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EXPLORATION OF THE SOCIOECONOMIC ECOLOGY OF KATHMANDU, NEPAL

A FACTOR ANALYSIS APPROACH

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I. INTRODUCTION

A. An Urban Ecological Study

The main objective of this research is to identify and explain fundamental dimensions of selected socioeconomic characteristics of Kathmandu, Nepal, to examine their spatial patterns by using factor analysis and to relate these aspects to urban ecological models.

The term "ecology" has recently become a catchword. Robson has suggested that it is a much over-used and frequently misused term.[1] The word was originally coined by biologists to describe the mutual relaionships among organisms and their environments. The application of this concept to social sciences by Park and his associates,[2] and Barrows[3] at the Chicago school during the 1920's gave rise to the field of human or social ecology. Park was the first person to develop a theory of the city based on an analogy between plant communities and human communities.[4]

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[1]See B.T. Robson, Urban Analysis: A Study of City Structure with Special Reference to Sunderland (Cambridge: Cambridge University Press, 1969), p. 8, hereinafter cited as Robson, Urban Analysis.

[2]See Robert E. Park, Ernest W. Burgess, and Roderick D. McKenzie, The City (Chicago: University of Chicago Press, 1925).

[3]See H.H. Barrows, "Geography as Human Ecology," Annals of the Association of American Geographers, XIII (March, 1923), 1-14.

[4]Park introduced the idea of urban ecology as a formal discipline as early as 1915. See R.E. Park, "The City: Suggestions for the Investigations of Human Behavior in the City Environment," American Journal of Sociology, XX (March, 1915), 577-612. A revised version of this paper with the same point of view was later published in 1923. See R.E. Park, "The City: Suggestions for the Investigations of Human Behavior in the Urban Environment," in The City, by Park, Burgess, and McKenzie, pp. 1-46, hreinafter cited as Park, "The City." See also R.E. Park, "Human Ecology," American Journal of Sociology, XII (July, 1936), 1-15.

Barrows suggested that by studying the "mutual relations between man and his natural environment," geography could be considered the science of human ecology.[1] Later, ecological concepts in social sciences were discussed and elaborated by several persons such as Taylor,[2] Quinn,[3] Duncan,[4] Hawley,[5] Stoddart,[6] and Rees.[7] For example, Hawley discusses the nature of human ecology in terms of three aspects: differentiation, community structure and spatial structure, whereas Duncan suggested linkages of four "referential concepts"--population, environment, technology and organization for the "functional interdependence" of the ecological complex. Despite these different theoretical frameworks for the study of human ecology, one common attribute of such ecological studies is that they deal with interrelations of human characteristics and spatial structure of these characteristics. Theoderson has agreed

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[1]See Barrows, "Geography as Human Ecology," 1-14.

[2]See W.P. Taylor, "What is Ecology and What Good is It?" Ecology, XVII (July, 1936), 336-46, hereinafter cited as Taylor, "What is Ecology?"

[3]See J.A. Quinn, "The Burgess Zonal Hypothesis and Its Critics," American Sociological Review, V (April, 1940), 210-18; and idem, Human Ecology (New York: Prentice-Hall, Inc., 1950).

[4]See O.D. Duncan, "Human Ecology and Population Studies," in The Study of Population: An Inventory and Appraisal, ed. by P.M. Hauser and O.D. Duncan (Chicago: University of Chicago Press, 1959).

[5]See A.H. Hawley, Human Ecology: A Theory of Community Structure (New York: Ronald Press Company, 1950)

[6]See D.S. Stoddart, " Geography and Ecolofical Approach," Geography, L (July, 1965), 242-51.

[7]See P.H. Rees, "Factorial Ecology: An Extended Definition, Survey, and Critique of the Field," Economic Geography, XLIII, Supplement (June, 1971), 220-33, hereinafter cited as Rees, "Factorial Ecology."

with this view by suggesting human ecology as "the study of spatial distribution of interrelated social variables."[1] In this context, this research may be considered an ecological study.

