo, and Tariaso) in the head village of the Banda phratry called Wiae, discussed later below and which is the



paramount village of the whole Nchumuru ethnic group. Recognition as an Nchumuru is determined by *kabuno* membership, which consists not only of the living, but also and primarily the ancestors. Consequently, the ancestral shrine of the *kabuno* is the controlling factor within the *kabuno* and traditionally should be located in the *kabuno* head house or compound. In addition, in Nchumuru society as it is with other West African societies such as the Krachi (Agorsah 1986), the Brong (Posnansky 1971, 1976), the Yaluka of Sierra Leone (Decorse 1988), and the Tiv (Bohannon 1971), the builder of the environment is the user and at the same time he is the one who maintains it. Social connections, therefore play a vital role in spatial behaviour. One very basic fact about many traditional societies (including prehistoric ones) is that spatial behaviour is not merely a technological problem, but principally one of social relation-

ship, the main goal being the practical adherence to cultural values. This assertion is supported by studies carried out by Mhlanga (1976), Prussin (1969), Mills (1985), Sinclair (1987), and Beattie (1960).

Nchumuru occupation of their present area (the Banda-Wiae area) has been reconstructed into four phases (Agorsah 1983, 1985b, 1988a and b). Each phase is characterised by social and spatial adjustments that have been identified through a study of the location of settlements and changes in house location within settlement. As has been remarked, the development of settlements in the northern Volta basin has been seen as clearly influenced by the social systems of the societies. The case of Wiae settlement succinctly demonstrates this assertion. Archaeological and ethnographic evidence has been used to identify the clan (*kabuno*) areas at Old Wiae (Agorsah 1983; Fig. 2).

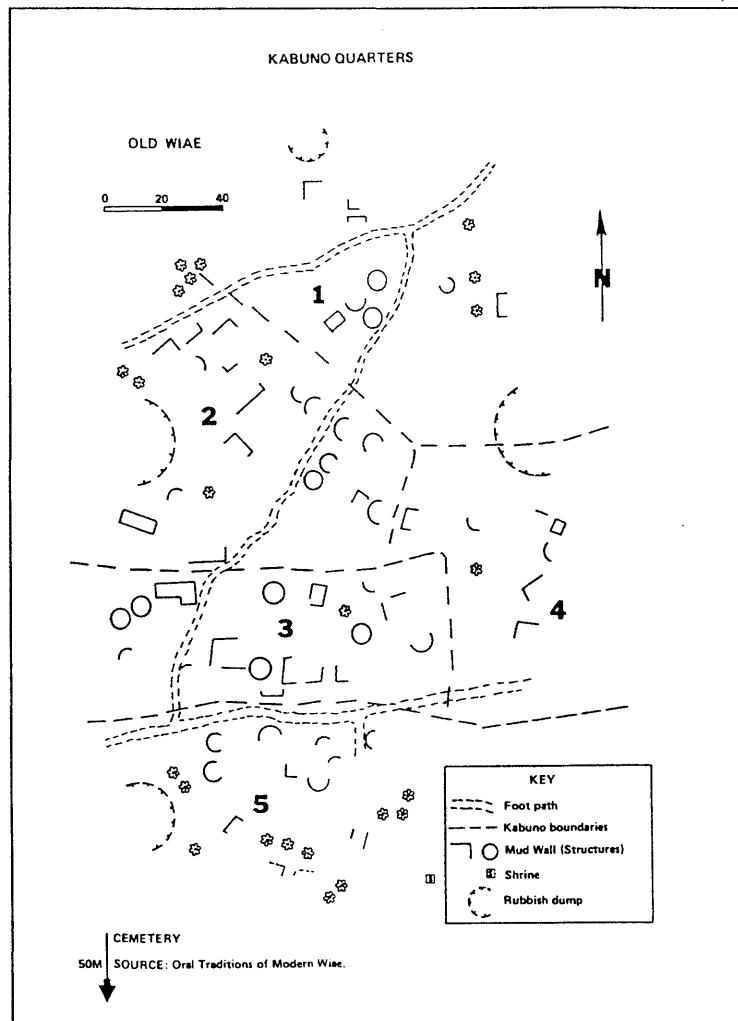


Fig. 2. Boundaries of *kabuno* (clan) quarters at Old Wiae, Ghana. 1=Kpenwiae, 2=Ntrapo, 3=Tarieso, 4=Breniase, 5=Dapoeta.

