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NOUN CLASSIFICATION AND ETHNOZOOLOGICAL CLASSIFICATION IN MACHIGUENGA, AN ARAWAKAN LANGUAGE OF THE PERUVIAN AMAZON¹

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A system of noun classification (numeral classification) is described in the Machiguenga language as spoken on the upper Manu river, southern Peru. Since the same numeral classifier may occur with both the animate and the inanimate affix for many numerals, there exist animate and inanimate forms for many numeral classifiers. Animate forms refer mostly to groups of animals, while inanimate forms refer mostly to plants and plant parts. Numeral classifiers for animals create an analogy between some distinctive aspect of the animal's form and some inanimate object: the classifier for 'small animals' (mice, small birds, flies) is the animate form of the classifier for 'seeds and other small, round, numerous objects'; the classifier for 'monkeys with non-prehensile tails' (tamarins, squirrel monkeys, etc.) is the animate form of the classifier for 'vines, strings and veins'. The relationship between the cognitive processes of noun classification and ethnobiological classification is explored.

1. INTRODUCTION

Noun classification is a characteristic of some languages in which nouns and their associated elements are grouped into a number of linguistically marked categories based on salient semantic features such as gender, animate/inanimate status, size, shape, texture, number, flexibility, solidity, fluidity, body parts and so on. Systems of noun classification occur in widely separated and historically unrelated languages and show similar features in cross-linguistic comparisons (Allan 1977:301). Ethnobiological classification, the classification of plants and animals as found in indigenous and folk cultures, is based on salient morphological features of biological organisms, and shows remarkable similarity in cross-cultural comparisons (Berlin 1992:27). In this paper, noun classification in the Machiguenga language of Peru is discussed in the light of linguistic, cognitive and ethnobiological theory. Since a large proportion of Machiguenga noun classifiers are concerned with plants, animals and their constituent parts (leaves, stems, flowers, bones, skin, teeth and so on), the Machiguenga language provides an excellent opportunity to study the similarities and differences between noun classification and ethnobiological classification.

With the exception of a few illustrative examples drawn from personal communications (see Doris Payne 1987; Derbyshire and Payne 1990), this paper represents the first published account of noun classification in Machiguenga. It is also the most thorough treatment of noun classification yet published for any language in the Arawakan language family, and represents a significant contribution to the study of classification in Amazonian languages and worldwide. By drawing on both ethnobiological and linguistic theories, new insights are provided for understanding the cognitive processes behind the unique human capacity for labeling and categorizing the world of things.

Following a brief introduction to Machiguenga language and culture (Sections 1.2 and 1.3), this paper presents an overview of cross-linguistic definitions of classification (Section 2), emphasizing how Machiguenga both fits and defies the accepted models. A theoretical framework is established using

Dixon's (1986) discussion of noun class vs. noun classification and Derbyshire and Payne's (1990) discussion of (1) numeral-type classification, (2) concordial classification, and (3) verb-incorporated classification. In the third section (3.1-3.3), the three kinds of classification (following Derbyshire and Payne) found in Machiguenga are discussed individually. In Section 4, the peculiar case of "1+2" (numeral + concordial-animate/inanimate) classification in Machiguenga numerals will be examined, emphasizing the relevance of this case to the cross-cultural study of noun classification and ethnobiology. In the concluding section, examples of Machiguenga classification are compared with examples from other languages in order to speculate on the evolution of noun classification in the Machiguenga language and to point towards universal underpinnings of classification in human cognition.

1.2. LINGUISTIC, GEOGRAPHIC AND CULTURAL SETTING

The Machiguenga language of southeastern Peru belongs to the pre-Andine Maipuran branch of the Arawakan language family, and is most closely related to Ashaninka (Campa), Nomatsiguenga, Yanasha (Amuesha) and Piro (Noble 1965). The most complete descriptions of the Machiguenga language available to date are the Spanish-Machiguenga dictionary (Aza 1923) and grammatical study (Aza 1924) written by a Dominican priest working at the beginning of the century. Anecdotal descriptions of Machiguenga and other Arawakan languages are found in Farabee's (1918) accounts of an expedition to southern Peru. In more recent years, Machiguenga phonetics have been described by Solis (1973) and Snell (1974). A Machiguenga-Spanish dictionary is soon to be released (Snell and Snell in press). Comparative studies on the Arawakan language family are found in Perea y Alonso (1942) and Noble (1965).

Some 13,000 speakers of various dialects of Machiguenga inhabit the tributaries and headwaters of the Urubamba and Upper Madre de Dios Rivers, in the tropical mountain forest on the eastern slopes of the Andes (Lizarralde 1988). The research for this paper was conducted in the village of Yomybato (or Quebrada Fierro) on the upper Manu river, a tributary of the Upper Madre de Dios, within the boundaries of the Manu Biosphere Reserve. The dialect of Machiguenga spoken there is the same as that described by Solis (1973) and differs only slightly from the dialect (or dialects) spoken in the Urubamba River, as described by Snell (1974).

Like other indigenous Amazonian groups, the Machiguenga have a sophisticated knowledge of the plants, animals and natural habitats which surround them. During the course of ethnobiological research with the Machiguenga, the author came across noun classification in the Machiguenga language. In fact, ethnobiological objects appear to provide the *raison d'être* for the system of noun classification. In their forest-dependent lifestyle, most objects in Machiguenga material culture are derived directly from plant and animal resources: needles carved from monkey bones, necklaces strung with seeds and animal teeth, tobacco snuff stored in giant snail shells, manioc-beer kegs hollowed out of palm trunks, handsome crowns woven from the brilliant breast feathers of toucans and macaws and the coal-black wings of curassows. It is within the environmental setting of the tropical rain forest and the theoretical framework of ethnobiology that this study of Machiguenga noun classification was conceived.

1.3. NOTES ON ORTHOGRAPHY

Machiguenga words in this paper are written with an orthography developed by the Summer Institute of Linguistics (see Snell 1974). All Machiguenga, Spanish and other foreign language terms appear in the text in italics. In examples, affixed classifiers will be indicated with the abbreviation "CL:" followed by a one-word gloss of the classifier's meaning. More detailed explanations of classifier meanings will be discussed in the text. Affixed animate and inanimate classifiers will be identified with the abbreviations "ANIM" and "INAN." Verbal roots are identified by the abbreviation "VR", and standard abbreviations are used for parts of speech ("PL" for plural, "D.O." for direct objects, and so on). An asterisk indicates ungrammatical or otherwise incorrect forms. For the purpose of simplicity, all animal and plant species will be referred to in the text only by their Machiguenga names and their common English equivalents (for mammals see Emmons 1990; for birds see Hilty and Brown 1986; for fish see Goulding 1980; for plants see Johnson 1983).

2 AN OVERVIEW OF NOUN CLASSIFICATION

Amazonian languages such as Machiguenga present a curious challenge in the cross-linguistic study of classification, since they defy categorization according to the standard definitions provided by linguists such as Dixon (1986) and Allan (1977). Dixon (1986) separates classification into two broad categories which he distinguishes with typological features: noun class and noun classification. Noun class is characterized by being an obligatory, closed grammatical system containing a small number of classes (2-20) indicated by an affix, article or clitic. The typical example is gender classification of nouns, found in many languages worldwide. The class marker is never restricted to the noun word, but rather is found in various elements of the noun phrase, expressing agreement between the noun and the other elements. Noun class is typically found in agglutinative or inflectional languages (Dixon 1986, cited in Doris Payne 1987:22). Noun classifiers, unlike noun class markers, are free words (though sometimes they occur in combination with numbers), and constitute a large set (20-400) of semantic categories. There is never reference to classifiers outside the noun phrase where they occur with (or in place of) the classified noun. Nouns may take more than one classifier and classifiers are often obligatory in numeral expressions. Systems of noun classification are typically found in isolating languages (ibid).

