A TEMPORAL CLASSIFICATION OF FOLKLORE OF THE OKANAGAN INDIANS

by

FRANCIS ROBERT JOHN FLYNN
B.SC., UNIVERSITY OF BRITISH COLUMBIA, 1969

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS

in the Department
of
Anthropology and Sociology

We accept this thesis as conforming to the
required standard

THE UNIVERSITY OF BRITISH COLUMBIA
April, 1976

In presenting this thesis in partial fulfilment of the requirements for an advanced degree at the University of British Columbia, I agree that the Library shall make it freely available for reference and study. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by the Head of my Department or by his representatives. It is understood that copying or publication of this thesis for financial gain shall not be allowed without my written permission.

Department of ANTHROPOLOGY & SOCIOLOGY

The University of British Columbia
2075 Wesbrook Place
Vancouver, Canada
V6T 1W5

Date APRIL 29, 1976

Abstract

The Okanagan Indians classify their folklore into three states: (1) animals only in the area (2) animals and humans living harmoniously (3) animals and humans hunt and kill each other. Word counts were done on 55 stories and distance and other coefficients were calculated between pairs of stories. Cluster analyzes on the matrix of distances attempted to determine if the classifications could be arrived at methodologically. Analyzes used were Factor Analysis, Smallest Space Analysis, and Hierarchical Clustering. Results were mixed, and some techniques of Hierarchical Clustering separated the stories into the three categories.

TABLE OF CONTENTS

Introduction

Informants among the Okanagan Indians claim that when the world was first created there existed only animals living on the earth. As the folklore traces the develcpment of the world, it tells of the transition from this state to a later state where animals and people exist as enemies. This transition goes from that first state, to a state where animals and people exist as friends, and finally to the present time where people (humans) and animals hunt and kill one another.

As in most cultures, the folklore of the Okanagan Indians can be interpretted as fulfilling many functions of their culture. These interpretations could specify that the myths explain the history of the society, account for social customs, relate dreams of individuals, or even form the bases of ritual and religions.

Previous work (Maranda, Taylor, and Flynn, 1972) attempted to separate the folklore of this society into two distinct divisions of "myth" and "legend". It was hypothesized that the category "myth" told of stories which could not possibly be true and that they corresponded to fairy tales. Stories which were "legends" were thought to have had basis in fact and history.

While some informants of the Okanagan Indians had initiated these two classifications, other informants felt that this categorization of their folklore was both naive and erroneous. They pointed out that a number of "legends" could never occurred and that they were simply Indian adaptations of "white man's" stories. Thus although a methodological analysis was successful in partitioning the folklore into these two divisions, the arguments above cast a serious doubt on its validity, and the term "stories" is now used.

It has been stated that myth is timeless because although it always refers to events which happened in the past, these events are not related to specific historical happenings (Levi-Strauss, 1967, p.205) . Later in the same work, Levi-Strauss claims that although the meaning of myth cannot be found by simply examining isolated elements, myth is in fact made up of constituent units.

The three temporal divisions of the folklore of Okanagan Indians do not correspond to specific historical events. However, they do represent three different periods. Furthermore, within each of these periods, the characters that appear in the stories are strictly limited. Thus by examining the occurrences of these characters which adhere to the strict definitions of each temporal division, this thesis will methodologically partition the folklore of the Okanagan Indians into three temporal states.

Methodology

The stories were punched on computer cards with normal grammatical punctuation and spacing.

One of the problems faced in the analysis of any text is the "ambiguity" inherent in natural language.

For example, consider the words "animal" and "people". These words are used in the stories such that their meanings are obvious. However, there are times when "people" does not refer to human beings and "animal" does not refer to its normal definition. Consider instead a phrase that has both words. "Animal people" would refer not to human beings, but instead to animals collectively as a cohesive and distinct group. Furthermore, the phrase, as used in these stories, implies a group of animals displaying characteristics similar to those of humans.

The first step in the analysis was to disambiguate the stories. That is, all words which had more than one meaning were tagged with a numerical suffix which separated the different meanings. The disambiguation[1] was performed using a computer programme (Maranda, Taylor, and Flynn, 1972).

1 Given the phrase "the animals went to the area" the programme would scan the word immediately after "animal" for the word "people". If "people" is present, "animal" will be tagged with the numerical suffix 2 and become "animal2", otherwise this tag will be 1. "animal" was the only disambiguated word included in this analysis.

Each story was then processed by a computer programme (Flynn and Coulthard, 1973) which yielded a list of all unique words in each story, and the rate per thousand words of each word within its own story. If, for example, a word occurred ten times in a story, and the total number of words in that story was four hundred, then the rate per thousand words for that word in that particular story would have been (10 x 1000) / 400 = 25. The reason for the use of the rate per thousand words rather than percentages is that the stories contained in excess of 55,000 words, and a word with a low frequency would have been expressed as a very low percentage rate.

The use of word counting for the analysis of content has grown greatly in the recent past (Mosteller and Wallace, 1964), and this technique shall be utilized here.

The actual process of obtaining word counts for each story of the corpus was relatively simple, but the basic problem of methodology enters when one considers the problem of how to compare stories once the word counts have been obtained.

The next step in this process was to form a large table incorporating the occurrences of all the words throughout all the stories. Therefore, for each unique word throughout all of the stories, there was tabled a rate per thousand words for each of the stories. In all of the stories there were more than 3000 unique words.

This table[2] then represented the total occurrences of all words in all the stories. It was from this table that a sub-table was formed by removing those words which belonged to the group which was to be examined.

Since the three states of the folklore refer to animals and people, it was decided to select from the table of total occurrences only those words that explicitly referred either to animals or to people.

There were 92 words which could refer either to animals or to humans. Of these, 59 were terms of relationship, such as father, mother, and brother. These words had relatively low word counts and to delete them from the analysis would not change the overall structure of the relationships between the stories, but would in fact remove words which would serve to distort the distinctions between the stories.

2 This is an example of the table.

Bear	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0
	8.5106	10.1010	0.0	0.0	0.0
	0.0	13.2345	0.0	3.0864	0.0
	3.1250	0.0	0.0	0.0	0.0
	0.0	0.0	33.6700	0.4160	3.3223
	0.0	0.7524	0.3751	0.0	0.0
	0.0	0.0	0.0	0.0	0.0
	7.7855	0.0	10.0223	0.0	7.7519
	17.5953	0.0	0.0	4.5714	0.0
	0.0	0.0	0.0	0.0	0.0

Because the disambiguation of the corpus (Maranda, Taylor, and Flynn, 1972) did not take into account the differentiation for these 92 words, they were eliminated from this analysis. A list of those 198 words which were included in the final table is given in Appendix I. The rates per thousand words of each word of the final table for each story are presented in Appendix II.

This table which contains the rate per thousand words for each of 198 words for each of the 55 stories is the final data base from which the groupings or clusters of stories will be calculated.

Because it was desired to group these stories, it then became necessary to calculate some measure which would indicate a relationship between each and every story. Measures of both similarity and dissimilarity between pairs of stories were evaluated and calculated.

Once these coefficients had been computed, the final analysis was to evaluate the different techniques of grouping or clustering the stories.

Three different modes of grouping were considered. The first technique was to calculate the Pearson R Correlation Coefficient (Kendall and Stuart, 1961) and then to perform Factor Analysis (Harman, 1960).

For the other techniques, the Euclidean Distance (Jardine and Sibson, 1961) was used to measure the relationships between stories.

The second technique was to examine and test non-hierarchical clustering, and this included non-metric analysis (Guttman, 1968).

The third and final technique, hierarchical clustering (Anderberg, 1973), is actually a group of techniques since there are a variety of ways to measure the criteria for one story to be grouped or clustered with another story or stories.

The Okanagan Indians and their Folklore

Okanagan is one of seven languages of the Interior Salish lingustic grouping. Although classified as a member of the "Southern" group of four languages (which also includes Columbia, Kalispel, and Couer D'Alene), Okanagan serves as a "transition" between this group and the "Northern" group of the Thompson, Lilloet, and Shuswap languages.

The Okanagan Indians have inhabited the northern portion of the State of Washington and the southern portion of British Columbia. Their area forms a rectangle, with the four corners at Vernon, Nelson, the confluence of the Spokane and Columbia Rivers, and the confluence of the Okanagan and Columbia Rivers.

The Okanagans live in an area of great topographical diversity, ranging from a desert-like valley to rain-drenched mountains. They have usually dwelled in the lowlands, and have ventured into the mountainous areas mainly for the purposes of hunting and gathering berries. The society has an informal social organization with class and rank of members exerting little influence. They tend to live in extended family groups, and construct large pit houses in the lowlands for winter dwelling.

Within the Okanagan there are two linguistic territories, the "East" and the "West". The corpus[3] contains stories which are representative of both groups. Furthermore, it includes a fair representation of the features and aspects of the folklore of the people. These stories are recognized as eing longer and more comprehensive than earlier editions and include all aspects of earlier collections.

Before proceeding further, it must be stated that the stories of the corpus do not fall completely into one of these simple temporal states. Because there are different states, some stories must encompass two or more of these states, and other stories will relate events which tell of the transition from one state to another.

Thus although each story has been arbitrarily classified by the informants as belonging to one of the three original states, it may contain elements of two or more states simultaneously, or function as a transitional story from one state to another.

The best example of a story being in a transitional

3 The corpus analyzed consisted of fifty five Okanagan Indian stories tape-recorded during 1966-1971 by Larry Pierre, and Okanagan Indian from Penticton, and Randy Bouchard of the B.C. Indian Language Project in Victoria. These stories, translated into English by Pierre and Bouchard, were made available in 1971 by the B.C. Indian Language Project through Dr. Pierre Maranda of the Department of Anthropology and Sociology at the University of British Columbia.

state occurs in a myth where we encounter animals only, but they are living in a society which can be described as similar to the structure of that of the Okanagan Indians. Thus, though the story exists as animals living in a harmonious state, there exists the implicit though not-stated influence of humanity.

Methods of Similarity and Dissimilarity

There exist literally dozens (perhaps hundreds) of coefficients of similarity and dissimilarity. To consider them all would constitute years of work.

However, these coefficients fall into the three levels of interval, ordinal, and nominal. The coefficients which have been discussed here are all of the interval or highest level. To employ a measure of the ordinal level would result in a loss of information. To use a measure of the nominal level would involve an even greater loss of information.

Finally, there are a number of interval level measures, but the Pearson R Correlation Coefficient and the Euclidean Distance Coefficient represent the two measures that are undoubtedly used well in excess of 99% of the time for interval level data.

(1) Pearson R Correlation Coefficient

Given two variables x and y, the formula for the Pearson R Correlation (Steel and Torrie, 1960) between these two variables is

$$\frac{\sum_{i=1}^{m}(x_i-\bar{x})\quad(y_i-\bar{y})}{\left|\sum_{i=1}^{m}(x_i-\bar{x})^2\sum_{i=1}^{m}(y_i-\bar{y})^2\right|^{1/2}}$$

where n is the number of observations, $\bar{x}$ is the mean of variable x over the n observations and $\bar{y}$ is the mean of variable y over the n observations. This measure is widely used in most fields of physical, natural, and social sciences and the literature describing it is quite extensive. (Kendall and Stuart, 1961). For any story (variable) in the corpus approximately 90% of the entries are 0.0. If one considers the numerator of the correlation coefficient which reduces to

$$\sum_{i=1}^{n} x_i y_i - n*\bar{x}*\bar{y}$$

the term $-n*\bar{x}*\bar{y}$ is negligible and has almost no influence on the coefficient.

Essentially, the large number of corresponding 0.0 values severely limits the range of this coefficient, and thus makes the value of its use questionable. Furthermore, if two stories have a common major character occurring often they will also have a very high correlation coefficient (Appendix III).

(2) Modified Pearscn R Correlation Coefficient

This modified correlation coefficient is calculated in the same manner as the Pearson R Correlation Coefficient but when common observations of both the variables being considered are both 0.0 they are considered missing data and omitted from the calculations. This coefficient has several basic flaws and problems.

The most serious objection to this coefficient is that it obtains its results from different samples of the data base. For example, the coefficient obtained for stories one and two uses different (non-missing data) observations than does the coefficient between stories two and three. In addition, these two coefficients are based on different numbers of observations. Thus this coefficient uses only a small proportion of the observations from each story, and furthermore it does not necessarily use the same observations from story to story.

This coefficient is also inflated, although not nearly as badly as the original Pearson R. In addition this coefficient fails to account for values of 0.0 on two stories which are themselves important in that they signify the absence of a particular character or word in a story.

(3) Volume Coefficient

Since the data base consists of fifty five stories or variables, with each story having 198 entries, one then can conceptualize the stories as variables in a 198 dimensional space. It then becomes a simple matter to calculate the joint space of two stories in this space as a proportion of the potential common "volume" that might be occupied by these stories in the 198 dimensional space.

This coefficient unfortunately has a few theoretical and practical problems. The coefficient is calculated in the following manner: for any particular word calculate the fraction of the minimum of the two stories under consideration over the maximum of the two. Now the most basic problem occurs when one or even both of the stories have a value of 0.0 on a given dimension. If both are 0.0 then the fraction is undefined. If one is 0.0 and the other is not 0.0 then the proportion calculated becomes 0.0. To calculate the space it is necessary to find the product of these 198 proportions. Obviously if one or more of the proportions is 0.0 the joint product will itself be 0.0. To avoid this possibility it was decided that if one of the stories on any particular word is 0.0 then the proportion for that particular word is arbitrarily defined as 1.0. Alternatively one may simply avoid words where 0.0 occurs on either of the two stories. Unfortunately, if this is done, what one is then in fact doing is comparing different coefficients which are based on different sized dimensions. For example, the volume coefficient between story one and story two may be the product of only fifteen proportions because 183 of the proportions were 0.0 or undefined. The coefficient between story 10 and story 11 might in fact use 30 proportions. Essentially then what we are doing is comparing two coefficients based on different numbers of dimensions.

Arguments for and against using this coefficient based on the preceeding discussion can be made. In fact, mathematicians consulted by the author have been divided on the issue. Another basic problem is that since we are using the minimum divided by the maximum and finding the product of these proportions for any two vectors or variables, the larger the number of dimensions or observations the smaller will be the coefficient. In this particular case the largest coefficient was in the general area of 10E-7 while the smallest coefficient was in the area of 10E-16. However, if a smaller number of dimensions are used the coefficients become much larger. The interpretability of these coefficients is open to question when one considers the minimum and maximum sizes and their ranges.

It is interesting to note however, that the 1485 coefficients obtained are lognormally distributed. If one were to take the natural logarithm of each coefficient then these new coefficients would be normally distributed. Since this coefficient is the invention of the author, little subsequent work has been done to explore its characteristics and performances. Those aspects which should be examined include (1) the further theoretical implications of zero products (2) the great variability in the sizes of the coefficients (3) the implications of the lognormal distribution of the coefficients.

(4) The Distance Coefficient

This coefficient also considers each story or variable as a point in a 198 dimensional space. However, using the standard Euclidean formula for distances between two points, the standard distance can be calculated between each story and every other story. This is probably the best method for measuring the differences behind the stories but there are conceptual arguments to be considered. The smallest value calculated was approximately 16 and the largest value approximately 80 (Appendix IV).

The basic problem for this coefficient is similar to the problems of the Volume Coefficient. In the third chapter the method for selecting the data base was discussed. It was reported that word counts were run on each of the individual stories, and from this computer programme the rate per thousand words was calculated for each word in each story. Then a table was constructed in which the variables were the fifty five stories, and the observations were the rates for certain selected words.

The basic problem is that one could question the validity of representing the stories as points in a multidimensional space. For this space, each story has as its dimensions the selected words. In addition, for any dimension the distance of a story from the origin (or 0.0 coordinate) is the rate calculated for that particular word.

The problem is minor when compared to the following advantages of this measure: (1) it removes the high measure of similarity experienced with some of the measures already discussed in this chapter; (2) it provides a measure of a relationship between stories that can be used for sophisticated cluster analysis techniques.

The only methodological problem involved will occur during cluster analysis when it will become necessary to make arbitrary decisions as to what distance constitutes "nearness". This problem, however, is a weakness of the clustering techniques, not of the distance coefficient.

Finally, one might ask if the relationships between stories can be expressed by a linear measure such as the Euclidean Distance. It is possible that the distance between two stories is not a straight line, but is indeed a complex winding curve, or even a complex hyperplane. The thought itself is horrifying, for the calculation of such a function would be so difficult and tedious that it might as well be impossible.