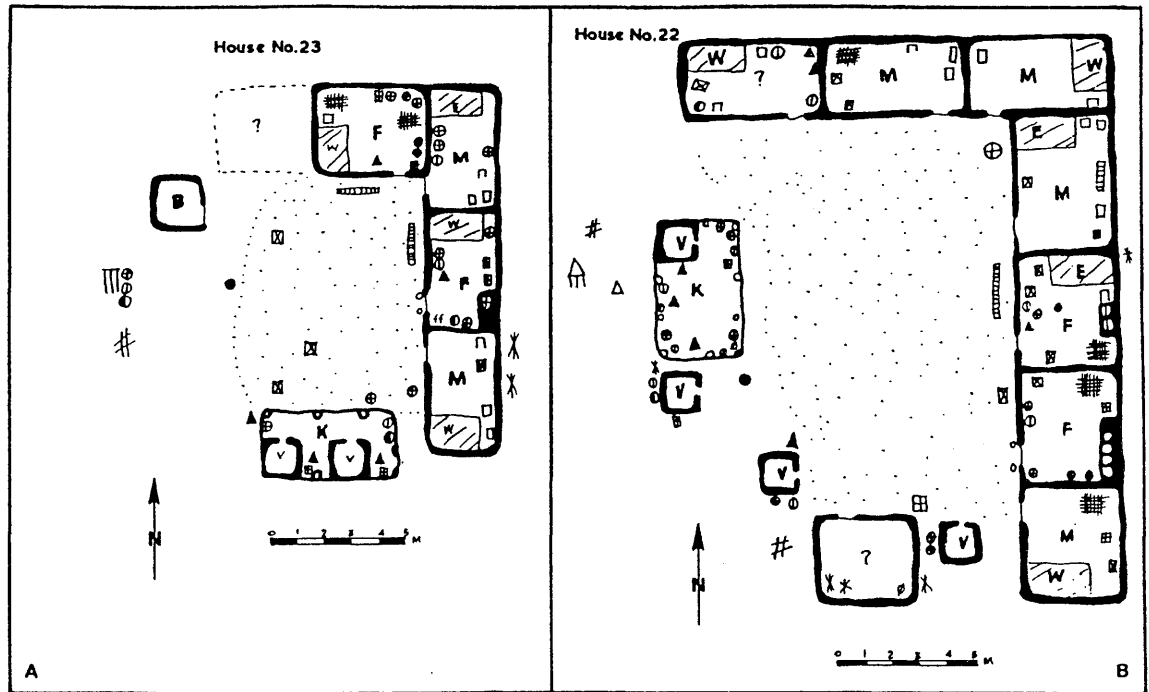


Fig. 3. Location and distribution of structural features and objects in houses with *kabuno* shrines.

The importance of keeping the *kabuno* system intact at Old Wiae is also indicated by the presence of *kabuno* shrines at central locations in the compounds as keepers of the clan spirit (Fig. 3), which has also been noted elsewhere (Kuper 1972). Also we recognize that courtyards of compounds open into each other to maintain *kabuno* connections. These patterns of spatial distribution were carried forward into New Wiae, which in 1972 showed signs of the tendency which ten years later, in 1981, became clearly manifested.

Figures 4 through 6 represent a breakdown of the distribution. Ethnographic evidence from Wiae suggests that a change in social relationships among *kabuno* groups would certainly effect changes in future distribution of *kabuno* compounds. However, over the four hundred years of its existence, the Nchumuru village of Wiae seems to have maintained the spatial features of the settlement in the same conservative fashion that social relationships have been maintained. The Nchumuru example at Wiae also indicates that the effect of the social system on the spatial pattern depends on the strength of the relationship involved, although the nature of the relationship appears to be more crucial. The socio-spatial dynamics among the Nchumuru are also demonstrated when we analyse the development and

placement of individual structural features within the settlement.

#### *Settlement Patterning at the Individual Feature Level*

The history of the growth of individual houses or compounds in the Nchumuru village of Wiae also provides data that gives strong support to the importance of socio-spatial dynamics in the study of past human behaviour (Agorsah 1985a and b, 1986a and b). The tracing of the growth of individual houses not only provides us with a history of the structural development of the basic units of the settlement, but also the adjustment through which the basic social unit of the society (the family) was going. The examples of houses 1, 51A, and 10 provided below constitute the true pattern of the development of house structures (Figs. 7-9; Agorsah 1983, 1986b).