Classification in Amazonian languages—for example the system in Yagua (Doris Payne 1987) and the system described here—defies rigid typological definitions. Noun classifiers in both Yagua and Machiguenga can take on typological features which Dixon reserves for noun class systems. For example, noun classifiers may appear as affixes rather than whole words, and may show agreement beyond the limits of the numeral phrase. Examples from Tzeltal numeral classification (which fits Dixon's typological definition) and counter examples from Machiguenga illustrate these points:

| Tzeltal: | | Machiguenga: | |
|-----------------------|--------------|-------------------------|-------------------|
| (1) a. <i>j-tejk'</i> | <i>ich</i> | b. <i>pa-kana-t-iro</i> | <i>tsiti-kana</i> |
| one-CL:plant | chili pepper | one-CL:body-INA | CL:plant-CL:body |
| 'one chili pepper' | | 'one chili pepper' | |

| | | | |
|---|----------------------------|--|---|
| c. <i>jun</i> one-CL:general 'one chili pepper' | <i>ich</i> chili pepper | d. <i>pa-t-iro</i> one-(no CL)-INAN 'one chili pepper' | <i>tsiti-kana</i> CL:plant-CL:body |
| (2) a. <i>j-kojt'</i> one-CL:animal 'one dog' | <i>tz'i'</i> dog | b. <i>pa-kana-n-iro</i> one-CL:body-ANIM 'one dog' | <i>otsiti</i> dog |
| (3) a. <i>cha'-chujk'</i> two-CL:loop 'two loops of vine' | <i>ak'</i> vine | b. <i>pi-tsa-t-eti</i> two-CL:rope-INAN 'two lengths of liana' | <i>shivi-tsa</i> liana-CL:rope |
| c. <i>cheb</i> two-CL:general 'two vines' | <i>ak'</i> vine | d. <i>pi-t-eti</i> two-(no CL)-INAN 'two lianas' | <i>shivi-tsa</i> liana-CL:rope |
| e. <i>pimil</i> large 'thick vine' | <i>ak'</i> vine | f. <i>shivi-tsa</i> liana-CL:rope 'thick liana' | <i>ogampore-tsa-ni</i> thick-CL:rope |

In the Tzeltal examples, the classifiers *kojt'* (for animals), *tejk'* (for plants), and *chujk'* (for loops or knots) behave like whole words occurring only in combination with numerals. They do not act as affixes nor require agreement with any other elements of the phrase. In the Machiguenga examples, the words *tsitikana* ('chili pepper', containing the numeral classifier *-kana*, 'meaty bodies' as well as *-tsiti*, 'whole living plants'), *shivitsa* ('liana', containing the classifier *-tsa*, 'ropes, lianas, vines') and *ogamporetsani* ('thick rope, liana', also containing *-tsa*) all require numeral classifiers as affixes in order to be grammatical, contradicting Dixon's typology. The classifiers occur with numerals and there are many of them (more than twenty, see Table 2), characteristics that Dixon claims are indicative of noun classification. Yet they are affixes rather than whole words, are present in an agglutinative language, and in some cases require agreement beyond the numeral expression, characteristics that Dixon reserves for noun class markers. The affixes *-n* and *-t* in Machiguenga, indicating animate vs. inanimate things, fit better with Dixon's typology for noun class markers (see Section 3.1). Yet these noun class markers occur together with noun classifiers within the same numeral expression (see examples 1 and 2).

Allan (1977) distinguishes four kinds of noun classification: (1) numeral classification; (2) concordial classification; (3) predicate classification; and (4) intra-locative classification. Allan also implies that classifying languages can themselves be classified based on these distinctions. Some languages, like Thai and Tzeltal Mayan, are numeral classifier languages, because classifiers are used with numerals (though may occur in non-numeral contexts as well) to indicate certain properties of the nouns being counted. The closest English equivalents to numeral classifiers are in expressions of measurement ('one glass of water' as opposed to 'one bucket of water') or in collective expressions ('one herd of buffalo' as opposed to 'one flock of geese'). However in English these "classifiers" are obligatory in only a few kinds of expressions, and are not specialized enough to warrant considering English as a "numeral clas-

sifier language”.

Other languages, like several African and Australian languages, are concordial classifier languages, because classifiers are required to express concordance or agreement between a head noun and its dependent elements. Allan’s “concordial classification” and Dixon’s “noun class” are similar, with the typical example being gender systems. Athapaskan languages are known as predicate classifier language because they contain classificatory verb stems. Intra-locative classification is a rarer kind of classification in which classifiers are affixed to locative expressions.

Derbyshire and Payne (1990) assert that many Amazonian languages cannot be labeled as belonging to any one of Allan’s four discrete types of classification, since one language may contain various types. Building on and modifying Allan’s definitions, Derbyshire and Payne describe three kinds of classification important for Amazonian languages: 1) numeral-type classification; 2) concordial classification; 3) and verb-incorporated classification.

1) Numeral-type classification as defined by Derbyshire and Payne is much like Allan’s “numeral classification”. Like Allan, Derbyshire and Payne concede that numeral classification is not restricted to numeral expressions, but occurs frequently enough in association with numerals to warrant the name “numeral-type classification”. In this paper, the distinction will be made between *true* numeral classification (numeral classifiers occurring in numeral expressions) and *numeral-type* classification (numeral classifiers occurring in adjectives, nouns and other non-numeral expressions).

2) Concordial classification is much like gender concordance in many European languages, except that the scope is broader than the male/female/neuter distinction, including such attributes as animate/inanimate and human/non-human (Derbyshire and Payne 1990:245). Concordial classifiers are affixed to nouns, verbs and adjectives to make them agree throughout the phrase. This is much like Dixon’s concept of noun class, except that Allan’s definition is not typologically rigid and allows room for the kind of concordance between numerals, nouns and adjectives in Machiguenga as mentioned in examples 1-3. Animate/inanimate classification in Machiguenga is mostly independent from other forms of classification and nearly fits Dixon’s typology for noun class systems. Despite the limitation of Dixon’s definition, the term noun class (understood to be a special case of concordial classification, see Derbyshire and Payne 1990:245) will be used throughout the rest of the paper to distinguish animate/inanimate classification from other kinds of classification found in Machiguenga.

3) Verb-incorporated classification is similar to Allan’s “predicate classification”, except that verb-incorporated classifiers refer to the understood objects and subjects of verbs rather than to the verbal actions themselves. In this sense, verb-incorporated classifiers are essentially noun classifiers that are incorporated into or affixed to verbs.

Machiguenga contains all three forms of classification discussed by Derbyshire and Payne. In addition, it presents some degree of combination and overlap between these three different forms of classification. Overlapping forms of classification will be indicated by “adding” their respective numbers together.

1+2) Numeral + concordial classification. Numeral classifiers in true numeral expressions are obligatorily marked with noun class markers (a special kind of concordial classifiers) indicating the animate/inanimate status of the object being counted (see Section 3.1). Also, as discussed in examples 1 and 2, numeral-type classifiers are obligatory in certain nouns, adjectives, verbs and other non-numeral expression in order to express agreement between the head noun and dependent elements, much as concordial classifiers do.

1+3) Numeral + verb-incorporated classification: Some (though not all) numeral and numeral-type classifiers are also affixed to verbs (see Section 3.3) in order to reference their understood objects (for transitive verbs) or subjects (for intransitive verbs).

Despite areas of overlap, the three kinds of classification in Machiguenga are independent enough to warrant an individual discussion of each. For example, many common verb-incorporated classifiers are only occasionally or never found in numeral-type expressions, and vice versa (see examples 9-13, Section 3.3). While animate/inanimate noun class is obligatory in true numeral expressions (1+2 classification), it is not found (or the semantic distinction has been lost; see example 7) in numeral-type adjectival expressions. Furthermore, noun class occurs in many contexts independent of both numeral and verb-incorporated classification (see Section 3.1).

3. CLASS MARKING AND CLASSIFICATION

3.1. ANIMATE/INANIMATE CLASS MARKERS

The animate and inanimate classes are indicated by the affixes *-n* and *-t*, and are obligatory in true numeral expressions. There are three true numerals in Machiguenga (here listed in both the animate and inanimate forms): *paniro-patiro* ('one'), *piteni-piteti* ('two') and *mavani-mavati* ('three' or 'several'). The ordinal expression *apiteni-apiteti* ('second', 'the next one', 'another one') behaves like a numeral as well. The expressions *majani* ('few'), *tovaini-tovaiti* ('many') and *maganiro-magatiro* ('all') are also constructed like numerals in Machiguenga. The markers *-n* and *-t* indicate animate/inanimate noun class and agree with the noun being counted. The exception is the term *majani*, 'a few, a little', which has apparently become fossilized and takes only the animate form (*maja-n-i* and never **maja-t-i*)². The term *tovaini*, 'many', appears to be on the verge of fossilization: the animate form (*tovai-n-i*) is often, though not always, used in place of the inanimate form (*tovai-t-i*).

The number four may be expressed as *pite-page* ('two' + plural suffix³), i.e. 'several twos, a pair of twos', but it is used infrequently and carries neither an animate/inanimate class marker nor numeral classifiers. The number five may be expressed by the verb *notsongavakotake*, 'my hand ran out of fingers', but it is used infrequently and takes no numeral or animate/inanimate classifiers (though it does contain the verb-incorporated classifier for 'hand'; see Section 3.3). Despite the existence of these terms for numbers beyond three, Machiguenga counting typically ends at two or three: "One, two, several, many..." (*patiro, piteti, mavati, tovaini*).