Factor Analysis

If one were to have a large number of variables which were intercorrelated, one would expect the interrelationships between the various variables to be due to one or more underlying factors. Factor Analysis is a methodological technique for determining those variables which have common factors. Thus one could make the assumption that high intercorrelation within a cluster of variables is due to the presence of a single factor for any particular variable in that cluster.

The most elementary configuration would result if each variable were to have a unique factor. If this were to happen, then there would be the same number of factors as there were variables.

Mathematically, this technique measures three different types of variance.

(1) common variance measures the proportion of the total variance that correlates with other variables

(2) specific variance, which doesn't correlate with other variables

(3) error variance

This technique specifically measures the common variance between variables.

Despite the failure of the data base to meet the standards and assumptions of normality necessary for Factor Analysis, this technique was employed simply to examine the results it would produce. The matrix of Pearson R correlation coefficients was submitted to a computer programme (Bjerring) which performed Factor Analysis with Varimax rotation. The number of factors was equal to the number of eigenvalues[4] which were equal to or greater than a value of one (1.0).

In Appendix V, the major characters of each story (in terms of the number of occurrences) are presented, and the character common to each story of a particular factor is underlined.

For 44 of these stories, Factor Analysis has selected the character which occurs most often in a story as the principal factor for that story. In an additional ten stories, there are two major characters which occur with a large frequency. For these stories Factor Analysis has selected the second major character as the factor. Finally, story number 22 was the only story for which Factor Analysis did not select either the main character or one of the two main characters in a story.

4 Find a number λ and an n-dimensional vector $x \neq 0$ such that $Rx = \lambda x$. Any number λ that satifies this equation is called an eigenvalue of R. (Harman, 1960)

When the Factor Analysis was done with the limitation that only three factors were to be calculated, the results obtained were totally heterogeneous and no worthwile interpretation could be made.

As was mentioned in the discussion of the Pearson R correlation coefficient, for any two stories that have a major character occurring with high frequency in both of them, the correlation coefficient would be greatly inflated, and this relationship would be expressed in Factor Analysis by both stories being included in the same factor.

Guttman-Lingoes Smallest Space Analysis (MINISSA)

The techniques of Factor Analysis and hierarchical clustering usually rely on the metric value of a measure of similarity or dissimilarity to make decisions regarding the grouping or clustering of selected variables.

In contrast to this, Smallest Space Analysis, one technique of the Guttman-Lingoes Non-Metric Analysis system, considers only the relative distance or proximity of variables (Guttman, 1968) .

Given a matrix of similarity or dissimilarity coefficients which are assumed to be informative of order only, determine a Euclidean space for which the distances among the points have the same rank order (or are minimally discrepant from that order) in as few dimension as possible.

Consider the following two hypothetical matrices which show correlation between four variables.

	1	2	3	4
1	1.00			
2	0.90	1.00		
3	0.60	0.70	1.00	
4	0.40	0.50	0.80	1.00

	1	2	3	4
1	1.00			
2	0.99	1.00		
3	0.96	0.97	1.00	
4	0.94	0.95	0.98	1.00

For the purpose of calculating coordinates in a two dimensional space, the relations between the variables are identical for the two matrices when one considers the crders of the coefficients. That is, the correlation between variables one and two has the largest magnitude and the correlation between one and four the smallest. Thus Smallest Space Analysis will yield the same solution for both the matrices of coefficients.

Definition 1: P is a r-element array of similarity or dissimilarity indeces or coefficients between all possible pairs of n objects, and contains the entities p_{ij}, where $i=1,\ldots,n-1$ and $j=i+1,\ldots,n$) where $i \neq j$ and $p_{ij}=p_{ji}$. Furthermore $r=n(n-1)/2$

definition 2: S is a r-element vector or array of real numbers with elements s_{ij}, where $s_{ij}=f(p_{ij})$ such that $s_{ij}<s_{kl}$ (semi-strong monotonicity when some P are tied and strong monotonicity when there are no ties) for all i,j,k, and l where $i \neq j$ and $k \neq l$. Thus the S vector is a monotonic transformation of the P vector.

Definition 3: X is a N by M matrix of rectangular co-ordinates for M dimensions.

Definition 4: D is a r-element vector of distance when the elements of D, d_{ij}, are calculated by

$$\left| \sum_{a=1}^{m} (x_{ia}-x_{ja})^2 \right|^{1/2}$$

Thus, given P, some initial configuration X, a fixed m, and the distances (d_{ij}) calculated as above, the problem is the minimization of a function of the two sets of unknowns, D and S .

One solution is to normalize a least squares or loss function L, where

$$L=\left| \sum_{ij}(d_{ij}-s_{ij})^2 / \sum d^2_{ij} \right|^{1/2}$$

Furthermore, define the following as a measure of raw fit.

$$\emptyset^{+}= \sum_{ij}(d_{ij} - d^{+}_{ij})^2$$

where d^{+} are the derived distances between the points.

Furthermore,

$$\sum_{ij} d^{+}_{ij} = \sum_{ij} d_{ij}$$

$$\left(\sum_{ij} d^{+}_{ij}\right)^2 = \sum d^2_{ij}$$

and

$d^{+}_{ij} < d_{kl}$ if $p_{ij} < p_{kl}$ (dissimilarity coefficients)

then if $\emptyset=1- \sum_{ij} d_{ij} d^{+}_{ij} / \sum_{ij} d^2_{ij}$

a coefficient of alienation is defined as

$$K= \left| 1-(1-\emptyset)^2 \right|^{1/2}$$

The coefficient or alienation is then an indication of how well a solution represents the original order of the data (Guttman 1968). When considering this coefficient, two aspects must be examined to determine whether a solution is acceptable in a given number of dimensions (m).

The most important consideration of the coefficient of alienation is, of course, the size of this coefficient. For any solution in a given m dimensions, the coefficient of alienation should ideally be less than or equal to .10, however any solution that yields a fit less than .15 is considered to be adequate.

In conjunction with the size of the coefficient, one must also consider the changes in the sizes of the coefficient when going from one dimension to a higher dimension as, for example, when changing from a two dimensional solution to three dimensional solution. If the fit for one dimension was .40, the fit for two dimensions .12, and the fit for three dimensions .09, obviously the decrease in size of the coefficient from one dimension to two dimensions is considerably greater than the change from two to three dimensions. In this particular situation the solution in two dimensions would be used.

Theoretically, for a problem with n variables, there will be a perfect fit (coefficient of alienation = 0.0) in n-2 dimensions (Lingoes 1969). One aspect of this particular package of programmes is that the Smallest Space Analysis computer programme will determine the number of dimensions for which the best solution can be obtained for a particular set of data.

For the matrix of distance coefficients, the best solution obtained was in a ten dimensional space (Appendix VII) with a coefficient of alienation of .05192 and Kruskal's Stress of .04868. In two dimensions, however, the fit obtained was as high as .21, and for three dimensions the result fell to only .18. This would suggest that this technique has determined that this corpus of stories does not form a simple triplex, but is instead a complex system involving many more aspects than was suggested by the introduction. A preliminary examination of the output for ten dimensions yielded the observation that of the many facets that dictate the structure of the corpus, a few can be identified.

For those stories which have only animals living in harmony, the great majority have coyote as the principal character. Coyote represents "God" on earth to the Okanagan Indians. He was placed in that area to rid it of "people eaters", and to provide food for future generations of "people".

Although he had great powers and performed numerous magical transformations to make the Okanagan area liveable, coyote had a mischievous nature and was continually getting in trouble. As a result, one story of the corpus tells us that when he had finished his work, he was placed in a canoe and shipped out to sea, never to return again as a powerful creature.

The first dimension of the MINISSA output sharply partitions the corpus into two distinct divisions. On one side of the dividing line are all stories which have coyote as either the main character or as the second major character in a story. Because coyote had left the area before any humans appeared, this distinction separates twenty stories which all belong to the first state of only animals living in the area.

Of the other stories, the first dimension also separates out a pair of stories which have grizzly bear as the main character. Furthermore, these two stories, although close on the first dimension to the other non-coyote stories of the corpus, are a distinct entity between these and the coyote stories. In addition, these two stories describe animals only, but animals that are living in a society that is human structured.

It is interesting to note that grizzly bear is the one character that appears in all temporal states of the stories. Grizzly bear is also unique in that she is regarded as being the most "powerful" animal on the earth, even more "powerful" than coyote.

The second of the ten dimensions has two stories located at a great distance from the other fifty three.

These two stories are versions of the same story, and although they again represent the state of animals only, they contain two major characters (owl and chipmunk) which are not major characters in any other stories.

Similarily, the fourth dimension separates from the other stories two which have wolf as the main character.

The other dimensions represent heterogeneous results, with complete mingling of all categories or states.

Thus for this particular set of data, one could conclude that while there is a partial categorization of the data as indicated by the divisions along the first dimension, the structure is much more complex than was first stated.

Hierarchical clustering

Although it is perhaps the technique used most often for cluster analysis and also the technique that is most widely discussed, dissected, and analyzed, hierarchical clustering remains essentially a collection of ad-hoc techniques.

As the name hierarchical implies, this technique functions by first grouping points, objects, variables or observations which are "closest" together, then it combines these facets and repeats the procedure until there remains but one item or cluster (Jardine and Sibson, 1971) .

The previous sentence has employed a number of terms to indicate that which has been grouped or clustered. Indeed, there is widespread debate as to whether grouping or clustering should be used to describe this technique. For this discussion, the term "cluster" will be arbitrarily used. Also, although hierarchical cluster analysis can be used for many types of data, we are only concerned here with analyzing variables, the fifty five stories of the Okanagan Indians.

A very general description of hierarchical cluster analysis would be that given N clusters (or points or variables or objects), and N(N-1)/2 relationships between these points, begin by clustering the two which are "closest" to one another, and define this as a new cluster. Continue this clustering until only one cluster remains.

For the original N variables, the relationships between them can be a measure of distance (Ball, 1965) or a measure of similarity or dissimilarity (Johnson, 1967). Here we will use only the Euclidean distance between each story and every other story as the measure of relation.

There exist a large number of criteria for determining when two clusters are "near" each other (Ball,1965). For this work, five of what might be considered to be popular methods will be examined. These techniques are (1) Nearest Neighbour (2) Furthest Neighbour (3) Average (4) Centroid and (5) Ward Technique.

Throughout the analyzes of the five techniques, reference will be made to clusters of stories with the total output. An important question that must be asked would inquire how one determines clusters within the hierarchical scheme.

This problem is not only relevant to this work, but is one that has been widely discussed and debated. Although there are methods for separating clusters, these invariably violate basic statistical principles. Thus for this task the user must make ad-hoc decisions about the determination and identification of clusters.

Within the spirit of this problem, clusters in this work have been determined by visual examinations of the levels of the merging of clusters. Thus, if a series of clusters join together with small increments in the measure of clustering (or small increments or decrements for the Centroid method) and then there is a large jump is the size of these measurement, the cluster which existed before the large change would be categorized as separate clusters.

After an examination of this problem, perhaps a solution might procede from the following observations.

If one has a sufficiently large number of points (more than ten) within the total system then the distribution of all possible inter-cluster distances (we are considering only Euclidean distances between variables for this argument) will approximate a normal distribution.

An examination of randomly generated points has confirmed this statement. Also examined was a system of ten points with two clusters of five highly packed points. The distance between the two clusters was set to an arbitrary distance of ten thousand times the distance of that for two points within the same cluster. The distribution of the distances for all clusters maintained a normal distribution. The basic reason for this is that with only ten points there are in excess of one million possible distances, and for fifty points this number rises to more than one billion.

A proposed test might encompass the following. Once the hierarchical technique has determined a cluster by merging two previous clusters, one would generate a random cluster from the total data base with the same number of elements as the new cluster to be tested. Thus one would have two comparable clusters, one calculated by the technique, and one generated at random.

After this is done, a comparison could be made to see if the calculated cluster is significantly more compact than the generated cluster.

One problem for this test would be that one might state that a randomly generated cluster might not be representative of the data set. One method of correcting this fault would be to generate inter-point distances rather than points themselves, and these distances would be generated by a probability function which would not yield a configuration with a low probability of occurrence.

Once one has the two clusters for comparison, then a test can be implemented which would check for a statistically significant difference between the two clusters.

The formulation of such a test is not a simple matter because the cluster generated by the hierarchical scheme does not represent a series of independent points. However, the author feels that this conceptualization has interesting possibilities, and will endeavour to more fully explore them in the future.

The matrix of 1485 coefficients was submitted to a computer programme (Wood, 1974) and the results for the five techniques were analyzed. The resulting dendograms are in Appendix VI.

The Nearest Neighbour technique specifies that the criterion for for the joining of any two clusters is the shortest distance between any point in the first cluster and any point in the other cluster. This technique has the decided mathematical advantage that it is invariant under monotone transformations on the original data. However, Nearest Neighbour tends to produce a chaining effect, with long drawn out strings of points (Sokal, 1974).

An examination of the results from this method indicated partial success in the attempt to define the hypothesized three states of the folklore of the Okanagan Indians.

There were what can be classified as three sections in the output. The first section was a large cluster of seventeen stories which all referred to the state when animals only lived on the earth. Furthermore, all cf the stories have the Coyote as the main character.

The second cluster was less tightly grouped and contained seventeen stories also. Of these, one story referred to the same state as the first main cluster, and the other sixteen were a heterogeneous mixture of the second and third states.

Finally, there were twenty one stories which were loosely interconnected and could not be grouped as clusters.

For the Furthest Neighbour, also known as the complete linkage technique, the criterion is to compare those two points that are the furthest apart in two adjacent clusters. This technique is also monotone-invariant and it results in tight ball-shaped clusters (Sokal, 1974).

An examination of the output of this method yields a result which is the closest to proving the original hypothesis than any of the previous techniques in this paper.

There occurred four different groupings or divisions for this technique.

The first cluster consisted of ten stories bound close together. Of these ten, eight referred to the last state of the hypothesis when Indians and Humans exist in total distrust and hatred. The other two stories in this cluster refer to the period when animals and humans lived together in harmony,

The second cluster consisted of seven elements tightly grouped together. Of these seven, six referred to the second state when animals and humans co-existed, and the seventh story to the third state that describes the separation of the two groups.

The third cluster was not as tightly packed as the first two, but it consisted of twenty two stories which all referred to the first state when only animals lived in the area.

Finally, there are sixteen stories which could not be classed into distinct clusters, with the exception of the two stories about chipmunk and owl, which were extremely close to each other.

As might be implied by its name, the Average technique uses as its criterion the average distance between all points in one cluster to all points in an adjacent cluster (Anderberg, 1973) .

The results of this technique were similar to those of the Furthest Neighbour method, but were not as well defined.

Again, there were four classifications. The first consisted of nine points, of which seven referred to the third state of the hypothesis, and two to the second state.

The second group was a cluster of seven variables, of which six stories referred to the state of harmony between animals and humans, and the seventh was of the third state.

A third cluster of nineteen variables was formed for which all of the stories were of the first state.

Of the remaining twenty stories, there were two clusters of two stories each, but the remaining variables showed no propensity to form defininitive clusters.

The Centroid, or centre of cluster method, measures the distance between the geometric centres of two adjacent clusters as the criterion for joining. For most of the techniques of hierarchical clustering, the distance between clusters increases as further clustering proceeds. The Centroid method is one technique for which this statement does not necessarily hold true. Since the criterion is to measure the distance between the centres of clusters, once a cluster has been enlarged by having two clusters become a single one, then in all probability the geometric centre of the new cluster will be at a location different from the original geometric centres of its two component clusters.

Thus it becomes possible that although at the time of amalgamation these two clusters were the ones closest together, the new cluster may in fact be a shorter distance from a third adjoining cluster. This phenomenom is known as "reversing" (Wood, 1974).

The results from this technique yielded only two definite clusters. The first cluster consisted of nine stories which were of the animals only-state the second cluster of thirteen stories contained a mixture of stories belonging to both the second and third states. The remaining stories did not exhibit any apparent clustering or grouping.

The final technique (Ward) determines the proximity of two clusters by forming new cluster groups, and calculating the sum of the squares of all distances from one point to another with the new cluster. The clustering which minimizes this sum of squares is the one chosen.

The results of this technique were unique to this study, in that there were only two of the fifty five stories which did not belong to a clearly defined cluster.

The stories which referred to the first state of animals only divided into three clusters. The largest cluster contained nineteen stories which have coyote as the main character. The second cluster of four stories all involved the character grizzly bear, and the third cluster of six stories contained stories with other principal characters. There was a cluster of eight variables of which seven of the stories related to the third and last state.

