

Heterarchy and the Analysis of Complex Societies

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ABSTRACT

Archeologists' dissatisfaction with Service's band-tribe-chiefdom-state model of sociocultural complexity has resulted in the epistemological reexamination of hierarchy, the exploration of heterarchy, and the historical and contextual flux between them. This calculus of power relations within and between polities aids understanding of how power shifts occur and under what conditions various power distributions constitute stable and unstable configurations. Power relations, while predicated on systems of values, leave physical evidence when their importance is ranked and reranked by individuals, groups, and organizations as conditions change. The hierarchy-heterarchy relation offers a new approach to the study of agency, conflict, and cooperation.

I backed the Renault into the farm lane and switched off the motor. My palms were sweaty, and my stomach hurt. It was June of 1976, the second year we had excavated at Mont Dardon. This season we would begin the regional survey.

The lush Burgundian countryside, enchanting to my fieldcrew, had me terrorized. A grassy carpet hid every bit of ground except in gardens or where big Charolais cattle had worn it bare under trees or along paths. On the topographic sheets, a tangle of one-lane roads ended in ancient farmyards or disappeared in somber woodlands. I was parked at the edge of our first survey segment, carefully chosen back in Missouri. While it was 6 kilometers from our site on the map, it was thirty by car. Only part of this was due to the rolling topography. Indeed, the Celtic road connecting Dardon with the next hillfort slashed straight north, disregarding terrain, but the Roman and modern roads followed latticed faults and gentle slopes.

I had just published a critique of those settlement studies employing the Central Place model to chart state formation (Crumley 1976), arguing that the world archaeological record indicated not one but several distinct systems of settlement associated with the state. If this were so, there was reason to reject the necessary congruence of social and spatial hierarchies; new models were needed to explore the relation between sociopolitical organization

and settlement. My doctoral work had suggested that certain Celtic Iron Age polities were states but that their sociopolitical organization was distinctive in the diversity of sources of power (Crumley 1974, 1987c). I hypothesized that polities that administratively subsumed considerable environmental and cultural diversity could be used to formulate an alternative to strictly economic models of state formation.

Burgundy, in east-central France, provided a perfect venue: it was the Iron Age homeland of the Aedui, a Celtic polity with ties to Rome. Burgundy has always brokered West European trade because of its position between the Loire River and the Rhône-Saône river corridor; the region possesses heterogeneous physiography and an extensive, well-preserved, and culturally diverse archaeological and historical record. Three major climatic regimes meet in its skies; its geology includes facies of both marine and volcanic origin; land-use/land-cover is a colorful mosaic; and historical events have left marks both seen and unseen.

The sampling strategy we had devised was flexible and closely integrated with the rest of the project. Survey segments were chosen for the coincidence of cultural features, such as known Celtic roads and sites, and environmental zones and their ecotones. Preliminary research in the archeology, history, and ecology of late antique and medieval Burgundy led us to conclude that although politi-

cal, social, and economic circumstances changed markedly, many features of the landscape remained in use through several periods or disappeared and reappeared.

For better or worse, I had gotten exactly what I wanted. The complexity and rich history of the Burgundian landscape could help us identify both enduring and ephemeral elements and forge a less mechanical, more-historical interpretive frame. I eased the car out from under the trees and drove back to the crew. We would let Burgundy teach us.

CONCEPTS

Our first lessons were about *scale*. I used scale to indicate the *grain* of the unit of analysis relative to the whole matrix. Every day the survey crew argued during lunch about what was to be termed a site. I stayed out of the discussion but insisted that we pick up everything, including plastic soldiers and nineteenth century crockery.

Soon it became clear that artifact density and distribution did vary markedly between and within survey segments. To interpret these data, sites and other places where activity occurred and the boundaries themselves were analyzed at several different spatial scales (Marquardt 1977, 1985; Crumley 1976:67). Temporal and functional changes in the intensity of activity between highland and lowland, around passes, and at river fords offered clues to the fluctuating roles of commerce, defense, and cultural preference (Crumley et al. 1987). Our temporal frameworks also underwent renovation. It was simply not possible to focus on changes in settlement and land use around the time of the Roman conquest of Gaul (58 BC) without knowledge of elements that characterized earlier *and* subsequent landscapes. Matching the long chronology of Mont Dardon to the project as a whole, we expanded our research to include the entire Iron Age, the medieval period, and contemporary Burgundy.