As illustrated in Table 1, numerals and numeral-like expressions have a common structure:

numeral prefix - animate/inanimate marker - numeral suffix + noun (optional)

The numeral 'one' (*paniro, patiro*) and the expression 'all' (*maganiro, magatiro*) consist of a prefix (*pa-* or *maga-*) and the suffix *-iro*, with the animate/inanimate marker (*-n* or *-t*) affixed between (*patiro*,

'one inanimate thing, *maganiro*, 'all (animate)'). The other numerals and numeral-like expressions consist of a prefix (*pi-te-* for 'two', *mava-* for 'three, several', *tovai-* for 'many') and the suffix *-i* with animate/inanimate marker affixed between (*piteni*, 'two animate things', *mavati*, 'several inanimate things').

The verb 'to be' employs the same noun class affixes found in numerals:

| | |
|----------------|--|
| <i>ai-n-io</i> | 'there is, there are (animate things)' |
| <i>ai-t-io</i> | 'there is, there are (inanimate things)' |

All other verbs take the "feminine" form to refer to inanimate things and the "masculine" form to refer to animate things. For this reason, Machiguenga who speak Spanish may refer to the inanimate forms as *hembra* ('female') and the animate forms as *macho* ('male'). In addition, the sun, the moon, the stars, lightning, rainbows and other natural phenomena perceived to be sentient by the Machiguenga (all are important mythological characters) are also treated with the animate forms. Snell makes the observation that

All masculine nouns are animate, and 'exceptionally' the sun, moon stars (all of which were once people), shoes, rubber, gold and money. The majority of feminine nouns are inanimate, but the category includes some animates: women, some female pets, deer, toads, frogs and lizards (cited in Doris Payne 1987:35).⁴

Animate/inanimate and male/female noun class is found for both the subjects and objects of verbs:

| | | |
|------------|----------------|---------------------------|
| <i>o-</i> | subject prefix | female/inanimate |
| <i>i-</i> | subject prefix | male/animate |
| <i>-ro</i> | object suffix | female/inanimate |
| <i>-ri</i> | object suffix | male/animate ⁵ |

3.2 CLASSIFICATION

3.2.1. NUMERAL CLASSIFICATION IN MACHIGUENGA

Numeral classifiers in Machiguenga are affixes that may be attached to numeral expressions in order to specify certain attributes (size, shape, flexibility, texture) of the object being counted. While the animate/animate class marker is obligatory for all true Machiguenga numerals (except for 'four' and 'five', as discussed earlier), numeral classifiers are optional, and are used only with the numerals 'one', 'two', 'second/another', and (rarely), 'all'. Numeral classifiers are affixed into numeral expressions between the numeral prefix and the animate/inanimate class marker⁶:

numeral prefix - numeral classifier - animate/inanimate classifier - numeral suffix + noun

| | | | | | |
|--------|------------|--------------------------|-----------|--------------|----------------|
| (4) a. | <i>pa-</i> | <i>-poa</i> | <i>-t</i> | <i>-iro</i> | <i>sekatsi</i> |
| | 'one' | CL: 'cylindrical object' | INAN | suffix-'one' | 'manioc plant' |

papoatiro sekatsi

'one tuber of manioc' (as opposed to one leaf, stem, etc.)

- b. *pa-* *-poa* *-n* *-iro* *parari*
'one' CL:'cylindrical object' ANIM suffix-'one' 'river otter'

papoaniro parari

'one river otter' (belonging to the class of cylindrical animals)

Since numeral classifiers are optional, one may also correctly say:

- c. *pa-* — *-t* *-iro* *sekatsi*
'one' (CL omitted) INAN suffix-'one' 'manioc plant'

patiro sekatsi

'one manioc' (unspecified part)

- d. *pa-* — *-n* *-iro* *parari*
'one' (CL omitted) ANIM suffix-'one' 'river otter'

paniro parari

'one river otter' (unspecified animate object)

Since numeral classifiers are rather specific, the noun may also be omitted with minimal loss of meaning:

- e. *pi-poa-te-t-i*
two-CL:cylindrical-(two)-INAN-(suffix)
'two tubers' (understood to be 'two tubers of manioc')

- f. *pi-poa-te-n-i*
two-CL:cylindrical-(two)-ANIM-(suffix)
'two cylindrical animals' (understood to be 'two river otters')

Numeral classifiers are used frequently in Machiguenga speech, especially for the most common objects. Classifiers are semantically active: recently introduced objects such as pencils (which take the classifier for sticks), paper (which takes the classifier for broad leaves) and propeller blades (which take the classifier for bows, knives and stone axes) are incorporated into existing categories. Ambiguous objects may be classified in several logically consistent ways. For example when receiving a gourd full of manioc beer, one might call it *pa-tsota-tiro* ('one gourd'), emphasizing the container, or *pa-koa-tiro* ('one container full of liquid'), emphasizing the contents. Stingrays may take the classifier *-pana*, 'broad, flat objects' (such as banana leaves, paper), emphasizing the body, or the classifier *-tsei*, 'sharp or thorny

- d. *ario-tsantsa-shi-ani*
 thus-CL:long-CL:leaf-()
 'plant with lanceolate leaves this size' (speaker uses hands to indicate length)
- e. *tsiripe-miria-ki-teni*
 small-CL:cluster-CL:seed-()
 'plant with small, clustered seeds or berries'

Many of these adjectival expressions correspond with scientific, botanical descriptive terms such as "lanceolate leaves", "obovate leaves", "cardioid leaves", "raceme," and so on.

3.3. VERB-INCORPORATED CLASSIFICATION

Classifiers are affixed into verbs in order to specify the understood objects or subjects of verbal action, or the medium in which the action takes place. One of the most common is the classifier *-aa* (varies freely with *-aja*), used to indicate action taking place in water or relating to water or other liquids:

- (9) a. *o-kimo-aa-take*
 it-VR:to grow-CL:water-(suffix)
 'the water rose, the river has flooded'

The same affix occurs with nouns, adjectives and locative expressions:

- b. *parianti-aa*
 banana-CL:water
 'banana beer'
- c. *tsompogi-aa-ni*
 deep-CL:water-(suffix)
 'deep water'
- d. *o-aa-ku*
 INAN-CL:water-LOCATIVE
 'at the river's edge'

Also, this affix is used in a few verbs associated with eyes (see also *-oki*, 'eye', below), apparently referring to the liquid surface of the eye:

- e. *no-katsi-aa-take*
 I-VR:to hurt-CL:water-(incomplete)
 'I have an eye infection'
- f. *no-ve-aa-tanai*
 I-VR:to heal-CL:water-(complete)

'My eye infection has healed'

Also common are the body-part classifiers *-gito* (*igito*, 'his head') to indicate verbal action directed to heads or skulls, *-vako* (*irako*, 'his hand') for verbs associated with hands, *-oki* (*iroki*, 'his eye') for verbs associated with eyes, and *-ponki* or *-vonki* (*ivonkiti*, 'his leg') for verbs associated with legs.

- (10) a. *i-tso-gito-take-ro*
he-VR:to suck, finish-CL:head-(incomplete)-D.O.
'he sucked/finished the meat off the head of an animal'⁷

as opposed to:

- b. *i-tso-tega-take-ro*
he-VR:to suck-CL:flower(-)-D.O.
'it sucked the nectar from a flower (i.e. bees, hummingbirds)'

- (11) *i-tsonga-vako-take*
he-VR:to finish-CL:hand(-)
the number five, literally, 'the hand ran out of fingers'

- (12) *i-kaa-oki-take-mpa*
he-VR:to bathe-CL-eye(-)-REFLEXIVE
'he dripped herbal medicine in his own eye'

- (13) a. *i-ne-vonki-take-ro*
he-VR:to look-CL:feet(-)-her
'he checked her feet for foot parasites'

- b. *pa-ponki-tiro*
one-CL:foot-INAN
'one root'

The first three body part classifiers appear to be used only in verbs, not in numerals or adjectives. The body-part classifier *-ponki* or *-vonki* ('leg, roots'), is used both in verbs and in numerals and adjectives, referring both to human and animal legs and to the roots or stems ('legs') of plants. Munduruku, a Tupian language, is particularly rich in such body-part classifiers occurring mostly in verbal settings (Derbyshire and Payne 1990:261).

