I. Buchler

Measuring the development of kinship terminologies: Scalogram and transformational accounts of Omaha-type systems

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MEASURING THE DEVELOPMENT OF KINSHIP TERMINOLOGIES:

SCALOGRAM AND TRANSFORMATIONAL ACCOUNTS OF OMAHA-TYPE SYSTEMS¹

INTRODUCTION

The principles governing the development — or evolution — of Omaha kinship terminologies, and the relationship of these principles to residence rules, corporate kin groups, and asymmetric marriage systems, have been the subject of considerable theoretical interest and analysis (e.g., Lowie 1930; White 1939, 1959; Murdock 1949; Lane and Lane 1959; Eyde and Postal 1961; Moore 1963). The purpose of this paper is to present a formalization of the development of Omaha terminologies; to describe logical regularities in the development of Omaha systems. This paper is one of a series of studies in which I have attempted to describe, in some simple and systematic fashion, the development of various types of kinship terminologies (Buchler 1964a, 1964b, 1965). In order to place the present discussion in proper historical perspective, I would like to consider, at the outset, several theoretical accounts of the sociological determinants of kinship terminologies, and to suggest certain inadequacies of these interpretations.

Theoretical discussions of the determinants of kinship terminologies may be profitably divided into three major categories: (1) preferential and prescriptive marriage rules; (2) various universal sociological principles; and (3) the constitution of kin and residential groups (cf. Murdock 1949; 113).

¹ I am indebted to Professor George Peter Murdock for his advice during the original research upon which this paper is based. Professor John Atkins, of the University of Washington, had completed a scalogram analysis of Omaha terminologies, several months before I began my studies. I have decided to publish my Omaha data only after being informed by Atkins that current commitments make the publication of his Omaha material highly unlikely. I express my gratitude to Professor Atkins for his generosity in suggesting that I publish my analysis.

Kinship Terminology and Marriage Forms

Under the influence of Kohler (cf. Tax 1960: 13), various marriage rules, often in combination with other institutional variables, have been suggested as determinants of kinship terminology. They are as follows: (1) the sororate and levirate (Sapir 1916; Lowie 1919: 33-34); (2) secondary cross-generational marriages (Rivers 1914; 1924: 70, 191; Gifford 1916; Lesser 1928, 1929; Lowie 1930: 104-105, 107-108, 1932, 1947: 37; Aginsky 1935); (3) symmetric and/or asymmetric cross-cousin marriage (Rivers 1914: 27; Lowie 1947: 37; Lane and Lane 1959; Eyde and Postal 1961); and (4) oblique (cross-generational) and asymmetrical cross-cousin marriage (Moore 1963).

There are three basic objections to all of the above interpretations: (1) The specified causal relations between marriage forms and kinship terminology can at best account for only four or five terminological assignments: they invariably fail to provide a comprehensive enumeration of the data at hand. (2) Secondary marriages can only occur in a fraction of all unions and are, consequently, unlikely to significantly influence kinship usages (cf. Murdock 1949: 123-124).² (3) Any theory which attempts to relate asymmetric alliance to the development of Omaha and/or Crow terminology³ fails to account for the differential functions which terminological systems perform. For example, Omaha terminologies, on the one hand, and the terminology of asymmetric marriage systems, on the other, are widely different things, except for superficial terminological (i.e., formal) resemblances (Lévi-Strauss 1951). Classified on a functional level, in terms of the type of exchange of women which they insure within the group, they have nothing in common, except that their terminology is asymmetrical (cf. Buchler 1965). The basic formal distinction between asymmetric and Omaha (or Crow) systems is clear: there are no distinct affinal assignments in most asymmetric systems. Conversely, virtually all

² The importance of secondary marriages, when they attain a certain level of numerical significance, has also been argued by Rose (1960: 229-233; but see de Josselin de Jong 1962). Whatever the validity of Rose's conclusions, they are certainly not applicable to Omaha (or Crow) terminologies.

³ Several years ago, Needham (1960) suggested an association of Crow terminology and symmetric alliance, in the Mota case. His analysis was further muddled by 'confounding the notions of exogamy and alliance.' This analytic confusion has been admirably clarified in a recent exchange with Keesing (1964), in which it is pointed out that Crow and Omaha systems are clearly as inconsistent with symmetric alliance as they are with asymmetric alliance (Needham 1964a: 312).

Omaha (and Crow) systems have terminologically distinct affinal assignments. In sum, a failure to differentiate the Crow-Omaha type from the Miwok (asymmetric) type may lead to rather serious interpretive errors, for "The important point with the Crow-Omaha type is not that two kinds of cross-cousins are classified in different generation levels, but rather that they are classified with consanguineous kin instead of with affinal kin as it occurs, for instance, in the Miwok system" (Lévi-Strauss 1951: 162).