Finally, we realized that in registering human decisions (e.g., where and how to build, what to husband), the landscape mapped changes in the perceptions of individuals, groups, and entire societies. Most challenging, however, was our realization that in our own problem-setting choices we reflected individual and cultural histories. To the extent we are able to identify either our own biases or those of peoples long dead, such perspectives constitute an important focus of analysis. We employ the concept of *effective scale*, the scale at which pattern is

recognized and meaning inferred, to chart temporal, spatial, and cognitive differences and to critique our own and others' work (Crumley 1979:164-65, 1987c:420; Marquardt 1985:176; Marquardt and Crumley 1987:2,16; Oaks 1987:301; Crumley and Marquardt 1987:614).

Our period-by-period investigation of factors influencing settlement and land use has produced a maze of boundaries—social, linguistic, topographic, climatic, administrative, commercial—that do not necessarily *nest* but often crosscut one another. We consider these spatial divisions themselves worthy of study and define Burgundy as a complex dynamic system in the changing spatial, temporal, and cognitive patterns of its relations.

Most geometric models of settlement are informed by theories of both biological and social complexity that rely almost exclusively on a single type of structure: *hierarchy*. Hierarchies (as opposed to other kinds of structured relations) are composed of "...elements which on the basis of certain factors are subordinate to others and may be ranked" (Crumley 1979:144, 1987a:158). There are at least two types of hierarchy: *scalar* and *control*. A common error, not just in settlement archeology but in ecology, biology, and elsewhere, is that researchers uncritically *nest* levels of analysis, confusing scalar with control hierarchies and leading to the misinterpretation of chains of causation. Global-regional-local climate is an example of a scalar hierarchy: any level can affect any other. The American court system is an example of a control hierarchy: decisions at higher levels affect the operation of lower levels. Scalar hierarchies are routinely mistaken for control hierarchies; in essence, the position of an element in a structure is invariably given value.

In some state societies, hierarchy is not simply one of many patterns in which elements might be ordered but a pervasive structural metaphor and a definition for order itself. When hierarchy and order are considered interchangeable, the popular understanding of chaos—the word of Greek origin for confusion or lack of pattern or plan—opposes hierarchy.

Yet many structures, both biological and social, are not organized hierarchically. There is nothing intrinsically hierarchical about an oak tree or a symphony, yet each has undeniable structure and constitutes an orderly representation of the relations among elements. Nonetheless, few terms identify other kinds of order. Hierarchy—inasmuch as it is often a reductionist metaphor for order—has disproportionately influenced theory building in both social and natural scientific contexts.

To date, the almost unconscious assumption of hierarchy-as-order remains unexamined among social scientists, especially in the area of *complex* society. Class relations are cognized as social hierarchies: "marrying up" or "beneath oneself," "climbing the social ladder." Ironically, societies not as pervasively ranked (not as *complex*) then appear "closer to nature," fostering elitism and rationalizing political and cultural hegemony (Diamond 1974; Levi-Strauss 1966). This conflation of hierarchy with order makes it difficult to imagine, much less recognize and study, patterns of relations that are complex but not hierarchical. It is ironic that the governmental structure we most prize (democracy) is the ideal representation of a power *heterarchy*.

Heterarchy was first employed in a modern context by McCulloch (1945). He examined alternative cognitive structure(s), the collective organization of which he termed heterarchy. He demonstrated that the human brain, while reasonably orderly, was not organized hierarchically. This understanding revolutionized the neural study of the brain and solved major problems in the fields of artificial intelligence and computer design. To date, it has had little impact on the study of society.

Heterarchy may be defined as the relation of elements to one another when they are unranked or when they possess the potential for being ranked in a number of different ways. For example, power can be counterpoised rather than ranked. Thus, three cities might be the same size but draw their importance from different realms: one hosts a military base, one is a manufacturing center, and the third is home to a great university. Similarly, a spiritual leader might have an international reputation but be without influence in the local business community. The relative importance of these community and individual power bases changes in response to the context of the inquiry and to changing (and frequently conflicting) values that result in the continual reranking of priorities.

RELATION BETWEEN HIERARCHY AND HETERARCHY

Drawing on a long history of reciprocal borrowing and legitimation between the social and natural sciences (Ellen 1982), the past two decades of theory in biology saw hierarchy everywhere in nature (e.g., Allen and Starr 1982; O'Neill et al. 1986; Pattee 1973; cf. Ricklefs 1987). However, considerable recent work in self-organizing

systems (Corcoran 1992; Kaufmann 1993; Langton 1992; Scott 1991) also finds order in a redefined chaos. Emphasizing initial conditions, this *new* chaos is not at all the opposite of order; history itself becomes the key to prediction, offering the first solid theoretical links between complex organic and physical systems. This has set the stage for renewed collaboration among physical, biological, and social scientists.