Finally, a cluster of fifteen variables was formed of which nine stories were of the second state and six of the third state.

Conclusions

Although the results of the analysis vary with the technique used, the fifty five stories have been successfully separated into the hypothesized three states in relation to the presence of animals and humans within the stories.

Because each story had a large number of words with no occurrences, the use of the Pearson R correlation coefficient became inappropriate. Furthermore, due to the affect of this coefficient, Factor Analysis produced thirteen factors. For all but one story, the main factor for each story corresponded to either the main character (in terms of frequency) or the second of two main characters.

The results from smallest space analysis (MINISSA) showed an improvement when the number of dimensions required for a solution decreased to ten. However, only one dimension was fully interpretable with three other dimensions having some recognizable distinctions. The remaining six dimensions were totally heterogeneous and analyzes of them were impossible.

It is with the use of hierarchical clustering that final success is achieved. Although the Centroid method produced an output of little use, the results from the Average and Nearest Neighbour algorithms showed well defined and interpretable clusters corresponding to the hypothesized states. However, even here there were a number of stories which could not be so categorized. The technique involving clustering of the Furthest Neighbour yielded even better a solution, but again there were uncategorized stories.

Finally, the hierarchical cluster analysis employing the Ward technique was able to classify all but two of the stories into distinct clusters for which all could be labelled as belonging to one of the three hypothesized states.

This work illustrates many of the problems faced by the social scientist in quantitative research. Such problems include the question of how to measure the relationships between variables being considered for analysis. The choices are many, and the analyst must be careful to match a technique with his or her particular type of data set. Once the relationships between the variables have been established, there are many techniques of cluster analysis which can lead to vastly different results.

Finally, once one has employed a technique such as cluster analysis, the results must be carefully considered, for a variety of conclusions can be deduced from a single output.

In conclusion, although the methodological analysis has involved varied techniques with mixed results, the stories have been partitioned into three distinct temporal categories. Thus although the stories do not reference specific historical events, the analysis of characters which logically define the three temporal states of the stories has yielded clear methodological divisions of the folklore of the Okanagan Indians.

BIBLIOGRAPHY

Anderberg, M.R., Cluster Analysis for Applications, Academic Press,New York, 1973

Ball, G.H., "Data Analysis in the Social Sciences: What about the details?", Proceedings - Fall Joint Computer Conference, 1965, 27,Pt. i,pp. 553-599. Spartan Books, Washington D.C.

Bloombaum, M. "Doing Smallest Space Analysis". Journal of Conflict Resolution , 14,(September): 409-416.

Bloombaum, M., "Some Recent Examples in Facet Theory and Nonmetric Analysis". Paper presented at the Canadian Sociological and Anthropological Association annual meeting, St. Johns, Newfoundland, June 1971.

Bjerring, J. H., "Factor Analysis", Computing Centre, The University of British Columbia. 1973

Bouchard R. and Pierre L. "How to Write the Okanagan Languages", B.C. Indian Language Project, Victoria, 1973 (Revised).

Flynn, F. and Coulthard, J. "WCOUNT: A word counting and frequency analysis program". Computing Centre, The University of British columbia, January 1973.

Fuchter, B. Introduction to Factor Analysis , D. Van Nostrand, Princeton, New Jersey, 1954.

Gower, J.C. "A comparison of some methods of cluster analysis", Biometrics , December 1976, 623-637.

Guttman, L. "A general nonmetric technique for finding the smallest space coordinate space for a configuration of points.", Psychometrika , 1968, 33, 469-506.

Harman, H. H. Modern Factor Analysis , The University of Chicago Press, Chicago, 1965.

Jardine, N. and Sibson, R. Mathematical Taxonomy , John Wiley and Sons, 1971.

Johnson, S.C. "Hierarchical clustering schemes", Psychometrika , 1967, vol. 32, No. 3, 241-254.

Kendall, M.G. and Stuart, A The Advanced Theory of Statistics, Vol. II . Griffin, London, 1961.

Kongas-Maranda, E. and Maranda, P. , _Structural Models in Folklore and Tranformational Essays_ . Mouton, 1971.

Kruskal, J.B. "Multidimensional scaling: A numerical method" , _Psychometrika_ , 1964, 29, 1-27.

Kruskal, J.B. "Multidimensional scaling by optimizing goodness of fit to a nonmetric hypothesis", _Psychometrika_ , 1964, 29, 115-129.

Kruskal, J.B. and Hart, R.E. "A geometric interpretation of diagnostic data from a digital machine: Based on a studey of the Morris, Illinois Electronic Central Office", _Bell System Tech. J._ , 1966, 45, 1299-1338.

Leach, E. _Levi-Strauss_ , Fontana/Collins, 1970, London.

Levi-Strauss, C. _Structural Anthropology_ , 1967, Anchor Books, New York.

Lingoes, J.C. "An IBM-7090 program for Guttman-Lingoes smallest space analysis-I", _Behav. Sci._ , 1965, 10, 183-184.

Lingoes, J.C. "New computer developments in pattern analysis and nonmetric techniques". In _Uses of computers in psychological research - The 1964 IBM symposium of statistics._ Gauthier-Villar, 1966, Paris, 1-22.

Lingoes, J.C. "Some boundary conditions for a monotone analysis of symmetric matrices", _Michigan Mathematical Psychology Program,_ 69-9, 1969.

Lingoes, J.C. and Roskam E.E. "A mathematical and empirical analysis of two multidimensional scaling algorithms", _Psychometrika_ , 1973, 38, supp.

McQuitty, L.L. "Rank order typal analysis", _Educ. Psychol. Measmt._ , ,1963,23,55-61.

Maranda, P., Taylor, B. and Flynn, F., "From Words to Plots: Computerized Analysis of Myths", Paper delivered in the Canada-France Workshop on the Analysis of Representative Systems, No. 1, Vancouver, 1972.

Matson, R.G. and True, D.L. "Site relationships at Quebrada Tarapaca, Chile: A comparison of clustering and scaling techniques", _American Antiquity_ , Vol. 39, No. 1, January, 1974.

Mosteller, F. and Wallace, D.L. _Inference and Disputed_

Authorship: The Federalist , Addison-Wesley, 1964.

Ray, V. "The Sanspoil and Nespelem: Salish Peoples of Northeastern Washington", University of Washington Publications in Anthropology , Vol. 5, (December 1932), 3-237.

Roskam, E.E.C.I. "Metric analysis of ordinal data in psychology", Doctoral Dissertation, University of Leiden, 1968, 1-165.

Roskam, E.E.C.I "A comparison of principles for algorithm construction", Michigan Mathematical Psychology Technical Report , MMPP 1969.

Sokal, R.R. "Classification: Purposes, principles, progress, prospects", Science , N.Y., 1974, 185, 1115-1123.

Spier, L. (editor) "The Sinkaietk or Southern Okanagan of Washington", Contributions from the Laboratory of Anthropology 2, General Series in Anthropology No. 6 , George Banta Publishing Company, Agent, Menasha, Wisc., 261 pp., 1938.

Steel, R.G.D. and Torrie, J.H. Principle and Procedures of Statistics , McGraw-Hill, New York, 1960.

Thurstone, L.L. Multiple Factor Analysis , The University of Chicago Press, Chicago, 1947.

Teit, J.A. "The Okanagan", In: The Salishan Tribes of the Western Plateaus , Bureau of American Ethnology, 46th Annual Report, 1928-29. Smithsonian Institute, Washington, D.C., 1930.

Wallace, M.D. "Alliance polarization and war in the international system, 1815-1964: A measurement procedure and some preliminary findings", Paper presented to the Canadian Political Science Association, Montreal, June 2-5, 1972.

Wood, J.J. "A computer program for hierarchical cluster analysis", Newsletter of Computer Archaeology , Vol IX, No. 4, June 1974.

APPENDIX I

KEYWORDS FORMING DATA BASE

aeneas	aksts'w#in	animal1
animal2	ants	baby
badger	baldy	bear
bears	beaver	beavers
bird	birds	blackfoot
blackfoots	blue-grouse	blue-jay
boy	boys	buck
buffalo	bull	bull-frog
bulls	cat	ch#iwchu
cha/atlmx	chickadee	chinook
chipmunk	cougar	coyote
crab	crane	cranes
creature	creatures	cubs
deer	doctor	doctors
doe	dog	dogs
e#w#ilhwelh	eagle	eagles
elk	enemies	eskimos
fawn	fawns	fish
fisher	fox	frog
frogs	girl	girls
grasshopper	grasshoppers	grizzlies
grizzly	grouse	half-human

half-sasquatch	horse	horses
human	humans	indian
indians	inkameep	insects
joseph	k/w'ast#inek	k'iyawtk/n
kids	kingfisher	kings
kinikinick	kinnickinnick	kitl-ti-ta-lal-o
kla/7pilxkn	kts'ats'a/kwa7	kwaw7/ikw
kwaw7#ikw-kw	kwi#lstn	lady
lefty	lynx	magpie
magpies	man	meadow-lark
men	mice	mole
moles	monster	mosquitoes
mountain-goat	mountain-goats	mountain-sheep
mouse	muskrat	nhithetwel'x
nighthawk	nkw'a7kw'7ikn7	nxwuyalnp#itx
okanagan	okanagans	osprey
owl	p'a/k/w'k/w'	pak/mk/n
paul	people	people-eater
people-eaters	person	persons
ponies	priest	rabbit
rabbits	rats	rattlesnake's
raven	robin	salmon
sasquatch	sasquatches	seagull
sheep	shuswap	shuswaps
sk/a7u7sk/in7kst	sk'lhp'etl'm#itk	skunk
skwant	sna-sna-sna	snake

snakes
snk/wa7lhk/nilhx
snk'#lip
snk'mch#inax
snwimn
snx/elm#ina
sockeye
spaniards
sparrow-hawk
spider
squirrel
squirrels
stawn7k/na7kst
stum'kst
sucker
sum#ix
su7yalhts'a7
swallow
swallows
swan
swans
swa7w#ilh
sxwel#m#ulaxw
sxwel'm/ulaxw
tet'ak/#ina7
tmskwast
trout
ts'ak/w'ma7
ts'ska/kna7
turtle
turtles
warrior
warriors
watch-birds
water-bird
water-insects
water-monster
whale
whippor-will
whitefish
willow-grouse
wolf
wolverine
wolves
woman
women
wood-tick
wood-worms
woodcutter
woodpecker
worms
yir-ki-natl-pow-
7a/nn'
7ihnk'

APPENDIX II

NON ZERO OCCURRENCES OF KEYWORDS IN THE STORIES

STORY NUMBER 1

animal2	.9718
frog	25.2672
frogs	9.7182
people	12.6336
person	.9718
swallow	5.8309
swallows	2.9154
women	.9718

STORY NUMBER 2

animal1	1.8605
coyote	39.0698
deer	13.9535
mice	.9302
moles	1.8605
person	.9302

rats	.9302
wood-tick	19.5349

STORY NUMBER 3

coyote	29.0323
crab	20.4301
frog	19.3549
people	2.1505
turtle	13.9785
turtles	5.3763

STORY NUMBER 4

blackfoot	.6570
buffalo	11.8266
bull	22.3390
bulls	.6570
coyote	32.8515
enemies	.6570
indians	1.3141
lady	5.2562
man	1.3141
okanagan	1.9711

people	1.3141
su7yalhts'a7	4.5992
warrior	.6570
woman	.6570

STORY NUMBER 5

coyote	33.2226
eagle	19.9336
fox	6.6445

STORY NUMBER 6

animal1	10.1733
animal2	1.8839
baby	.3768
beaver	5.6519
blue-jay	6.7822
boy	.7536
buck	5.2751
cat	.3768
coyote	29.0128
deer	3.7679
doctor	1.8839

fawn	3.7679
indian	1.5072
lynx	1.8839
man	.3768
mole	1.5072
people	6.7822
person	4.8983
woman	.7536

STORY NUMBER 7

bird	31.6206
fish	27.6680

STORY NUMBER 8

boy	1.5886
coyote	22.6370
fish	2.3828
fox	18.2684
frog	7.1485
indian	.7943
indians	.3971
monster	.3971

people	11.9142
people-eater	1.1914
people-eaters	.3971
person	.3971
turtle	6.7513
water-monster	11.9142
woman	7.5456

STORY NUMBER 9

animal1	1.1905
animal2	1.1905
birds	1.1905
coyote	33.3333
deer	2.3810
girl	5.9524
girls	9.5238
magpies	2.3810
people	2.3810
raven	2.3810
woman	1.1905
women	1.1905
worms	4.7619
7a/nn'	2.3810

STORY NUMBER 10

animal2	1.3581
beaver	2.7162
birds	3.6215
buck	3.6216
coyote	36.6682
creature	.4527
deer	5.4323
doctor	.4527
doe	2.2635
dog	2.7162
enemies	.9054
fish	1.8108
fox	14.4862
kingfisher	4.5269
lady	1.8108
man	4.5269
mole	2.2635
people	4.9796
people-eater	1.3581
rabbit	2.2635
rabbits	1.3581
woman	1.3581
wood-tick	1.3581

STORY NUMBER 11

animal1	.3868
animal2	1.5474
baby	1.5474
bear	8.5106
bears	.3868
cha/atlmx	.7737
coyote	12.7659
deer	.3868
fish	.3868
fox	1.5474
girl	.3868
grizzly	30.1741
indian	.3868
indians	.3868
man	3.0947
people	2.3211
person	.3868
raven	.7737
woman	6.1896
women	.3868
woodpecker	.3868
worms	1.1605

STORY NUMBER 12

bear	10.1010
coyote	18.1818
girl	3.0303
grizzly	25.2525
lady	20.2020
man	5.0505
men	4.0404
mole	1.0101
muskrat	10.1010
woman	6.0606

STORY NUMBER 13

blackfoot	1.8382
coyote	25.7352
fish	5.5147
fox	18.3823
okanagan	1.8382
people	16.5441
people-eater	3.6765
salmon	3.6765
shuswap	1.8382
trout	9.1912
whale	27.5735

woman	1.8382

STORY NUMBER 14

animal2	1.3514
baby	2.7027
bears	1.3514
blue-jay	4.0541
boys	1.3514
coyote	28.3784
creatures	1.3514
girl	9.4595
grizzly	1.3514
men	2.7027
mountain-goat	9.4595
mountain-goats	5.4054
people	1.3514
rattlesnake's	1.3514
woman	2.7027

STORY NUMBER 15

coyote	33.5570
fox	6.7114

people	2.2371
people-eaters	4.4743
snakes	24.6085

STORY NUMBER 16

aksts'w#in	.4070
animal2	.4070
boy	8.1400
boys	6.1050
bull-frog	2.0350
coyote	24.4200
e#w#ilhwelh	.4070
eagles	.8140
fish	6.9190
girl	.4070
girls	2.8490
insects	1.2210
lady	.4070
man	6.9190
men	.4070
mosquitoes	.4070
people	8.1400
people-eaters	.4070
person	3.6630

salmon	.8140
shuswap	.4070
sk'lhp'etl'm#itk	.4070
skwant	.4070
snk'mch#inax	.4070
snx/elm#ina	.4070
swa7w#ilh	.8140
woman	2.4420
women	.4070

STORY NUMBER 17

animal2	.5294
bear	13.2345
bears	.5294
beaver	7.9407
beavers	1.0588
birds	.5294
coyote	33.8804
deer	10.0581
kids	.5294
magpie	21.7046
magpies	1.0588
mole	3.1763
people	5.8232

swan	2.1175
swans	5.8232

STORY NUMBER 18

birds	.4810
boy	7.2150
buck	.4810
coyote	39.4420
crane	.4810
cranes	4.8100
deer	19.7210
doctor	.9620
enemies	1.9240
kitl-ti-ta-lal-o	.4810
man	.4810
mole	4.3290
people	3.3670
woman	7.2150
yir-ki-natl-pow-	.4810

STORY NUMBER 19

animal1	1.5432

badger	4.6296
bear	3.0864
coyote	46.2963
doe	4.6296
fawns	1.5432
fox	24.6913
girl	4.6296
monster	18.5185
rabbit	3.0864

STORY NUMBER 20

animal1	2.0661
animal2	4.1322
coyote	33.0578
dog	12.3967
fish	10.3306
fox	37.1901
people	6.1983

STORY NUMBER 21

bear	3.1250
deer	1.5625

grizzly	28.1250
people	3.1250
wolf	35.9375
wolverine	7.8125
wolves	3.1250
woman	3.1250