In Machiguenga as well as in Munduruku, some verb-incorporated classifiers serve also as noun classifiers. As mentioned above, the classifier *-aa*, for water, can be incorporated into verbs, nouns and adjectives, but not numerals. The classifier *-shi*, for plant leaves (*oshi*, 'its leaf'), occurs in verbs (14 a), nouns (b), adjectives (c), numerals and their associated noun phrases (d), locative expressions (e) and in a compound numeral classifier (f):

- (14) a. *i-tima-shi-take*
 he-VR:to stay, wait-CL:leaf-()
 'he spied, hunted from a blind' (hunting blinds are made of leaves)
- b. *tsirompi-shi*
 fern-CL:leaf
 'fern leaf' (as opposed to stem, root, etc.)
- c. *tsiripe-shi-ati komashki*
 small-CL:leaf-(suffix) guava
 'small-leafed variety of guava'
- d. *pa-shi-tiro komashki mecho-shi-ari*
 one-CL:leaf-INAN + guava + VR:to be born-CL:leaf-(suffix)
 'one fresh, young bud leaf of guava'
- e. *in-keni-shi-ku*
 (prefix: plants)-VR:to enter?-CL:leaf-LOCATIVE
 'in the forest'
- f. *pa-shi-tsa-tiro*
 one-CL:leaf-CL:rope-INAN
 'one herbaceous vine' (as opposed to one woody liana)

In the final example, the classifier *-shitsa*, 'herbaceous vine, nerve, vein', appears to be composed of the classifier for leaf, *-shi*, combined with the classifier for ropes and lianas, *-tsa*, hence connoting a flimsy, herbaceous vine as opposed to a stiffer, woody liana (*otsa*). The classifier *-tsa*, for ropes, lianas and snakes, is apparently related to the verbal root for tying and untying (15 a-b). It also occurs as a classifier in verbs to indicate the growth habit of lianas or vines (c), as well as snake-like (d) or worm-like (e) locomotion:

- (15) a. *o-tsa-take* *soga-tsa*
 she-VR:to tie-(incomplete) + *soga* (Spanish: 'rope')-CL:rope
 'she tied the rope'
- b. *tsa-i-ro!*
 VR:to tie-(suffix:reversal?)-it (imperative form)
 'untie it!'
- c. *o-kamari-tsa-take shivi-tsa*
 INAN-VR:to crawl-CL:rope-(incomplete) + vine/liana-CL:rope
 'the vine creeps, spreads along the ground'

- d. *i-kamari-tsa-tanake maranki*
ANIM-VR:to crawl-CL:rope-(progressive) + snake
'the snake was crawling'
- e. *i-kama-tsa-take* *i-tsomiri-te*
ANIM-VR:to die-CL:rope-(incomplete) + his intestinal worms
'his intestinal worms died, he passed intestinal worms in his stool'

The system of verb-incorporated classification in Machiguenga is not as extensive as that for numeral classification, with perhaps no more than ten to fifteen commonly used verbal classifiers as opposed to at least thirty common numeral-type classifiers. A few classifiers occur in both systems. This appears to be intermediate between the case of Mundurucu (Tupian), in which verb-incorporated, numeral and concordial classification occur together (with the verb-incorporated system being most developed), and the case of Palikur (Arawakan), in which verb-incorporated and numeral classification are entirely independent (see Derbyshire and Payne 1990).

4.1. DUAL-PURPOSE NUMERAL CLASSIFIERS

Some numeral classifiers occur only with the inanimate class marker: *pa-shi-t-iro*, 'one leaf', and *pa-koroa-t-iro*, 'one stalk of sugar cane'. Yet as illustrated in the above examples dealing with manioc tubers and otters (both belonging to the category of cylindrical things), some common numeral classifiers are used with both the animate and inanimate class markers. Numeral classifiers, typically referring to plants and plant parts, are applied to animals in interesting and sometimes surprising ways. For example:

- (16) a. small mammals take the classifier for seeds and pebbles (*-kitso*);
b. large mammals take the classifier for chili peppers and banana bunches (*-kana*);
c. otters take the classifier for logs and manioc tubers (*-poa*).

The word *okitsoki* means 'its seed'. The classifier *-kitso* (16 a) with the inanimate marker refers to seeds, beads, small stones and other such objects. With the animate marker this classifier refers to small mammals, birds and bird eggs, non-stinging ants, flies, and other small, abundant animals. Small size an important semantic feature, as well as round shape and abundant nature of the objects.

- (17) a. *pa-kitso-tiro shinki*
one-CL:seed-INAN + corn
'one corn kernel'
- b. *pi-kitso-te-ti nengetsiki*
one-CL:seed-INAN + neck-CL:seeds⁸
'two necklace beads'

- c. *pa-kitso-n-iro sagari*
 one-CL:seed-ANIM + mouse
 'one mouse'
- d. *atava o-gitso-ni pi-kitso-te-ni*
 chicken + its-CL:seed + two-CL:seed-ANIM
 'two chicken eggs'

The classifier *-kana* (16 b; see also examples 1 and 2) appears to refer to fleshy, often edible things that have a bulky body or torso. With the inanimate class marker, it is used to refer to banana bunches and chili peppers. Note the difference between:

- (18) a. *pa-kana-tiro parianti*
 one-CL:body-INAN + banana
 'one bunch of bananas'

- b. *pa-pa-tiro* *parianti*
 one-CL:pod-INAN + banana
 'a single banana'

and between:

- c. *pi-tsiti-teti* *tsiti-kana*
 two-CL:plant-INAN CL:plant-CL:body (chili pepper)
 'two chili pepper plants'

- d. *pi-kana-tiro* *tsiti-kana*
 two-CL:body-INAN CL:plant-CL:body (chili pepper)
 'two single chili peppers'

The inclusion of chili peppers within this category is apparently due to the use of chili peppers as a meat substitute⁹. The word for chili pepper apparently consists of two numeral classifier affixes, *-tsiti*, for whole plants and *-kana*, for meaty bodies; hence *tsitikana*, 'plant meat, i.e. chili pepper'. With the animate marker, *-kana* refers to quadruped game animals (see Tables 2 and 3): peccary, tapir, deer, agouti, capybara, and so on. Other four-legged mammals included in this category are not edible, notably dogs and jaguars, but the most common use of the classifier is for game animals.

The word *opoa* means 'its trunk, its wood'. The noun classifier *-poa* (16 c; see also examples 4, 7) refers to solid, cylindrical objects with relatively small branches or limbs compared to the elongated body. The inanimate members include tree trunks, logs and manioc tubers. The animate members include river otters, kinkajous, caimans, catfish, and other animals which have an elongated, sleek, cylindrical form and relatively small limbs.

In Table 2 is a list of all noun classifiers encountered to date which refer to animals. Included in the list are examples of both animate and inanimate nouns members of each category. The meanings of related noun or verb stems are given when known.

4.2. ANALOGY IN THE NOUN CLASSIFICATION OF ANIMALS

Examining Table 2, it appears that the choice of a numeral classifier for an animal depends upon analogy: some distinguishing feature of the animal is likened to some inanimate object, usually a plant part. Often, the analogy is based on the overall size and shape of the animal. By using the classifier *-kitso* ('seeds'), small birds are likened to small, round seeds; by using the classifier *-poa* ('logs'), otters are likened to the cylindrical shape of logs. In several cases, the analogy is not based on the shape or size of the whole animal, but rather on the shape of some salient part of the animal. By using the classifier *-shitsa* ('strings, vines'), the non-prehensile tails of certain monkeys are likened to dangling, herbaceous vines. Monkeys with prehensile tails take the classifier *-empe* ('branches'), which refers to their ability to grasp tree branches with their tails. In other cases, the classifier is derived from the internal anatomy of the animal: *-sama* ('hollow tubes, flutes'), the classifier for large birds, appears to refer to the hollow bones of these animals. The birds most typical of this category (currasows and guans) are important game birds, and the hollow bones are used for making tobacco snuff tubes. The use of the classifier *-taki* ('skins') for parrots and macaws (and sometimes toucans) is apparently related to the use of their feathered skins as ornaments.

The most important semantic features treated in the system of numeral classification appear to be (in approximate order of importance): size, dimensionality, flexibility, shape or external form, internal structure, inherent property (edibility) and texture. In most cases, the classification depends upon multiple semantic features.

(19) size/shape + flexibility:

- a. *-kitso* small, round, hard objects (pebbles or seeds)
- b. *-motia* small, round, soft objects (rubber balls, grubs and bellies).

