

CULTURAL TRAITS: UNITS OF ANALYSIS IN EARLY TWENTIETH-CENTURY ANTHROPOLOGY¹

R. Lee Lyman and Michael J. O'Brien

Department of Anthropology, University of Missouri, Columbia, MO 65211

The basic analytical unit used by E. B. Tylor, Franz Boas, Clark Wissler, A. L. Kroeber, and other early anthropologists interested in cultural transmission was the cultural trait. Most assumed that such traits were, at base, mental phenomena acquired through teaching and learning. The lack of an explicit theoretical concept of cultural trait meant that the units varied greatly in scale, generality, and inclusiveness among ethnographers. Efforts to resolve the difficulties of classification and scale were made but were largely unsuccessful. The history of the concept of cultural trait reveals not only the roots of modern theoretical difficulties with units of cultural transmission but also some of the properties that such a unit needs to have if it is to be analytically useful to theories of cultural evolution.

CONSIDERABLE WORK ON CULTURAL TRANSMISSION has taken place over the past several decades (e.g., Boyd and Richerson 1985; Cavalli-Sforza and Feldman 1981; Cloak 1975; Durham 1991; Lumsden and Wilson 1981; Richerson and Boyd 1992), including trying to answer the question of what constitutes a unit of cultural transmission (see Auger 2002 and references therein). During the first half of the twentieth century, "cultural trait" and the synonymous "cultural element" were commonly used for such units, but at the time neither the process of transmission nor the "thing" being transmitted was discussed within the context of a theory of cultural transmission. Most anthropologists provided commonsensical remarks about the unit and used it to determine something about the "development of American Indian cultures and tribal groups" (Bennett 1944:162).

Modern researchers have proposed names for units of cultural transmission—"meme" (Auger 1999, 2000, 2002; Blackmore 1999, 2000; Dawkins 1976) and "culturgen" (Lumsden and Wilson 1981) being two of the better-known terms—but there is little consensus as to what the units entail (Benzon 2002; Williams 2002). We do not intend to add significantly to this debate. Rather, we believe that many of the modern difficulties involved in understanding the nature of the units and their role in cultural transmission have their roots in late nineteenth- and early twentieth-century anthropology. Those roots are worth examining. Here we focus on cultural traits as units of cultural transmission. Previous studies (Driver 1965, 1973; McNett 1979) cover other details of the history of cultural traits in anthropology. We begin by distinguishing between two kinds of analytical units,

the conflation of which has long made it difficult to operationalize the concept of cultural trait. We next summarize what was said about cultural transmission prior to about 1940 and then turn attention to various statements made by ethnologists about cultural traits. We limit coverage primarily to the late nineteenth century and the first two-thirds of the twentieth century. This allows us to examine the work of E. B. Tylor, Franz Boas, and A. L. Kroeber, all of whom had profound intellectual impacts on how cultural traits were formulated and used. We conclude with suggestions regarding the properties that a unit of cultural transmission should have in order to be theoretically useful.

KINDS OF ANALYTICAL UNITS

If our interest is in the histories of cultures, then our explanatory theory should include consideration of cultural transmission, and the theory's analytical units should comprise units of transmission. To help us understand how early anthropologists thought about cultural traits as culturally transmitted entities, we distinguish between two kinds of units. *Empirical units* are things that can be seen and held, such as a fossil tooth or a ceramic jar. Empirical units have properties, and we use *ideational units* to measure them. Units such as centimeters and grams do not exist in any empirical sense, but they do exist in an ideational sense. As such, they are useful for measuring properties of empirical units (Dunnell 1971; Krause 1985; Lyman and O'Brien 2002; O'Brien and Lyman 2002). Those properties or characters can exist at any number of scales. The character "width" is an ideational unit that can be measured with ideational units termed centimeters. A jar with a 0.8-cm-wide lip is an empirical unit and so is a 1.5-cm-wide fossil tooth. Ideational units can be *descriptive*, used merely to characterize a thing, or they can be *theoretical*, created for specific analytical purposes.

Ideational units can be derived either intensionally or extensionally. An *intensional* definition comprises the necessary and sufficient conditions for membership in a unit; it explicitly lists the definitive character states that a phenomenon must display to be identified as a member of the unit. The phenomenon will exhibit states of other characters, but those are nondefinitional (descriptive) and hence are ignored. The definitive character states of theoretical units are drawn from theory. We may specify three classes of rim angle for ceramic jars—1–30 degrees, 31–60 degrees, and 61–90 degrees—based on a theory of vessel function that indicates some angles are necessary for some functions, whereas other angles are necessary for other functions. We may never find specimens with rim angles of 31–60 degrees, but the fact that something might *not* exist has no bearing on unit construction.

As opposed to an intensional definition, which is imposed on empirical specimens, an *extensional* definition is derived by enumerating select character states shared by a unit's members. The definitive criteria are literally an extension of observed character states of specimens in a group. The definition of a group is written after the group is created, and thus the definitive criteria are seldom theoretically informed in an explicit manner. Because the unit definitions depend

on the specimens examined, three problems result (O'Brien and Lyman 2002). First, the distinction between definitive character states and descriptive ones is seldom explicit. Second, the fact that a set of phenomena can be sorted into piles and a definition of an average specimen in each pile can be written reinforces the notion that the piles are somehow real rather than analytical products. Third, there is no guarantee that the resulting units will be of the same scale. Some may be defined by one character, others by two characters, others by three, and so on. As a result, some units will be general and inclusive whereas others will be specific and exclusive (Lyman and O'Brien 2002, 2003). All three problems are found in early discussions of cultural traits.

CULTURAL TRANSMISSION

A major research focus at the end of the nineteenth century and for the first several decades of the twentieth century was "historical ethnology" (Goldenweiser 1925; Radin 1933). Research cast in this mold had as its goal the reconstruction of the historical development of particular cultures. Cultural transmission played a critical role in the history of each culture and was discussed in commonsensical terms. During the first half of the twentieth century, culture was viewed as being largely a mental phenomenon (Boas 1891; Kluckhohn and Kelly 1945; Tylor 1871), and the transmission of culture was viewed as involving the movement of ideas from person to person (Spaulding 1954).² This view has several important implications. First, language is critical to efficient and accurate cultural transmission (Bidney 1944). Second, what is transmitted is a cultural trait, whether in the form of an idea or an object (Barnett 1940, 1942; Boas 1904, 1924; Driver 1973; Kluckhohn and Kelly 1945; Kroeber 1940; Linton 1936; Malinowski 1931; Murdock 1940; Wissler 1923). Third, culture is not inherited like genes; rather, culture is "acquired," typically by learning but also by "borrowing" and "mimicking" (Kroeber 1923a; Murdock 1932, 1940; Redfield, Linton, and Herskovits 1936; Tylor 1871; Willey 1929; Wissler 1916b, 1917, 1923). Fourth, cultural transmission can take several paths, all of which can lead to similarities among cultures (Boas 1909, 1924; Steward 1929). Fifth, cultural transmission can be from genetic ancestor to genetic descendant, but it can also be between genetically unrelated individuals (Kroeber 1923a; Murdock 1932). Sixth, cultural transmission results in the accumulation of culture. This accumulation is never ending. Whereas the number of genes an organism has is finite—despite the number of transmission events (generations) leading up to its production—there is no such limit on the number of ideas that an individual human can have (Kroeber 1923a; Murdock 1932).