STORY NUMBER 22

animal1	2.2745
animal2	3.0326
chipmunk	5.3071
deer	.7582
fisher	15.9212
girl	1.5163
girls	11.3723
lady	1.5163
man	.7582
p'a/k/w'k/w'	4.5489
people	4.5489
raven	1.5163
skunk	31.8423
squirrel	6.8234
women	1.5163

STORY NUMBER 23

bird	2.1598
humans	2.1598
mice	2.1598
mouse	36.7171
people	4.3197
ts'ska/kna7	6.4795
woman	2.1598

STORY NUMBER 24

grasshopper	20.9204
grasshoppers	4.1841
sheep	25.1045

STORY NUMBER 25

animal2	1.8703
baldy	.6234
bird	1.2469
coyote	.6234
fish	4.9875
girl	.6234
girls	1.2468

man	.6234
men	.6234
mouse	6.2344
osprey	4.9875
owl	1.2469
people	6.8579
salmon	3.1172
snake	8.7282
sockeye	28.6783
trout	5.6110
water-bird	5.6110
whippor-will	1.2469
whitefish	3.7406
wolf	4.3641
wolves	1.2469
woman	5.6110

STORY NUMBER 26

coyote	29.7398
okanagan	7.4349
people	14.8699
woman	14.8699
women	7.4349

STORY NUMBER 27

bird	.9615
eskimos	.9615
fish	.9615
man	18.2692
monster	12.5000
nighthawk	.9615
people	6.7308
rattlesnake's	.9615
water-monster	2.8846
woman	7.6923
women	.9615
7ihnk'	1.9231

STORY NUMBER 28

animal1	6.7340
animal2	3.3670
bear	33.6700
fish	16.8350
people	26.9360

STORY NUMBER 29

animal2	3.7438
bear	.4160
bird	.4160
blue-grouse	1.2479
chickadee	13.7271
coyote	23.2945
dog	3.3278
fox	5.8236
girl	1.2479
grizzly	.8319
grouse	7.0715
kinikinick	.4160
people	6.6556
person	.4160
sucker	3.7437

STORY NUMBER 30

bear	3.3223
birds	3.3223
bull-frog	19.9336
deer	3.3223
grizzly	3.3223
man	3.3223
people	9.9668

person	9.9668
wolf	19.9336
woman	16.6113
women	6.6445

STORY NUMBER 31

birds	1.3699
boy	5.4795
deer	2.0548
lady	16.4384
man	16.4384
meadow-lark	2.0548
monster	4.1096
people-eater	8.9041
sparrow-hawk	2.0548
watch-birds	1.3699

STORY NUMBER 32

animal1	.7524
baby	7.5245
bear	.7524
bird	.7524

boy	15.0489
coyote	.7524
crane	.7524
deer	4.5147
girl	11.2867
grizzly	.7524
grouse	.7524
insects	.7524
lady	3.0098
lynx	13.5440
magpie	3.7622
man	.7524
men	3.7622
mountain-sheep	1.5049
nxwuyalnp#itx	.7524
owl	13.5440
people	9.0293
rabbit	2.2573
raven	1.5048
robin	1.5049
water-insects	.7524
woman	3.0098
wood-worms	.7524

STORY NUMBER 33

animal1	.3751
animal2	.7502
baby	4.1260
bear	.3751
boy	10.8777
coyote	.3751
deer	3.7509
e#w#ilhwelh	7.8770
girl	4.8762
girls	1.5004
grizzly	.3751
grouse	.7502
insects	.3751
lady	3.7509
lynx	8.6272
magpie	3.7509
man	2.2506
men	.7502
owl	6.7517
people	2.6257
person	.7502
rabbit	1.8755
raven	3.3758
robin	.7502
seagull	4.5011

sheep	.3751
squirrel	.3751
tet'ak/#ina7	.7502
water-insects	.3751
willow-grouse	.3751
woman	1.1253
wood-worms	.3751

STORY NUMBER 34

bird	1.5106
chipmunk	30.2115
deer	1.5106
girl	3.0211
kwaw7#ikw-kw	1.5106
lady	3.0211
owl	40.7854
pak/mk/n	1.5106
people	3.0211
people-eater	3.0211
rabbit	12.0846
sna-sna-sna	4.5317
sxwel#m#ulaxw	1.5106
whippor-will	3.0211

STORY NUMBER 35

bird	2.9528
chipmunk	22.6378
girl	1.9685
girls	.9843
indian	.9843
kinnickinnick	.9843
kwaw7/ikw	1.9685
lady	2.9528
meadow-lark	2.9528
owl	24.6063
people	.9843
rabbit	17.7166
sna-sna-sna	1.9685
sxwel'm/ulaxw	.9843
whippor-will	.9843

STORY NUMBER 36

animal2	5.0000
cougar	1.2500
coyote	27.5000
fox	3.7500
k/w'ast#inek	1.2500
kwi#lstn	3.7500

man	18.7500
people	7.5000
people-eaters	2.5000
person	1.2500
snk'#lip	2.5000
wolf	1.2500

STORY NUMBER 37

animal2	16.7364
ch#iwchu	4.1841
coyote	25.1046
people	16.7364
person	4.1841

STORY NUMBER 38

bird	31.9410
deer	2.4570
indians	2.4570
man	17.1990
nhithetwel'x	2.4570
people	2.4570

STORY NUMBER 39

aeneas	1.0977
doctor	1.0977
human	2.1954
indian	3.2931
indians	2.1954
joseph	1.0977
kla/7pilxkn	2.1954
lady	6.5862
man	4.3908
men	2.1954
okanagans	1.0977
paul	1.0977
people	13.1723
people-eaters	1.0977
person	1.0977
shuswap	1.0977
shuswaps	7.6839
sucker	1.0977
warriors	2.1954
women	1.0977

STORY NUMBER 40

birds	1.9157

eagle	5.7471
eagles	26.8199
indian	1.9157
indians	1.9157
man	22.9885
people	3.8314
woman	1.9157

STORY NUMBER 41

animal1	.8651
bear	7.7855
bears	7.7855
blackfoot	.8651
buffalo	5.1903
cubs	.8651
elk	.8651
girls	2.5952
grizzlies	.8651
grizzly	11.2457
human	.8651
indian	3.4603
indians	1.7301
lady	10.3806
man	12.1107

men	1.7301
okanagan	.8651
people	4.3253
people-eaters	1.7301
person	1.7301

STORY NUMBER 42

fish	2.1186
indians	2.1186
man	4.2373
men	4.2373
okanagan	2.1186
okanagans	21.1864
people	6.3559
shuswaps	23.3050

STORY NUMBER 43

bear	10.0223
bears	1.1136
boy	6.6815
fish	1.1136
grizzly	11.1359

indians	1.1136
lady	1.1136
man	15.5902
men	5.5679
people	7.7951
woman	1.1136

STORY NUMBER 44

boy	17.6470
boys	5.8824
doctor	5.8824
indian	11.7647
man	11.7647

STORY NUMBER 45

ants	1.5504
baby	3.1008
bear	7.7519
boy	7.7519
girl	1.5504
grizzly	9.3023
humans	1.5504

kinikinick	1.5504
man	13.9535
people	10.8527
sasquatch	13.9535
squirrels	1.5504
woman	9.3023
women	1.5504

STORY NUMBER 46

animal1	2.9326
bear	17.5953
bears	13.1964
boy	19.7948
chipmunk	1.4663
cubs	5.1320
deer	.7331
doctors	.7331
fish	1.4663
grizzly	5.1320
human	2.9326
humans	.7331
indian	.7331
lady	1.4663
man	11.7302

people	5.8651
people-eaters	.7331

STORY NUMBER 47

animal1	1.0267
boy	8.2136
deer	2.0534
half-human	1.0267
half-sasquatch	1.0267
horse	1.0267
humans	3.0801
indian	4.1068
indians	1.0267
man	3.0801
people	8.2136
sasquatch	21.5606
sasquatches	5.1335
squirrels	1.0267
woman	15.4004
women	1.0267

STORY NUMBER 48

chinook	3.1153
deer	9.3458
doctor	3.1153
indian	3.1153
indians	3.1153
man	6.2305
nkw'a7kw'7ikn7	21.8068
people	3.1153
person	9.3458
wolf	9.3458

STORY NUMBER 49

bear	4.5714
enemies	1.1429
frog	1.1429
grizzly	5.7143
humans	1.1429
indian	1.1429
indians	4.5714
inkameep	1.1429
kts'ats'a/kwa7	1.1429
lefty	25.1428
men	2.2857
people	5.7143

person	2.2857
shuswaps	2.2857
warriors	1.1429
wolf	3.4286
wolves	2.2857

STORY NUMBER 50

animal1	1.9639
birds	1.1783
blackfoot	3.9278
buffalo	.3928
doctors	.3928
girl	.7855
horse	.3928
horses	1.5711
indian	1.1783
indians	.3928
lady	4.3205
man	19.2459
men	2.3566
okanagan	3.9277
okanagans	.7856
people	5.4988
person	.7855

ponies	.3928
snk/wa7lhk/nilhx	6.2844
warrior	.3928
warriors	3.9277
woman	8.6410
women	.7855

STORY NUMBER 51

blackfoot	12.0192
blackfoots	9.6153
buffalo	3.6058
dogs	1.2019
horse	1.2019
horses	20.4327
indians	4.8077
k'iyawtk/n	18.0288
lady	3.6058
man	2.4038
okanagans	6.0096
people	4.8077
spaniards	1.2019

STORY NUMBER 52

animal1	.4953
boy	18.8212
boys	3.4671
dog	3.9624
dogs	1.4859
fish	1.9812
girl	9.4106
horse	4.4577
horses	.4953
lady	3.4671
man	13.8683
monster	8.9153
people	1.9812
people-eater	1.4859
person	.4953
spider	1.9812
woman	.4953
woodcutter	2.4765

STORY NUMBER 53

animal2	3.2154
kings	3.2154
people	3.2154

persons	3.2154
sk/a7u7sk/in7kst	3.2154
stawn7k/na7kst	3.2154
stum'kst	3.2154
tmskwast	3.2154
ts'ak/w'ma7	3.2154

STORY NUMBER 54

animal1	.9242
animal2	4.6211
coyote	1.8484
doctor	2.7726
doctors	4.6211
human	.9242
humans	.9242
indian	9.2421
indians	7.3937
man	1.8484
okanagan	.9242
people	14.7874
person	4.6211
snwimn	.9242
sum#ix	.9242

STORY NUMBER 55

chinook	2.1368
deer	4.2735
indians	8.5470
man	17.0940
priest	17.0940
woman	4.2735

APPENDIX III
PEARSON R COEFFICIENTS

	1	2	3	4	5	6	7	8
1	1.0000							
2	-0.0165	1.0000						
3	0.3778	0.5639	1.0000					
4	-0.0072	0.6564	0.5150	1.0000				
5	-0.0151	0.7148	0.5618	0.6534	1.0000			
6	0.0649	0.7669	0.5699	0.6603	0.7144	1.0000		
7	-0.0140	-0.0124	-0.0152	-0.0148	-0.0110	-0.0186	1.0000	
8	0.2830	0.5254	0.5782	0.4908	0.6116	0.5948	0.0256	1.0000

	1	2	3	4	5	6	7	8
9	0.0102	0.8055	0.6181	0.7184	0.7798	0.8157	-0.0144	0.6017
10	0.0271	0.8015	0.5895	0.6942	0.8037	0.8139	0.0114	0.7763
11	0.0090	0.3032	0.2328	0.2780	0.3066	0.3209	-0.0080	0.2944
12	-0.0253	0.3650	0.2802	0.3991	0.3647	0.3631	-0.0184	0.2875
13	0.1244	0.4564	0.3709	0.4280	0.5233	0.5228	0.0610	0.6703
14	-0.0040	0.7347	0.5768	0.6726	0.7314	0.7702	-0.0165	0.5654
15	0.0053	0.6672	0.5260	0.6110	0.6909	0.6764	-0.0122	0.5884
16	0.0929	0.6891	0.5488	0.6438	0.6841	0.7662	0.1359	0.6351

	9	10	11	12	13	14	15	16
9	1.0000							
10	0.8362	1.0000						

11	0.3468	0.3494	1.0000					
12	0.4149	0.4160	0.7927	1.0000				
13	0.5224	0.6638	0.2304	0.2258	1.0000			
14	0.8572	0.7709	0.3662	0.4384	0.4813	1.0000		
15	0.7313	0.7559	0.2878	0.3382	0.5058	0.6843	1.0000	
16	0.7987	0.7837	0.3377	0.3911	0.5619	0.7323	0.6533	1.0000

	1	2	3	4	5	6	7	8
17	0.0309	0.6991	0.4978	0.5776	0.6277	0.7107	-0.0174	0.4984
18	0.0109	0.8584	0.5723	0.6681	0.7222	0.8013	-0.0145	0.5946
19	-0.0199	0.6934	0.5421	0.6316	0.7642	0.6980	-0.0144	0.7358
20	0.0320	0.5249	0.4139	0.4800	0.6421	0.5595	0.1162	0.7977
21	0.0098	-0.0059	-0.0164	-0.0161	-0.0143	-0.0055	-0.0133	0.0123
22	0.0290	-0.0127	-0.0199	-0.0159	-0.0186	0.0167	-0.0173	0.0074
23	0.0331	-0.0119	-0.0102	-0.0110	-0.0116	0.0049	0.0328	0.0310
24	-0.0151	-0.0134	-0.0164	-0.0160	-0.0118	-0.0202	-0.0110	-0.0205

	9	10	11	12	13	14	15	16
17	0.7130	0.7148	0.3414	0.3890	0.4407	0.6484	0.5917	0.6336
18	0.8311	0.8346	0.3396	0.3941	0.4920	0.7578	0.6777	0.7721
19	0.7697	0.8825	0.3205	0.3689	0.6138	0.7313	0.7131	0.6608
20	0.5823	0.8346	0.2587	0.2596	0.6769	0.5414	0.6051	0.5763
21	-0.0098	-0.0085	0.5460	0.3844	0.0030	0.0123	-0.0123	-0.0015
22	0.0785	-0.0070	-0.0104	-0.0061	0.0112	-0.0084	-0.0145	0.0348
23	-0.0055	-0.0030	0.0018	-0.0107	0.0243	-0.0078	-0.0067	0.0158
24	-0.0155	-0.0194	-0.0167	-0.0198	-0.0198	-0.0179	-0.0132	-0.0213

	17	18	19	20	21	22	23	24
17	1.0000							
18	0.7498	1.0000						
19	0.6220	0.6988	1.0000					
20	0.4720	0.5363	0.8181	1.0000				
21	0.0138	0.0114	-0.0152	-0.0109	1.0000			
22	-0.0088	-0.0072	-0.0197	-0.0021	-0.0140	1.0000		
23	-0.0033	0.0024	-0.0152	-0.0016	-0.0024	-0.0047	1.0000	
24	-0.0188	-0.0157	-0.0156	-0.0156	-0.0144	-0.0187	-0.0116	1.0000

	1	2	3	4	5	6	7	8
25	0.0574	-0.0101	-0.0088	-0.0067	-0.0072	0.0252	0.1048	0.0863
26	0.1518	0.6612	0.5375	0.6312	0.6582	0.7473	-0.0142	0.6987
27	0.0935	-0.0200	-0.0105	0.0134	-0.0176	0.0411	0.0395	0.1777
28	0.2251	-0.0106	0.0091	-0.0014	-0.0146	0.1402	0.2262	0.1945
29	0.0740	0.6528	0.5203	0.6012	0.6835	0.7023	-0.0069	0.6486
30	0.1019	0.0096	-0.0155	-0.0099	-0.0212	0.0810	-0.0197	0.1565
31	-0.0231	0.0039	-0.0250	0.0760	-0.0181	-0.0099	-0.0167	-0.0083
32	0.0917	0.0385	-0.0048	0.0082	-0.0055	0.1040	-0.0059	0.1157

	9	10	11	12	13	14	15	16
25	0.0213	0.0200	0.0243	0.0007	0.1103	0.0136	0.0001	0.0909
26	0.7674	0.7472	0.3727	0.3924	0.5833	0.7250	0.6349	0.7749
27	0.0071	0.0998	0.1186	0.1119	0.0869	0.0130	-0.0050	0.2563
28	0.0269	0.0653	0.2068	0.1577	0.2273	0.0054	0.0146	0.2202
29	0.7376	0.7839	0.3239	0.3486	0.5676	0.6933	0.6489	0.6852