Sociological Principles

Various sociological principles were first introduced into kinship studies in contradistinction to the view (Morgan 1877) that the kinship terminology of the Australian tribes had its origin in a-prior condition of group marriage and was not correlated with the existing social institutions (Radcliffe-Brown 1931: 426). The classificatory principle in terminology, as well as the levirate, was accounted for by a single sociological principle: "the principle of the social equivalence of brothers" (Radcliffe-Brown 1931: 429). It was suggested (Radcliffe-Brown 1931: 428) that this principle was present in all classificatory systems. Similarly, variations between types of systems were explained in terms of the "different ways in which this extension of the basic classificatory principle can be applied" (Radcliffe-Brown 1959: 66). All other attempts to account for kinship systems (in terms of secondary marriages, exogamous moieties, etc.) either were consigned to 'conjectural history' or were rejected for completely tangential reasons (Radcliffe-Brown 1959: 61). Derivative principles, e.g., "the structural principle of the unity of the lineage group" (Radcliffe-Brown 1959: 70-79), were used to account for Omaha and Crow systems. It was suggested that a limited number of structural principles govern various types of generational skewing and that these principles underlie both the terminological system and the social structure (Radcliffe-Brown 1959: 75). The principle of the unity of the lineage group specifies that a person who is connected with a lineage by some significant kin or affinal bond will terminologically merge lineage members who belong to various 'natural' generations. Similarly, this principle may govern the unitary classification of clan members (Radcliffe-Brown 1959: 70-71), and is said to account for the following forms of Omaha generational skewing: (1) MB = MBS, MBSS, MBSSS; (2) MZ = MBD, MBDD, MBDDD; (3) B = MBDS, MBDDS; (4) F =

FMBDS, FMBSDS, FMBSSDS; (5) FM = FMBD, FMBS; (6) FMB = FMBS, FMBSS. Variations in the development of the principle of the unity of the lineage group were used to explain the extension of terminological principles from the genealogical lineage to the clan. In sum, the ordering of persons within kinship terminologies is derived from the application of specified structural principals to either patrilineal or matrilineal lineages (Radcliffe-Brown 1959:78): kinship terminology directly reflects social organization and regulates social behavior (Radcliffe-Brown 1959:68-75, *passim*).

There are a number of objections to the above interpretations. As the suggested sociological principles, or laws, are common to all 'classificatory systems' — or unilineal descent systems — they cannot account for terminological variations between these systems. As they fail to account for the variation between systems, they certainly cannot account for underlying similarities. Their predictive value is negated by the very fact of variation; a unitary principle would be expected to produce a common effect (cf. Lowie 1937:224-225; Murdock 1949:121; Lévi-Strauss 1953:542-543). Consider Radcliffe-Brown's (1959:78) notion that Crow and Omaha systems are produced by the application of a single structural principle to matrilineal and patrilineal lineages, respectively: that the meaning of kin terms in Crow and Omaha systems are adequately explained by propositions which state an invariant relationship between lineage membership and terminological classification. Let us parallel Lounsbury's (1964:355) critique of these notions. In reference to Fox terminology (Tax 1960), Radcliffe-Brown (1959:72) notes "that a man calls his mother's father 'grandfather', but calls all the males of the lineage in the three succeeding generations 'mother's brother' (MB)." An examination of Fox terminology indicates that the meaning of the mother's brother term in this Omaha system cannot be *a male member of my mother's patrilineage*, for (a) there are male members of mother's patrilineage who are not members of the mother's brother's class (MF) and (b) there are 'mother's brothers' who are not members of mother's patrilineage: for example, MMZS, MMZSS, and MMBDS. Patrilineage membership is neither a necessary (b) nor a sufficient (a) condition for assignment to the mother's brother's kin class in this Omaha system. Further, Radcliffe-Brown's conceptions fail to provide any general explanation (a) for Omaha and Crow type classifications when these systems are not associated with patrilineal or matrilineal lineages, (b) are found in inappropriate combinations (e.g., Omaha-

matrilineages; Crow-patrilineages), or (c) for the very considerable variation between kinship terminologies which fall within any given structural type (Omaha, Crow, etc., cf. Buchler 1964a, 1964b, 1964c, 1965).

The Constitution of Kin and Residential Groups

Theories which account for kinship systems in terms of the constitution of kin and local groups have, for nearly a century, exerted a dominant influence in kinship studies (Tylor 1889: 261; Rivers 1914: 72-3, 1924: 58, 67-68; Lowie 1915: 223, 226, 1919: 29, 1929: 380-383, 1947: 115, 154, 162; Kroeber 1917: 86-87; Lesser 1929: 722; White 1939: 569, 1959: 133; Murdock 1947: 57-58; 1949: 124-125, 148-156, 161-171, *passim*). For example, various theorists (White 1939, 1959; Murdock 1949) have suggested that Iroquois terminology is a 'base form' from which Omaha and Crow systems have evolved, with the development of sib organization and/or various preferential marriage rules. Rules of residence and descent, and the alignments of kinsmen which they produce, are said to be the independent variable; kinship terminology is said to be the dependent variable. The evolutionary choice between the Omaha/Crow alternative is said to be a function of lineality of descent. A society which develops 'strongly' corporate, patrilineal descent groups, will, it is suggested, often develop Omaha kinship terminology. Conversely, the development of 'strongly' corporate matrilineal descent groups will often result in the development of Crow kinship terminology. Alternatively, it has been suggested that asymmetric marriage rules and residence rules 'precondition' the social groups which determine Omaha and Crow systems (Lane and Lane 1959: 262-264).

One of the inadequacies of theories of this sort is that they purport to provide a general explanation for the development of various types of kinship terminologies without first describing, with some economical set of operations, the explained regularities. Once a set of developmental regularities have been comprehensively described, then a theoretical analysis of these regularities may be more feasibly undertaken. One cannot really expect that the notion of a 'strongly' corporate patrilineal descent group will satisfactorily account for the development of Omaha kinship terminologies, unless we have previously been provided with some precise, and operationally explicit, explanation of what, in fact, a strongly developed kin group is.