(20) dimensionality + flexibility:

- a. *-tsa* one-dimensional, somewhat flexible objects (lianas, ropes and snakes)
- b. *-shitsa* one-dimensional, flimsy objects (herbaceous vines, string and the non-prehensile tails of certain primates).
- c. *-tonki* one-dimensional, rigid objects (bones and needles)
- d. *-ki* one-dimensional, somewhat rigid (twigs and small trees)

(21) dimensionality + flexibility + internal structure:

- b. *-ki* one-dimensional, somewhat rigid, solid objects (twigs and small trees)
- c. *-pi* one-dimensional, less rigid, hollow objects (arrows and other reeds).

- (22) inherent property + size/shape :
- a. *-kana* fleshiness, edibility; large, bulky shape with “limbs” (banana bunches, large game animals, also chili peppers)
 - b. *-pa* fleshiness, edibility; medium cylindrical or pod-like shape (individual bananas, corn cobs, bean pods, flat-bodied fish)
- (23) size/shape + relative size/shape of parts:
- a. *-kana* large, bulky torso with medium-sized limbs (banana bunches, large mammals)
 - b. *-poa* cylindrical torso with a sleek shape and relatively small limbs (logs, otters, caimans)
 - c. *-tsenko* small torsos supported on long, thin limbs (tripod-like clusters of arrows frogs, shrimp, grasshoppers).
- (24) shape + internal structure and/or contents:
- a. *-saranta* flat, membranous covering carried on a set of rigid, internal supports (tents, bats, butterflies).
 - b. *-naki* round, hollow containers (gourds, clay pots, teeth, snails)
 - c. *-koa* round, hollow containers full of liquid (gourds of manioc beer, pots full of liquid)
- (25) texture:
- a. *-tsei* object covered in spines (spiny plants, porcupines)
 - b. *-ai* objects with a single pointed or sharp end (bottle gourds, avocados, stinging insects)¹⁰
 - c. *-mai* matted, tangled texture (cotton balls, tangled vines, sloth fur).

4.3. GENERAL PRINCIPLES OF ETHNOBIOLOGICAL CLASSIFICATION

As can be seen in Table 2 and in the above examples, the numeral classification of animals in Machiguenga is based on arbitrary semantic features that tend to ignore natural, taxonomic groupings. Given the sophisticated zoological knowledge of the Machiguenga, this was at first quite surprising. Machiguenga ethnozoological and ethnobotanical classification resembles systems of ethnozoological classification described throughout the world (Berlin 1992). The taxonomic groupings recognized by the Machiguenga, especially at the level of folk genus, map quite well onto the Western taxonomic system. In some cases, Machiguenga taxonomic knowledge is more refined than Western knowledge. How can the unnatural groupings of animals found in Machiguenga noun classification be resolved with Machiguenga ethnozoological classification and with current ethnozoological theory?

Berlin, expanding upon the formal taxonomic principles proposed by Kay (1971), proposed nine “general principles of classification and nomenclature in ethnozoology” (Berlin, Breedlove and Raven 1973). The most significant of these principles for the current discussion are summarized here:

Principles 1-3: All languages contain a system of linguistically recognized groupings (taxa) of organisms of varying degrees of inclusiveness. The taxa are arranged in a system of no more than five hierar-

chically ordered ethnobiological ranks: unique beginner, life form, generic, specific and varietal. A sixth "intermediate" level was tentatively suggested. Taxa assigned to each rank are mutually exclusive, except in cases of polysemy where a single term is used at different taxonomic levels or "levels of contrast," depending on context. Taxonomic terms may have multiple meanings (polysemy) depending upon the "contrast set" which is meant: 'man' may refer to the species *Homo sapiens* in contrast to other primates, or to a member of the male sex as opposed to the female 'woman', or to the age category of adult male as opposed to 'boy'.

Principle 7: The taxa in the rank of folk genus (or generic rank) are large but finite in number, usually around 500, and are usually included in one of the life forms. Aberrant or unaffiliated folk genera exist which are not included in any life form, usually due to morphological uniqueness or cultural importance. The folk genera are the building blocks of folk taxonomy, often being the first taxa mentioned in spontaneous conversation and the first taxa learned by children, and are hence the most salient level of classification. They tend to be recognized immediately according to overall pattern or "gestalt". The recognition of folk genera is probably related to the cognitive processes of basic object-level categorization (see Rosch and Lloyd 1978; Posey 1979:93).

Principle 9: Intermediate taxa may occur, usually between the ranks of folk genus and life form. Intermediate taxa can be demonstrated to exist when informants speak about certain genera as being "friends" or "relatives" of one another or when taxonomic mistakes are analyzed in studies of inter-informant variation. Yet only in rare cases do intermediate taxa have names. For example in English folk zoology, moths and butterflies belong to a single salient group and frogs and toads belong to another, yet neither of these salient folk categories have common English names. Because they are not named, such taxa are known as "covert categories" (see Berlin, Breedlove and Raven 1968). These data suggest that higher-order classification occurs later in the developmental history of systems of ethnobiological classification.

In his recent "tune-up", Berlin (1992:27-35) makes the following additions to the general principles:

Tune-Up 1: Systems of ethnobiological classification are "natural", that is, based on observed, biological affinities between organisms, independent of cultural significance.

Tune-Up 4: The generic and specific ranks have an internal structure in which certain organisms are perceived as prototypic for the group, while others are less typical.

Tune-Up 5: A majority of ethnobiological taxa correspond with Western scientific taxa, especially at the generic rank.

4.4. ETHNOZOOLOGY AND NOUN CLASSIFICATION IN MACHIGUENGA

Machiguenga ethnozoological classification includes only two named life form categories: 1) *tsimeri*, 'birds'; and 2) *shima*, 'fish'. There appear to be three "covert" (see Principle 9) or unnamed categories: 3) mammals; 4) four-legged reptiles; and 5) insects (bees, ants, beetles, spiders, butterflies, etc.). In addition, there are numerous aberrant (see Principle 7) or left-over species that are not considered to belong to any of the categories: bats, armadillos, sloths, snakes, centipedes, worms, shrimp, snails.

The term *tsimeri* refers more specifically to the intermediate category of small birds, corresponding roughly to the scientific order of Passeriformes. Yet the term can be used in a more general context at the level of life form to mean 'all birds' (see comment on polysemy, Principles 1-3). Fish are known as *shima*, which is again a more specific term indicating the folk genus of 'aracu fish'. However the term can be used in a collective sense to mean the life form of fish. These examples illustrate both polysemy and the principle of prototypic taxa (Tune-Up 4). The intermediate category of Passeriform birds and the genus of 'aracu fish' are considered to be the most typical examples of their respective life forms, and hence can be elevated to a higher order of classification to refer collectively to all members of a given life form.

While the other life forms do not have names, they are salient categories in Machiguenga classification of animals. Mammals (except for bats) are considered to be a single group by the Machiguenga due to the presence of hair and the breast-feeding of young. The term *poshiniri-page* ('delicious'+PL; i.e. 'the multiplicity of game animals') means in its prototypic sense 'large game mammals': monkeys, tapirs, peccaries, agoutis, and so on. Covert intermediate categories for mammals also appear to exist: monkeys, ungulates, carnivores and small rodents. With the exception of snakes, the Machiguenga recognize the morphological similarities between various terrestrial and amphibious reptiles such as turtles, caimans, lizards and frogs. Various intermediate groups of insects are also recognized, corresponding largely to major scientific orders and families.

In Table 3, the numeral classifiers from Table 2 are grouped according to major life forms or intermediate categories in Machiguenga folk zoology. Asterisks indicate those classifiers that cross-cut natural categories. When organized in this way, it becomes apparent that noun classifiers, despite cutting across natural taxonomic categories, tend to divide the most important life forms into consistent, and in some cases natural, units. For example, mammals and birds are both divided by numeral classifiers into three general categories:

MAMMALS:

- 1) large mammals (mostly important game species: peccaries, tapirs, agoutis; also dogs);
- 2) small mammals (mostly rodents and marsupials: mice, spiny rats, opossums);
- 3) left-over category (cylindrical mammals: mostly carnivores like otters, coatimundi, kinkajous).

BIRDS:

- 1) large birds (mostly important game species: currasows, guans, trumpeters, tinamous);
- 2) small birds (not important game species: trogons, wrens, flycatchers);
- 3) left-over category (birds with decorative skins: parrots and macaws, sometimes toucans).

