case, constructing an object category metalanguage that can be applied across unrelated languages should be feasible. It should also be extremely worthwhile, for it could lead eventually to the discovery and documentation of true "object universals." What is needed now is further research with an eye toward this objective.

2 / Semantic Aspects of Linguistic Acculturation

Language is a notoriously flexible instrument that registers changes in the content of cultural systems more sensitively and surely than any other. Such changes may affect phonetics, syntax, and vocabulary, but it is in the lexicon that they can be traced most readily, whether they are due to internal cultural developments or to the effects of intercultural contact. And yet in recent years the topic of vocabulary shifts has received little attention from anthropologists interested in processes of acculturation. For the most part, earlier studies of this phenomenon have focused upon the interrelationship of sociocultural and linguistic factors, with emphasis placed mainly on the former; and in those cases where linguistic factors have been stressed, phonetics and word morphology tend to receive much fuller treatment than semantics. In view of these circumstances, it seems both desirable and worthwhile to address the topic of lexical change anew.

The development of ethnographic lexicography has provided linguistic anthropologists with orderly procedures for describing taxonomic structures underlying native terminologies. Thus far, however, work in this area has dealt almost exclusively with synchronic aspects of terminological systems. In this chapter, I shall attempt to show that several concepts employed in lexicographical studies may be usefully brought to bear upon a type of semantic change that occurs as a result of intercultural contact. In so doing, I shall present and interpret a body of data collected among the Western Apache of Arizona.

First, however, it is necessary to consider a more traditional approach to the study of semantic change. In the past, shifts in the referential meaning of words have been described by (1) establishing the original meaning or primary sense of a given lexeme; (2) recording the changes that have altered this meaning; and (3) relating these changes to some set of linguistic, social, or historical factors that presumably precipitated them. In short, the basic procedure has been the documentation of a lexeme's history, conceived as a linear succession of units of meaning. This approach, which Stephen Ullman (1963) has aptly labeled "atomistic," rests on the assumption that while synchronic linguistics properly deals with systems, diachronic linguistics must concern itself with single elements. In the sphere of semantics, this assumption carries with it a strong implication that changes in the meaning of words typically occur independently of one another or, at best, are rarely systemically related. The atomistic approach thus raises a question of some importance: namely, is it possible to formulate descriptive generalizations about changes in referential meaning above the level of the isolated lexeme? I hope to show that such statements can be made and that they serve to clarify an intriguing form of linguistic acculturation that until recently has remained obscure.

There appear to be three major processes by which the vocabulary of a language adjusts to objects and ideas introduced as a consequence of intercultural contact. First, one or more lexemes—loanwords—may be borrowed from the language (or languages) associated with the alien culture. Second, new lexemes may be created from indigenous linguistic materials. Third, existing lexemes may be extended to label unfamiliar phenomena, thereby acquiring novel meanings that serve to enlarge their semantic range. The literature on loanwords is now quite voluminous (cf. Haugen 1956; Weinreich 1953), but processes of lexical innovation and extension have stimulated comparatively little research. It is the latter of these processes—lexical extension—that I wish to consider here.

Data from a modern Western Apache speech community indicate that several decades ago a sizeable set of Apache lexemes was extended en masse to cover a conspicuous item of material culture introduced by Anglo-Americans. Specifically, a group of Apache anatomical terms was extended to label the different parts of automobiles and pickup trucks (see figure 3). As we shall see, the application of anatomical terms to motorized vehicles resulted in a kind of semantic change that is clearly apparent at the level of the terminological set but not at the level of its constituent lexemes. Consequently, a conventional atomistic interpretation—that is, an interpretation that exam-

ANATOMICAL TERMS (re: humans)	EXTENDED MEANINGS (re: motorized vehicles)
biwos ('shoulder')	'front fender(s)'
bigan ('hand and arm')	'front wheel(s)', 'tires'
biyedaa' ('chin and jaw')	'front bumper'
bikee' ('foot', 'feet')	'rear wheels', 'tires'
bínii' ('face')	'area extending from top of windshield to front bumper'
bita' ('forehead')	'windshield'
bichįh ('nose')	'hood'
bigháń ('back')	'bed of truck'
bik'ai ('hip and buttock')	'rear fender(s)'
bizé' ('mouth')	'opening of pipe to gas tank'
bidáá ('eyes')	'headlights'
bits'ǫǫs ('veins')	'electrical wiring'
bibiiye' ('innards')	'all items under hood'
bizig ('liver')	'battery'
bibid ('stomach')	'gas tank'
bijíí ('heart')	'distributor'
bijíí'izólé ('lung')	'radiator'
bich'í' ('intestines')	'radiator hose(s)'
bi'ik'ah ('fat')	'grease'

FIGURE 3. Western Apache anatomical terms with extended meanings.

ined the Apache terms in isolation and did not consider their relationships vis-à-vis one another—would fail to disclose that together with the individual lexemes a *system of classification* had also been extended. Following a closer look at the Apache data, I shall return to this point and discuss it in greater detail.