Rather than attempting to specify causal relations between Omaha

systems and social groups or marriage rules, we structure the variability between Omaha systems, thus illustrating that their development is logical, orderly, and predictable. In the next section I introduce our method of describing developmental regularities, namely, scalogram analysis.⁴

SCALOGRAM ANALYSIS

Scaling may be defined as a method for ordering qualitative data within taxonomic hierarchies. Although scalogram analysis was initially developed for attitude measurement, Guttman (1944:142) has emphasized that "Scaling analysis is a formal analysis and hence applies to any universe of qualitative data of any science, obtained by any manner of observation." The most basic concept of scale theory is the universe of attributes. The universe consists of all the attributes that define the concept being measured. We are interested in the concept of an Omaha type system. The term attribute may be used interchangeably with qualitative variable; our qualitative variables are terminological equations (e.g., $MBS = MB$). The determination of the presence or absence of any given variable must be determined for each unit (system) that is to be scaled. That is, any system must receive either a positive (+) or a negative (—) score for the terminological equations that define the concept of an Omaha type system. If a system receives a positive score for variable X (e.g., $MBS = MB$), then it cannot receive a negative score ($MBS \neq MB$) for the same variable; in Guttman's (1950b:335) terms, a system cannot score in the opposite categories ($MBS = MB$ and $MBS \neq MB$) for any item (variable).

We begin our analysis with a finite set of variables (derived from the data) which define the concept being measured. The rank order of these variables divides the initial group of systems into subsets; these subsets are what Guttman calls scale types. Individual scores for systems are determined by assigning integers in order (e.g., 1, 2, 3, 4, 5) to the scale types. Additional variables may increase the number of scale types; they will not interchange the ordering of systems which have previously been scaled. We arrive at an important methodological point for the scale that has been constructed in this study; it by necessity deals with a 'sample' of variables, but scalogram

⁴ This introduction to scalogram analysis, written for anthropologists, was developed in a previous publication (Buchler 1965).

theory shows that if the universe of attributes measures a single variable (the concept of an Omaha system), then the same rank order of systems will be obtained regardless of which sample of attributes (terminological equations) is drawn from the universe (Guttman 1950a : 81). The notion that a universe of attributes measures a single concept is referred to as unidimensionality.

The unidimensionality of a scalogram account assures us that the scalable attributes are the predictable consequences of an 'underlying principle'. The scale measures the logical development of the principle in question; i.e., the logically possible forms through which Omaha systems may change are reduced to a single variable (terminological equation) at each step in a taxonomic hierarchy, thus allowing us to demonstrate that priority, in a logical sense, can be assigned to certain variables.

The basic methodological problem in scaling is determining the arrangement of the variables that will yield the maximum coefficient of reproducibility. The computation of the coefficient of reproducibility (Guttman 1950a : 77) is:

$$1 - \frac{\text{no. of errors}}{\text{no. of equations} \times \text{no. of societies.}}$$

The coefficient expresses the relationship between the multivariate distribution of a scale without errors and the obtained multivariate distribution in any particular case (Guttman 1950a : 77). The reliability of any scale is indexed by the extent to which repeated measurements may be expected to result in similar results (cf. Green 1954 : 339). The aspects of reliability that we are concerned with has been variously called test-retest reliability (Guttman 1945, 1946) and stability. If the body of data being scaled is not subject to conscious modification, then the reliability of a scale is assured.

In geometrical terms, an axis is assigned to each variable that scales, and particular Omaha systems are located in the multidimensional space that is defined by these axes (cf. Wright 1954 : 11). The predictability of an acceptable scale depends upon its ability to differentiate, on each axis, units which have scored in the scalable category of an item from units which have scored in either the non-scalable category of an item or for which there is no information.

The following graphic rule will clarify the predictive properties of the scale:

1. When a + is preceded by a 0 or a —, predict downward, filling in the terminological equation that is located on the axis which is denoted by the 0 or + in question.

From this rule several limitations on predicting equations follow:

- a. When there are no +’s which supercede a 0 in the taxonomic hierarchy the rule does not apply to that 0.
- b. The generating rule applies only to 0’s and +’s. A dash (—) indicates that a unit has scored in the non-scalable category of an item (Guttman 1950c: 335).

In the diagram below, all of the items (regardless of their content) i.e., 1-4 may be generated, for individual three, as all of the items score in the scalable category, viz., all axes receive a positive score for individual three. Items four, three, and one may be generated for individual two, as there is no information (0) for item three, and item two has scored in the non-scalable category (—). Items one and two may be generated for individual one, as there is no information for variable three, and it is not superseded in the taxonomic hierarchy by a positive score. Item four has scored in the non-scalable category, and consequently cannot be generated.

Variables	4	—	+	+
	3	0	0	+
	2	+	—	+
	1	+	+	+
		1	2	3
		Systems		

An increase in the number of scale types or ‘cutting points’ results in the expansion of the predictive range of the scale. Items which differentiate the existing number of scale types are of greater intrinsic methodological significance than items which do not increase the predictive range of the scale. “If a cutting point *c* happens to coincide with a previous cutting point *a* or *b*, then the new item contributes

no new differentiation; it is indeed *perfectly dependent* on the item which has the same cutting point; all people (systems) in one category of one item are in the corresponding category of the other" (Guttman 1954:222).