The similarities between these two schemes of classification are apparent. The first category in both cases is a salient category of large animals, mostly important game species. The second category is for small animals, mostly not important game species. The final category is a left-over category containing important animals not included in the first two groups. The prototypic species for each category tend to belong to the same zoological order or family: 'large mammals' are mostly ungulates, 'small mammals' are mostly rodents, 'cylindrical mammals' are mostly carnivores; 'large birds' are mostly of the family

Cracidae, 'small birds' are mostly of the order Passeriformes, 'birds with decorative skins' are typically parrots and macaws (Psittaciformes; some informants also include toucans, valued for their decorative skins but belonging to a different order).

FISH:

Likewise fish are divided into categories of:

- 1) large fish with few bones, meat like bird meat (classifier *-sama*, also for large birds);
- 2) medium to large, flat-bodied fish (many bones);
- 3) small fish (so small that when you eat them you just get a mouth full of bones);
- 4) left-over category (cylindrical fish: catfish).

Size tends to be of prime importance in the scheme of numeral classification of animals. Edible and other useful species figure prominently. Also, the concept of unusual or left-over taxa is significant. Salient body parts are also significant in this system of classification. The vast majority of insects fall into the humble category of 'small, round, numerous things' (*-kitso*, 'seeds and small round things'). The classifiers used for specific kinds of insects tend to emphasize unusual or salient body parts: the stingers of bees and wasps (*-ai*, 'things with pointed ends'), the sharp needle of the mosquito (*-tonki*, 'bones, needles'), the rubbery texture and round shape of beetle grubs (*-motia*, 'bellies, rubber balls').

The case of monkeys is particularly interesting, since the noun classification has taxonomic significance. The classifier *-empe* ('branches') refers to the prehensile tails of the larger monkey species, capable of grasping tree branches: spider monkeys, woolly monkeys and howler monkeys. All belong to the scientific family of Atelidae (following Schneider et al. 1993) and are important game species. The classifier *-shitsa* ('string-like things') refers to smaller monkeys lacking prehensile tails: tamarins, night monkeys, squirrel monkeys and others. Most belong to the family Cebidae and none are hunted or consumed with great frequency. There is no ethnozoological term distinguishing between these two groups of monkeys, but the evidence from noun classification suggests that there exists a "covert category" (see Principle 9), an unnamed intermediate level in Machiguenga classification that separates monkeys with prehensile tails from those without. Evidence from mythology supports this conclusion: the first animals to be transformed from human to animal form were the spider monkeys, woolly monkeys, and other large species with prehensile tails.

The use of the noun classifier *-taki* ('skins') for parrots and macaws, separate from other birds, is a reflection of their taxonomic salience. As in the case of monkeys, the noun classification of parrots and macaws provides evidence for a covert category in Machiguenga classification of birds, in this case corresponding to the scientific order of Psittaciformes (parrots, parakeets and macaws). Interestingly, all birds categorized with the noun classifier for 'small animals' (*-kitso*) are included in the ethnozoological category of *tsimeri*, 'small birds', corresponding to the ornithological order of Passeriformes. In this case, noun classification reflects an existing "overt" ethnozoological category.

Unusual or "aberrant" forms, such as sloths, stingrays, bats, and shrimp are treated in ethnozoological classification as *sui generis* categories that contain only one or a few members. Ethnobiological theory refers to such categories as "unaffiliated taxa" (see Principle 7, above). A similar situation is found in the noun classification of animals. Sloths, unusual animals by anyone's standards, are given their own category, *-mai*, which refers to matted things such as cotton balls and tangled vines as well as to the

sloth's matted hair. Porcupines, rather than being included with other large mammals, are given their own category, *-tsei*, 'things covered in spines', also used for spiny plants. Interestingly, sloths and porcupines share a common mythological origin, apart from other mammals, again emphasizing their unusual nature in Machiguenga taxonomy¹¹. Other categories for unusual animals include: *-pana* ('broad, flat things'), used for stingrays; *-saranta* ('flimsy coverings with internal support'), which refers to the membranous wings of bats and butterflies; and *-tsenko* ('long-legged, tripod-like things'), used for shrimp, lizards, frogs, and other long-legged things with hopping locomotion.

Yet despite the light shed by this study of noun classifiers on certain intermediate and unaffiliated taxa in Machiguenga ethnozoological classification, it is clear that noun classification of animals does not follow the same rules as ethnobiological classification. Ethnobiological categories tend to be natural categories. Animals are assigned a place in a hierarchical taxonomy of organisms based on general morphological features or "gestalt". Noun classification of animals in Machiguenga resembles noun classification of other inanimate objects. The categories are largely arbitrary (i.e. not natural), and are based on the presence or absence of specific features (flexibility, dimensionality, texture, etc.) rather than on taxonomic gestalt.

Whereas systems of ethnobiological classification are concerned with classifying the living products of evolution, systems of noun classification are concerned mostly with classifying inanimate things, often things that are the products or raw materials of human manufacture. Likewise, noun classifiers used for animals in Machiguenga tend to emphasize the parts of animals used in material culture or cuisine: the classifier for large birds, *-sama* ('hollow tubes'), appears to refer to their hollow bones, used in the manufacture of tobacco snuff tubes; the classifier for large mammals, *-kana* ('meaty bodies'), emphasizes the bulky carcass of the animal being prepared for cooking; the classifier for parrots and macaws, *-taki* ('skins') appears to refer to their use as ornaments (the fact that some informants also include toucans in this category is further evidence of this fact).

One informant explained classifiers in this way, "When the macaw is flying, it is *paniro*, 'one living thing', when it is dead, it is *patakiniro* ('one skin'). When the tapir is in the forest, it is *paniro*, 'one living thing', when it is lying on the ground to be butchered, it is *pakananiro* ('one meaty body')". Classifiers are indeed used to refer to living animals in many common conversational settings. Yet this astute observation provides an insight into an underlying principle of noun classification for animals as well as other objects. Noun classifiers refer to objects in terms of their constituent parts, their abstract forms, their function as raw material to be transformed by human manufacture into material culture. Noun classification is concerned with the place of animals and other objects in the inanimate world of man-made things, not their place in the natural order of living organisms.

5. CLASSIFICATION AND COGNITION IN A CROSS-CULTURAL PERSPECTIVE

Borges writes of a fictional Chinese encyclopedia in which animals are divided into the following categories:

- a) belonging to the Emperor, (b) embalmed, (c) tame, (d) suckling pigs, (e) stray dogs, (h) included in the present classification, (i) frenzied, (j) innumerable, (k) drawn with a very fine camel hair brush, (l) *etcetera*, (m) having just broken the water pitcher, (n) that from a long way off look like flies (cited in Ellen 1979:6).

This beautiful parody shocks us by being both absurd and yet somehow logical at the same time. By considering the noun classification of animals in Machiguenga, we are confronted with a similar paradox, one which offers insights into the cross-cultural comparison of classification.

Numeral classification in Machiguenga is characterized by combining a system of noun classification and a system of animate/inanimate noun class to produce a synthetic system in which animals are classified according to analogy with inanimate objects. Many classifying languages have classifiers that distinguish people from animals. In Tzeltal and Thai, for example, there are classifiers referring to the category of people as opposed to animals (examples 21 and 22). Animals (with exceptions for special animals such as elephants in Thai) are all included under a single category. Machiguenga is different, in that animals are grouped into a number of separate categories. People are not included under any specially marked category, and are simply referred to with the animate class marker without a numeral classifier (example 23).

(21) Tzeltal:

- | | | |
|----|-----------------|--------------|
| a. | <i>cha-kojt</i> | <i>tz'i'</i> |
| | two-CL:animal | dog |
| | 'two dogs' | |
| b. | <i>cha-tul</i> | <i>winik</i> |
| | two-CL:people | men |
| | 'two men' | |

(22) Thai:

- | | |
|----|----------------------|
| a. | <i>ma-song-tua</i> |
| | dog-two-CL:animal |
| | 'two dogs' |
| b. | <i>kon-song-kon</i> |
| | people-two-CL:people |
| | 'two people' |

(23) Machiguenga:

- | | | |
|----|---------------------------|---------------|
| a. | <i>pi-kana-te-n-i</i> | <i>otsiti</i> |
| | two-CL:body-ANIM | dog |
| | 'two dogs' | |
| b. | <i>pi-poa-te-n-i</i> | <i>parari</i> |
| | two-CL:cylindrical-ANIM | river otter |
| | 'two river otters' | |
| c. | <i>pi-teni matsigenka</i> | |
| | two-(no CL)-ANIM person | |
| | 'two people' | |

Despite the differences between Machiguenga and other systems of noun classification, there are some striking similarities. Most importantly, the basic kinds of objects classified are quite similar in a number of systems. Machiguenga shares with Tzeltal and a number of other Amerindian languages categories referring to general kinds of shapes: long, slender, non-flexible objects; flexible, rope-like objects; small, round objects; flat, leaf-like objects, and so on (Allan 1977:301). The categories of animate vs. inanimate, big vs. small, liquid vs. solid state, and hollow vs. solid construction are also important in many unrelated systems of classification throughout the world (Allan 1977:299-302).