In this broader search for the sources of order in the universe, self-organization refers to the order-oriented behavior of opportunistic organisms, differentiating such order from that seen, for example, in snowflakes (Kaufmann 1993). At present, researchers in the biological and physical sciences are engaged in its exploration (but see Scott [1991], Kohler [1993], and Gumerman and Kohler [1994]). One of the most interesting findings is that self-organizing systems are able to perform the most sophisticated computations when operating at the boundary between order and randomness (Langton 1992).

Human organization, by measures of adaptability and interactivity, is arguably the most complex category of self-organizing system known. For human societies, the concept of self-organizing systems suggests that adaptive success may be related to the juxtaposition of cognitive and ecological liminality (Turner 1964; Ellen 1982) with flexible power relations. While hierarchy undoubtedly characterizes power relations in some societies, it is equally true that coalitions, federations, and other examples of shared or counterpoised power abound. The addition of the term heterarchy to the vocabulary of power relations reminds us that forms of order exist that are not exclusively hierarchical and that interactive elements in complex systems need not be permanently ranked relative to one another. In fact, it may be in attempts to maintain a permanent ranking that flexibility and adaptive fitness is lost.

HIERARCHY, HETERARCHY, AND COMPLEX SOCIETIES

Dissatisfaction the band-tribe-chieftdom-state model of sociocultural complexity forwarded by Service has increased in recent years. The complaints are by now familiar: the variability, incomparability, and indeterminacy of categories, the perfidy of clear markers in the archeological record, the failure of much archeological data to fit cultural evolutionary models, and the disagreeable

and persistent association of approaches that purport to chart increasing cultural complexity with racism and colonialism.

How might greater epistemological attention to both hierarchy and heterarchy, as well as analysis of the historical and contextual flux between them, offer new insights? I believe that there are several advantages, particularly to those who study the social formation of larger polities (generally termed chiefdoms and states), forms that now cover the planet.

First, the hierarchy-heterarchy relation admits both temporal and spatial flexibility; for example, governmental heterarchies (e.g., peer polities; Renfrew and Cherry 1986) can move over time to hierarchies and vice versa (Crumley 1987a:164-65, 1994b) without invoking the rhetoric of collapse. Heterarchical relationships among elements at one spatial scale or in one dimension (members of the same club) may be hierarchical at another (the privilege of seniority in decision making). Heterarchy is both a structure and a condition.

Such work is likely to have many other uses, and we have begun to explore only three areas: heterarchies of *scale* (Marquardt and Crumley 1987; see also Bloch [1964] on the tritemporal scale of the *Annales* school of French history), heterarchies of *power* (e.g., Crumley 1987c, 1995; Gunn et al. n.d.), and heterarchies of *values* (McCulloch 1945; Crumley 1987b; Crumley 1994a,b).

Simultaneous spatial analysis at multiple levels is the key to utilizing the huge and (for the most part) well-done site-based archeology of the last half-century. Already within- and between-site analysis has expanded our understanding of individual and group behavior and has made possible, for example, studies of gender relations and social status. It is time to make similar links among regions and continents, so as to be able to offer credible comment on the history and future of human-environment relations.

Power relations are demonstrably the most complicated and most important aspect of the governance of human societies. It is particularly important to know how power shifts occur and under what conditions various power distributions constitute stable and unstable configurations. The work would have great utility in the study of change and perhaps be able to explain how certain forms of governance can be associated with particular histories of environmental stability and instability. This gives equal value to all social formations, inasmuch as we can learn important lessons from them all.

Power relations are predicated on systems of values that are ranked and reranked in their importance by individuals, groups, and organizations as conditions change. By studying the physical evidence of decisions (e.g., the boundaries of a royal preserve), a hierarchy of values may be seen to be enshrined at one social, spatial, or temporal scale (elite aesthetics, regional biodiversity, the early Middle Ages) and contested at another (poaching peasants, microclimates, the later Middle Ages). Inasmuch as it subsumes other opinion, every decision provides the raw material for later change. New approaches to agency, conflict, and cooperation can be devised.

Finally, it is important for archeology through its theory and practice to affirm the dignity, appropriateness, and complexity of all human societies, as well as to forthrightly explore the cultural production of value as it pertains to the past. Thus may we see our data anew.

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