A Scalogram Analysis of Omaha Terminological Systems

The rank order of terminological equations on the Omaha scale is as follows:

1. MBS = MB	5. MMBD = MM
2. MBSS = MB	6. FZDS = SS
3. MBD = M or MZ	7. MFZD = Z
4. FZD = D or ZD	

In Wintu terminology, FZDS = SS (Du Bois 1935). This is a scale error. The coefficient of reproducibility is computed as follows:

$$1 - \frac{1}{7 \times 14} = 0.99$$

Following is the rank order of Omaha systems and their associated types (cf. Scale I):

<i>Systems</i>	<i>Scale Types</i>
1. Wintu (Du Bois 1935)	2
2. Dorobo (Huntingford 1942, 1951, 1954)	4
3. Tokelau (Macgregor 1937)	4
4. Chahar (Vreeland 1953)	4
5. Bari (Seligman 1932)	4
6. Lango (Driberg 1923, 1932)	4
7. Arapesh (Mead 1942)	5
8. Kalmuk (Aberle 1953)	5
9. Amba (Winters 1956)	6
10. Tzeltal (Sousberghe and Uribe 1962)	6
11. Fox (Tax 1960)	7
12. Nyoro (Beattie 1957, 1958)	7
13. Omaha (Dorsey 1881-82)	7
14. Northern Pomo (Gifford 1922)	7

SCALE I

A Scalogram Analysis of Omaha Terminological Systems

System No.	Scale Type	Scale Variables						
		1	2	3	4	5	6	7
1	2	X	X	—	—	0	X	0
2	4	X	X	X	X	—	—	—
3	4	X	X	X	X	—	—	—
4	4	X	X	X	X	—	—	—
5	4	X	X	X	X	—	—	—
6	4	X	X	X	X	—	—	—
7	5	X	X	X	X	X	—	—
8	5	X	X	X	X	X	—	—
9	6	X	X	X	X	X	X	—
10	6	X	X	X	X	X	X	—
11	7	X	X	X	X	X	X	X
12	7	X	X	X	X	X	X	X
13	7	X	X	X	X	X	X	X
14	7	X	X	X	X	X	X	X

Coefficient of Reproducibility = 0.99

A Transformational Analysis of Omaha Kinship Terminologies

A scalogram analysis of Omaha kin terms provides the minimal structural information that will allow us to differentiate Omaha systems from one another; an analysis of this sort, however, fails to account for those kin class assignments which are not of significance in measuring the logical development of Omaha terminologies. A sufficient account of (i.e., a complete enumeration) of these assignments is produced by a formalization of the terminological logic which underlies Omaha systems: Lounsbury's (1964) rewrite rules. These coding rules, written as expansion formulations (e.g., $X \rightarrow XY$), will 'expand' kin types to the more genealogically remote kin types to which they are equivalent in Omaha systems. Written as reduction formulations (e.g., $XY \rightarrow X$), they will "operate always on more remote kin types to 'reduce' them to the genealogically closer kin types to which they are terminologically equivalent" (Lounsbury 1964: 356). In formulating his rewrite rules, Lounsbury uses the following

graphic conventions. (1) A sequence of three dots (...) preposed to a kin type (... ZS) indicates, for example, that the specified kin type is one's linking relative's sister's son; a sequence of three dots postposed to a kin type (e.g., FZ...) indicates that the specified kin type is a link in a genealogical chain between ego and any other kin type (e.g., FZD). (2) A sexual dimension may be introduced into a formulation by preposing either a male (♂) or a female (♀) sign to a kin type. For example, ... ♂ ZD → ... ♂ Z is to be read — *one's male linking relative's sister's daughter is to be regarded as structurally equivalent to one's male linking relative's sister* (Lounsbury 1964: 366-367). The rules may alternatively be written as expansion or reduction statements by reversing the arrows (Lounsbury 1964: 357). Lounsbury's half-sibling⁵ rule and Omaha skewing⁶ rules are written as follows:

Half-Sibling Rule: FS → B; MS → B; FD → Z; MD → Z
 "Let one's parent's child be considered to be one's own sibling"
 (Lounsbury 1964: 360).

There are three Omaha Skewing Rules:

1. *Skewing Rule (Omaha Type I):* FZ... → Z...

"This is to be read: *Let the kin type FATHER'S SISTER, whenever it occurs as a link between ego and any other relative, be regarded as structurally equivalent to the kin type SISTER in that context*" (Lounsbury 1964: 359).

Corollary: ... ♀ BS → ... ♀ B; and ... ♀ BD → ... ♀ Z

"This is to be read: *One's female linking relative's BROTHER'S CHILD (BROTHER'S SON or BROTHER'S DAUGHTER) is to be regarded as structurally equivalent to that female linking relative's SIBLING (BROTHER or SISTER, respectively)*" (Lounsbury 1964: 360).

2. *Skewing Rule (Omaha Type II):* First Stronger Form: FZ → Z

"Let the kin type FATHER'S SISTER be equivalent to the kin type SISTER" (Lounsbury 1964: 370).

⁵ "The half-sibling rule expresses the formal equivalence between half siblings and full siblings" (Lounsbury 1964: 357).

⁶ "The skewing rule expresses the formal equivalence, in specified contexts, between two kin types of different generations" (Lounsbury 1964: 357).

Corollary: $\varphi BS \rightarrow \varphi B$; and $\varphi BD \rightarrow \varphi Z$

"Let a woman's BROTHER'S CHILD be equivalent to that woman's sibling" (Lounsbury 1964: 370).

3. *Skewing Rule* (Omaha Type III): Second Stronger Form:
 $\sigma Z \dots \rightarrow \sigma D \dots$

"Let a man's SISTER, as linking relative, be regarded as equivalent to that man's DAUGHTER as linking relative" (Lounsbury 1964: 372).

Corollary: $\dots \varphi B \rightarrow \dots \varphi F$

"Let any female linking relative's BROTHER be regarded as equivalent to that female linking relative's FATHER" (Lounsbury 1964: 372).

Skewing Rule II transforms a FZS, FZD etc., into a "grandchild" (e.g., Khalkha).