30	0.0211	0.0443	0.1883	0.1254	0.0815	0.0218	-0.0090	0.1719
31	-0.0166	0.0961	0.0328	0.3703	-0.0026	-0.0273	-0.0201	0.1850
32	0.0895	0.0504	0.0594	0.0988	0.0820	0.1468	0.0063	0.2195

	17	18	19	20	21	22	23	24
25	0.0051	0.0276	-0.0133	0.0393	0.1002	0.0042	0.1937	-0.0229
26	0.6299	0.7596	0.6364	0.5271	0.0349	0.0303	0.0534	-0.0153
27	0.0081	0.0550	0.1464	0.0172	0.0184	0.0208	0.0348	-0.0177
28	0.2687	0.0237	0.0248	0.1324	0.0703	0.0595	0.0524	-0.0146
29	0.6035	0.6746	0.7185	0.6751	0.0103	0.0082	0.0082	-0.0189
30	0.0512	0.1066	-0.0229	0.0046	0.5141	0.0096	0.0371	-0.0213
31	-0.0100	0.0518	0.0290	-0.0238	-0.0192	0.0106	-0.0176	-0.0181
32	0.1192	0.1711	0.0231	0.0174	0.0167	0.0189	0.0158	-0.0269

	25	26	27	28	29	30	31	32
25	1.0000							
26	0.1317	1.0000						
27	0.0956	0.2189	1.0000					
28	0.1475	0.2107	0.1523	1.0000				
29	0.0321	0.6879	0.0343	0.1264	1.0000			
30	0.1639	0.2987	0.2638	0.1992	0.0355	1.0000		
31	-0.0232	-0.0234	0.5316	-0.0222	-0.0289	0.0381	1.0000	
32	0.0544	0.1450	0.0949	0.1642	0.0683	0.1018	0.1586	1.0000

	1	2	3	4	5	6	7	8
33	0.0175	0.0397	-0.0231	0.0053	-0.0148	0.0652	-0.0284	0.0393

34	0.0032	-0.0096	-0.0196	-0.0129	-0.0163	-0.0128	0.0067	-0.0068
35	-0.0115	-0.0198	-0.0228	-0.0129	-0.0174	-0.0233	0.0427	-0.0209
36	0.0740	0.6596	0.5258	0.6243	0.6744	0.7182	-0.0157	0.6072
37	0.2013	0.6056	0.4959	0.5650	0.6005	0.7422	-0.0138	0.6015
38	0.0121	0.0065	-0.0139	0.0023	-0.0125	0.0052	0.6527	0.0018
39	0.2767	-0.0264	0.0030	0.0475	-0.0244	0.1290	-0.0227	0.2104
40	0.0260	-0.0164	-0.0146	0.0066	0.0673	0.0078	-0.0134	0.0242

	9	10	11	12	13	14	15	16
33	0.0736	0.0360	0.0336	0.1114	0.0083	0.0740	-0.0123	0.2014
34	-0.0059	0.0015	-0.0181	0.0061	-0.0018	-0.0052	-0.0150	-0.0117
35	-0.0055	0.0039	-0.0220	0.0138	-0.0198	-0.0100	-0.0180	-0.0199
36	0.7376	0.8117	0.3448	0.3975	0.5349	0.6873	0.6479	0.8205
37	0.7060	0.6999	0.3033	0.3024	0.5531	0.6560	0.5855	0.7289
38	-0.0074	0.0491	0.0310	0.0384	0.0034	-0.0161	-0.0103	0.1073
39	0.0188	0.0927	0.0414	0.1853	0.2239	0.0040	0.0181	0.2319
40	-0.0082	0.0669	0.0553	0.0644	0.0164	-0.0128	-0.0104	0.1793

	17	18	19	20	21	22	23	24
33	0.1212	0.1617	0.0018	-0.0094	-0.0057	0.0254	-0.0117	-0.0164
34	-0.0117	-0.0047	-0.0039	-0.0146	-0.0149	0.0655	-0.0076	-0.0163
35	-0.0242	-0.0211	0.0071	-0.0199	-0.0194	0.0702	-0.0096	-0.0175
36	0.6051	0.6864	0.6815	0.5913	0.0219	0.0205	0.0083	-0.0170
37	0.5956	0.6443	0.5803	0.5328	0.0145	0.0711	0.0409	-0.0149
38	0.0042	0.0228	-0.0165	-0.0085	-0.0084	-0.0012	0.0460	-0.0126
39	0.0567	0.0256	-0.0322	0.0543	0.0196	0.0688	0.0600	-0.0245

40	-0.0083	0.0047	-0.0190	-0.0064	-0.0067	0.0024	0.0012	-0.0145

	25	26	27	28	29	30	31	32
33	0.0013	0.0488	0.0913	0.0566	0.0201	0.0472	0.2725	0.8364
34	0.0134	0.0018	-0.0073	0.0134	-0.0102	-0.0107	0.0342	0.3845
35	0.0013	-0.0123	-0.0158	-0.0064	-0.0188	-0.0242	0.0292	0.3275
36	0.0484	0.6907	0.4380	0.1147	0.6843	0.1079	0.3182	0.0603
37	0.1096	0.7453	0.1107	0.2962	0.7169	0.1388	-0.0228	0.1304
38	0.0308	0.0105	0.3883	0.0237	0.0075	0.0455	0.2878	0.0362
39	0.1081	0.2695	0.3491	0.3928	0.1336	0.2066	0.3504	0.2236
40	0.0145	0.0448	0.5040	0.0441	0.0009	0.0913	0.3893	0.0210

	33	34	35	36	37	38	39	40
33	1.0000							
34	0.2779	1.0000						
35	0.2479	0.9514	1.0000					
36	0.0659	-0.0109	-0.0194	1.0000				
37	0.0601	0.0073	-0.0095	0.7297	1.0000			
38	0.0417	0.0139	0.0516	0.2519	0.0168	1.0000		
39	0.1336	0.0295	0.0160	0.2604	0.3287	0.1467	1.0000	
40	0.0510	-0.0137	-0.0172	0.3482	0.0333	0.2985	0.2202	1.0000

	1	2	3	4	5	6	7	8
	0.0463	-0.0260	-0.0261	0.1103	-0.0256	0.0279	-0.0237	0.0234
42	0.0614	-0.0177	-0.0117	-0.0056	-0.0156	0.0144	0.0286	0.0439
43	0.1083	-0.0225	-0.0113	0.0115	-0.0198	0.0454	0.0119	0.0995

44	-0.0206	-0.0183	-0.0223	-0.0071	-0.0161	0.0272	-0.0150	0.0137
45	0.1328	-0.0266	-0.0130	0.0014	-0.0235	0.0586	-0.0218	0.1728
46	0.0465	-0.0141	-0.0210	-0.0068	-0.0217	0.0471	0.0094	0.0532
47	0.0905	-0.0004	-0.0142	-0.0061	-0.0203	0.0648	-0.0188	0.1848
48	0.0315	0.0857	-0.0215	-0.0125	-0.0196	0.0879	-0.0182	0.0106

	9	10	11	12	13	14	15	16
41	0.0095	0.0572	0.5316	0.6347	0.0263	0.0093	-0.0108	0.1539
42	-0.0074	0.0156	0.0043	0.0033	0.0545	-0.0044	-0.0069	0.0737
43	-0.0030	0.0833	0.5654	0.4919	0.0895	0.0278	-0.0050	0.2983
44	-0.0211	0.0276	0.0242	0.0313	-0.0269	-0.0146	-0.0179	0.3206
45	0.0172	0.0748	0.4627	0.3549	0.1130	0.0480	-0.0055	0.2870
46	-0.0120	0.0326	0.2891	0.2631	0.0331	-0.0019	-0.0123	0.2718
47	0.0162	0.0384	0.0963	0.0573	0.0863	0.0245	-0.0079	0.1846
48	0.0038	0.0510	0.0095	-0.0051	0.0069	-0.0249	-0.0159	0.0882

	17	18	19	20	21	22	23	24
41	0.0858	-0.0147	-0.0144	-0.0104	0.2939	0.0434	-0.0038	-0.0256
42	0.0008	-0.0048	-0.0205	0.0154	-0.0057	0.0009	0.0072	-0.0156
43	0.1336	0.0553	-0.0034	0.0209	0.3066	0.0209	0.0201	-0.0199
44	-0.0256	0.0990	-0.0213	-0.0212	-0.0195	-0.0163	-0.0158	-0.0162
45	0.0954	0.0994	-0.0111	0.0149	0.2397	0.0226	0.0438	-0.0235
46	0.1575	0.0935	0.0034	0.0049	0.1171	0.0073	0.0006	-0.0217
47	0.0196	0.1512	-0.0258	0.0074	0.0314	0.0073	0.0478	-0.0204
48	0.0580	0.1304	-0.0258	-0.0127	0.2512	-0.0071	-0.0065	-0.0196

	25	26	27	28	29	30	31	32
41	0.0029	0.0470	0.3978	0.3202	0.0196	0.1459	0.5707	0.0856
42	0.0240	0.0700	0.1305	0.1175	0.0190	0.0375	0.0592	0.0433
43	0.0575	0.1195	0.5550	0.4768	0.0591	0.2118	0.4664	0.2670
44	-0.0226	-0.0209	0.3229	-0.0199	-0.0258	0.0135	0.4190	0.3260
45	0.0987	0.2650	0.5500	0.3952	0.0657	0.3268	0.3398	0.3130
46	0.0075	0.0425	0.2851	0.4928	0.0173	0.1078	0.3521	0.3445
47	0.1054	0.2959	0.2885	0.1404	0.0298	0.2992	0.0995	0.2436
48	0.0314	0.0183	0.1660	0.0398	-0.0019	0.3178	0.1370	0.0444

	33	34	35	36	37	38	39	40
41	0.1267	0.0009	0.0081	0.2889	0.0654	0.2338	0.4259	0.3301
42	0.0044	-0.0102	-0.0179	0.0900	0.0745	0.0626	0.5100	0.0887
43	0.2462	-0.0061	-0.0174	0.3871	0.1298	0.3072	0.3994	0.4260
44	0.3853	-0.0222	-0.0118	0.2272	-0.0203	0.2023	0.1782	0.3022
45	0.2598	-0.0068	-0.0217	0.3182	0.1570	0.2364	0.3580	0.3488
46	0.3582	0.0094	0.0033	0.2013	0.0586	0.1591	0.2044	0.2220
47	0.1869	-0.0100	-0.0192	0.0867	0.1080	0.0533	0.2169	0.1082
48	0.0620	-0.0111	-0.0232	0.1385	0.0684	0.1207	0.1539	0.1408

	41	42	43	44	45	46	47	48
41	1.0000							
42	0.0860	1.0000						
43	0.7578	0.1558	1.0000					
44	0.2722	0.0391	0.4619	1.0000				
45	0.5263	0.1092	0.7606	0.3907	1.0000			

46	0.5905	0.0555	0.7291	0.5645	0.5696	1.0000		
47	0.0846	0.0430	0.2229	0.2773	0.7378	0.2256	1.0000	
48	0.1400	0.0315	0.1490	0.1522	0.1133	0.0721	0.0617	1.0000

	1	2	3	4	5	6	7	8
49	0.0999	-0.0194	0.0035	-0.0127	-0.0186	0.0242	-0.0172	0.0498
50	0.0691	-0.0214	-0.0195	0.0465	-0.0224	0.0572	-0.0208	0.1172
51	0.0346	-0.0239	-0.0218	0.0344	-0.0211	-0.0053	-0.0196	0.0149
52	0.0019	-0.0241	-0.0272	0.0041	-0.0223	0.0059	0.0267	0.0304
53	0.1227	-0.0269	-0.0156	-0.0212	-0.0237	0.0477	-0.0220	0.0739
54	0.2854	0.0588	0.0673	0.0804	0.0547	0.2730	-0.0199	0.2782
55	-0.0202	0.0321	-0.0218	0.0122	-0.0158	0.0025	-0.0146	0.0112

	9	10	11	12	13	14	15	16
49	-0.0105	-0.0042	0.2141	0.1492	0.0435	-0.0037	-0.0096	0.0354
50	0.0090	0.1046	0.1239	0.2209	0.0726	0.0240	-0.0127	0.2509
51	-0.0178	-0.0035	-0.0115	0.0296	0.0326	-0.0257	-0.0156	0.0218
52	0.0336	0.0484	0.0268	0.1170	0.0021	0.0761	-0.0209	0.3387
53	0.0031	0.0141	0.0049	-0.0398	0.0830	-0.0072	-0.0082	0.0564
54	0.1125	0.1514	0.0816	0.0158	0.2735	0.0860	0.0855	0.2859
55	-0.0043	0.0737	0.0715	0.0803	-0.0198	-0.0101	-0.0175	0.1388

	17	18	19	20	21	22	23	24
49	0.0469	-0.0074	-0.0153	0.0001	0.2306	-0.0049	0.0081	-0.0186
50	-0.0049	0.0537	-0.0246	0.0009	0.0126	0.0219	0.0252	-0.0225

51	-0.0142	-0.0162	-0.0279	-0.0103	-0.0156	-0.0101	-0.0036	-0.0212
52	-0.0259	0.0920	0.1062	0.0279	-0.0210	0.0025	-0.0125	-0.0223
53	0.0111	-0.0061	-0.0313	0.0361	-0.0058	0.0295	0.0160	-0.0238
54	0.1304	0.1063	0.0472	0.1326	0.0223	0.0725	0.0640	-0.0215
55	0.0119	0.0829	-0.0208	-0.0208	-0.0026	-0.0089	-0.0060	-0.0158

	25	26	27	28	29	30	31	32
49	0.0270	0.0581	0.0294	0.2175	0.0262	0.1488	-0.0284	0.0404
50	0.0808	0.2438	0.7461	0.1173	0.0176	0.2809	0.5958	0.1202
51	-0.0094	0.0312	0.0645	0.0596	-0.0005	0.0094	0.0855	0.0097
52	0.0006	0.0066	0.5349	0.0426	0.0112	0.0387	0.5800	0.4704
53	0.0425	0.1044	0.0586	0.1932	0.0819	0.0511	-0.0363	0.0493
54	0.1201	0.3359	0.2325	0.4115	0.2287	0.2279	0.0243	0.1737
55	0.0088	0.0443	0.5168	-0.0194	-0.0252	0.1212	0.4056	0.0218

	33	34	35	36	37	38	39	40
49	-0.0080	-0.0136	-0.0210	0.0256	0.0867	0.0055	0.1962	0.0105
50	0.1296	-0.0053	-0.0101	0.4524	0.0865	0.3729	0.4315	0.5375
51	-0.0066	-0.0142	-0.0187	0.0415	0.0447	0.0325	0.1518	0.0452
52	0.4822	0.0034	-0.0036	0.2547	0.0086	0.2183	0.1750	0.3026
53	-0.0043	-0.0130	-0.0262	0.0887	0.2993	-0.0021	0.2000	0.0075
54	0.0669	0.0118	-0.0014	0.2835	0.5186	0.0922	0.6529	0.1507
55	0.0716	-0.0170	-0.0233	0.3301	-0.0199	0.3255	0.1661	0.4256

	41	42	43	44	45	46	47	48
49	0.1826	0.0970	0.2255	-0.0061	0.1602	0.1258	0.0413	0.0835

50	0.5240	0.1658	0.5998	0.3650	0.5671	0.3030	0.3077	0.1834
51	0.1174	0.1405	0.0712	0.0055	0.0519	0.0189	0.0187	0.0139
52	0.2804	0.0545	0.5041	0.7045	0.4453	0.5700	0.2374	0.0874
53	0.0114	0.0353	0.0696	-0.0324	0.0848	0.0173	0.0537	-0.0017
54	0.2452	0.1495	0.2678	0.2512	0.2815	0.1442	0.2514	0.2409
55	0.3264	0.0855	0.4153	0.2816	0.3477	0.2076	0.1482	0.2169

	49	50	51	52	53	54	55
49	1.0000						
50	0.0348	1.0000					
51	0.0220	0.1860	1.0000				
52	-0.0187	0.4232	0.0409	1.0000			
53	0.0335	0.0333	0.0080	-0.0203	1.0000		
54	0.2134	0.2458	0.1271	0.0606	0.2778	1.0000	
55	0.0294	0.5596	0.0684	0.3008	-0.0317	0.1470	1.0000