EARLY VIEWS ON CULTURAL TRAITS

In his introduction to Stanislaw Klimek's (1935) statistical analysis of cultural traits, Kroeber (1935:1) remarked that "culture elements or traits . . . have long been in ethnological employ without criticism on methodological grounds, so far as I

know." He pointed out that Wissler (1916a, 1917, 1927, 1928; see also Kroeber 1931a) had used them to formulate culture areas, which Kroeber also had recently done (Driver 1962). Wissler defined the term "cultural trait" only once. To him, a culture was characterized by the "enumeration of its observable traits," and a cultural trait was "a unit in the tribal culture" that included artifacts, "mannerisms," and "concepts" (Wissler 1923:50).

Otis Mason (1886, 1890, 1895, 1896) had earlier discussed similarities and differences in what he variously termed "arts" or "inventions" across different geographic areas that approximated what would become Wissler's cultural areas. For Mason (1895:101), "arts" included "words, industries, social structures, customs, folk-tales, beliefs and divinities." Inventions included "useful and decorative arts, language, literatures, social fabrics, laws, customs, fashions, creeds and cults" (Mason 1890:3). For Mason (1896:639), arts were cultural traits: "By arts of life are meant all those activities which are performed by means of that large body of objects usually called apparatus, implements, tools, utensils, machines, or mechanical powers, in the utilization of force derived from the human body, from animals, and from natural agencies, such as gravity, wind, fire, steam, electricity, and the like." An art, then, was something cultural that could comprise an "activity," an idea ("social structure"), or what today we would consider an artifact. Archaeologist William Henry Holmes (1903) used the term "arts" in the same way Mason had. For both, an "art" was a generic, somewhat inclusive trait.

Like most of their contemporaries, Wissler and Mason defined cultural traits extensionally on the basis of observed behaviors and artifacts. Given that cultural traits had been long used by ethnologists, we suspect that Mason and Wissler did not find it necessary to devote much effort to discussing their epistemological basis. A major part of that basis is found in the writings of Tylor and Boas, who in the late nineteenth and early twentieth centuries laid major portions of the foundation for the use of cultural traits as analytical units.

Edward Burnett Tylor

Tylor (1871) typically used the terms "institutions" and "customs" for what later would be termed cultural traits. This is illustrated by his concept of "survivals," defined as "processes, customs, opinions, and so forth which have been carried on by force of habit into a new state of society different from that in which they had their original home, and they thus remain as proofs and examples of an older condition of culture out of which a new has been evolved" (Tylor 1871:16; see also Lowie 1918). Tylor's (1889:246) interest in what he termed "adhesions," or customs that "accompany" one another, also reflected his use of cultural traits.

Tylor did not define what kind of unit a survival or an adhesion was, although in practice they seem to have been empirical manifestations of behaviors. This is reflected in two ways in *Primitive Culture*. First, Tylor (1871:7) instructed the analyst to "dissect" civilization "into its details, and to classify these in their proper groups" for comparison. The details could include weapons such as spears, clubs, bows and arrows; textile arts such as matting and netting; myths on various topics

such as eclipses and place names; and ritual practices such as sacrifices to spirits. Definitions of categories of cultural traits were derived extensionally from observable phenomena, whether artifacts or behaviors. Second, cultural traits were empirical because they were like "species of plants and animals" (Tylor 1871:8), paralleling the views of contemporary naturalists that species were real entities waiting to be discovered (Mayr 1969). "To the ethnographer," Tylor (1871:8) continued, "the bow and arrow is a species, the habit of flattening children's skulls is a species, the practice of reckoning numbers by tens is a species. The geographical distribution of these things, and their transmission from region to region, have to be studied as the naturalist studies the geography of his botanical and zoological species. . . . Just as the catalogue of all the species of plant and animals of a district represents its Flora and Fauna, so the list of all the items of the general life of a people represents that whole which we call its culture."

Franz Boas

Boas (1904:517, 519) used the terms "elements" and "traits of culture" in much the same way that Wissler would. He also discussed "the theory of [the] independent origin" of elements and "their transmission from one part of the world to another" (Boas 1904:519). In an early study of folklore, Boas (1896) applied his training in geography to study the distributions of cultural traits "for purposes of historical interpretation" (Lowie 1956:1003). Boas (1896:3-4), in fact, provided the interpretive algorithm for such studies when he wrote, "the nearer the people, the greater the number of common elements; the farther apart, the less the number"; and "similarity between two tales . . . is more likely to be due to dissemination [diffusion] than to independent origin." He was concerned about the psychological basis of culture and believed that empirical culture phenomena were the products of ideas.

Boas (1891) had earlier described how to contend with the fact that in the Americas one had to study present-day (spoken) folklore in the absence of written history. Boas added his own twist to Tylor's comparative method when he defined the analytical unit of the method, terming it an "element" and noting that "a single element may consist of a number of incidents which are very closely connected and still form one idea" (Boas 1891:14). Here "incidents" are the empirical specimens that are manifestations of ideas, and the latter are ideational units termed "elements." This distinction between elements as ideas and their empirical manifestations as myths or tales was not made in Boas's (1896) later study. In subsequent studies of variation in decorative motifs, Boas (1903, 1908) extended the concept—without explicit mention of the term "element"—to material items such as moccasins, parfleches, baskets, and needle cases. That similarity in the form of geographically or temporally separated artifacts, particularly the "style" of their decoration, was evidence of social transmission was made clear when Boas (1909:536) remarked that a continuous distribution of formally similar artifacts "suggests very strongly that a line of migration or of cultural contact may have extended" over the area in question. As we have shown elsewhere (Lyman, O'Brien, and Dunnell 1997), this became an interpretive algorithm not only of

anthropology in general but of Americanist archaeology in particular. What went largely unremarked was that the unit of transmission was actually an idea or a concept—a meme—that had empirical manifestation as a form of artifact or of one or more character states thereof. This point was made by the architects of another school of thought.