FSZ $\rightarrow$ FDS (Skewing Rule III)
 $\rightarrow$ ZS (Half-Sibling Rule)
 $\rightarrow$ DS (Skewing Rule III)

The corollary of Skewing Rule III generates the terminological assignments of Omaha systems (e.g., Khalkha, Wintu), in which MB, MBS, MBSS, etc., are given a second ascending generation classification.

MBSS $\rightarrow$ MBS (by Skewing Rule I corollary)
 $\rightarrow$ MB (by a second application of the same)
 $\rightarrow$ MF (Skewing Rule III corollary)

Lounsbury's merging⁷ rule and merging rule corollary are written as follows:

Merging Rule: $\sigma B \dots \rightarrow \sigma \dots$; and $\varphi Z \dots \rightarrow \varphi \dots$

"Let any person's sibling of the same sex as himself (or herself), when a link to some other relative, be regarded as equivalent to that person himself (or herself) directly linked to said relative" (Lounsbury 1964: 360).

⁷ "The merging rule expresses the formal equivalence, in specified contexts, between siblings of the same sex" (Lounsbury 1964: 357).

Corollary: ...♂B → ...♂; and ...♀Z → ...♀

"Any linking relative's sibling of the same sex as himself (or herself) is to be regarded as equivalent to that linking relative"
(Lounsbury 1964:360).

Using Lounsbury's rules I reduce a number of kin types to the genealogically closer kin types to which they are structurally equivalent. The scale variables that are accounted for by each reduction series are noted.

<i>Scale Variables</i>		<i>Reduction Series</i>
1, 2	1. MBSS	→ MBS (by Skewing Rule I corollary) → MB (by a second application of the same)
3	2. MBD	→ MZ (by Skewing Rule I corollary) → M (by Merging Rule)
4	3. FZD	→ ZD (by Skewing Rule I)
5	4. MMBD	→ MMZ (by Skewing Rule I corollary) → MM (by Merging Rule)
6	5. FZDS	→ ZDS (by Skewing Rule I)
7	6. MFZD	→ MZD (by Skewing Rule I) → MD (by Merging Rule I) → Z (by Half-Sibling Rule)

Scale variable six equates a "grandchild" (SS) with a FZDS. In many Omaha systems FDZS is also equated with ZDS; zero and first degree collaterals of the second descending generation are not differentiated. Consequently, an additional taxonomic distinction (lineal vs. collateral) must be introduced. SS and ZDS may be glossed 'lineal grandson' and 'collateral grandson', respectively. These kin types, in turn, are members of the superclass 'grandchild', which may include kin types such as (e.g., Fox) FFZSS, FFZSD, FFZDS, FFZDD, MZSSS, and FZSSS.

The scale variables are the product of successive applications of the rewrite rule (written as expansion rules) to primary kin types (or relative products). The varying combinations, into which these kin types and expansion rules enter accounts for the typological variance

between Omaha systems. Consequently, each scale step may be written as the product of a kin type and an appropriate expansion rule (or rules).

<i>Kin-Type</i>	<i>Expansion Rules</i>	<i>Scale Variables</i>
1. MB	1. Skewing Rule I Corollary (MBS)	MB = MBS
2. MB	1. Skewing Rule I Corollary (MBS) 2. By a second application (MBSS)	MB = MBSS
3. M	1. Merging Rule (MZ) 2. Skewing Rule I Corollary (MBD)	M = MBD
4. ZD	1. Skewing Rule I (FZD)	ZD = FZD
5. MM	1. Merging Rule (MMZ) 2. Skewing Rule I Corollary (MMBD)	MM = MMBD
6. ZDS	1. Skewing Rule I (FZDS)	SS = FZDS
7. Z	1. Half-Sibling Rule (MD) 2. Merging Rule I (MZD) 3. Skewing Rule I (MFZD)	Z = MFZD

A Typology of Omaha Systems

A typology of Omaha terminological systems may be constructed from the scalogram model, specifying the kin types and expansion rules that will produce each scale type. When there are no rules indicated for a scale type, this indicates that the same rules, which have been previously specified, operating in different in different combinations upon the same kin types, will account for the scale type in question.

<i>Scale Type 2 Systems</i>	<i>Kin Types</i>	<i>Expansion Rules</i>
1. Wintu	MB	a. Skewing Rule I Corollary

Scale Type 4 Systems

2. Dorobo	M, ZD	a. Skewing Rule I
3. Tokelau		b. Merging Rule
4. Chahar		
5. Bari		
6. Lango		

Scale Type 5 Systems

7. Arapesh	MM
8. Kalmuk	

Scale Type 6 Systems

9. Amba	ZDS
10. Tzeltal	

Scale Type 7 Systems

11. Fox	Z	a. Half-Sibling Rule
12. Nyoro		
13. Omaha		
14. Northern Pomo		

Asymmetric Exchange Terminologies

The distinction between Omaha and asymmetric exchange terminologies has been established on a functional level, in terms of the marriage regulatory entailments of asymmetric terminologies. Affinity, in asymmetric exchange systems,⁸ is terminologically encoded; the marriage prescription is embedded in the terminological code. The institutional expression of the terminological logic of asymmetric exchange systems is manifested in affinal alliances between lineal descend groups. Now many of the equations in systems of this sort (e.g., Purum, Vaiphei) are distinctly characteristic of Omaha terminologies: MB = MBS, MF (Purum, Vaiphei); FZS = ZS, SS and FZD = ZD, SD (Purum); MBD = M (Mapuche; Faron 1956); MBD = MM (Vaiphei; Needham 1959). If we assume a concordance between the logic of terminological codes and the institutional expression of this logic (prescriptive alliance), then systems of this type invariably reveal equations which indicate asymmetric alliance; for example, WB = MBS, BW = MBD, WF = MB.