APPENDIX IV
DISTANCE COEFFICIENTS

	1	2	3	4	5	6	7	8
1	0.0							
2	55.21	0.0						
3	42.06	41.32	0.0					
4	51.80	36.38	41.58	0.0				
5	49.83	32.58	38.47	33.77	0.0			
6	43.81	29.31	36.28	31.91	27.99	0.0		
7	51.99	62.27	60.24	59.53	57.54	54.14	0.0	
8	39.61	40.46	36.43	39.28	33.06	31.07	54.11	0.0

	1	2	3	4	5	6	7	8
9	46.57	27.06	34.83	29.59	25.01	21.13	55.32	31.72
10	50.32	27.67	37.90	32.33	25.29	23.77	58.21	26.02
11	45.66	48.09	48.20	46.11	43.44	39.62	54.35	41.46
12	51.06	48.59	49.77	44.93	44.79	42.00	58.61	45.27
13	52.05	47.86	49.88	47.13	42.20	40.44	60.41	34.50
14	44.34	30.98	35.71	31.16	26.91	22.35	53.20	31.65
15	51.80	35.94	41.32	37.00	32.06	31.47	59.73	35.71
16	40.28	33.12	36.20	32.03	28.67	21.90	47.77	28.20

	9	10	11	12	13	14	15	16
9	0.0							
10	22.57	0.0						

11	40.03	43.30	0.0					
12	41.25	43.81	24.72	0.0				
13	41.06	35.96	50.82	53.86	0.0			
14	18.42	26.12	37.53	39.01	41.70	0.0		
15	29.14	29.11	46.09	47.44	44.08	30.91	0.0	
16	21.47	25.56	36.95	39.48	38.34	22.70	31.97	0.0

	1	2	3	4	5	6	7	8
17	53.23	35.05	43.77	39.76	36.58	31.44	61.72	40.82
18	54.41	24.25	40.83	35.67	32.13	27.34	62.24	37.48
19	64.20	40.90	48.58	43.82	36.40	40.40	70.35	38.29
20	59.74	48.14	52.09	48.85	40.63	43.62	63.16	32.22
21	55.17	65.22	63.52	62.86	61.08	57.38	62.85	57.95
22	48.49	60.17	58.15	57.32	55.52	50.77	57.47	52.19
23	47.50	59.46	57.21	56.49	54.52	50.32	55.28	50.86
24	44.98	56.55	54.31	53.51	51.29	47.45	53.39	48.78

	9	10	11	12	13	14	15	16
17	31.58	32.44	46.12	46.98	47.93	34.16	39.32	34.55
18	25.41	25.21	46.78	47.35	46.15	29.76	35.32	29.44
19	36.53	27.60	55.49	55.49	45.64	39.16	39.33	42.64
20	42.93	28.98	54.74	57.12	39.97	44.23	43.04	42.82
21	58.74	62.06	39.88	48.30	65.27	56.11	63.03	54.94
22	50.49	56.45	52.02	55.93	59.81	50.53	57.61	47.76
23	51.93	55.69	50.90	55.41	58.87	49.69	56.66	47.39
24	48.79	52.99	47.91	52.48	57.23	46.37	53.73	44.55

	17	18	19	20	21	22	23	24
17	0.0							
18	31.87	0.0						
19	44.83	40.50	0.0					
20	50.24	47.48	32.81	0.0				
21	63.86	64.54	73.14	70.30	0.0			
22	59.25	59.87	68.56	65.14	60.76	0.0		
23	58.49	58.95	67.91	64.58	59.77	54.09	0.0	
24	55.94	56.51	65.34	62.30	57.19	51.21	50.13	0.0

	1	2	3	4	5	6	7	8
25	44.11	56.99	54.62	53.80	51.85	46.96	50.94	46.68
26	44.55	35.01	38.86	34.26	31.72	25.57	56.59	28.40
27	37.12	52.20	49.47	48.11	46.45	40.76	47.58	39.33
28	49.50	65.47	62.83	62.50	61.19	53.39	55.07	52.65
29	40.80	34.56	37.22	33.66	28.69	24.68	51.40	27.77
30	44.97	58.05	56.48	55.59	53.98	47.43	55.98	46.55
31	40.26	52.33	50.47	47.38	47.20	42.58	49.48	44.00
32	40.67	53.56	52.21	51.11	49.39	42.55	51.60	43.55

	9	10	11	12	13	14	15	16
25	48.55	52.44	47.58	52.42	53.98	46.31	53.98	42.69
26	25.02	28.12	40.37	42.95	39.01	26.33	34.30	23.73
27	43.07	45.59	39.77	44.76	50.40	40.18	48.82	33.13
28	57.81	59.87	51.80	56.47	57.55	56.41	62.29	49.24
29	24.29	25.58	37.41	40.83	38.20	24.32	32.14	23.43

30	50.37	53.45	45.10	50.68	56.28	48.04	55.91	42.65
31	44.33	46.27	42.31	39.01	52.98	41.81	49.85	35.39
32	44.44	49.37	44.22	47.63	52.78	40.61	51.53	37.06

	17	18	19	20	21	22	23	24
25	55.72	55.82	65.61	61.12	54.50	51.16	45.45	47.65
26	35.96	29.74	43.22	45.64	58.62	53.08	51.69	50.23
27	50.77	50.46	57.73	57.49	52.03	45.36	44.09	41.20
28	55.09	64.23	71.80	65.25	63.29	58.66	58.26	57.31
29	35.72	33.59	40.35	39.11	54.74	48.51	47.66	44.59
30	56.02	55.07	67.32	63.57	41.68	52.78	51.36	49.54
31	51.81	51.12	60.95	58.98	53.49	46.29	45.94	42.05
32	50.58	49.92	62.72	59.80	54.71	48.38	47.72	45.05

	25	26	27	28	29	30	31	32
25	0.0							
26	47.05	0.0						
27	39.79	40.08	0.0					
28	53.24	53.25	49.16	0.0				
29	44.17	27.51	37.74	51.87	0.0			
30	45.30	43.78	38.17	52.98	46.07	0.0		
31	42.98	46.05	24.33	53.69	39.82	43.81	0.0	
32	43.76	44.48	36.87	50.96	40.63	44.59	36.34	0.0

	1	2	3	4	5	6	7	8
33	36.16	49.14	47.64	46.24	44.26	38.03	46.95	40.02
34	60.51	69.78	68.20	67.37	65.92	62.56	66.86	63.37

35	48.87	59.90	57.75	56.74	54.96	51.24	55.26	52.39
36	44.41	34.60	38.35	33.74	30.07	25.68	54.78	31.09
37	41.23	36.99	39.49	36.20	33.21	24.57	54.69	31.33
38	47.07	58.17	56.51	55.32	53.72	49.41	32.95	50.74
39	30.71	49.52	46.36	44.71	43.44	36.08	45.91	36.25
40	46.38	58.50	56.19	54.87	51.25	48.97	55.46	49.80

	9	10	11	12	13	14	15	16
33	39.63	44.94	39.28	42.95	50.18	36.71	46.94	32.15
34	63.54	66.35	63.19	65.79	69.77	61.64	67.73	60.37
35	52.19	55.66	51.76	54.89	60.27	50.00	57.21	48.47
36	25.50	23.99	39.56	41.42	40.30	26.57	32.95	19.88
37	26.97	29.92	40.77	44.52	39.61	27.84	35.60	24.12
38	51.11	53.44	49.28	53.25	58.72	48.97	55.95	44.29
39	39.65	43.24	38.19	41.03	45.74	36.87	45.55	30.80
40	50.78	52.61	48.31	52.19	58.02	48.52	55.63	42.14

	17	18	19	20	21	22	23	24
33	46.67	46.65	59.40	56.30	50.65	43.15	42.88	38.80
34	69.13	69.48	76.69	74.55	70.44	63.00	64.77	62.33
35	59.23	59.81	67.32	65.26	60.45	52.22	53.68	50.60
36	36.39	33.26	41.09	42.43	57.31	51.44	50.98	48.18
37	36.82	35.22	45.66	44.90	57.50	50.09	50.08	48.07
38	57.50	57.60	67.26	64.08	59.18	53.16	51.07	49.25
39	47.25	48.53	59.38	54.54	49.45	41.59	40.69	37.78
40	57.51	57.80	67.04	63.71	58.82	52.71	51.93	48.94

	25	26	27	28	29	30	31	32
33	39.26	41.74	30.27	49.61	35.49	40.72	28.11	17.12
34	61.86	64.40	58.04	69.54	60.45	64.02	57.65	49.27
35	50.70	53.70	45.48	60.18	48.56	53.15	45.27	39.86
36	47.23	28.54	32.59	54.75	25.99	47.49	36.09	44.44
37	45.68	25.92	40.15	49.10	24.64	46.66	43.69	42.78
38	48.89	52.00	35.06	58.37	46.73	50.29	38.05	46.30
39	36.58	37.03	24.79	42.80	32.57	37.18	25.78	31.40
40	48.91	50.76	31.64	57.47	46.50	48.72	35.10	46.25

	33	34	35	36	37	38	39	40
33	0.0							
34	50.63	0.0						
35	38.29	20.09	0.0					
36	39.00	63.17	51.93	0.0				
37	39.07	62.64	51.65	25.53	0.0			
38	40.87	63.41	51.21	43.52	49.83	0.0		
39	25.25	54.98	41.79	34.75	33.43	38.16	0.0	
40	40.26	63.93	52.67	40.33	49.07	42.79	36.45	0.0

	1	2	3	4	5	6	7	8
41	37.53	51.86	49.28	45.58	46.14	40.46	48.47	42.02
42	43.12	56.52	54.02	53.09	51.25	46.46	52.25	47.04
43	36.76	52.18	49.40	48.07	46.43	40.58	48.10	40.92
44	39.94	52.63	50.21	49.04	46.93	41.60	49.22	43.33

45	38.54	54.19	51.40	50.25	48.68	42.48	50.89	41.18
46	43.77	56.63	54.45	53.32	51.69	45.90	53.02	47.01
47	40.48	54.42	52.34	51.34	49.56	43.35	51.73	41.76
48	40.81	51.57	51.72	50.70	48.68	41.96	50.89	45.06

	9	10	11	12	13	14	15	16
41	42.51	46.00	29.59	31.18	51.22	39.70	48.48	34.73
42	48.44	51.92	47.26	51.71	55.04	45.89	53.43	42.26
43	43.19	45.86	28.79	35.40	50.25	39.81	48.75	32.12
44	44.19	47.63	42.26	46.99	53.36	41.31	49.59	32.17
45	44.99	47.83	32.83	40.05	51.19	41.69	50.77	34.35
46	48.82	51.64	40.16	44.76	55.73	46.11	53.81	37.73
47	46.00	49.60	43.20	48.60	52.65	43.24	51.73	37.74
48	45.40	48.54	44.31	49.31	53.96	43.37	51.11	38.97

	17	18	19	20	21	22	23	24
41	48.61	51.49	60.97	57.64	45.39	44.37	44.43	40.85
42	55.24	56.06	65.31	61.28	56.81	50.55	49.54	46.55
43	47.93	50.38	61.09	57.33	45.28	45.27	44.33	41.18
44	51.98	49.88	61.98	58.77	53.32	46.66	45.66	41.75
45	50.37	50.99	62.82	59.04	48.08	47.25	45.95	43.70
46	51.07	53.56	64.75	61.71	53.61	50.58	50.00	47.03
47	53.08	50.39	63.97	60.01	54.24	48.56	46.77	44.68
48	51.43	50.31	63.32	59.85	47.85	48.07	47.17	43.71

	25	26	27	28	29	30	31	32
41	41.05	43.35	26.36	44.88	37.45	40.31	22.96	36.42
42	46.34	47.94	38.07	53.55	43.59	47.91	40.32	43.28
43	40.47	42.22	22.99	40.95	37.18	39.27	25.90	33.20
44	42.75	45.77	28.98	53.45	39.50	44.14	27.57	32.45
45	41.67	40.49	25.19	43.78	39.44	37.96	31.05	33.99
46	46.92	48.88	35.05	41.67	43.91	46.31	34.00	36.02
47	42.50	40.38	32.57	51.51	41.28	39.45	37.34	36.64
48	43.33	46.58	34.17	53.45	40.97	38.33	35.56	40.24

	33	34	35	36	37	38	39	40
41	28.97	57.40	44.47	35.88	40.62	38.44	22.79	35.83
42	38.23	61.99	50.44	45.43	45.77	47.27	28.05	46.26
43	27.52	57.93	45.43	33.83	39.68	37.02	23.79	33.69
44	25.68	58.80	45.93	38.11	43.39	39.91	28.39	37.17
45	30.01	59.58	47.67	37.07	41.07	40.39	27.47	37.07
46	31.87	61.57	50.14	42.79	46.43	45.06	34.24	43.01
47	32.60	60.45	48.60	43.68	43.14	45.71	31.24	44.02
48	33.69	59.81	47.83	41.64	43.22	43.29	31.13	42.44

	41	42	43	44	45	46	47	48
41	0.0							
42	38.50	0.0						
43	16.69	37.47	0.0					
44	29.58	40.49	25.79	0.0				
45	25.42	40.62	18.53	29.66	0.0			
46	26.90	45.04	22.63	28.14	28.62	0.0		

47	36.26	43.10	33.92	33.30	20.96	39.04	0.0	
48	34.15	42.44	34.43	35.01	37.52	41.84	39.70	0.0

	1	2	3	4	5	6	7	8
49	38.89	53.75	50.75	50.31	48.23	42.94	50.46	43.77
50	37.33	51.97	49.38	47.14	46.29	40.13	48.61	40.35
51	43.75	56.66	54.23	52.01	51.41	46.87	53.51	47.69
52	41.04	53.92	51.51	49.97	48.40	43.39	49.53	44.24
53	30.71	46.96	44.08	43.16	40.48	34.69	43.11	36.21
54	31.44	48.97	46.21	45.08	43.18	34.35	46.99	35.73
55	40.45	51.88	50.62	49.03	47.37	42.58	49.64	43.84

	9	10	11	12	13	14	15	16
49	45.27	49.45	39.19	45.29	52.74	42.46	50.57	39.61
50	42.75	45.21	39.40	42.07	50.45	39.66	48.73	32.96
51	48.69	52.33	47.62	50.96	55.54	46.36	53.65	43.39
52	44.37	48.26	43.56	46.08	53.73	40.83	50.90	32.86
53	36.95	42.13	35.76	41.98	46.65	33.77	43.36	30.62
54	39.13	43.02	38.65	45.01	45.21	36.74	45.32	30.78
55	44.31	47.00	41.72	46.30	53.60	41.71	50.00	36.61

	17	18	19	20	21	22	23	24
49	51.36	53.35	62.74	59.21	48.16	47.61	46.41	43.20
50	50.76	50.24	61.39	57.60	51.91	45.05	44.05	41.03
51	55.55	56.31	65.44	61.92	57.03	50.77	49.84	46.73

52	53.09	50.99	59.69	58.55	54.47	47.48	46.97	43.39
53	45.79	46.68	57.25	53.13	47.52	39.77	38.64	34.33
54	46.74	47.94	58.76	53.77	50.35	42.55	41.69	39.09
55	51.54	50.59	62.31	59.12	53.32	46.94	45.91	42.24

	25	26	27	28	29	30	31	32
49	43.00	45.26	36.28	48.63	39.91	42.25	38.26	39.87
50	39.78	39.30	17.27	49.74	37.75	37.52	22.42	36.02
51	47.05	48.91	39.46	55.12	44.01	48.53	39.79	43.93
52	43.60	46.49	25.34	53.07	40.30	44.81	24.59	29.69
53	34.95	37.88	25.73	45.80	30.48	37.38	27.86	31.29
54	37.45	36.28	28.07	42.45	32.00	37.58	32.63	33.36
55	42.59	44.82	24.91	53.83	40.02	42.23	28.32	39.41

	33	34	35	36	37	38	39	40
49	34.28	59.55	47.36	43.78	42.38	45.50	29.83	45.01
50	29.25	57.74	45.07	32.06	40.41	35.31	22.96	30.62
51	38.39	62.02	50.42	46.60	46.50	48.04	34.79	47.35
52	25.18	59.15	47.03	38.50	44.19	40.63	30.31	38.12
53	22.59	53.60	39.52	35.34	33.22	37.65	18.72	37.13
54	27.92	56.15	43.25	35.04	29.78	40.13	16.29	38.61
55	31.92	59.04	46.63	35.96	43.86	37.25	29.21	34.26