Fundamentally, the physical development of the house or the compound in Wiae seems to entail more than satisfying purely functional requirements, e.g. the form of the house is consciously conceived (designed) and realized (built) in response to an existing set of conditions accepted by the people as a social group. It is the social factor that provides the continuity between Old and New Wiae house forms, and

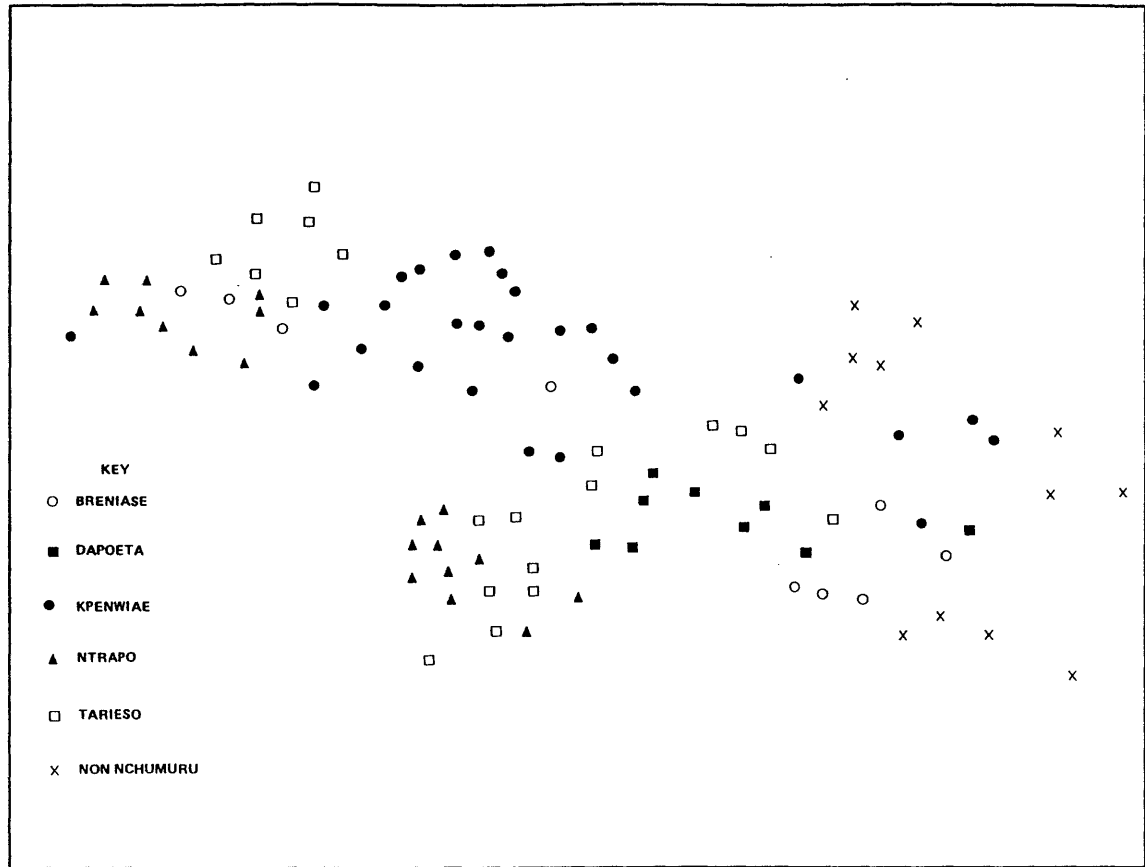


Fig. 4. Summary of the distribution of *kabuno* (clan) houses at New Wiae, Northern Ghana.

their orientation toward *kabuno* kinsfolk as social custom required is a clear illustration of how spatial order was taking form to satisfy social requirements (Figs. 7– 9, Table 1). The socio-spatial relationship shows how the pattern of the building, its maintenance, constraints, and also the patterns of daily life and demography are all fused in the form, thus giving it dual coherence: social and physical (Agorsah 1986b). A closer study of the various parts of the individual house among the Nchumuru (the rooms, courtyard, back yard, kitchen, and similar divisions of the house) also show how all these parts of the individual house and other houses are linked to one another. The connectivity pattern (*connectivity* here meaning the degree of accessibility between houses) is also emphasized by the network of footpaths which accommodate the criss-cross movements among relatives in different compounds and also give access to the main paths leading out of the settlements to the streams, shrines, farms, and other areas.

An interesting aspect of the growth of house form

Table 1. Development of houses: characteristics of households.