German Diffusionism

Parallel to Wissler's age-area model of cultural history was a developing body of diffusion theory in Germany known as *Kulturkreislehre* (e.g., Graebner 1905, 1911). Its goal involved "explaining the totality of culture history in time and space through the identification and spread of trait complexes, groups of culture elements that are empirically found in association with each other. The theory [rested on] the hypothesis that cultural history can be traced back to a number of distinct cultural centers as opposed to one single locus of origin [and that] these centers spread through trait complexes, not individual traits" (Golbeck 1980:230). Boas (1911) correctly pointed out that there was a permanence to the units employed by the diffusionists in their identification of *Kulturkreise*, or "culture circles." A "fundamental" tenet of the theory was "that a given cultural element, or a complex of traits, can retain its identity while being passed from one people to another over the principal parts of the earth's inhabited surface" (Herskovits 1945:147). Fritz Graebner (1905) referred to such static traits as "type fossils." This was not a part of the Boasian view, which held that diffused traits typically were modified in order to be integrated into the recipient culture (Boas 1911). Not surprisingly, then, given the diffusionist view of static traits, Boas (1930:104) noted that diffusionist theory minimized the "possibility of the independent origin of similar ideas." We approve of Boas's use of the word "idea" because this was exactly how the diffusionists viewed the traits they used—as ideas—but they were often at very general and rather inclusive scales.

In an insightful study of the *Kulturkreise* school and its attendant methods, Clyde Kluckhohn (1936) made three points that are of interest here. First, he noted that most ethnologists failed to understand that for the diffusionists, traits were rather general ideas, *not* specific empirical units. Second, the definitions of cultural traits were "inevitably somewhat subjective." Third, the creation of units—what he referred to as "atomization"—often "does real violence to the cultural phenomena in question" (Kluckhohn 1936:170). Kluckhohn's points concern matters of classification and scale. Ralph Linton (1936:400) echoed the concern for classification when he remarked, "definitions and classifications are among the most valuable tools for the research worker, and anthropology is still sadly lacking in both." Similarly, Homer Barnett (1940:21) observed, "too often we deal in catchwords and arbitrary categories which are useless as tools and of uncertain value for purposes of classification." Although the significance of classification was recognized, few attempted to deal with it.

A. L. KROEBER AND CULTURE-ELEMENT DISTRIBUTIONS

Kroeber was one of the few anthropologists to grapple with problems of classification and scale of cultural traits, but prior to so doing, his interest was solely in studying their distributions (Kroeber 1904, 1908, 1917, 1923b). An example of how he did this is shown in Figure 1, taken directly from one of his publications (Kroeber 1923b). He provided no caption, but in the associated text he indicated that the "idea of this diagram is to suggest geographical relations by horizontal arrangement, temporal relations by vertical disposition" (Kroeber 1923b:128). Kroeber (1923b:128) noted that the "genetic assumption which underlies the arrangement of elements in the diagram is that, other things equal, widely distributed traits are likely to be ancient; locally limited ones, of more recent origin," a necessary assumption of the age-area notion (Kroeber 1931a). Kroeber (1923b:128) bemoaned the fact that graphs such as Figure 1 included but "a fraction of those [cultural traits] that might have been chosen." Perhaps in part for this reason, Kroeber and his students and collaborators undertook statistical analyses of successively longer lists of traits with the intention of formalizing and making more objective the analytical protocol of historical ethnology (Bennett 1944).

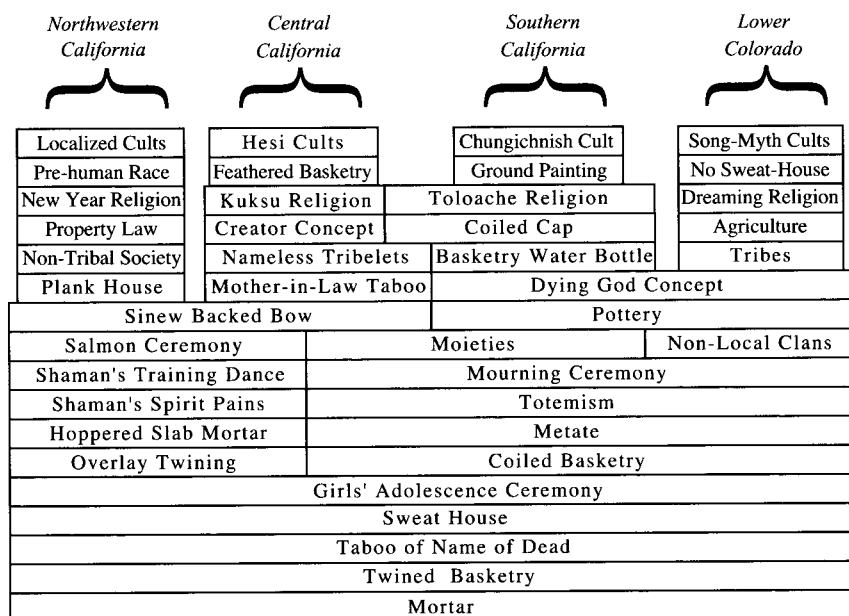


Figure 1. A. L. Kroeber's (1923b) Example of How Cultural Traits Can Be Plotted in Time and Space to Detect Historical Development of Culture Areas

Each rectangle contains a cultural trait. Geographic space varies along the horizontal axis, and Kroeber suggested that time passes along the vertical axis.

Statistical Analyses

In 1926 three of Kroeber's students, Clements, Schenck, and Brown (1926), proposed a technique for strengthening and systematizing the study of distributions of cultural traits. They applied chi-square analysis to 282 traits distributed across several Pacific islands. Those islands that shared many traits were thought to have "affiliations" with one another. Wilson Wallis (1928:95) expressed concern over the method and "the weight to be attached to common traits which have similar specific forms in two or more groups" and suggested that whether a trait was "generic" or "specific" would influence efforts to detect diffusion. Here Wallis was calling attention to the scale of a trait. A generic trait is one that is general and inclusive; a specific trait is exclusive and particular.³ Wallis (1928) believed that a generic trait, whether technologically complex or not, was likely to have a wide geographic distribution precisely because it was generalized and inclusive. He also believed that technologically complex traits were likely to be invented only once, and thus their distribution was a result of diffusion.

Forrest Clements (1928:302) replied that a "generic trait" tends to be "composed of simpler traits" and hence "is a complex trait which in turn may be part of a still larger trait complex. Thus it will be seen that unless we are dealing with the simplest units, the question of what is or is not generic is quite relative. The use of generic traits as such, then, is not to be recommended, and in the statistical method it is essential for all traits to be reduced to their simplest elements. That is to say, the sample must consist of *specific* traits only." He then noted that the "more complex the generic trait, the greater will be the number of its specific elements" (Clements 1928:303). These statements beg several questions. First, what is a trait complex? Wissler (1923:52) had earlier implied that a trait complex comprises a number of functionally interrelated traits that are meant to achieve a particular end. Several years later Melville Herskovits (1926:231) suggested that a "culture complex" is made up of a set of culture traits that merely "go together," which sounds a bit like Tylor's (1889) "adhesions."⁴ Robert Lowie (1920:13) used the term "linked traits" to approximate Tylor's adhesions. In contrast, Edward Sapir (1916:29) indicated that a trait complex is an "assemblage of specific elements [or traits that are] functionally unified, as a rule," a definition preferred by Kroeber (1931b:149). Sapir (1916:52) also noted that "the greater the specialization of function, the more neatly are the parts of a complex apt to be bound together."