Another interesting feature of the Machiguenga system is its extreme semantic transparency. Many of the noun classifiers are derived directly from noun stems with little modification. Fully elaborated Machiguenga numerals tend to be relatively long units consisting of five or six syllables, like fresh geological formations that have yet to undergo the phonological erosion that wears at complex words and obscures etymology. Classifiers can be used in creative and innovative ways by the speaker. All of these factors suggest that noun classification has evolved rather recently in the language. Doris Payne (1987:38) suggests that the presence of multiple kinds of classification in unrelated Amazonian languages could be the result contact between indigenous people in pre-Hispanic or colonial times. It is perhaps in this way that noun classification was introduced to the Machiguenga language and became superimposed on an already existing system of noun class.

Unlike Machiguenga, some systems of classification are characterized by a certain degree of semantic opacity. Proto-Bantu was once considered to contain a complex gender system consisting of eleven arbitrary categories. Denny and Creider (1976) suggest that this is in fact a system of noun classification, based on principles similar to those found in other classifier languages (size, shape, dimensionality, inherent properties, etc.), but in which semantic transparency has been somewhat lost due to the effects of linguistic fossilization and phonetic erosion. Dyirbal, an aboriginal Australian language, represents a situation of even greater semantic opacity. Noun classification consists of four apparently arbitrary categories whose members bear little obvious semantic relationship to one another. Dixon (1982) was able to analyze the categories in terms of focal members that were related to other members by long strings of association. His analysis clarified the logic behind the four cryptic categories, which are as follows: (1) human males, most animals; (2) human females, animals that were mythologically female, the sun (mythologically female), and by extension fire and all other dangerous things, including warfare; (3) non-flesh food; (4) everything not in other classes (cited in Lakoff 1987:93). It is possible that the arbitrary gender systems of modern European languages like French and German also represent cases in which semantically active systems of noun classification became reduced and fossilized into arbitrary systems of noun class.

Further research into systems of classification may reveal patterns which, as Lakoff (1987) argues, represent universal features of human cognition. In the evolution of systems of classification, categories expand by analogy to incorporate new or more abstract elements. In ethnobiological classification this leads to the formation of higher-order levels of classification (covert categories, named intermediate categories, life forms). In noun classification, the rules governing membership in a given category become blurred with time, such that semantic relationships become opaque and only grammatical functions are retained.

The "basic object level" appears to be the way that the brain stores information about things, including the motor programs for how to interact with them (Rosch and Lloyd 1978). Noun classifiers appear

to corroborate the concept of basic object level categories. As Posey (1979) notes, the basic object level also corresponds well with the concept of the folk genus. Such cognitive structures may underlie the observed universal features of both noun classification and folk biological classification. However, noun classification in Machiguenga produces unnatural groupings of organisms, while ethnobiological classification tends to reflect the taxonomic and evolutionary relationships. This phenomenon may have to do with the fundamental difference between seeing organisms in their natural context as opposed to seeing them in terms of their cultural utility. In fact many exceptions to the scientific accuracy of ethnobiological systems are explained by the influence of mythology, utility or other cultural factors (see Bulmer 1974).

In Machiguenga noun classification, most animals are placed in unnatural groups which contradict both ethnozoological and scientific classification: otters, caimans and catfish are grouped together under the category of 'cylindrical animals'; small birds, mice and flies are grouped together under the category of 'small, round, numerous animals'. In a few cases, noun classification corresponds somewhat closely with evolutionary groupings: for example the distinction between monkeys with prehensile tails and those with non-prehensile tails. In other cases, noun classification provides evidence for covert intermediate levels of ethnobiological classification. Yet for the most part noun classification of animals appears to follow the same arbitrary semantic rules as the noun classification of other objects. Only in those cases where an arbitrary semantic category has evolutionary significance (the prehensile tails of monkeys) does the linguistic classification of animals reflect evolutionary taxonomy. This appears to be a function of the utilitarian principle guiding noun classification: noun classification is concerned with the constituent parts and material properties of inanimate objects destined for human use, not the taxonomic gestalt or evolutionary history of living things.

NOTES:

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2. Another possibility is that *majani* ('few, a little') represents a contraction, perhaps from *mavani-vanti*, 'three-remaining', i.e. 'only a few left,' and that the noun class marker has been lost in the contraction. However the fact that the inanimate form of *tovani-tovaiti* ('many') appears to be falling out of usage suggests that *majani*-**majati* may have suffered the same fate.
3. The suffix *-page* indicates the plural, with a connotation of multiplicity or diversity. For example *inchato-page* ('tree'-PL), means 'the diversity of tree species'; *poshiniri-page* ('delicious ones'-PL) means, 'the diversity of game animals'.
4. There appear to be vestiges of a gender system in the Machiguenga names for animals. Many animal names end either in *-ri* (the male/animate verb ending) or *-ro* (the female/inanimate form). For example *para-ri* ('river otter'), *kema-ri* ('tapir'), *shintori-ri* ('peccary'), *mamo-ri* ('sabalo fish'), *tsonki-ri* ('hummingbird') and many others carry what appears to be the male/animate suffix. Yet *mani-ro* ('deer'), *mase-ro* ('frog'), *sago-ro* ('lizard'), *kima-ro* ('macaw'), *komagina-ro* ('woolly monkey') and many others appear to carry the female/inanimate suffix. Note

that Snell (cited in Doris Payne 1987:35) considers deer, frogs and lizards to be part of the inanimate noun class in Machiguenga, but makes no mention of macaws or woolly monkeys. In my experience the latter two are both animate/male. While *poriatsi-ri* ('sun') and *kashi-ri* ('moon')—both mythological males—appear to bear the male/animate suffix, *impoki-ro* ('stars,' also mythological people) appears to bear the female/inanimate suffix. Yet all three belong to the animate noun class. Thus the apparent presence of noun class suffixes in Machiguenga animal and other names appears to have little or no semantic significance for modern speakers, possibly with the exceptions noted by Snell (*ibid*).

5. An interesting exception to the rules of male/female class markers in verbs occurs when two men are talking in jest about a third man, usually present at the conversation. In this case, the third man is referred to with the feminine/inanimate form. This appears to be part of typical male joking behavior in which men feminize one another with sexual, and especially homosexual, comments and jokes.
6. Since animate/inanimate and numeral classifiers are affixed into the middle of numeral expressions, one is tempted to refer to these classifiers as "infixes". However the structure of numeral expressions illustrated in Table 1 suggests that numerals consist of agglutinative prefixes and suffixes. Strictly speaking, numeral classifiers and animate/inanimate classifiers should thus be considered suffixes, rather than infixes. The animate/inanimate classifier in Machiguenga is more clearly a kind of suffix: numerals are never used independently of the animate/inanimate classifier, for example **pa-iro*, 'one' (animate/inanimate class not specified), or **pite-i*, 'two' (class not specified) are unheard of. The case for the numeral classifiers is more ambiguous. Numeral classifiers are not obligatory, and hence intrude into the free-standing numeral (*patiro* becomes *pa-poa-tiro*, etc.). Thus the term "infix" stills seems appropriate and descriptive in the case of Machiguenga numeral classifiers, distinguishing these internally applied affixes from more normal suffixes which do not interrupt free-standing units. Perhaps the terms "pseudo-infix", "internal affix" or "insuffix" could be coined.
7. The verb root *-tsogito* ('to finish eating the head') is associated with a social custom in which a hunter is prohibited from eating the head of an animal he has killed, lest he lose his hunting skills. The head of a game animal is always given away to be eaten by another family, usually the family of the hunter's brother-in-law. It is a compliment and a sign of respect to give someone the head of an animal to eat, and the meat is considered to be a great delicacy.
8. When occurring in final position, the classifier *-kitso* ('seeds') is contracted to *-ki* (17 b), not to be confused with classifier *-ki*, for sticks.
9. A similar situation exists among the Tzeltal and Tzotzil Maya, who classify chili peppers as meats in their use of the four eating verbs, *ti*, 'to eat flesh', *lo*, 'to eat fruit', *we*, 'to eat bread' and *k'ux*, 'to eat crunchy food'.
10. Notice that the classifier *-tsei* ('spines') shares a similar final diphthong the classifier *-ai*, which refers to things with a single, sharp point, such as bees, avocados, and bottle gourds. Also, biting insects such as *mapoi* ('mosquitoes') and *yai* ('army ants') have a similar final sound. In Machiguenga, all final diphthongs are nasalized. This may represent an example of sound symbolism in the use of classifiers.
11. A group of men assembled a raiding party, planning to attack and capture the star-people. The men climbed up the umbilical cord of the sky, a long liana known as "monkey's ladder," connecting the earth to the heavens in ancient times. In the rear of the war party were two men, one carrying arrows for the attack and one carrying bundles of rope to tie up the star-people as prisoners. As the party reached the top, the guardian of the umbilical cord sheared the cord with his scissors. As the party of warriors began to fall, Yavireri blew his magical breath and transformed all the people involved into animals. The scissor-wielding guardian of the cord became the toucan, the scissors becoming its beak. The warriors leading the party (hence higher up on the cord) became the flying birds, such as orioles and kingfishers. The warriors towards the back of the party (hence lower down) became the ground-dwelling birds such as currasows, tinamous and guans. The two men bringing up the rear had an even worse fate. The one carrying the arrows fall to the ground face down, and the arrows impaled him in the back. He became the porcupine. The one carrying the bundles of rope landed face up, such that the bundles became fused to his back. The stun he received has left him slow-witted to this day. He, of course, is the sloth. The sky, with its umbilical cord now severed, floated high up into the heavens where it remains out of ordinary human reach to this day.