In this section I provide a formal specification of the functional distinction between asymmetric exchange terminologies, on the one hand, and Omaha terminologies, on the other, with particular reference

⁸ Faron (1962:60) suggests that the designation "matrilateral marriage" is preferable to "mother's brother's daughter's marriage" or "matrilateral cross-cousin marriage." Since only one type of asymmetric system has been described in any satisfactory detail — aside from hypothetical patrilineal models — the term asymmetric alliance seems to be clearly preferable to "matrilateral marriage," as marriage is but one aspect of the complex of political, economic and ideological entailments that we are concerned with in systems of this sort (cf. Needham 1964b: 1377-1378).

to Purum relationship terminology (Das 1945; Needham 1958). First, I list the thirteen Purum lexemes⁹ and the kin types which they denote (Needham 1962: 77), followed by Needham's (1962: 76) ordering of the Purum categories of descent and alliance.

1. *pu*: FF, MF, MB, WF, MBS, WB, WBS
2. *pi*: FM, MM, MBW, WM, WBW
3. *pa*: F, FB, MZH
4. *nu*: M, MZ, FBW
5. *ni*: FZ
6. *rang*: FZH
7. *ta*: eB, FBSe, MZSe
8. *u*: eZ, FBDe, MZDe
9. *hau*: yB, FBSy, MZSy, yZ, MZDy, MBS, BW, WBD
10. *sar*: Z
11. *mau*: SW
12. *sha*: S, BS, WZS, D, BD, WZD
13. *tu*: FZS, ZH, FZD, ZS, DH, ZD, SS, SD, DSW, DS, SDH, DD.

←		←		←		
f.	m.	f.	m.	f.	m.	f.
			<i>pu</i>	<i>pi</i>	<i>pu</i>	<i>pi</i>
	<i>rang</i>	<i>ni</i>	<i>pa</i>	<i>nu</i>	<i>pu</i>	<i>pi</i>
<i>tu</i>	<i>tu</i>	<i>u</i> <i>sar</i> <i>nau</i>	<i>ta</i> (ego) <i>nau</i>	<i>nau</i>	<i>pu</i>	<i>pi</i>
<i>tu</i>	<i>tu</i>	<i>sha</i>	<i>sha</i>	<i>nau</i> <i>mau</i>	<i>pu</i>	
<i>tu</i>	<i>tu</i>	<i>tu</i>	<i>tu</i>			

⁹ These are actually radicals, isolated by Needham "on the basis of a comparative study of Chin languages and societies" (Needham 1964b: 1378).

A basic dimension of the tripartite categorization of the social order is the Purum division of the total society into (1) wife-giving groups, (2) wife-taking groups, and (3) lineally related descent groups (Needham 1962:78): these constructs may include several descent groups relative to any specified descent group. The men of a wife-giving group are pu ; their wives are pi : the value (the denotative range or range of significance) of these variables (categories) is (a) FF, MF, MB, WF, MBS, WB, WBS and (b) FM, MM, MBW, WM, WBW, respectively. The basic functional dimension of the system is defined by the opposition of the categories pu/tu : "This crucial opposition between wife-giving and wife-taking categories is the governing principle of the Purum terminology of social classification" (Needham 1964b:1380). Governing the categorization of the men of a wife-giving group is Hereditary Affinity Rule I.

Hereditary Affinity Rule I: $W \dots \rightarrow M \dots$

This is to be read: *Let one's WIFE, as linking relative, be regarded as equivalent to one's MOTHER, as linking relative.*

1. WBS $\rightarrow$ MBS (Hereditary Affinity Rule I)
 - $\rightarrow$ MB (Skewing Rule I Corollary)
 - $\rightarrow$ MF (Skewing Rule III Corollary)
 - $\rightarrow$ WF (Hereditary Affinity Rule I)
 - $\rightarrow$ WB (Skewing Rule III Corollary)

A second Hereditary Affinity Rule must be introduced to account for the classification of the wives of the men of a wife-giving group; i.e., the denotata of the term pi .

Hereditary Affinity Rule II: $\dots \varphi BW \rightarrow \dots \varphi M$

This is to be read: *Let any female linking relative's BROTHER'S WIFE be regarded as equivalent to that female linking relative's MOTHER.*

2. WBW $\rightarrow$ MBW (Hereditary Affinity Rule I)
 - $\rightarrow$ MM (Hereditary Affinity Rule II)
 - $\rightarrow$ WM (Hereditary Affinity Rule I)

Two denotative types are not accounted for in the above derivations: FF and FM. A transformation rule of the form $M \dots \rightarrow F \dots$ would have to be formulated to account for these types. However,

a rule of this type would assign various denotata to Purum categories of which they are not empirically members.

Now a rule must be formulated which expresses the formal equivalence between 'half-parents' and 'full-parents'.

Half-parent Rule: $FW \rightarrow M$; $MH \rightarrow F$

This is to be read: *Let one's parent's (FATHER or MOTHER) spouse (WIFE or HUSBAND) be considered to be one's parent (MOTHER or FATHER, respectively).*

I continue with Purum terminology:

3. MZH	$\rightarrow MH$	(Merging Rule)
	$\rightarrow F$	(Half-parent Rule)
4. FBW	$\rightarrow FW$	(Merging Rule)
	$\rightarrow M$	(Half-parent Rule)
5. FBS _(e)	$\rightarrow FS_{(e)}$	(Merging Rule)
	$\rightarrow_{(e)}B$	(Half-Sibling Rule)
6. MZS _(e)	$\rightarrow MS_{(e)}$	(Merging Rule)
	$\rightarrow_{(e)}B$	(Half-Sibling Rule)
7. FBD _(e)	$\rightarrow FD_{(e)}$	(Merging Rule)
	$\rightarrow_{(e)}Z$	(Half-Sibling Rule)
8. MZD _(e)	$\rightarrow MD_{(e)}$	(Merging Rule)
	$\rightarrow_{(e)}Z$	(Half-Sibling Rule)

A further rule must be introduced to account for a terminological assignment ($MBD = {}_yZ$) which Needham (1962:78) indicates is an "infraction of one of the cardinal rules of matrilineal terminologies, viz., that marriageable women must be distinguished from prohibited women."