House No.	1	51A	10
Location	620M20	900N10	620M20
Kabuno Head	Kpenwiae Asofoakye Asabese	Tarieso Abena Bruku	Tarieso Kwasi Kyere
No. of Rooms	8	4	8
No. of Inhabitants			
Adult (M/F)	2/2	0/1	3/5
Other (M/F)	1/3	2/4	4/1

is the data it provides for explaining social transformation, which has been a major concern of scholars in recent years in the context of spatial configurations (Agorsah 1983 b and c, 1988a and b; Webb 1985; Goody 1973, 1975; Tait 1961; Decorse 1988; Holl 1987; Zubrow 1978; Black 1978; Hodder 1977; Clarke 1972;

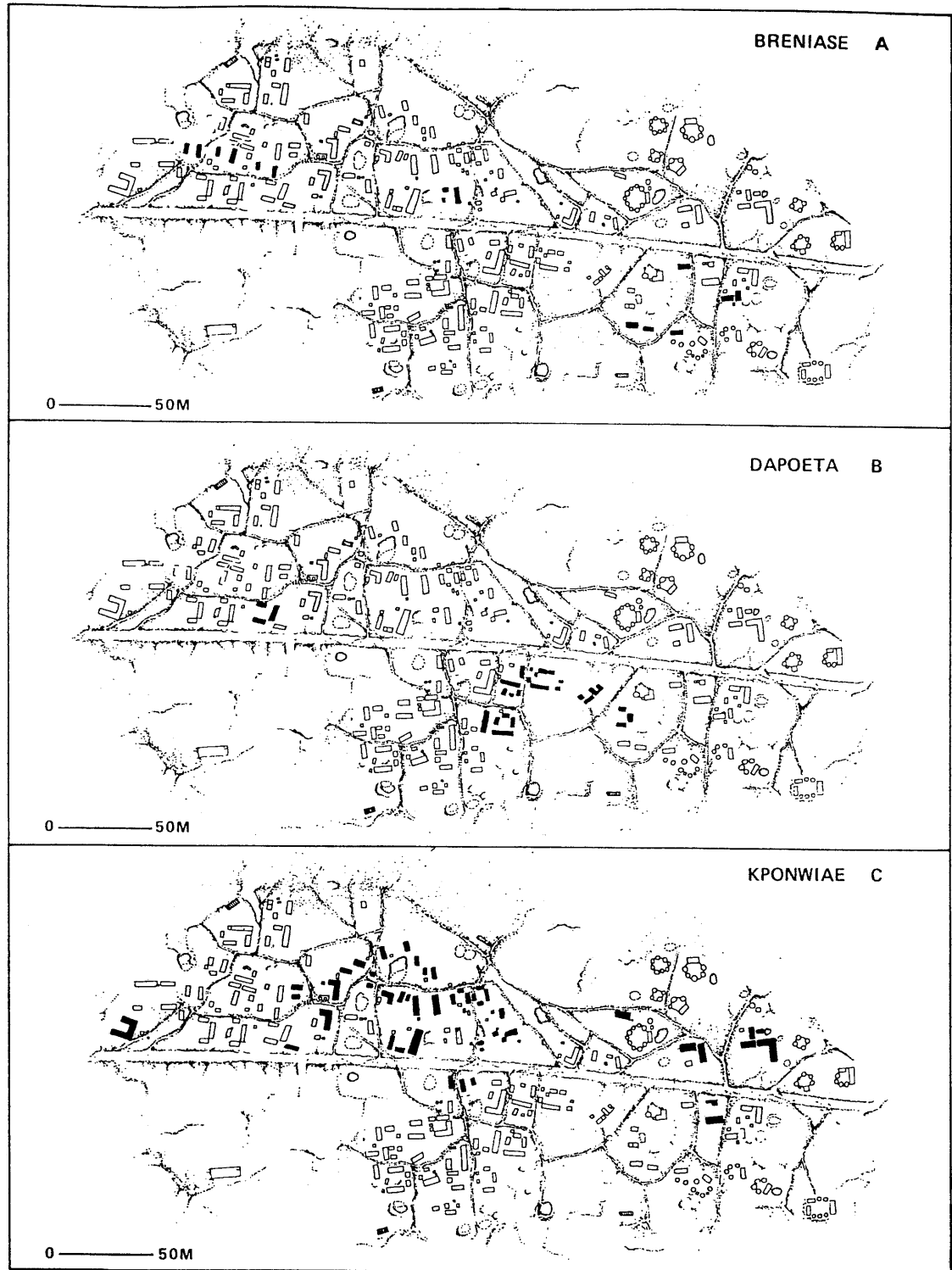


Fig. 5. Distribution of *kabuno* houses at New Wiae.