Anatomical Terms and Automobiles

Western Apache is one of seven languages that comprise the Southern Athabascan, or Apachean, substock of the Athabascan family. The other languages in this substock are Navajo, Chiricahua, Mescalero, Jicarilla, Lipan, and Kiowa-Apache. Western Apache includes five mutually intelligible dialects: San Carlos, Cibecue, White Mountain, and Northern and Southern Tonto (Goodwin 1942). Phonological differences between the San Carlos and White Mountain dialects have been described by Hill (1963). The material for this paper was provided by consultants living in the community at Cibecue, which is located just south of the Mogollon Rim near the center of the Fort Apache Indian Reservation.

My data come from five Apache men, sixty years or older, who speak but little English. All were present on the Fort Apache reservation between 1930 and 1935, when Apaches first began acquiring automobiles and pickup trucks. Unlike younger Apaches, some of whom are bilingual, my consultants were totally unfamiliar with English terms for the parts of motorized vehicles. This is not to suggest, however, that the use of extended anatomical terms is today restricted to members of the senior generation. On the contrary, the extended terminology is part of every Apache's basic vocabulary and is commonly resorted to in daily conversation. Long before an Apache child learns that a car has a battery, he or she knows it has a 'liver'.

Western Apache anatomical terms occur as responses to the query, *X bits'i la' hat'íí wolzeeʔ* ('What are the parts of an *X*'s body called?'), where *X* is a lexeme labeling the class of objects whose anatomy is being investigated. Several hundred lexemes, including *nałbiil* ('automobile', 'pickup truck'), can fill this position, and strictly speaking there are as many sets of anatomical terms as there are substitutable lexemes. The set that refers to 'humans' (*ndee*), for example, cannot be considered semantically isomorphic with the sets for 'horse' (*łíį́*), 'bear' (*shash*), or 'automobile' (*nałbiil*), even though many of the same terms are present in all four. This becomes evident when we recognize that, depending on which set it is in, the same anatomical term may have distinctly different referents. Thus, applied to humans, the term *bikee'* denotes 'foot'; applied to horses, 'hoof'; to bears, 'paw'; and to automobiles, 'tires'.

In the presence of multiple anatomical sets, we can only speculate on which one, or ones, actually served as the model for labeling motorized vehicles. Several Apaches, citing functional similarities between cars and horses, suggested that the latter may have served in this capacity. Significantly, however, none of the anatomical terms extended to motorized vehicles is unique to the set for horses. In fact, the extended terms are found in a great many anatomical sets and so are extremely common. With this in mind, I shall concentrate on the set that is probably basic to all the others, that which is used in reference to men and women.

Listed in the left-hand column of figure 3 are nineteen anatomical terms supplied by my consultants in response to the query, *ndee bits'í la' hat'íí wolzeeʔ* ('What are the parts of a person's body called?'). These lexemes, together with a large number of others that were not extended to automobiles, comprise what I shall call the *anatomical set*. The meanings of the extended terms, which are glossed in the right-hand column, were given in response to the query, *nałbííl bits'y 'a' hat'íí wolzeeʔ* ('What are the parts of an automobile's body called?') and together make up the *extended set*. As shown in figure 4, the anatomical set takes the form of a three-level part-whole taxonomy, with *ndee bits'í* ('human's body') serving as the cover term. Eight of the set's eighteen remaining terms are subsumed under two superordinate lexemes, *binii'* ('face') and *bibiiye'* ('innards'), which operate at the second taxonomic level. It is important to note that the hierarchical structure of the anatomical set has been faithfully duplicated in the extended set. Indeed, as shown in figure 5 the two structures are identical.