We do not find it surprising that the unit variously termed "trait complex" or "cultural complex" would not have a universal meaning, given that the basic unit of "cultural trait" did not. The confusion was exacerbated by the common perception that cultures were made up of "congeries of disconnected traits, associated only by reason of a series of historic accidents, the elements being functionally unrelated" (Spier 1931:455). This view is epitomized by Lowie's (1920:441) characterization of a culture as a "planless hodge-podge, that thing of shreds and patches."

Another question begged by Clements's remarks is, what is the finest, least-inclusive scale at which traits can be defined? As Kluckhohn (1939:347) observed, the "degree to which a 'generic trait' is broken down cannot be fully standardized."

Driver and Kroeber had addressed this concern when they posed a question and then gave their answer:

Are our elements or factors, the culture traits, independent of one another? While we are not prepared to answer this question categorically, we believe that culture traits are in the main if not in absolutely all cases independent. Within the limits of ordinary logic or common sense. Essential parts of a trait cannot of course be counted as separate traits: the stern of a canoe, the string of a bow, etc. Even the bow and arrow is a single trait until there is question of an arrow-less bow. Then we have two traits, the pellet bow and arrow bow. Similarly, while the sinew backing of a bow cannot occur by itself, we legitimately distinguish self-bows and sinew-backed bows; and so, single-curved and recurved bows, radically and tangentially feathered arrows, canoes with blunt, round, or sharp sterns, etc. (Driver and Kroeber 1932:213)

Here Driver and Kroeber were defining the concept of a cultural trait as a minimal functional unit, at least in terms of artifacts. It is unclear what a minimal functional unit of social organization might be. A few pages later they lapsed back into the standard definition of a cultural trait as “the smallest units recognizable or definable” (Driver and Kroeber 1932:216).

Kroeber (1908) had earlier used a biological metaphor when discussing the validity of the three culture areas of California mentioned in Figure 1. He noted that when compared with one another, the three areas

contrast strongly. But the moment each of these three is considered alone, culturally well-defined groups of tribes are evident within it. This does not weaken the value of the recognition of culture-areas. The genus breaks up when we consider species. Even the species seems no longer a unit when attention is allowed to be given to races. But the differences between genera become insignificant when the family and the order are in view. Neither the order nor the species, the race nor the genus, is, therefore, unimportant or unreliable. A biology recognizing only species is a scientific impossibility; but a biology dealing with nothing lower than genera would be equally impossible. The culture area, broad or minute, has its value, and in fact is indispensable, as a means to an historical understanding of its components; but it has value only so long as its relativity is recognized. (Kroeber 1908:286)

Kroeber did not use this biological metaphor when speaking of the scale of cultural traits, perhaps because a minimum functional unit of culture—what he and Driver later proposed—was not so empirically obvious as was a species of organism. Cultures, Kroeber (1917:399) wrote, “are like organisms, which incorporate countless pieces of other organic material not by mechanical aggregation but by assimilation, thus attaining or retaining their own proper entity

and organic form. The analysis of culture into its elements, and the tracing back to these individual units, must be the first task of the ethnologist as of the historian." This metaphor was obviously not as well developed as the one used earlier for culture areas, although it may have eventually fed into the notion expressed by Driver and Kroeber (1932) of a minimum functional unit. An individual organism, not its various parts, is the minimum functional unit that can stand alone. One can study pelage color, tail length, reproductive behaviors, and the like among organisms, but those characters are not stand-alone, independently functioning units.

The analytical unit known as a cultural trait was a commonsensical one that required minimal theoretical discussion. Since the 1870s, traits had been used to record rapidly disappearing cultural information on American Indians and to write cultural histories in terms of independent invention, diffusion, and affiliation (Driver 1962)—uses that did not demand any explicit theoretical warrant. The attitude seems to have been that the units worked, so there was little need to worry about what they actually were. Nevertheless, there was some discussion of how to operationalize the concept in ethnological settings, where the goal was to record cultural data for purposes of comparative analyses. Salvage ethnography might not require much rigidity in data-recording units, but analytical studies focusing on the similarities of trait lists clearly demanded that the traits be similar from list to list. This is probably what prompted Kroeber to consider the concept of cultural trait more explicitly.

Culture Elements

In his introduction to the first published "Culture Element Distribution" study, Kroeber (1935:1) remarked that "the question of first importance is whether the elements operated with are justifiable units." Kroeber indicated that to answer that question affirmatively, three conditions had to be satisfied: "First, the elements must be sharply definable. Second, they must be derived empirically, not logically. And third, they must be accepted for use without bias or selection" (Kroeber 1935:1). The condition of definability was meant to ensure that elements could be differentiated: "[I]t is the equivalent of measurability in other types of material" (Kroeber 1935:1). We take the condition of empirical derivation to mean that the unit definitions should be extensionally derived from specimens, whether observed artifacts or behaviors, or informants' testimonies. Kroeber (1935:2) feared that if elements were defined intensionally (our term), data would be "encountered which do not fit unambiguously into the concepts." Here he failed to keep a *description* distinct from a *definition*. The third condition, "nonselection of data, is of course axiomatic in any statistical approach, and should be equally so in any nonstatistical one" (Kroeber 1935:1). We take this condition to signify that the elements chosen should be a probabilistic sample of all possible ones.

That cultural traits were to be defined extensionally rather than intensionally was underscored when Kroeber (1935:2) argued that "negative elements" were not to be included in analysis.⁵ Such elements did not exist in a culture. In making this argument, Kroeber (1935:3) noted that this "is really an extension of the principle

that procedure must be wholly empirical, never merely logical." Otherwise, culture elements could be "of different cultural weight, 'size,' or importance" (Kroeber 1935:3). Klimek's (1935) statistical efforts with lists of culture elements had forced Kroeber (1935:11) and his students to generate "data of greater precision." No longer could an ethnologist simply generate a list of cultural traits; the units had to meet the three conditions Kroeber outlined. No such conditions had been described previously.

Kroeber (1936:101) later defined "culture elements" as the "minimal definable elements of culture." The following year he remarked that an element list "is a plastic thing, which is constructed in larval form from knowledge of a specific ethnography" (Kroeber 1937:1). This statement suggests that definitions of elements were derived extensionally. Support for this suggestion is found in the fact that each element was thought to be "reliable" when multiple informants independently agreed when asked if an element existed in their culture (Driver 1938:212).⁶ John Bennett (1944:177) pointed out a few years later that many culture traits were "non-comparable entities," and his discussion makes clear that this was a result of their definitions having been derived extensionally. Such derivation virtually insured that there was no consistency among units in scale or definition, particularly when different analysts compiled the lists.

OTHER EFFORTS AND COMMENTS

Few anthropologists of the time would have disagreed with Kroeber's (1937:1) point that culture elements provided "data far more satisfactory for comparative purposes than the customary monographic studies with their large areal gaps, dissimilarities of interest and approach, and poverty of negative statements." Nor would many have disagreed that one goal of anthropology was to answer questions of culture history. Quibbles over the reliability of culture-element data were, however, exacerbated by the fact that no consensus existed on exactly what a cultural trait was in a theoretical sense. We illustrate this by considering the remarks of several individuals who commented on the concept of cultural trait at the same time that Kroeber was developing his culture-element distribution surveys and proposing criteria for cultural traits.