	41	42	43	44	45	46	47	48
49	32.80	40.56	32.37	37.57	36.07	40.22	39.65	37.79
50	23.16	37.08	21.59	27.83	24.50	34.38	31.88	33.53

51	37.84	42.70	39.23	41.22	41.84	45.84	43.62	42.81
52	30.88	41.57	26.07	20.58	29.36	28.49	35.44	37.79
53	25.47	33.67	25.55	27.40	29.12	34.38	30.84	29.97
54	27.26	35.85	27.35	28.40	29.86	36.33	31.63	30.74
55	28.96	39.99	27.33	30.88	31.09	37.65	36.57	34.12

	49	50	51	52	53	54	55
49	0.0						
50	35.87	0.0					
51	42.19	36.65	0.0				
52	39.42	27.90	41.84	0.0			
53	28.94	25.60	34.06	29.63	0.0		
54	30.70	27.52	36.31	33.54	20.27	0.0	
55	37.44	23.62	40.40	31.90	28.14	30.85	0.0

APPENDIX V
FACTORS

Factor	Story	Main Characters
1	9	coyote, girls
	10	coyote, fox
	18	coyote, deer
	6	coyote, animal1
	14	coyote, girl
	2	coyote, wood-tick
	5	coyote, eagle
	16	coyote, boy
	19	coyote, fox
	26	coyote, people
	29	coyote, chickadee
	36	coyote, man
	15	coyote, snakes
	4	coyote, bull
	17	coyote, magpie
	37	coyote, people
	8	coyote, fox
	20	fox, coyote
	3	coyote, crab
	13	whale, coyote
2	50	man, woman
	27	man, monster
	55	man, priest
	40	eagles, man
	31	man, lady
3	49	lefty, grizzly
	43	man, grizzly
	41	man, grizzly
	12	grizzly, lady
	11	grizzly, coyote
4	46	boy, bear
	44	boy, man
	52	boy, man
	32	boy, owl,lynx
	33	boy, lynx
5	34	owl,chipmunk
	35	owl,chipmunk
6	22	skunk, fisher, ... people
	28	bear, people
	53	people, persons
	54	people, indian
7	45	sasquatch, man
	47	sasquatch, woman
8	48	nkw'a7kw'7ikn7, wolf
	30	wolf, bull-frog

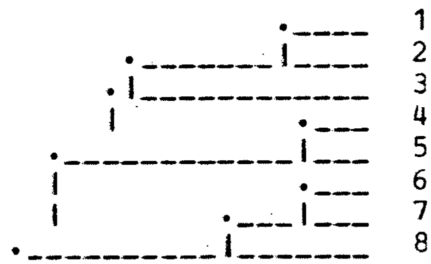
	21	wolf, grizzly
9	51	horses, k'iyawtk/n
	39	people, shuswaps
	42	shuswaps, okanagans
10	38	bird, man
	7	bird fish
11	24	sheep, grasshopper
12	1	frog, people
13	25	sockeye, mouse
	23	mouse

APPENDIX VI
DENDOGRAMS

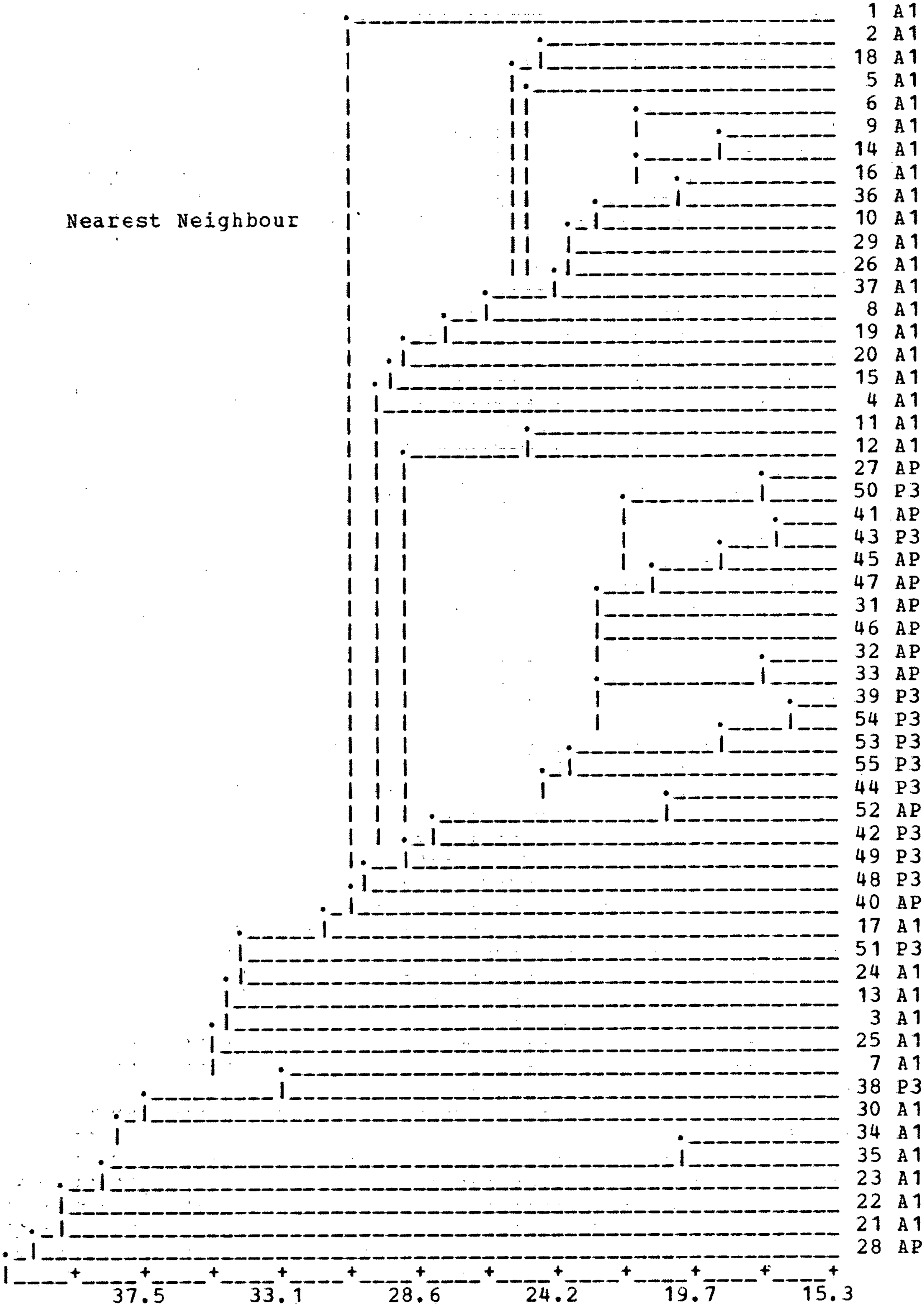
Code	Category
A1	animals only
AP	animals and humans in harmony
P3	animals and humans as enemies

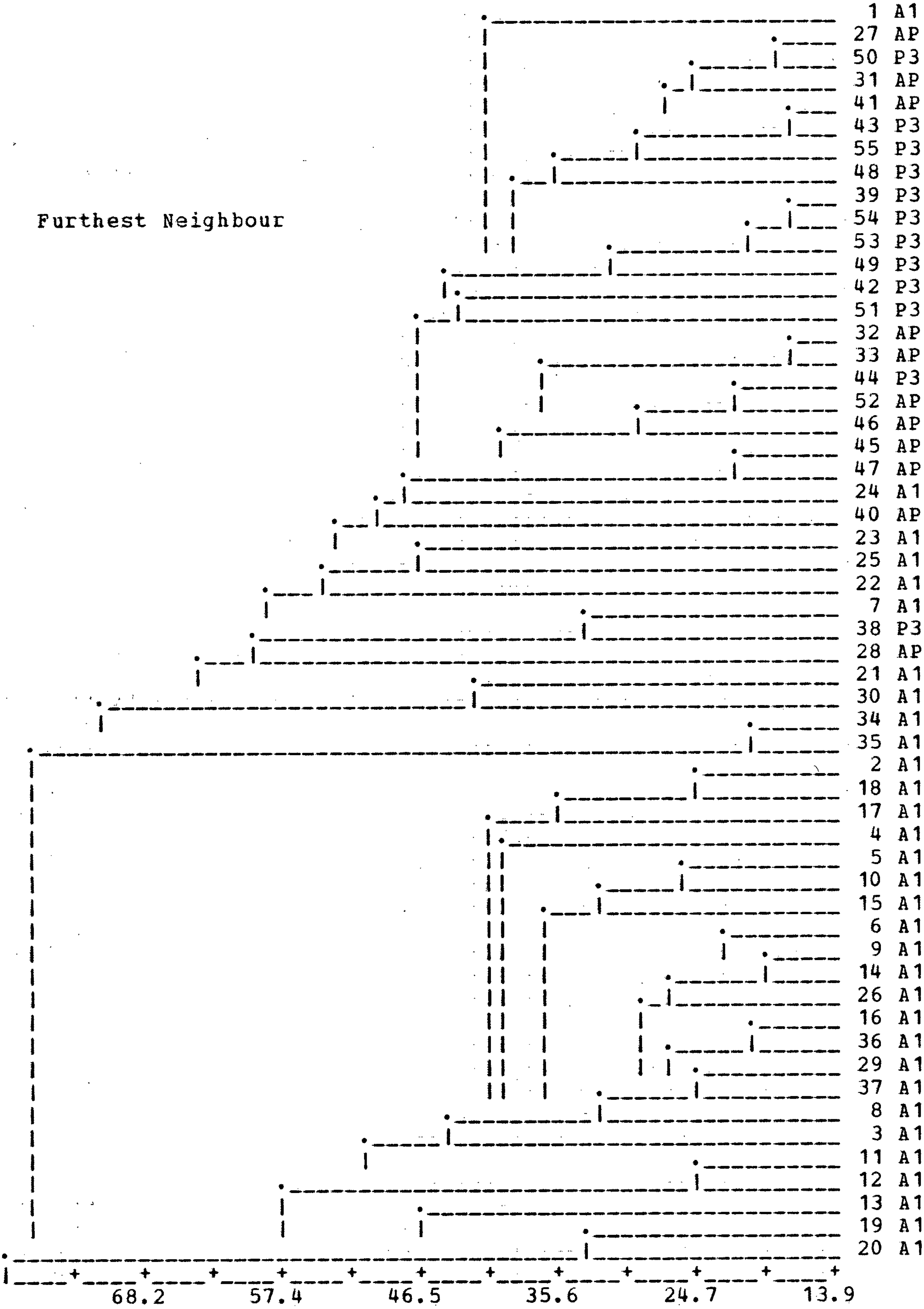
Story	Code	Story	Code
1	A1	29	A1
2	A1	30	A1
3	A1	31	AP
4	A1	32	AP
5	A1	33	AP
6	A1	34	A1
7	A1	35	A1
8	A1	36	A1
9	A1	37	A1
10	A1	38	P3
11	A1	39	P3
12	A1	40	AP
13	A1	41	AP
14	A1	42	P3
15	A1	43	P3
16	A1	44	P3
17	A1	45	AP
18	A1	46	AP
19	A1	47	AP
20	A1	48	P3
21	A1	49	P3
22	A1	50	P3
23	A1	51	P3
24	A1	52	AP
25	A1	53	P3
26	A1	54	P3
27	AP	55	P3
28	AP		

Consider this example of a dendogram:

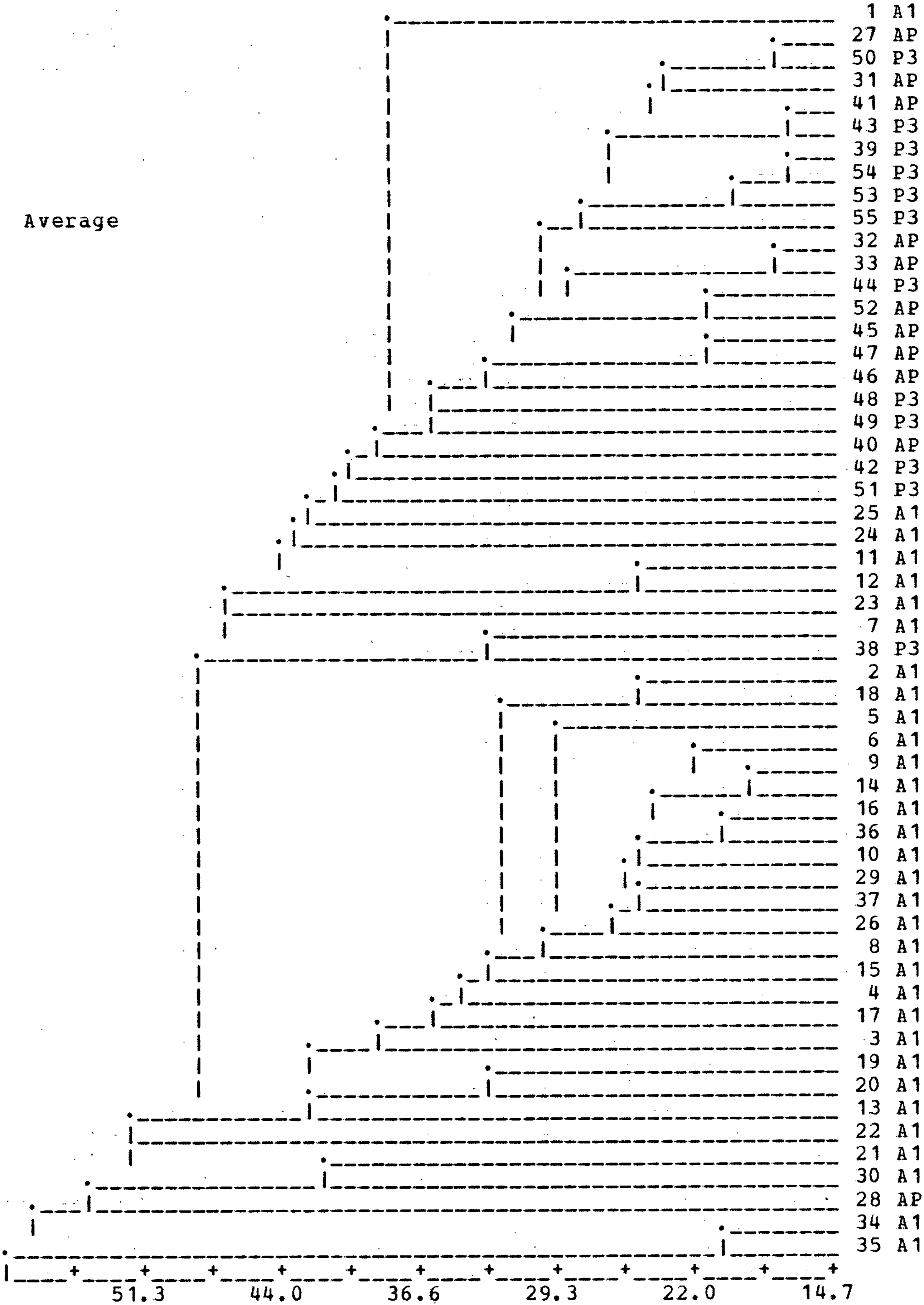


(1) a. point 4 joins with point 5
    b. point 6 joins with point 7
(2) point 1 joins with point 2
(3) points 6, 7 join with point 8
(4) points 1,2 join with point 3
(5) points 1,2,3 join with points 4,5
(6) points 1,2,3,4,5 join with points 6,7,8