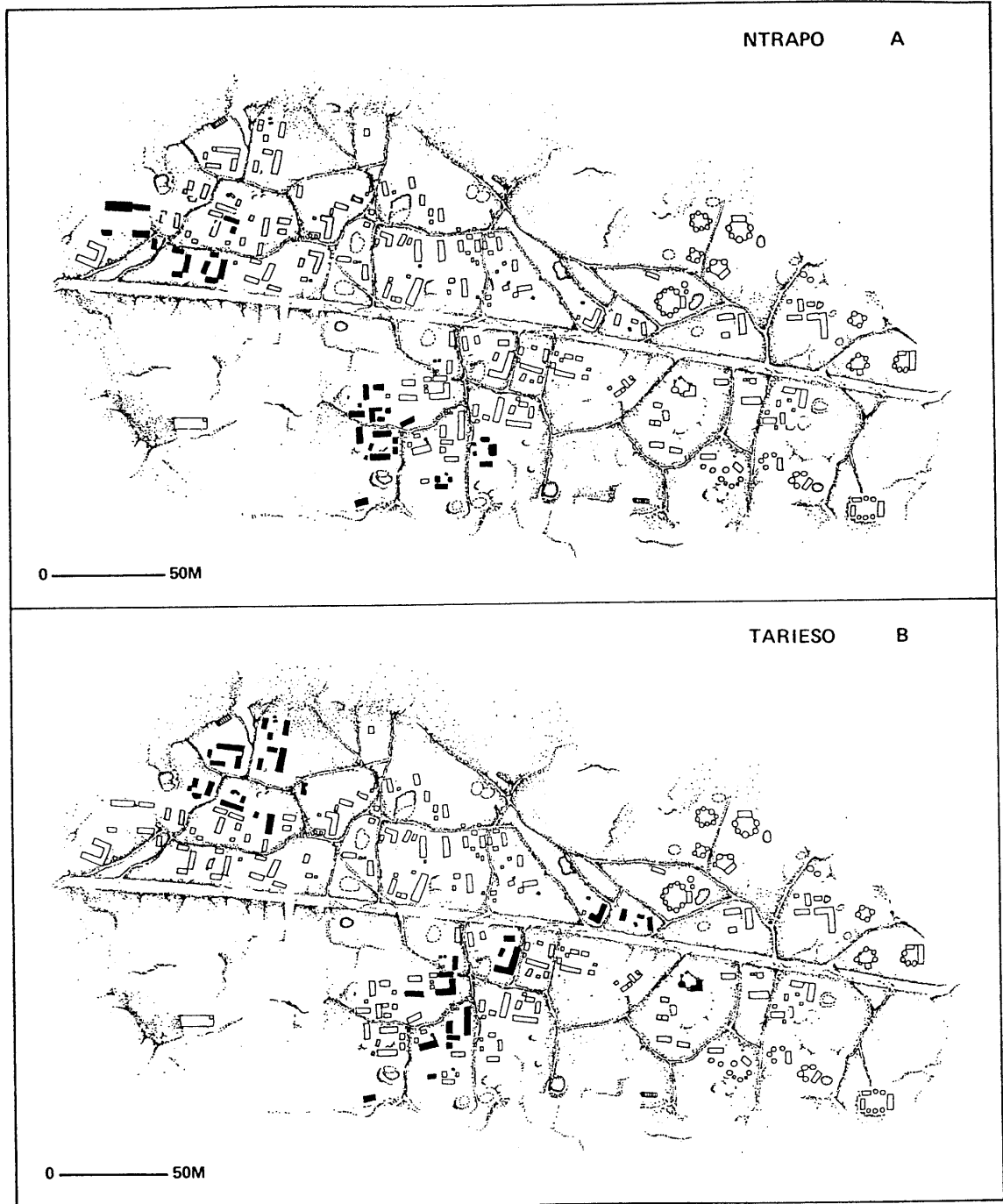


Fig. 6. Distribution of *kabuno* houses at New Wiae.