Ralph Linton

Linton's idea of what cultural traits entail was markedly different than those of many early twentieth-century anthropologists. To him, cultural traits are "arbitrary divisions" (Linton 1936:394). He may have used "arbitrary" to indicate that the traits are not some kind of natural units waiting to be discovered, but in our view he was searching for natural (emic-like) units rather than arbitrary (etic-like) ones. Linton was skeptical about the value of cultural traits that anthropologists routinely attributed to them. In particular, he noted that "differentiating" among traits "masked the actual interrelations of culture elements and made it extremely difficult for the reader to see them in their proper settings" (Linton 1936:396). Linton argued that a cultural trait has an empirical form, a function, and a meaning

within its particular cultural context. Trait lists effectively divorce the traits from their cultural contexts, causing them to lose various of their emic qualities such as function and very often meaning.

Linton indicated that because traits vary in scale, they can be classified hierarchically (Figure 2). He defined traits as “the individual acts and objects which constitute the overt expression of a culture” (Linton 1936:397). But traits “can be analyzed into a number of still smaller [less-inclusive] units” called “items” (Linton 1936:397). For example, to Linton (1936:397), a “bow is a culture trait, yet a comparative study of bows from several different cultures will reveal differences in the sort of wood used, the part of the tree from which the wood is taken, the shape, size, and finish of the completed object, the method of attaching the string, and the material used for the string. As far as a particular culture is concerned, the bow is a trait; the various details of wood, form, and string are items within a trait.”

Traits can be cumulative to form what Linton termed a “trait complex.” He adopted the view that traits forming a complex have to be functionally interrelated and thus “every trait is intimately associated with some other trait or traits to form a larger functional unit commonly known as a *trait complex*. The traits within such a complex are all more or less interrelated and interdependent from the point of view of both function and use” (Linton 1936:397). Linton suggested that multiple trait complexes can be “combined to form a still larger functional unit [termed] an *activity*. Lastly, the sum total of these activities constitutes the complete overt expression of the culture” (Linton 1936:397) (Figure 2).

Linton acknowledged two potential problems with his suggested classification scheme. First, the number of levels of inclusiveness can be “expanded almost indefinitely” (Linton 1936:398). He blamed this problem on the subjective judgment of the classifier and the complexity of the phenomena being classified. Linton did not comprehend that taxonomic classification can avoid these problems (Lyman and O’Brien 2002, 2003). That the complexity of the phenomena can create classification problems signifies that the definitions of his items, traits, complexes, and activities were extensionally derived. There was no specification of the scale of an item, nor did he specify the scales of traits, complexes, and activities. He did indicate that the smallest unit pertinent to functional studies is a trait complex because this seemed to be the perception of an “average member of any society” (Linton 1936:403).

The second potential problem with Linton’s classification scheme is that traits can occur in more than one complex. In a perfect aggregative hierarchy, such as that represented by the units of the Linnaean biological taxonomy, groups of individuals make up species, groups of species make up genera, groups of genera make up families, and so on. Importantly, each organism is a member of only one species, each species is a member of only one genus, and so on (Valentine and May 1996). Not so in Linton’s taxonomy of cultural units (see Figure 2). Thus, “the bow, in addition to its use with the arrow, might be used as part of a fire-making or drilling complex” (Linton 1936:399). Here Linton failed to keep a trait’s form distinct from its function.

LINNAEAN
BIOLOGICAL
TAXONOMY

LINTON

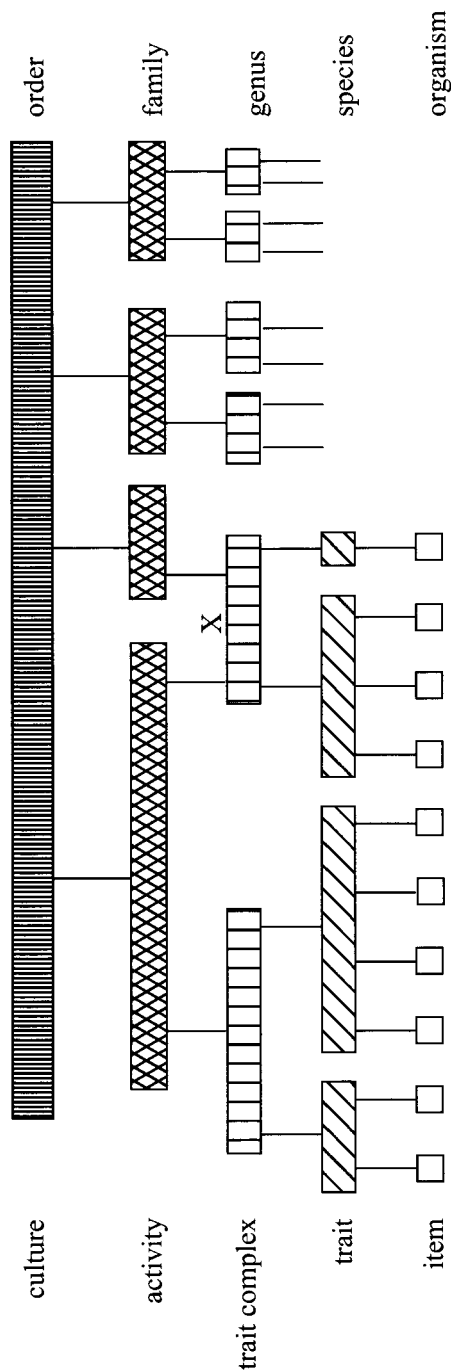


Figure 2. Ralph Linton's (1936) Model of the Scale, Classification, and Interrelationships of Cultural Traits to One Another and to a Culture. Note that the structure approximates what is known as an aggregative hierarchy such as the Linnaean biological taxonomy, but it is not a perfect example of such because specimens in categories at lower levels can contribute to multiple units at higher levels of inclusiveness. For example, the trait complex labeled X contributes to two activities; this is not allowed in the Linnaean taxonomy.

Ruth Benedict

Benedict (1932) proposed a unit similar to Linton's complex. She worried that the study of cultural traits "detached from their [cultural] contexts" could not lead to a robust understanding of a culture as an "organic and functioning whole" (Benedict 1932:1). She therefore argued that one should study "configurations of culture," characterized as a set of traits integrated "into consistent patterns in accordance with certain inner necessities that have developed within the group" (Benedict 1932:2). The scale of a configuration was more inclusive than a single trait or a minimal functional unit because it concerned the functional interrelations of traits.