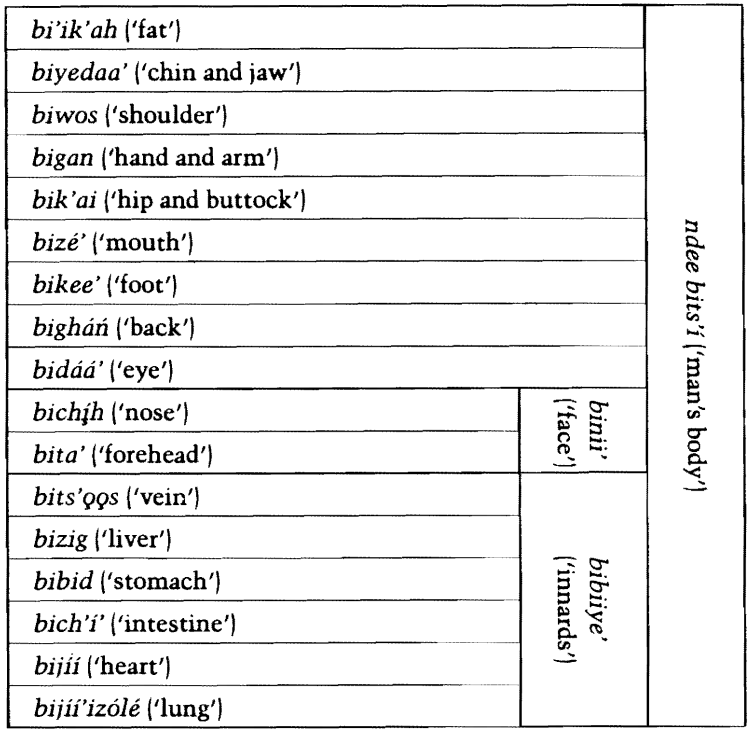

FIGURE 4. Taxonomic structure of anatomical set. (Note: Hatched areas indicate position in taxonomy of additional [i.e., unextended] anatomical terms.)

Set Extension

In dealing with the semantic extension of a single lexeme, the most that can be shown is that its associated category has been broadened to include a novel class of referents and, as a consequence, that the lexeme itself has acquired a new sense. At the level of the lexical set, however, it is apparent that extension involves more than the acquisition of new senses by individual lexemes. What is also involved, as we have seen, is an extension of classificatory principles and their structural interrelationships—in short, an entire taxonomic framework. Accordingly,

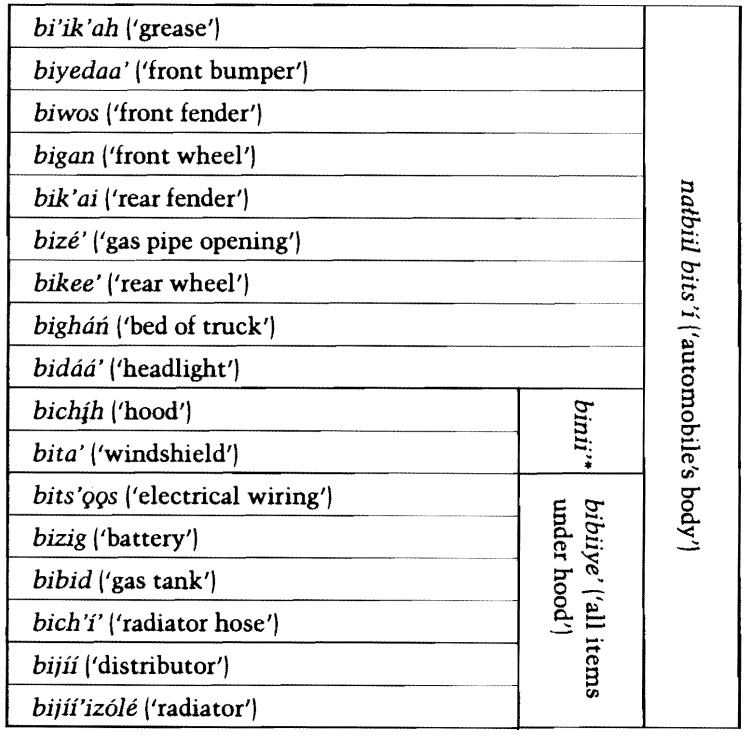

FIGURE 5. Taxonomic structure of extended set.
* 'area extending from top of windshield to front bumper'

set extension may be defined as the process in which all or part of a lexically coded taxonomy is mapped onto a portion of the environment that has not been previously classified.

The concept of set extension is a useful one. It allows us to generalize about semantic change at a level above the word by suggesting that entire lexical sets may be extended in a manner analogous to single lexemes. Extension of both sorts results in the expansion of existing semantic categories to include new referents. But set extension is unique in that it also entails the

extension of intercategory relationships. If lexical sets and their associated conceptual domains are viewed as models of how speakers of a language construe the world around them, then set extension can be considered a process whereby old models are used to structure fresh experience.

