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God's Heart is a Hexagon or Some Reasons for Regularity in Settled Regions

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OR
SOME REASONS FOR REGULARITY IN SETTLED REGIONS

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Two days before the conference convened, I was asked to speak about my views on archaeology in the Northeast. This was not so great an imposition as it may seem - there are some very healthy currents in the archaeological work being done in this area, as several papers presented at the opening sessions demonstrated. My problem was simply to find a lattice - an arbor in the absence of Speth - upon which to let my thoughts grow. And that solution to the problem, too, came easily in this central place where spatial order and social geography intersect. In my oral presentation, I did not elaborate formal theory nor appeal to a great body of data; the conference seemed a place to speak on a different, but no less fundamental and valid, level of understanding.   I offered a pair of parables and a moral suggested by my observations in the role of a recent immigrant to the North End of Boston; I freely transpose them here with a few elaborations.

On my way to the conference, I stopped, as often before, to look at the frozen parts of Boston Inner Harbor and to count the number of neighbors surrounding the polygons created by stress-induced cracking of the sea ice. When the water surface first congeals, it responds flexibly to ocean swells and the wakes of ships, but after it hardens, stresses must be relieved by breaking up the ice mass. This results in the formation of polygons with edges. As usual, there were approximately six sides per polygon. (Actually, in processual terms the picture is more complex. Initially, under the influence of sun and tides and waves, the ice breaks in very large sections that approximate quadrilaterals, but

under continuing stress, these devolve into an irregular hexagonal lattice in a matter of days.) I was, of course, intrigued and delighted to watch this spatial process in action. Other results of the process are well known: tundra polygons, snowflakes, many crystals are examples. In addition, I and numbers of my students have counted the sides developed by polygons in cracked pavements, the shells of hard-boiled eggs crushed for peeling, the crazing on two Korean celadon plates, and a number of social phenomena which I will mention later. All approached six in number on average.

I have watched a homologous, but less obvious, process taking place in the North End. (I was stimulated to make these observations as a result of a conversation with my landlord, James Mooney (yes, I have asked if he is related to Ghost Dance James Mooney, but it seems not.))

A brief historical sketch is necessary before these observations are recounted. The North End is the oldest part of Boston and has undergone a number of changes. One of these took place in the latter part of the 19th century when a burgeoning textile manufactory and its attendant shipping services were superimposed on the area. The nouveau riche owners and managers of these commercial activities moved to the Back Bay and the South End. Italian immigrants took over their residential but not their status positions. Since that time, the area has remained an Italian enclave. Latterly, in this decade, a new breed of nouveau riche (and a few unreconstructed true believers in urban values, such as me) have taken advantage of the long neglect of the area to find housing that is either prestigeful (the n.r. , in renovated condominiums) or "integrated" into the community (the u.t.b.).

Services have naturally followed in the wake of these migrants. (Notice that the emigrants need not be settlers. It is enough that the role positions of occupant and consumer (represented by apartment slots) be filled; as far as services are concerned, individuals may - and do - come and go at will.) A strong node has been built outside our area of concern: the reconstructed Quincy Market shares most of the delightful and distressing qualities of fairyland. It is, however, isolated by highways and high rise offices and is consequently, although nearby, a place to which one travels, not a part of daily routines.

But laundries are parts of daily routines (or of some routine with regular periodicity). New laundries are joining the old in the North End. The angular separations between them (according to my crude plots) tend to be 120 degrees; thus, their locations conform to the tenets of geometrical packing theory.

What can be made of these observations? There are, of course, skeptics among anthropologists (both of archaeological subset and of others) who find no validity to the findings of spatial analysis. I think it is time that this skepticism be laid to rest and the meaning of regularities in spatial distribution be given attention. I believe that adequate grounds for doing so are available.

Let us recall some of the salient literature. Christaller (1933; Baskin 1966) assumed a hexagonal hierarchy for market regions in southern Germany; Lösch (1940) developed a proof for uniform plains. Hudson (1969) integrated Löschian spatial theory (which emphasizes form) with Hägerstrands's (1953) and Bylund's (1956) diffusion models (which emphasize process). Hudson demonstrated that settlements in Iowa from 1870 to 1960 did become more regular over time and conform to the basic tenets of the earlier models. Note that this happened in spite of the superimposition of the USGS quadratic survey system upon the map of Iowa. Olsson (1968) applied the same theory to historical data from northern Sweden with the same result. Dacey (1966) demonstrated that the homogeneity assumption can be relaxed and tested his model empirically on a sample of counties in the United States. Olsson (1971) observes that the process is ecological and analogous to complicated birth and death interdependencies rather than to simple spatial reshuffling of locations. Pred (1967, 1969) has formulated a model which incorporates intervening variables for imitative behavior and information flow into the realm of investigation. In biology, D'Arcy Thompson (1942) synthesized in an appealing manner the then current knowledge about the occurrence of hexagonal networks in nature. Since his time, that knowledge has proliferated (see especially the continuing series in the U.S. Geological Survey Professional Papers and references in Woldenberg cited below).

After I spoke, Jim Moore introduced me to the work of Woldenberg who has developed a topological proof that three-edged corners must be overwhelmingly predominant in nature and thus that the average number sides of polygons in geographical networks tends to approach six, as the network grows while remaining fairly compact (Woldenberg 1972: 340-341). He synthesizes many studies of fluvial basins and of pulmonary artery and airway systems. Clearly, in nature, god's heart is a hexagon.

Now what are the implications for archaeological studies? We are told in many languages and ideologies that man - and woman - is either made in god's image or is, in fact god. Anybody from zu to the USA can tell you that. The works cited above suggest that, at heart, this may be so. As far as they distribute themselves, humans appear to conform to nature. Even when they are close to Nature: Birdsell (1958) documents hexagonal packing for Australian Aborigine groups as do Stewart (1966) and Kelly (1934) for Paiute and Wobst (1974) for Algonkians. I have used Kroeber's map (Kroeber 1939) to demonstrate that contiguous neighbors of native North American groups tended overwhelmingly to be six in number (Wilmsen 1973). The scanty evidence available suggests that there were, in the recent past, three convergent Bushmen territories at waterholes in the Kalahari; that is, space was organized on a three-cornered lattice. As packing density increases (due to external pressures) at these point-water sources (except privately registered boreholes), the same principle appears to operate in the consequent subdivision of space.

We must assume that hexagonal hierarchies are the most likely climax form taken by human activities with distribution in time and space. This conclusion carries profound implications for our studies. Woldenberg (1972: 349) concludes that the branching of fluvial systems is a function

of work and space requirements accomplished according to rules of mixed hexagonal hierarchies. This is to say that observed phenomena are the temporary states of processes taking place within structural dimensions. We not only may, but must follow the same reasoning in the investigation of human behavior. The investigation of distributional hierarchies is one step but only a descriptive step in the pursuit of our goal to understand social phenomena. It is a powerful tool for archaeologists but of little more value than are tools for refining chronologies unless integrated with processual theory evolved from all branches of the study of human phenomena. There is a precedent for looking at the North End as I have done: the distributions of antique shops, of women's clothing and furniture stores and of film theaters, have all been considered in terms of community functions. Undoubtedly, many other instances could be brought to light. All of these illuminate the processes of social life with which we are supposed to be concerned.

The moral, if it is not yet clear: to look only upon the surface description of distributions is to make that looking trivial, to watch the surface undulate is to understand its character.

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