Homer Barnett

Barnett (1940) echoed Linton (1936) and argued that a cultural trait had a form, a function, and a meaning within its cultural context. It was the "behavior" of traits resulting from their transmission from one culture to another that was of interest to Barnett. Did the traits retain their original function but not their meaning, for example? Barnett (1940:42) believed that "the process of diffusion and integration of functionally equivalent complexes parallel very closely, if they are not identical with, those characterizing invention and acceptance within a single cultural framework." In terms of cultural development, it made little difference if a cultural trait originated within the culture under study or if the trait originated elsewhere and diffused into the culture under study. Barnett's point was that a trait could be transmitted and retain its form, function, and meaning, or it could be transmitted and not retain any one, two, or perhaps all three of those qualities. Later, Barnett (1953) did not use the term "trait" but instead used "idea" when discussing diffusion, adhesions, and complexes. He wrote that adhesions were "persistent linkages between idea-sets as they diffuse across ethnic boundaries. Artifacts of this sort are called complexes because the analyst finds them to be made up of more than one component" (Barnett 1953:356).

George Murdock

Murdock (1932:204) noted that anthropologists defined cultural traits as "group habits or customs," whereas sociologists "almost universally speak of them as 'folkways.'" He perceived a "general agreement" that "the constituent elements of culture, the proper data of the science of culture, are group habits. Only the terms employed are at variance" (Murdock 1932:204). He argued that the term "cultural trait" was troublesome because it included not only group habits such as forms of salutation, burial practices, and religious concepts but also "material objects or artifacts, which are not group habits, indeed not habits at all but facts of a totally different order" (Murdock 1932:205). Murdock (1932:205) argued that artifacts are "outgrowths of habits," and although artifacts themselves might be transmitted via trade, knowledge of how to make them is what in fact allows them to become habits.⁷ Murdock favored the term "folkway" over cultural trait because it signified not the artifacts but rather the social setting of the artifacts. Adopting "folkway" to signify "group habits" would, Murdock (1932:205) reasoned, provide analytical units that were "objective behavioristic facts susceptible to repeated verification—

an absolute prerequisite for a scientific study.” The criterion of replicability via observation indicates that Murdock derived his definitions of folkways extensionally. The notion of repeated observations by the anthropologist was an attempt to get at the ideas underlying the observed behaviors.

Sociological Perspectives

Sociologist M. W. Willey (1929:207) defined cultural traits as “habits carried in the individual nervous systems” and stated that it was these “which constitute the elements of culture.” He felt that because traits were so “multitudinous,” it was impossible to enumerate them. To overcome this problem he suggested that traits “in association may more readily be studied” and designated a “grouping of traits [as] a culture complex” (Willey 1929:207). A complex was more than a group of traits; it constituted an integration of associated habits much like Benedict’s (1932) configurations of culture.

Sociologist Thomas McCormick was interested in quantitative analyses of cultural elements, including their frequencies of occurrence rather than just their presence in a culture. Unlike most anthropologists, though, McCormick (1939:464) was explicit about the fact that cultural elements “in any particular study may be whatever we regard as ‘elementary’ for our purposes and level of interest.” For him, cultural elements were etic-like, and the scale of an element was an analytical decision. What McCormick referred to as the “idea” of a particular behavior might be the same across multiple cultures, but it might have a unique empirical expression within each culture as a result of environmental differences. McCormick made clear that the reducibility of a cultural element into smaller, less-inclusive units that could be recombined into other elements indicated that many elements were in fact compound units of some sort. What he was after were “natural units” in the eyes of both the informant(s) and the investigator, particularly in the sense that the elements were not reducible to their component parts without destroying the integrity or function of the element (McCormick 1939:464).⁸ Anthropologists did not adopt McCormick’s view that cultural traits were units constructed for some analytical purpose.

Archaeological Views

W. C. McKern (1934, 1939; McKern, Deuel, and Guthe 1933) used the term cultural trait—without definition—in his formulation of what came to be known as the Midwestern Taxonomic Method of classifying archaeological cultures. The term was used to denote artifact units of various scales (Lyman and O’Brien 2003). Cultural trait was never defined, but the manner in which the term was used indicates that traits were artifact types (Lyman and O’Brien 2001). Types were used in the direct historical approach (McKern 1934; Steward 1942; Wedel 1938), which involved comparing lists of traits compiled from both ethnographies and the archaeological record. Likewise, the historical methods known as seriation (O’Brien and Lyman 1999) and percentage stratigraphy (Lyman and O’Brien 1999; Lyman, Wolverton, and O’Brien 1998) rested on the equation of artifact types with cultural traits.

Walter Taylor (1948) made explicit what previously had been implicit among Americanist archaeologists. As might be expected from a student of Kluckhohn's, Taylor (1948:98) believed that "culture is a mental construct, having to do with the contents of minds and not with material objects or observable behavior." A cultural trait is an idea and as such can "be either shared [identical from individual to individual] or idiosyncratic" (Taylor 1948:96). Cultural heritage is a result of cultural transmission over time. Because cultural traits are ideational, they have to be "inferred from the objectifications, from behavior or the results of behavior," such as artifacts (Taylor 1948:100).

DISCUSSION

To early twentieth-century anthropologists, cultural traits were ideas at various scales of inclusiveness and levels of complexity that were transmitted over space and through time. If those traits could be identified, they could then be used as analytical units. But there were numerous problems in so doing. Lowie (1917:85), for example, remarked that survivals may show "an *organic* relation between [traits] that have become separated and treated as distinct by the descriptive ethnologist. In such cases, one trait is the determinant of the other, possibly as the actually preceding cause, possibly as part of the same phenomenon." The first part of that statement is clearly focused on historical questions with the explicit addition of historical cause, and the last part is a reference to the fact that "cultural traits may be functionally related" (Lowie 1917:88). Paul Radin (1933:53) was referring to both the problem of scale and the problem of definition when he argued that traits had the character of "fictitious definiteness"—a problem manifest in attempts to determine if a trait in one culture was the same trait in another culture (Radin 1933:140).⁹ When Radin noted that the concept resulted in features of cultures being divorced from their sociocultural and human contexts, he was suggesting that traits could not be used for anything but historical ethnology.

Bronislaw Malinowski (1931:624) argued that the method of identifying traits was the "weakest point" in any analysis of such units. Further, he emphasized that the form of a trait did not necessarily reflect its function and that "it is the diversity of function not the identity of form that is relevant to the student of culture" (Malinowski 1931:625). He later reiterated this view by arguing that the only legitimate way to define a trait was "by placing it within its relevant and real institutional setting" (Malinowski 1960[1944]:54). Failure to agree on "what is the definite isolate in the concrete cultural reality [would preclude] any science of civilization" (Malinowski 1960[1944]:39). Because of such comments by Malinowski, Radin, Benedict, Willey, and Murdock, many anthropologists by the early 1940s believed that an irreducible minimal unit of culture was a "methodological impossibility" because "modern functional theory shows the interdependence of cultural phenomena at all levels" (Bennett 1944:178). As a result, Bennett (1944:178–179), for example, concluded that a cultural trait was "an abstraction having no value other than the immediate one placed upon it by the

user. . . . At what level must traits be abstracted to serve the [analytical] problem in view?" This was one of only two clear statements—McCormick's (1939) being the other—explicitly acknowledging that cultural traits were analytical units. That they should be contingent on their cultural contexts meant that they should be defined extensionally.