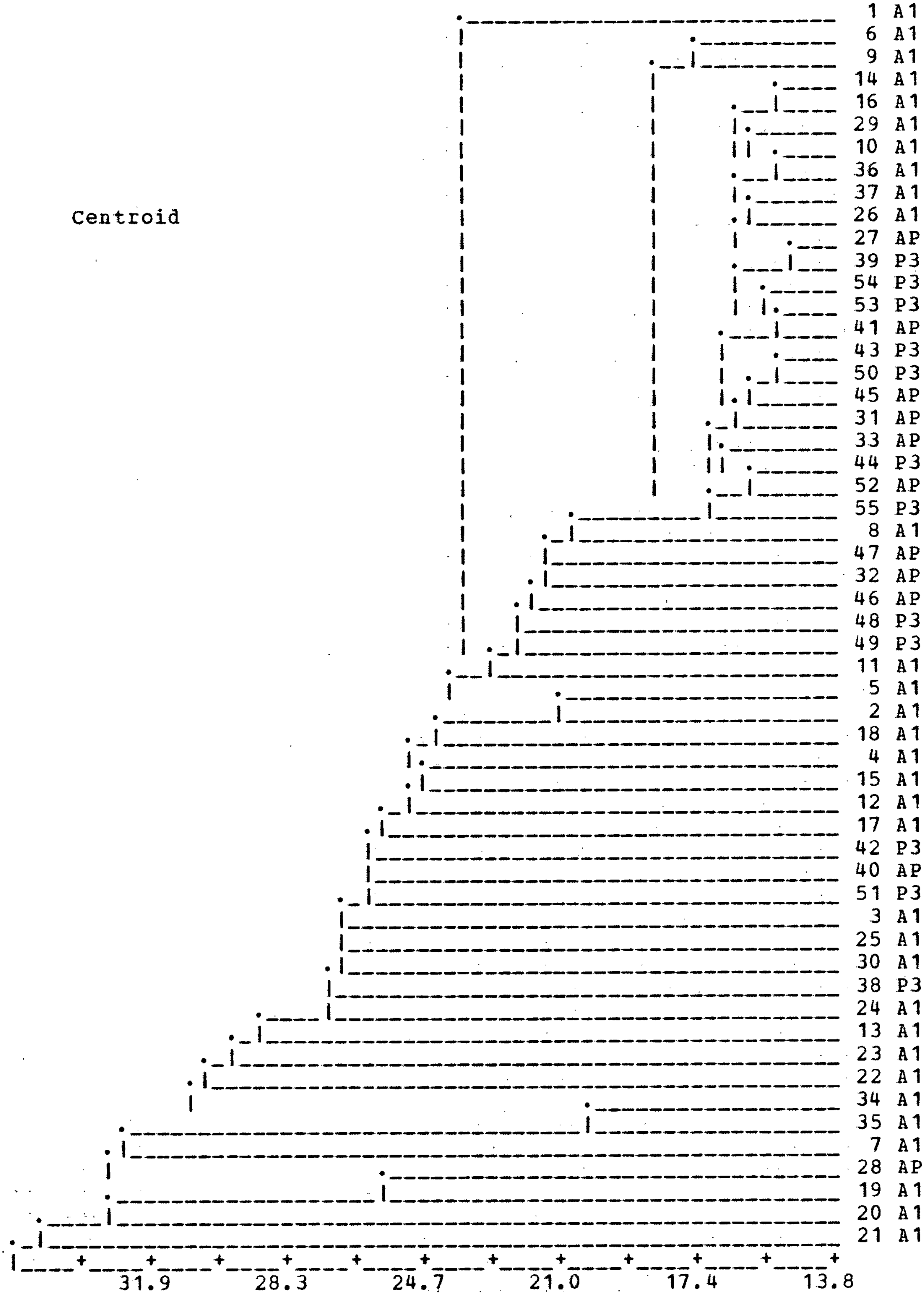

Nearest Neighbour
1 A1
2 A1
18 A1
5 A1
6 A1
9 A1
14 A1
16 A1
36 A1
10 A1
29 A1
26 A1
37 A1
8 A1
19 A1
20 A1
15 A1
4 A1
11 A1
12 A1
27 AP
50 P3
41 AP
43 P3
45 AP
47 AP
31 AP
46 AP
32 AP
33 AP
39 P3
54 P3
53 P3
55 P3
44 P3
52 AP
42 P3
49 P3
48 P3
40 AP
17 A1
51 P3
24 A1
13 A1
3 A1
25 A1
7 A1
38 P3
30 A1
34 A1
35 A1
23 A1
22 A1
21 A1
28 AP
37.5
33.1
28.6
24.2
19.7
15.3

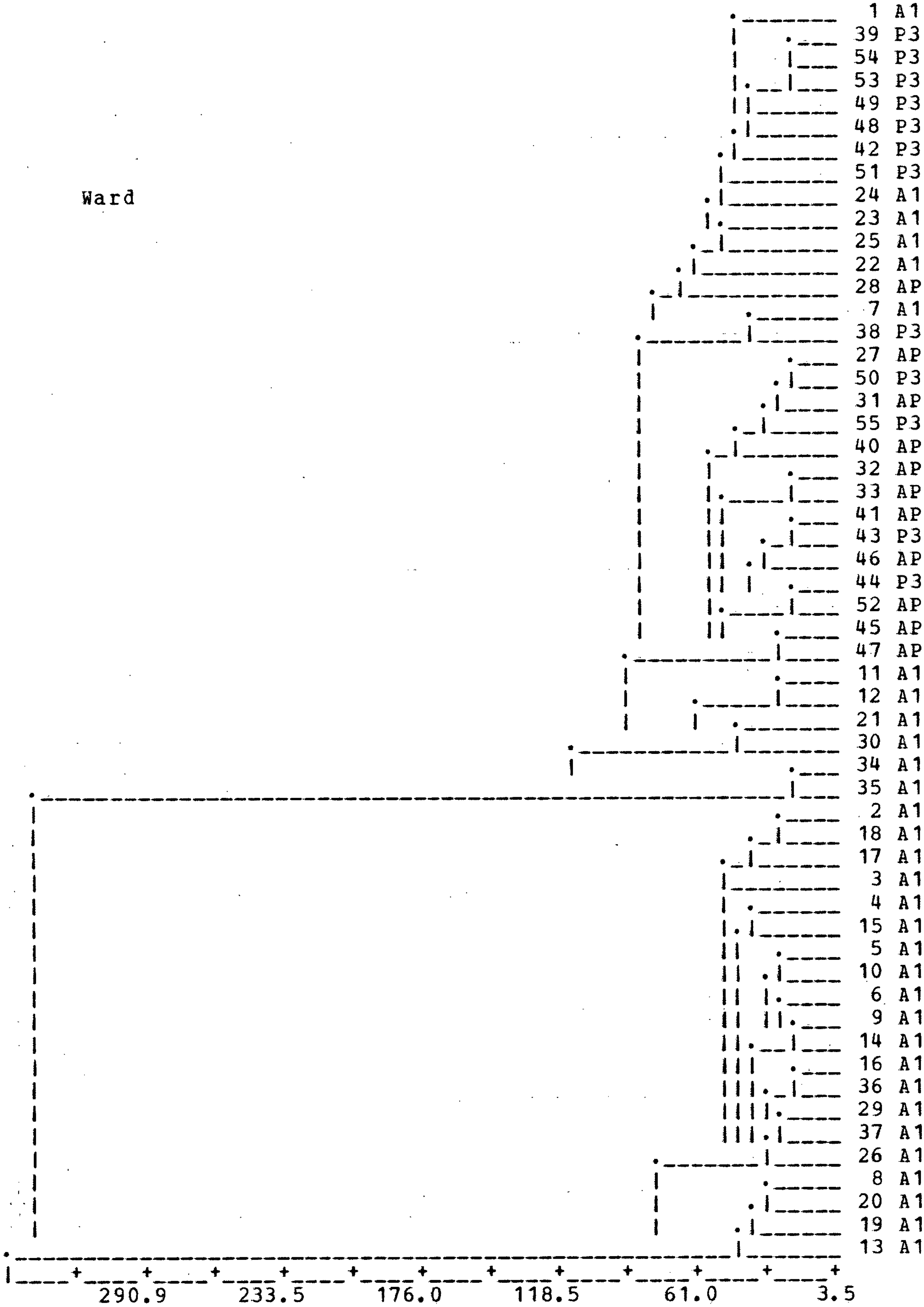


Furthest Neighbour


Average
1 A1
27 AP
50 P3
31 AP
41 AP
43 P3
39 P3
54 P3
53 P3
55 P3
32 AP
33 AP
44 P3
52 AP
45 AP
47 AP
46 AP
48 P3
49 P3
40 AP
42 P3
51 P3
25 A1
24 A1
11 A1
12 A1
23 A1
7 A1
38 P3
2 A1
18 A1
5 A1
6 A1
9 A1
14 A1
16 A1
36 A1
10 A1
29 A1
37 A1
26 A1
8 A1
15 A1
4 A1
17 A1
3 A1
19 A1
20 A1
13 A1
22 A1
21 A1
30 A1
28 AP
34 A1
35 A1
51.3
44.0
36.6
29.3
22.0
14.7

Centroid


1 A1
6 A1
9 A1
14 A1
16 A1
29 A1
10 A1
36 A1
37 A1
26 A1
27 AP
39 P3
54 P3
53 P3
41 AP
43 P3
50 P3
45 AP
31 AP
33 AP
44 P3
52 AP
55 P3
8 A1
47 AP
32 AP
46 AP
48 P3
49 P3
11 A1
5 A1
2 A1
18 A1
4 A1
15 A1
12 A1
17 A1
42 P3
40 AP
51 P3
3 A1
25 A1
30 A1
38 P3
24 A1
13 A1
23 A1
22 A1
34 A1
35 A1
7 A1
28 AP
19 A1
20 A1
21 A1
31.9
28.3
24.7
21.0
17.4
13.8


Ward
1 A1
39 P3
54 P3
53 P3
49 P3
48 P3
42 P3
51 P3
24 A1
23 A1
25 A1
22 A1
28 AP
7 A1
38 P3
27 AP
50 P3
31 AP
55 P3
40 AP
32 AP
33 AP
41 AP
43 P3
46 AP
44 P3
52 AP
45 AP
47 AP
11 A1
12 A1
21 A1
30 A1
34 A1
35 A1
2 A1
18 A1
17 A1
3 A1
4 A1
15 A1
5 A1
10 A1
6 A1
9 A1
14 A1
16 A1
36 A1
29 A1
37 A1
26 A1
8 A1
20 A1
19 A1
13 A1
290.9
233.5
176.0
118.5
61.0
3.5

APPENDIX VII
MINISSA COORDINATES FOR 10 DIMENSIONS

Story	1	2	3	4	5	6	7	8	9	10
1	0.72	-0.51	-0.26	-0.48	-0.45	-0.63	-0.47	-0.59	-0.69	-0.82
2	-0.56	-0.36	-0.74	-0.45	-0.33	-0.21	-0.54	-0.78	-0.24	-0.52
3	-0.21	-0.38	-0.55	-0.60	-0.28	-0.55	-0.51	-0.52	-0.74	-1.00
4	-0.32	-0.40	-0.81	-0.71	-0.26	-0.72	-0.30	-0.54	-0.01	-0.37
5	-0.36	-0.49	-0.52	-0.61	-0.07	-0.24	-0.57	-0.43	-0.14	-0.54
6	0.12	-0.50	-0.45	-0.46	-0.33	-0.34	-0.50	-0.57	-0.33	-0.39
7	0.82	-0.60	0.23	-0.65	0.13	0.38	-0.47	-0.54	-0.27	-0.55
8	-0.09	-0.60	-0.17	-0.37	-0.08	-0.52	-0.75	-0.50	-0.44	-0.34
9	-0.24	-0.42	-0.56	-0.48	-0.24	-0.42	-0.50	-0.58	-0.25	-0.43
10	-0.42	-0.53	-0.40	-0.49	-0.06	-0.42	-0.59	-0.57	-0.26	-0.32
11	0.41	-0.74	-0.72	-0.10	0.01	-0.35	-0.37	-0.46	-0.27	-0.39
12	0.44	-0.65	-0.98	-0.17	0.22	-0.49	-0.25	-0.45	-0.19	-0.47
13	-0.26	-0.59	0.21	-0.13	-0.06	-0.77	-0.75	-0.46	0.01	-0.38
14	0.12	-0.35	-0.55	-0.42	-0.20	-0.35	-0.52	-0.51	-0.27	-0.38
15	-0.36	-0.44	-0.63	-0.53	-0.25	-0.38	-0.62	-0.20	-0.43	-0.12
16	0.12	-0.56	-0.44	-0.53	-0.11	-0.47	-0.52	-0.62	-0.28	-0.35
17	-0.27	-0.56	-0.52	-0.34	-0.16	-0.35	-0.02	-0.75	-0.49	-0.37
18	-0.40	-0.48	-0.68	-0.45	-0.22	-0.39	-0.55	-0.84	-0.37	-0.32
19	-1.00	-0.46	-0.35	-0.50	0.02	-0.41	-0.61	-0.49	-0.24	-0.25
20	-0.61	-0.67	0.11	-0.42	0.16	-0.31	-0.82	-0.31	-0.22	-0.00
21	0.94	-0.89	-1.00	0.40	-0.13	-0.04	-0.73	-0.28	-0.13	-0.38
22	0.83	-0.32	-0.35	-0.57	-0.61	-0.42	0.07	-0.10	0.33	-0.38
23	0.83	-0.59	-0.35	-0.75	-1.00	-0.18	-0.51	-0.95	-0.23	-0.05
24	0.80	-0.48	-0.56	-0.76	-0.37	-0.18	-0.59	-0.02	-1.00	-0.13
25	0.80	-0.56	-0.09	-0.25	-0.47	-0.34	-0.76	-1.00	0.16	-0.55
26	-0.15	-0.65	-0.49	-0.30	-0.31	-0.65	-0.65	-0.73	-0.33	-0.42
27	0.71	-0.64	-0.44	-0.58	-0.08	-0.49	-0.66	-0.64	-0.26	-0.41
28	0.80	-1.00	0.20	-0.03	-0.12	-0.67	-0.01	-0.63	-0.53	-0.38
29	0.12	-0.52	-0.40	-0.45	-0.18	-0.45	-0.54	-0.52	-0.28	-0.38
30	0.83	-0.89	-0.63	0.04	-0.34	-0.52	-1.00	-0.68	-0.36	-0.47
31	0.79	-0.49	-0.64	-0.71	0.09	-0.53	-0.50	-0.55	-0.14	-0.37
32	0.73	-0.21	-0.37	-0.34	-0.13	-0.51	-0.48	-0.67	-0.38	-0.21
33	0.70	-0.31	-0.45	-0.45	-0.14	-0.44	-0.51	-0.59	-0.34	-0.26
34	1.00	0.89	-0.37	-0.11	0.08	-0.52	-0.61	-0.67	-0.33	-0.38
35	0.89	0.46	-0.39	-0.26	0.01	-0.47	-0.59	-0.61	-0.31	-0.40
36	-0.02	-0.64	-0.51	-0.66	-0.03	-0.51	-0.58	-0.62	-0.22	-0.41
37	-0.04	-0.64	-0.27	-0.42	-0.41	-0.59	-0.41	-0.56	-0.27	-0.46
38	0.85	-0.61	-0.31	-0.86	0.13	-0.06	-0.61	-0.64	-0.18	-0.55
39	0.67	-0.56	-0.34	-0.47	-0.19	-0.55	-0.54	-0.47	-0.29	-0.44
40	0.87	-0.79	-0.64	-1.00	0.23	-0.73	-0.75	-0.81	-0.17	-0.64
41	0.77	-0.67	-0.63	-0.42	0.00	-0.48	-0.38	-0.49	-0.21	-0.42
42	0.82	-0.58	-0.12	-0.64	-0.07	-0.75	-0.72	-0.00	-0.28	-0.72
43	0.82	-0.82	-0.53	-0.47	0.10	-0.49	-0.35	-0.57	-0.30	-0.35
44	0.79	-0.52	-0.50	-0.77	-0.02	-0.45	-0.50	-0.62	-0.34	-0.04
45	0.81	-0.79	-0.51	-0.38	-0.02	-0.61	-0.55	-0.75	-0.40	-0.22
46	0.85	-0.72	-0.46	-0.45	0.10	-0.53	-0.13	-0.67	-0.36	-0.15
47	0.77	-0.68	-0.41	-0.39	-0.20	-0.68	-0.77	-0.84	-0.56	-0.06
48	0.78	-0.56	-0.66	-0.47	-0.30	-0.13	-1.00	-0.41	-0.21	-0.40
49	0.75	-0.58	-0.43	-0.32	-0.33	-0.34	-0.46	-0.26	-0.35	-0.49
50	0.74	-0.64	-0.51	-0.61	-0.06	-0.55	-0.64	-0.60	-0.21	-0.42

51	0.80	-0.50	-0.52	-0.62	-0.43	-1.00	-0.78	-0.12	-0.08	-0.14
52	0.78	-0.49	-0.48	-0.72	0.08	-0.49	-0.49	-0.66	-0.29	-0.10
53	0.63	-0.49	-0.40	-0.48	-0.24	-0.42	-0.56	-0.49	-0.29	-0.39
54	0.62	-0.60	-0.26	-0.45	-0.33	-0.53	-0.56	-0.51	-0.31	-0.40
55	0.79	-0.64	-0.71	-0.84	-0.16	-0.39	-0.66	-0.61	-0.19	-0.48