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Errata:

pg. 43, example 18d. 'pi-kana-tiro' read "pi-kana-teti"
 pg. 47, 'aracu fish' read "boquechico fish"

TABLE 1: MACHIGUENGA NUMERAL EXPRESSIONS

| NUMERAL | ANIMATE | INANIMATE |
|-----------------------|-------------------|-------------------------------------|
| 'one' | <i>pa-n-iro</i> | <i>pa-t-iro</i> |
| 'two' | <i>pi-te-n-i</i> | <i>pi-te-t-i</i> |
| 'second, another one' | <i>api-te-n-i</i> | <i>api-te-t-i</i> |
| 'three, several' | <i>mava-n-i</i> | <i>mava-t-i</i> |
| 'all' | <i>maga-n-iro</i> | <i>maga-t-iro</i> |
| 'few, a little' | <i>maja-n-i</i> | * <i>maja-t-i</i> (not used) |
| 'many' | <i>tovai-n-i</i> | <i>tovai-t-i</i> (usage in decline) |

TABLE 2: MACHIGUENGA NOUN CLASSIFIERS FOR ANIMALS (IN ALPHABETICAL ORDER)

| CLASSIFIER | RELATED NOUN/ VERB STEM | MEANING | INANIMATE NOUNS | ANIMATE NOUNS |
|-----------------|---|-----------------------------------|---|---------------------------------------|
| <i>-empe</i> | <i>o-empe</i> , 'its branch' | 'branching things' | tree branches | monkeys with prehensile tails |
| <i>-ai</i> | <i>ir-ai</i> , 'its tooth' | 'things with pointed ends' | bottle gourds, avocados | bees, wasps, stinging ants |
| <i>-kana</i> | <i>tsiti-kana</i> , 'chili pepper' | 'fleshy, limbed things' | chilies, banana bunches | large mammals |
| <i>-kitso</i> | <i>o-kitso-ki</i> , 'its seed' | 'small, round, numerous things' | seeds, pebbles | small birds, mammals, insects, etc. |
| <i>-mai</i> | <i>shivitsa-mai</i> , 'tangle of vines' | 'matted or tangled things' | cotton balls, vines | sloths |
| <i>-mereto</i> | <i>i-mereto</i> , 'its ribs' | 'ribbed things' | ribs | small fish |
| <i>-motia</i> | <i>no-motia</i> , 'my belly' | 'elastic, spherical things' | rubber balls | beetle grubs |
| <i>-naki</i> | <i>seri-naki</i> , 'tobacco pipe bowl' | 'hollow containers' | pots, bottles, teeth | snails |
| <i>-pana</i> | <i>o-pana</i> , 'its leaf (broad)' | 'flat, broad things' | banana leaves, paper | stingrays |
| <i>-pa</i> | <i>o-pa</i> , 'its fruit pod' | 'flat, pod-like things' | dehiscent fruit pods, corn cobs, bananas | medium, flat-bodied fish |
| <i>-patsa</i> | <i>o-vatsa</i> , 'its flesh/fruit' | 'flesh, fruit, meat' | fruit pulp, meat | animal herds (esp. peccary) |
| <i>-poa</i> | <i>opoa</i> , 'its wood' | 'large cylindrical things' | tree trunks, manioc root | otters, coatis, caiman, catfish |
| <i>-sama</i> | <i>sama-tsi</i> , 'bamboo flute' | 'tubes, hollow bones' | kindling wood, flutes | large birds, large fish |
| <i>-sarantu</i> | VR: 'to cover' | 'coverings with internal support' | roof thatch, tents, fish with large fins | bats, butterflies, |
| <i>-shitsa</i> | <i>oshi-tsa</i> , 'its vine, vein' | 'string-like things' | tree roots, veins, nerves, herbaceous vines | monkeys with non-prehensile tails |
| <i>-taki</i> | <i>o-taki</i> , 'its skin, bark' | 'skins, outer coverings' | skin, tree bark | parrots, turtles, armadillos, beetles |
| <i>-tonki</i> | <i>i-tonki</i> , 'its bone' | 'long, thin, rigid things' | bones, needles | mosquitoes |
| <i>-tsa</i> | <i>o-tsa</i> , 'liana' | 'rope-like things' | woody lianas | snakes, worms, caterpillars |
| <i>-tsei</i> | <i>o-tsei</i> , 'its spine' | 'spiny things' | spiny plants | porcupines |
| <i>-tsenko</i> | <i>tsenko-tsi</i> , 'arrows in cluster, long pants' | 'long-legged, tripod-like things' | tripod-like clusters of arrow shafts | frogs, lizards, shrimp, crickets |

TABLE 3: MACHIGUENGA NOUN CLASSIFIERS FOR ANIMALS (GROUPED BY LIFE FORM)

| CLASSIFIER | MEANING | LIFE FORM | ANIMATE NOUN |
|--------------|-----------------------------------|----------------------------|---|
| -empe | 'branching things' | monkeys | monkeys with prehensile tails (game) |
| -shitsa | 'thin, stringy things' | monkeys | monkeys with non-prehensile tails (not usually hunted) |
| -kana | 'fleshy limbed things' | mammals | large mammals (mostly game) |
| -kitso (*) | 'small, round things' | mammals (also birds) | small mammals |
| -poa (*) | 'large cylindrical things' | mammals (also fish, etc.) | cylindrical mammals (otters, kinkajous; not usually eaten) |
| -sama (*) | 'tube-like things' | birds (also fish) | large birds (mostly game) |
| -kitso (*) | 'small, round things' | birds (also mammals) | small birds |
| -taki | 'skins, hard outer coverings' | birds (also turtles, etc) | parrots and macaws |
| -sama (*) | 'tube-like things' | fish (also birds) | large fish (sabalo, gamitana/tambaqui) |
| -pa | 'pod-like things' | fish | flat fish (boquechico, sabalillo) |
| -mereto | 'ribbed things' | fish | small fish, many bones |
| -poa (*) | 'large cylindrical things' | fish, (also mammals, etc.) | cylindrical fish (catfish) |
| -tonki | 'long, thin, hollow things' | insects | mosquitoes |
| -ai | 'pointy-ended things' | insects | bees, wasps, stinging ants |
| -motia | 'elastic, spherical things' | insects | beetle grubs |
| -kitso (*) | 'small, round things' | insects (also birds, etc.) | gnats |
| -tsei | 'spiny things' | unusual | porcupines |
| -mai | 'fluffy, cottony things' | unusual | sloths |
| -naki | 'hollow, inflexible containers' | unusual | snails |
| -pana | 'flat, broad things' | unusual | stingrays |
| -saranta (*) | 'covering on internal support' | unusual (also fish) | bats, butterflies, fish with large fins |
| -taki (*) | 'skins, hard outer coverings' | unusual (also macaws) | turtles, armadillos |
| -tsa (*) | 'thick, vinelike things' | unusual | snakes, worms, caterpillars |
| -tsenko (*) | 'long-legged, tripod-like things' | unusual | critters with long legs (lizards, frogs, insects, shrimp, etc.) |

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