A review of the literature on linguistic acculturation has uncovered only one other example of set extension.[1] This could be taken to mean that we are dealing with a very rare phenomenon, but more likely it indicates that linguists and ethnographers have not been in the habit of searching in the field for extended lexical sets. The additional example is provided by George Herzog (1941), who recorded a short list of Pima automobile terms—plainly anatomical extensions—that are similar in several respects to the Apache material discussed above. Unfortunately, the comparative utility of Herzog's corpus is limited on two counts. First, we cannot be sure that his list of extended Pima terms is complete, and second, the unextended meanings of the terms he presents are not precisely glossed. Nonetheless, it seems safe to conclude that the Western Apache were not alone in classifying the parts of motorized vehicles on the basis of an anatomical model. Indeed, the application of anatomical terms to motorized vehicles was probably for the Apache—and perhaps for the Pima as well—an ingenious adaptive move. Set extension facilitated communication about a totally foreign object in a familiar frame of reference and, at least for a while, made it unnecessary for Apaches to contend with an elaborate English terminology that even native speakers may sometimes find confusing.

A Semantic Explanation

In seeking to explain the extension of a lexical set we are not required to document the history of each of the set's constituent lexemes. Rather, we treat the set as a unit, assuming that an adequate explanation for its extension as a whole serves equally well for any and all of its members. But how should such an explanation be framed? More pointedly, how should we account for the fact that Western Apache anatomical terms were extended to automobiles and pickup trucks?

Let us begin by offering a functional explanation. Following their introduction by Anglo-Americans, motorized vehicles came to occupy a prominent place in the Western Apache transportation system that had formerly been filled by the horse; because anatomical terms were applied to horses, these terms were readily extended to their mechanized successors. On this account, set extension is explained as resulting from a functional equivalence between the category of objects customarily described by the extended set and the category of objects to which the set has been extended. I consider this explanation less than satisfactory. In the first place, too much depends on the putative correspondence of horse and car, a correspondence that several of my Apache consultants were eager to dispute. More important still, such an account is entirely removed from any aspect of language, thus implying (among a host of other misleading notions) that lexical changes cannot be profitably examined in relation to other linguistic phenomena.

An alternative explanation rests on the following assumption: when an item of foreign culture is incorporated into an established semantic category whose members are conventionally described with a particular lexical set, that set will be extended to cover the newly incorporated item. In this regard, it is interesting to note that motorized vehicles were classified by the Western Apache as instances of *'ihi'dahí*, a broad category that also includes humans, quadrupeds, birds, reptiles, fish, insects, plants, and several other engine-driven machines (e.g., bulldozers, tractors, steam shovels). This category contrasts with *destsǫǫhí*, which encompasses most topographical features and all but a few items of material culture. My investigation of these two categories has been fairly exhaustive, and it appears to be the case that *'ihi'dahí* includes only those phenomena that are capable of generating and sustaining their own movement. Conversely, *destsǫǫhí* is restricted to objects that are wholly immobile or depend for movement upon the action of external forces. So far as I have been able to determine, Apache anatomical terminologies are used exclusively in connection with members of the *'ihi'dahí* category. Members of the *destsǫǫhí* category are not described with anatomical sets,

but with other nomenclatures that do not concern us here.

A semantic explanation may now be offered for the extension of Western Apache anatomical terms to motorized vehicles. When the automobile was first introduced, it was perceived by Apaches to possess a crucial defining attribute—the ability to move itself—and on this basis was incorporated into the *'ihi'dahí* category. The conventional practice of describing members of this category with anatomical terms was then applied to cars and pickup trucks, producing the extended set discussed above. That Model-T Fords were found by the Western Apache to possess "livers"—which were part of the vehicles' "innards," which in turn were part of their "bodies"—might well have been expected. It was, in a way, a matter of common sense.

3 / A Western Apache Writing System: The Symbols of Silas John

Co-authored by Ned Anderson

In a lengthy essay published in 1888–89, Garrick Mallery, a retired military officer employed as an anthropologist by the Bureau of American Ethnology, invited explorers, missionaries, and ethnographers to provide him with information pertaining to systems of graphic communication then in use among the Indian tribes of North America. Expressing his conviction that these "primitive forms of writing provide direct and significant evidence upon the evolution of an important aspect of human culture," Mallery also warned that they were rapidly disappearing, and that unless those in existence were studied immediately the opportunity would be lost forever. Unfortunately for anthropology, Mallery's invitation went largely unheeded and his prophecy came true. In the closing decades of the nineteenth century, a number of native graphic systems went out of existence and a fledgling social science, occupied with more urgent concerns, scarcely took note of their passing.

The lack of enthusiasm that greeted Mallery's early call for research set a precedent which was destined to continue, for to this day the ethnographic study of so-called primitive writing systems—including those stimulated by contact with Europeans—has failed to engage the sustained interests of either linguists or cultural anthropologists. The result, I. J. Gelb (1963 : 10) has observed, is that "Some of these writings are known very inadequately, others are known only from hearsay and still others must exist in obscure corners of the globe as yet unnoticed by scholars."[1]

Under these circumstances, it is with marked enthusiasm