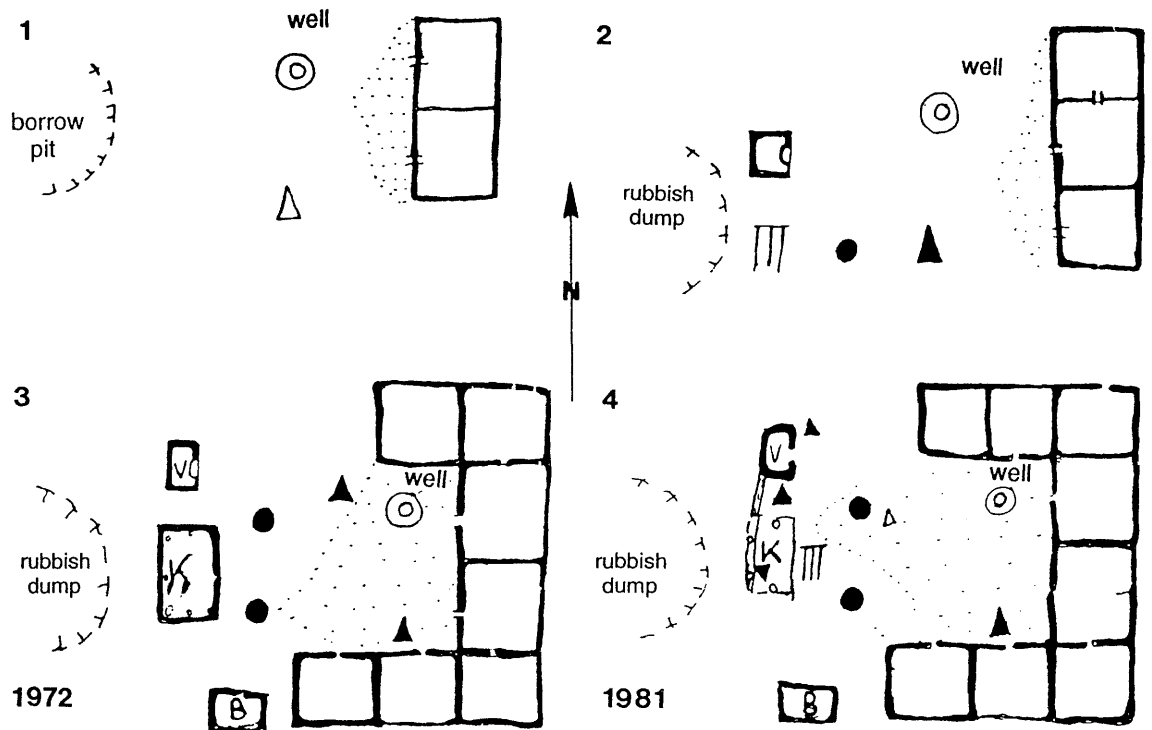


Fig. 7. Development of the house at New Wiae: house 1.

Haggett 1965; Soja 1971; Leach 1978; Hillier et al. 1978). It is not taken for granted that because of the close relationship between the social and spatial factors in human behaviour we should close our eyes to other factors that may at certain points in time exert effective influence on social transformations and which may not be reflected in the data available to the archaeologist. The point being made here is that the social factor cannot be ignored under any circumstance. Studies among the Tiv (Andah 1982), the Mossi of Burkina Faso (Skinner 1960, 1964), the Larteh of Ghana (Brokensha 1966), the Yalunka of Sierra Leone (Decorse 1988), the Akan (Fortes 1970), the Konkomba of northern Ghana (Tait 1961; Fletcher 1972), and among several other societies of West Africa clearly give support to the close interrelationships between the social organisation of these societies not only for purposeful and shared opportunity but also in the placement of structural features within the environments which they occupy at any time. Clan affiliations of these societies need special mention.

### Discussion

Most important in the development of the clan (*kabuno*) areas at Old Wiae has been the recurring

patterns of aggregation of *kabuno* members in the settlement. Once people became familiar with these patterns of behaviour, they tend to respond to them in terms of the shared opportunities that they offer. The more the shared opportunities gain root, the more positive the rule of cluster. The settlement history and the distribution of features within Old Wiae settlement clearly show that the Local Rule that operated was positive, and this seems to have carried on to New Wiae, even after it was burnt down by fire. The continuity of the pattern at New Wiae gives strong support to the overriding significance of affiliations in the location of family groups and their associated activities and cultural features. Figure 3 represents the distribution of clan compounds or houses at New Wiae in 1972 and 1981. The breakdown of this is represented by Figures 4 and 5, indicating the compounds belonging to specific *kabuno* in the whole settlement. Although the form of settlement is different from that of Old Wiae, the congregation of *kabuno* members provides evidence for continuity. Clearly, the *kabuno* system of the Nchumuru has significant effects on spatial colonisation. It defines locational regularities rather than being constrained by those regularities. At the level of Nchumuru community behaviour, the spatial development of the settlement