Murdock (1945) continued to use the concept of a cultural trait and perceptively noted that cultural traits did not have universal distributions because their empirical expressions varied from instance to instance. If geographically separated traits appeared to be identical, it was because of "similarities in classification, not in content. [This is because cultural traits] represent categories of historically and behaviorally diverse elements which nevertheless have so much in common that competent observers feel compelled to classify them together" (Murdock 1945:125). He also noted that traits that were perceived to be shared cross-culturally were so perceived as a function of their scale, generality, and inclusiveness. These points regarding the classification and scale of cultural traits were precisely the right ones to make. They had in fact been made earlier by Kroeber, but with little apparent effect. Murdock, however, seemed to pay them little heed in later analyses (e.g., Murdock 1949) and hardly mentioned them at all in still later programmatic statements (e.g., Murdock 1957a, 1957b). What he did do was admit that there were no doubt "errors" in his classification of cultural traits, but these were variously the result of "the arbitrariness inherent in any system of classification [and] faulty judgment in the categorization of data" (Murdock 1957b:687). Rather than perfect the classification, Murdock worked to enlarge the sample of cultures in his data base. This prompted A. J. F. Köbben (1967) to highlight inconsistencies in the definitions and scales of cultural traits. These fundamental problems have permeated virtually the entire history of the concept of cultural trait.

Similar weaknesses attended efforts such as Linton's (1936) regarding trait complex, activity, and culture to account for variation in the scale of cultural traits. The scale of such units was unclear ideationally, so it was unclear empirically as well. Herskovits's (1945:158) suggestion that cultures are made up of traits that "merge into larger divisions called complexes" that in turn merge into "culture patterns" did not help matters. Nor did Morris Opler's (1959) substitution of the term "component" for cultural trait and "assemblage" for trait complex. Opler (1959:955) at least defined his new terms explicitly: A behavioral event is "an associated body of ideas, symbols, artifacts, and behavior[s]" termed "components," and an "assemblage" is "the total group of components which are activated by the event and are considered appropriate in coping with or referring to [the event]." These are, however, commonsensical definitions that did not concern a unit of cultural transmission.

There was also discussion about how to make the social or ethnic units from which individual trait lists were generated somehow comparable (Naroll 1964), but few mentioned how to define the traits themselves. Driver (1965:329) observed that the concept of a cultural trait "is much more difficult to objectify and establish than the ethnic unit." He noted that Opler's (1959) proposed taxonomy of

components and assemblages “introduced some order in the continuum from small to larger and larger cultural units, but they are insufficient to account for the indefinitely large number of subject units in the indefinitely numerous hierarchies of classes within classes of cultural phenomena” (Driver 1965:329). More than a decade later Charles McNett (1979:52) again highlighted the classification problem when he noted that one may be forced to use a “proxy measure” when “coding” cultural traits for purposes of cross-cultural study. Dave Davis (1983:60) didn’t view this as a problem, observing that disciplines other than anthropology “have made little effort to specify a priori the kind or kinds of entities that diffuse.”

SUGGESTIONS

Most of those who have used the concept of cultural trait are interested in historical questions, and thus it is not surprising that discussions of the concept often include mention of cultural transmission. Culture is acquired by learning (acculturation and enculturation) and mimicking, so the units of transmission typically are ideas. Cultural lineages, cultural traditions, and social heritages are the results. But no one has figured out in theoretical terms exactly what a cultural trait is, other than that it is something that can be transmitted from person to person and from culture to culture. Many of these same notions are found in discussions of memes as units of cultural transmission; in particular, memes are ideas that can vary in scale from “stories, songs, habits, skills, inventions and ways of doing things” to “the first eight notes of the *Twilight Zone* theme” (Blackmore 2000:65). Several important properties of units of cultural transmission are clearly apparent in the various discussions reviewed above. We briefly discuss here what those properties entail. To do this, we review a few recent statements about units of cultural transmission.

With respect to pottery, Richard Krause (1985:30–31) proposed the concept of “recipe” as a “list of ingredients and amounts” and a “part that tells you what to do, how to do it, when to do it, and for how long.” In their discussion of pottery technology, Michael Schiffer and James Skibo (1987:597) elaborated on Krause’s notion by defining the term “recipe for action” as “(1) a list of raw materials, (2) a list of tools and facilities employed, (3) a description of the sequence of specific actions undertaken in the technological process, and (4) the contingent rules used to solve problems that may arise.” Schiffer and Skibo (1987:597) noted that recipes are often culturally transmitted, and this requires a “teaching framework [that] consists of a series of practices that can include imitation, verbal instruction, hands-on demonstration, and even self-teaching by trial and error.” Hector Neff (1992:160) used the term “recipe” in reference to a set of culture-specific “rules” for making ceramic vessels and indicated that the transmission of recipes over time resulted in the production of what archaeologists refer to as “traditions.” A good definition of a cultural tradition as manifest archaeologically is “a socially transmitted form unit (or a series of systematically related form units) which persists in time” (Thompson 1956:38).

In light of the concept of tradition and the history of the concept of cultural

trait, we find the concept of "recipe" as discussed by Krause, Schiffer and Skibo, and Neff to be useful for three reasons. First, the commonsensical meaning of the term captures the essence of what anthropologists mean when they use the term "cultural trait"—how (and to lesser extents when, where, and why) to produce something, whether a behavior or an artifact (a behavioral by-product). We expand the definition of recipe to include (1) a list of ingredients, (2) rules for acquiring ingredients, (3) specification of the amount of each ingredient, (4) rules for preparing the ingredients, (5) rules for mixing ingredients (including the order of adding them as well as how to mix them—"shaken, not stirred"), (6) rules for cooking (metaphorically) the mixed ingredients, and (7) rules for treatment and/or use after cooking.

Second, the recipe concept entails multiple parts of two general sorts—ingredients and rules—that can be reconfigured to form a different recipe. Alteration of ingredient acquisition, preparation, type, or amount; alteration of rules or the order of their implementation; or some combination of each will result in a different product, whether a behavior or an artifact. This property of recipes attends the difficulty encountered by early anthropologists when dealing with the scale of a cultural trait. It incorporates the concern of Driver and Kroeber that a cultural trait be a potentially independent functional unit, such as a bow, but it also incorporates concerns such as Sapir's that traits comprising a complex be functionally interdependent—a property to which we return—and Linton's observation that traits can be reduced so as to be less inclusive than some minimum functional unit.