Affinal Merging Rule I: $\dots \varphi BD \rightarrow \dots \varphi D$

This is to be read: *One's female linking relative's BROTHER'S DAUGHTER is to be regarded as equivalent to one's female linking relative's DAUGHTER.*

9. WBD	$\rightarrow MBD$	(Hereditary Affinity Rule I)
	$\rightarrow MD$	(Affinal Merging Rule I)
	$\rightarrow_{(y)}Z$	(Half-Sibling Rule)

The implications of the above derivation are sufficiently interesting to consider in some detail. It is important to note that a reduction rule which accounts for the formal equivalence of MBD and γZ merely provides an economic description of one of the principles governing the social classification of marriageable women; it fails to provide any general explanation of the terminological equation in the social context of an asymmetric alliance system. Let us consider Needham's 'contextual' explanation. Needham (1962; 1964 : 1379, 1380) draws an implicit distinction between the social category marriageable woman and the term which denotes this category (*ka-nau-nu/nau*; reduced by Needham to the radical *nau*); put another way, Needham argues that assignment to the kin class by which Purum denote marriageable women is a necessary, but not a sufficient condition for assignment to the social category 'marriageable women'. The necessary and sufficient conditions for assignment to the latter category include (a) kin class membership and (b) membership in a category of wife-giving descent groups (*pu*), rather than solely in the mother's brother's descent group: the meaning of 'marriageable woman' in the Purum terminology of social classification is *a same generation, female member of a wife-giving (pu) descent group*. In sum, Needham uses the contextual variable of descent group membership to sort denotative types into wife-giving, wife-taking and lineal kin categories congruent with an asymmetric alliance system. If this explanation of the ordering principles governing the crucial opposition between wife-givers and wife-takers is considered adequate, then it must be similarly applicable to the Lamet and Chawte (Needham 1960a) kinship lexicons, for here too we encounter the equation $MBD = Z$ in the context of asymmetric alliance. These modes of classification must be accounted for in the context of the systems in which they occur; they can scarcely be considered a "disquieting anomaly" (Needham 1960b : 102). Similarly, Needham (1959: 399) has suggested that the assignment of MBD, in the Vaiphei system, to a second ascending generation, zero degree collateral class, is mistaken. But all of the assignments of this "problematic class" are generated by previously formulated rules:

1. $MBD \rightarrow MZ$ (Skewing Rule I Corollary)
 $\rightarrow MM$ (Skewing Rule III Corollary)
2. $MBW \rightarrow MM$ (Hereditary Affinity Rule II)

The introduction of the third affinity rule changes the rules from

an unordered to an ordered set: Hereditary Affinity Rule III will always precede Hereditary Affinity Rule I in a reduction derivation.

Hereditary Affinity Rule III: $WZ \dots \rightarrow B \dots$

This is to be read: *Let one's WIFE'S SISTER, as linking relative, be regarded as equivalent to one's BROTHER, as linking relative.*

10. $WZS \rightarrow BS$ (Hereditary Affinity Rule III)

11. $WZD \rightarrow BD$ (Hereditary Affinity Rule III)

An additional taxonomic distinction must be introduced (lineal *vs.* collateral) to differentiate "lineal sons and daughters" (S, D) from "collateral sons and daughters" (BS, BD). "Collateral sons and daughters" are further differentiated by the sex of the initial link in the genealogical chain: when the link is male, they are assigned to the category *sha*; when the link is female (ZS, ZD), they are assigned to the wife-taking category (*tu, maksa*) which, in the Purum dualistic system of symbolic classification, is associated with the inferior feminine cycle, left, *Ningan* division, affines, evil spirits etc. (Needham 1962: 95-96). Two additional rules, an affinity rule and a merging rule, must be formulated to produce the designatum of the term which defines Purum wife-takers.

Hereditary Affinity Rule IV: $\dots H \rightarrow \dots S$

This is to be read: *One's linking relative's HUSBAND is to be regarded as equivalent to one's linking relative's SON.*¹⁰

12. $FZS \rightarrow ZS$ (Skewing Rule I)
 $\rightarrow DS$ (Skewing Rule III)
 $\rightarrow DH$ (Hereditary Affinity Rule IV)
 $\rightarrow ZH$ (Skewing Rule III)

13. $FZD \rightarrow ZD$ (Skewing Rule I)
 $\rightarrow DD$ (Skewing Rule III)

Affinal Merging Rule II: $SD \dots \rightarrow D \dots$

This is to be read: *Let one's SON'S DAUGHTER, as linking relative, be regarded as equivalent to one's DAUGHTER, as linking relative.*

14. $SDH \rightarrow DH$ (Affinal Merging Rule III)
 $\rightarrow DS$ (Hereditary Affinity Rule IV)

¹⁰ If there is a conflict in the application of a skewing rule and hereditary affinity rule IV to a kin type, then either rule may be assigned priority in a derivation. For a historical application of this form of analysis, see Buchler and Nutini, 1965.