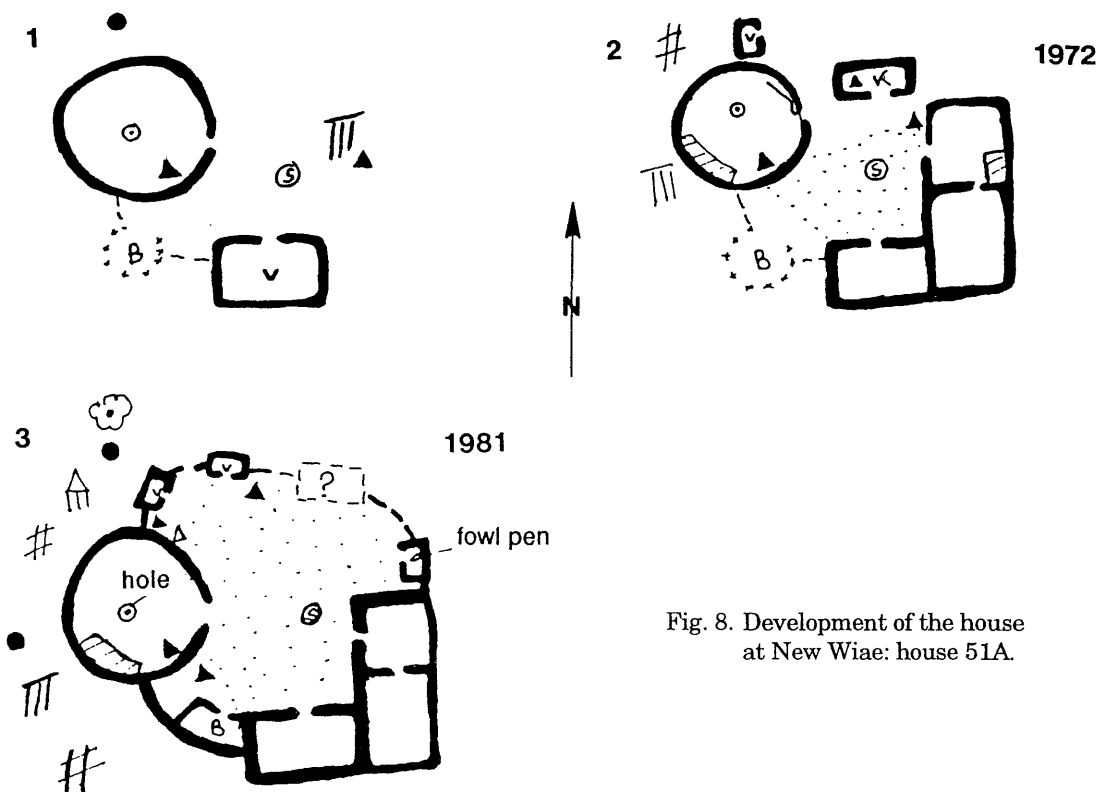


Fig. 8. Development of the house at New Wiaie: house 51A.

of Wiaie has been considered in relation to the spatial framework in which they had previously lived, perhaps since prehistoric times, as well as in terms of all practical factors that influenced their decisions as to where to locate their family groups in order to maintain the shared opportunities available to them. The speculation made before the test of the model with archaeological evidence was that, since the Nchumuru perception of the location of the *kabuno* houses was repetitious and carried through time, the development of any Nchumuru settlement would, theoretically, assume the pattern observed at New Wiaie. The correlation between spatial configuration and social structure may in some cases be obvious, and in others it may be extremely difficult to discover. But this study demonstrates that Nchumuru spatial configurations reflect not only the true, unconscious organization, but a model existing consciously in their traditional mind, although its nature may be illusory and even contradictory in reality. Herein lies the relationship between social and spatial dynamics.

The patterns that often result from such interaction have been explained by Hillier and his colleagues (1978) by their space syntax theory in terms that

demonstrate that there is a means of producing an overall differentiation in the man-made landscape without a clear idea of the limits of the settlement that a society occupies. I have explained elsewhere (Agorsah 1985) why it is easy to make strong arguments against the proposition that the cultural process which produced a pattern of settlement can be inferred from spatial form. The case of New Wiaie is an obvious indication that this has some support in the realm of human behaviour, the basis of which is the *kabuno* system in this case. But the discussion also indicates that the social process which produced a spatial pattern may not necessarily be spatial in character, because generally different processes may give rise to similar patterns. Even societies that are similar in many respects could generate different patterns of settlement as a result of relatively basic differences between them, making it difficult to recognise differences in patterning. These difficulties are due to the individual as well as the combined dynamic nature of the social and spatial factors in the formation of patterns. The discussion of this chapter clearly, therefore, supports the assertion made by Mills (1985) in his study of the Ovambo concept of