Third, the recipe concept highlights the flexibility that is built into virtually all ways of doing something and still producing a usable/consumable product. The recipe is ideational, but any given product that results will be a more or less imperfect empirical manifestation of that recipe. This again indicates that units of cultural transmission and replication can be of different scales, a point recognized by more recent commentators. L. L. Cavalli-Sforza and Marcus Feldman (1981:73) define a "cultural unit, or trait, [as] the result of any cultural action (by transmission from other individuals) that can be clearly observed or measured on a discontinuous or continuous scale." A trait can comprise "a given innovation, skill, type, trait, or specific cultural activity or object" (Cavalli-Sforza and Feldman 1981:15). They explicitly recognize that cultural things—artifacts, behaviors—"are often so complex that they have to be dissected into simpler components or aspects for an analysis to be useful."

Flexibility in the scale of the unit of cultural transmission should not be taken as fatal to the concept. Although it is true that the scale of a unit of biological transmission and replication—the gene—is known, we note that one phenotypic character of an organism can be polygenic (influenced by multiple genes), yet others can be pleiotropic (a single gene influences those several characters). Because there is no one-to-one correspondence between a gene and a somatic character, there has been a "long-standing debate in genetics about how large or small a fragment of a genome ought to count as the replicating unit (that is, as something that is copied and which can be treated separately)" (Lloyd 1992:337;

see Sterelny, Smith, and Dickison 1996 for additional discussion). This is precisely the alleged problem with cultural transmission because virtually every human behavior is underpinned by a recipe of unique composition, scale, and complexity. To argue that the state of a particular somatic character is identical across a set of monospecific organisms is a conclusion based on a definition of that character state that is sufficiently general to include all empirical specimens. Those specimens may or may not have identical genotypes with respect to that character state.

Two concepts are available in biological evolutionary theory that contend with the possibility that units of transmission are not always independent. The first is *constraint*, which refers to changes or restrictions thereof that are not embedded in the theory of cause (Gould 2002). During transmission, the units of transmission are sorted by mechanisms such as natural selection, drift (sampling error), and lack of fidelity in transmission. Importantly, the sorting mechanisms are external to the phenomena being transmitted. Constraint is internal to the phenomena being transmitted and concerns restrictions placed on future potential variants by mechanical or structural limitations. This results in “channeling” (Gould 2002)—the transmission of a trait can be constrained by the transmission of a trait with which it is mechanically linked. The former is replicated and sorted in concert with the replication and sorting of the latter. Such a trait is said to *hitchhike*—the second concept—with a trait that is actually being sorted. As a result of the mechanical or functional linkage of the two traits, the hitchhiker is also sorted, where sorting is a “simple description of differential representation” over time that “contains, in itself, no statement about causes” (Vrba and Gould 1986:217). The traditional concept of linked traits holds that the traits are genetically linked. The newer concept of hitchhiking allows a sorting mechanism to work on a trait that is genetically independent of yet mechanically linked to another. To help determine if a character or character state is a hitchhiker in the new sense or a linked trait in the old sense demands detailed mechanical and engineering studies (Hunt, Lipo, and Sterling 2001).

Importantly, “the location[s] of the ‘joints’ in a cultural genome appear to be capable of varying from case to case, and perhaps from context to context” (Wimsatt 1999:282). In other words, culture is highly plastic. The seeming arbitrariness of traits as cultural fragments gives them their viability and provides “our ability to re-package and re-articulate cultural products into seemingly arbitrary larger or smaller construction to be replicated and transmitted as units” (Wimsatt 1999:283). This means that “most cultural products are also compound products” (Wimsatt 1999:285). Recipes have no set numbers of rules or ingredients; they are neither genes nor chromosomes, although they *are* units of replication. Efforts to identify individual memes may be less critical to cultural evolution than the identification of individual genes in biology. A taxonomic classification with different levels of inclusiveness and generality may be the appropriate structure for a classification of cultural traits (see Figure 2).

Krause (1985), Schiffer and Skibo (1987), and Neff (1992) all use the notion of recipe to discuss ceramic artifacts. That the notion applies equally well to stone tools, textiles, and even pyramids should be apparent. It may be less apparent that

it applies equally well to a religious ritual, to a form of kinship reckoning, to a form of social structure, and the like, but a moment's reflection should make this clear. Archaeologists have long assumed that recipes for making pottery, decorating pottery, or doing thousands of other things are transmitted over time and across space (Lyman, O'Brien and Dunnell 1997; O'Brien and Lyman 1999). It is likely that similar recipes for all sorts of personal behaviors and interpersonal interactions are also transmitted.

CONCLUSION

Historical ethnologists who grappled with the concept of cultural trait had the right idea in monitoring cultural transmission. Although they failed to develop a solid concept of a unit of transmission, their discussions reveal some of the properties of such a unit that some anthropologists thought were important and other properties that other anthropologists thought were fatal to any analytical utility such units might have. These early workers typically defined cultural traits extensionally, probably in an effort to make their units have emic properties, but that protocol resulted in a host of difficulties, one centering on the scale of a trait and another being the comparability of traits recorded for different cultures. About the time such issues were being identified as potentially fatal to the concept, historical ethnology fell from disciplinary favor, and the cultural context, function, and meaning of sets of traits termed complexes, patterns, and configurations became important. These larger units, which encompassed multiple cultural traits, had the same epistemological problems that the smaller units had. Recognition that all of these units were potentially useful analytically demanded an explicit theory of cultural transmission, something that became available only in the 1980s.

To help conceptualize some of the useful properties of cultural traits as units of transmission, we have borrowed the concept of a recipe. A recipe is conceptual; it is a meme in the sense that it is a unit of cultural transmission. It can be dissected into smaller parts—ingredients and rules—and it can be added with other recipes to form a metaphorical menu. We are not saying that the concept of recipe as we have described it should underpin a modern unit of cultural transmission such as a meme. What we *are* saying is that the concept is a helpful one for explicitly formulating in theoretical terms a unit of cultural transmission. It underscores and helps structure various properties that any cultural replicator should exhibit, whether we call such replicators memes, cultural traits, culturgens, or simply ideas. Although they struggled, early anthropologists were, in our view, remarkably prescient with respect to units of cultural transmission.

NOTES

1. We thank Lawrence Straus, Reed Wadley, and four anonymous reviewers for helpful comments on an early draft.

2. References cited in this sentence and the remainder of this paragraph are meant to be exemplary and not exhaustive.

3. Recall W. H. Holmes's use of the term "art" as a sort of generic trait.
4. Herskovits (1945:149) was later explicit about this when he said that complexes are "conglomerates of traits related only in the mind of the student, not in the thinking and behavior of the peoples in whose cultures they are found."
5. Kroeber (1923b) had earlier used negative elements when he listed "No Sweat-Houses" for the Lower Colorado (see Figure 1).
6. Whether this gave the elements emic qualities might be debated, but many who commented were skeptical that cultural elements had such qualities.
7. Here, Murdock's thinking parallels Bidney's definition of culture as acquired through "habituation."
8. Recall that the property of cultural traits as minimal functional units had been proposed by Driver and Kroeber (1932), although they did not repeat it.
9. This is a typical problem with extensionally derived definitions: the definitive criteria are idiosyncratic because they depend on the specimens examined and also on the individual analyst deriving the definition.

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