Our analysis of Purum relationship terminology has been concerned with determining the formal consequences of a set of primitive statements (axioms) and with specifying the rules and procedures for deriving theorems (kin class assignments) from these statements. Rather than defining kin classes conjunctively — by isolating shared values on a denumerable set of dimensions — as in componential solutions in which the members of a class are assigned the same structural description, regardless of degree of genealogical distance, our account takes the form of a set of rules, which derive 'genealogically closer' kin types from the genealogical chains to which are equivalent.

This account provides a formal specification of Lévi-Strauss' (1951: 162; cf. 1949: 444-458) conception that the important point with the asymmetric terminological type (as distinguished from the Omaha type) is that cross-cousins are classified with affinal rather than consanguineal kin.¹¹ A set of rules are formulated which transform affines into consanguines; as in Dravidian systems, these coding rules imply "that affinity is transmitted from one generation to the next just as consanguinity ties are" (Dumont 1957: 24, 1953). Put differently, the category, but not the group, 'wife-givers' is entailed by the terminologically encoded marriage regulation: the prescription to marry a nau (ka-nau-nu/nau) applies to the category of wife-giving groups (pu) rather than to only the mother's brother's descent group (Needham 1964b: 1380). In the Purum case, this is clearly shown in Needham's (1962a: 79, Table 5, Table 2 below) analysis and tabulation of fifty-four marriages from the villages of Khulen, Tampak, and Changninglong; 48.1 per cent are *not* with women of the mother's clan.

¹¹ In a recent study, White (1963: 34-35, 39-42, 52-57, 145) has attempted to define prescriptive marriage systems in terms of a set of axioms, and matrilineal marriage systems in terms of certain operator relations ($WC = CW$ and $W^2 \neq I$); these formal considerations lead him to conclude that neither Purum relationship terminology, nor the marriages recorded by Das, are consistent with these axioms and relations. Indeed, his analysis suggests that (a) Purum relationship terminology may be "too complex and ambiguous to be an integral part of any consistent classificatory structure for marriage and descent" (White 1963: 132), and (b) "in each set of terms of address there is at least one reciprocal usage which implies that wives can be exchanged bilaterally between a pair of sibs" (White 1963: 133; cf. White 1963: 140, "the terms of relationship used between individual relatives, the first of the five major sets of data, do not form a closed or consistent classificatory system"). The inadequacy of these conclusions are sufficiently apparent, and do not demand further comment.

TABLE 2

(After Needham 1962: 79, Table 5)

Purum Marriages Outside the Mother's Clan

		Clan of Wife					Total	Outside Mother's Clan
		K	MK	M	P	T		
CLAN OF MOTHER	K	3	...	...	...	2	5	2
	MK	...	3	...	1	...	4	1
	M	6	...	6	2	...	14	8
	P	...	5	2	5	3	15	10
	T	...	1	2	2	11	16	5
Total		...	...	...	...	...	54	26

From this distribution of marriages it clearly follows that any definition of prescriptive marriage systems which satisfies axioms of the type: "There is a permanent rule fixing the single clan among whose women the men of a given clan must find their wives" (White 1963: 34, 82-83) will result in tautological definitions of the notion 'prescriptive marriage' (White 1963: 148); namely, that an asymmetric rule prescribes marriage within a clan, rather than with a category of wife-givers.

On several occasions, Needham (e.g., 1962a: 85, 87, 1962b: 259) has argued persuasively for the necessity of the study of systems of prescriptive alliance through an 'imaginative apprehension' of their system of social categories and has suggested that attempts to construe such classifications in a genealogical framework invariably distort the indigenous ideology,¹² and fail to take into account the pervasive conceptual order to which the social and symbolic orders are integrally related as part to whole. However, in the analysis of the ordering of relatives within the terminology of a system of prescriptive alliance, genealogically defined equations are invariably resorted to in demonstrating a matrilateral prescription (e.g., Needham 1962a: 77), and

¹² Faron (1962: 1153) suggests that the symbolic entailments (e.g., complementary dualism) which Needham associates with prescriptive alliance, may be revealed through an analysis of 'preferential matrilateral systems.' These notions depend upon whether one interprets the Mapuche as a case of prescriptive alliance or as a preferential system, which in term is a function of one's definition of these constructs. Complementary dualism, however, is revealed in systems which are clearly not prescriptive, by any definition (e.g., see Needham 1960).

although genealogical connection may be disregarded in ritually assimilating a woman into a marriageable (from a non-marriageable) category (Needham 1962a:87), a property of the definition of both appropriate and inappropriate marriage categories is consistently genealogical. A point of radical analytic importance, therefore, is that a strictly formal account of the coding rules underlying the genealogical ordering of relatives within kinship terminologies need not be construed as antithetical to the contextual analysis of the 'more abstract structural principles' underlying a culture's social and symbolic structure. Even in the initial definition of status differentials between wife-givers and wife-takers, inferences from genealogical considerations play a significant analytic role; for example, the association of wife-givers with senior lineal kinsmen (FF, MF) and wife-takers with junior lineal kin (DS, SS) (Needham 1962a:84). The abstract study of systems of coding rules may be considered an input to the study of cultural codes in systematic context (but cf. Hymes 1964a, 1964b:9).

SUMMARY

In this paper I have (a) reviewed various theoretical conceptions of the sociological determinants of kinship terminologies and suggested certain inadequacies in these interpretations, (b) presented a scalogram analysis of Omaha terminological systems and generated the scale variables with rewrite rules formulated by Lounsbury, and (c) presented a formal analysis of an asymmetric exchange terminology (Purum) and considered some of the theoretical implications of this analysis.

The University of Texas

I. R. BUCHLER

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