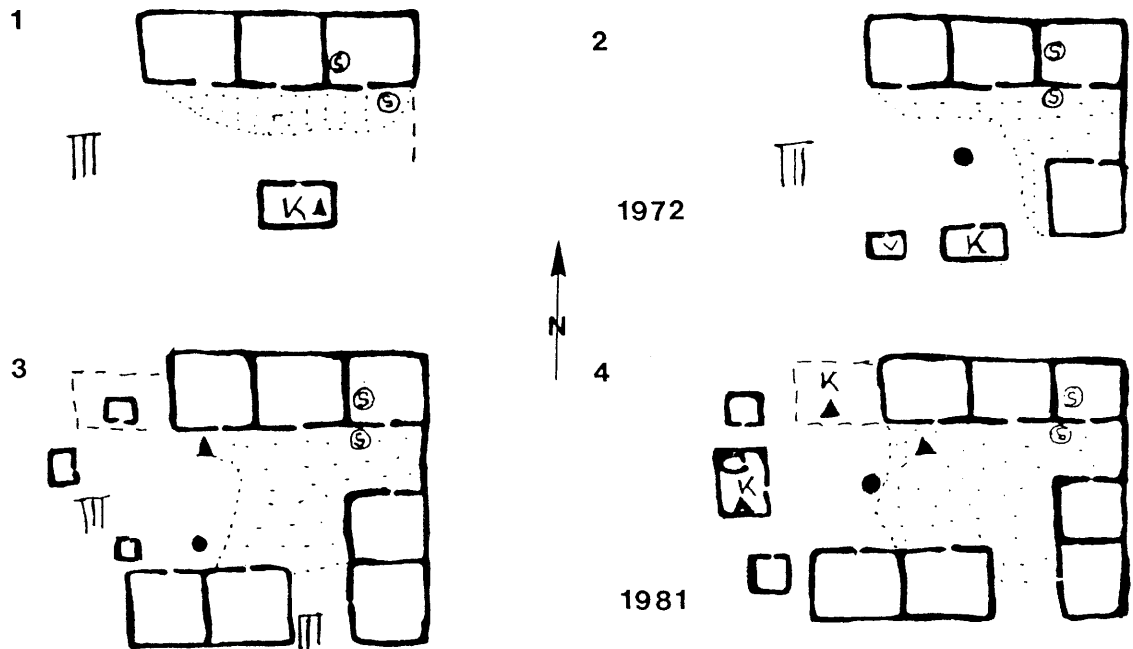


Fig. 9. Development of the house at New Wiae: house 10.

space that "in order to understand settlements, it is necessary to analyse their forms in relation to the social patterns that generate them, not only at the level of their appearance or what they look like, but more importantly in what they are as physical organization of society." The use of such models as the LR model of spatial behaviour should provide useful means towards the realization of this goal.

Studies that deal with the growth or development of individual features in settlements such as compounds or houses are very few and far between. Unfortunately, this is one of the areas of study where the true relationships between social and spatial dynamics can be observed. The importance of the use of evidence related to socio-spatial relationships has been demonstrated in the study of the development of the Nchumuru compound (Agorsah 1983). By use of ethnographic data, family history, and demography in the village of New Wiae, an attempt has been made to discover regularities, if any, of development of the compounds and to find out how they relate to the Nchumuru social system. The question here is: to what extent is the house form determined by the *kabuno* or family system of the Nchumuru?

### Concluding Remarks

Human spatial behaviour is strongly dependent on an individual society's cognition of its environ-

ment and experiences over time, which are defined by a convenient set of symbols (in the case of the Nchumuru, the pattern of the placement of structural features in their settlement). As Downs and Stea (1973) have pointed out from their own studies, these elements of definition are influenced by the society's cultural and social environment. Among the Nchumuru the demographic development of the household (Figs. 6 and 7) is linked more to family structure and social values than the size of the compound. For example, some of the houses, despite their bigger sizes, have far fewer inhabitants than smaller ones (Agorsah 1983). It is difficult to explain such a discrepancy if one has to rely on demographic factors only. When Zubrow (1975) proposed a model for population growth and settlement and the procedure for simulating them, his data appeared quite attractive, but so far it could not be a working tool for adequately explaining the dynamic relationships between social and other factors and for the explanation of spatial growth. Such a model cannot deal with a society in which the builder is the one who takes the locational decision and the one who, on the basis of his social relationships, maintains not only his social position but the continuity of his ancestry in his society. Zubrow's model defines four components such as a population resource check, settlement location, and a longevity function (Hodder 1978). These obviously do not take into account the social structure, which



more than anything else determines the dynamics of spatial patterning.

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