B. Why Kathmandu?

Social scientists have long been interested in the ecological study of cities. Varieties of models such as the classical models of urban structure (concentric zone model, sector model, and multiple nuclei model), "social area analysis," and factorial studies have been introduced for the purpose of understanding urban ecology.[2] In studying urban areas, sociologists have primarily dealt with analyses of the socioeconomic structure of residential areas using neighborhood concepts or social area analysis as frameworks. Neighborhood concepts were developed in the early 1920's,[3] and social area analysis was introduced after World War II.[4] Neighborhood concepts also have been used by

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[1]G.A. Theoderson, ed., Studies in Human Ecology, (Evanston, Illinois: Row Paterson and Company, 1961), p. 3.

[2]A brief review of different approaches to the study of urban structure including the models mentioned here, is given in Chapter II.

[3]See E.W. Burgess, "Can Neighborhood Work Have a Scientific Basis?" in The City, by Park, Burgess, and McKenzie, pp. 142-55; and R.D. McKenzie, "The Neighborhood: A Study of Local Life in the City of Columbus, Ohio," American Journal of Sociology, XXVII (September, 1921-May, 1922), 145-68, 344-63, 486-509, 588-610, and 780-99.

[4]See E. Shevky and M. Williams, The Social Area of Los Angeles: Analysis and Typology (Los Angeles: University of California Press, 1949), hereinafter cited as Shevky and Williams, Los Angeles; and E. Shevky and W. Bell, Social Area Analysis: Theory, Illustrative Application, and Computational Procedures (Stanford: Stanford University Press, 1955), hereinafter cited as Shevky and Bell, Social Area Analysis.

urban planners as a basis for the development of planned neighborhoods.[1] Recently, factorial studies of cities have made it possible not only to integrate the ideas of both the classical models and social area analysis, but also to identify and explain fundamental dimensions of urban ecology. Thus the factor analytical approach has been a rigorous tool for urban analysis. As stated by Berry and Rees, one useful aspect of the factor analytical approach can be that differing urban ecologies related to differing factor combinations can be arranged along a scale of urban development from pre- to post-industrial forms.[2] However, most urban studies using factor analysis have been limited to Western cities. There have been comparatively few studies on cities of the Third World such as those of Asia, and none on preindustrial cities of landlocked countries such as Kathmandu, Nepal, and Kabul, Afganistan.

Kathmandu, the capital city of Nepal which is now passing through a transitional stage of development from the preindustrial society to modernization, is different from Western cities, and also from colonial cities of the Third World. This difference includes several aspects such as social differentiation, economic characteristics, development of societal structure and modes of urban technology. This research on Kathmandu should further the understanding of the urban domain of the world, by providing a different spectrum of urban ecology

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[1]See C. Perry, "The Neighborhood Unit: A Scheme of Arrangement for the Family Life Community," in A Regional Plan for New York Environs, by Russell Sage Foundation, Vol. VII (New York: Russell Sage Foundation, 1929); and L. Mumford, "The Neighborhood and the Neighborhood Unit," Town Planning Review, XXIV (January, 1954), 256-70.

[2]B.J.L. Berry and P.H. Rees, "The Factorial Ecology of Calcutta," American Journal of Sociology, LXXIV (March, 1969), 491.

of the preindustrial city. Therefore, Kathmandu was selected for its socioeconomic ecological study. A second reason for the selection was personal since the author is very familiar with the city.

C. The Study Area

The study area which is about ten square miles, consists of the corporate city of Kathmandu and contiguously built-up areas around it excluding Patan, the twin city in the south. It corresponds with the urbanized area of the Kathmandu District, and hereinafter it is simply referred to as Kathmandu, and the corporate city of Kathmandu as city of Kathmandu or Kathmandu city.

D. Outline Presentation

Preceding sections of this chapter have presented the objective, nature and study area of this research. The next chapter (Chapter II) provides a conceptual framework for the socioeconomic ecological study of Kathmandu by presenting statements of the problem, hypotheses, and a brief review of related literature. Chapter III gives a background on Kathmandu describing its location, settlement development, and socioeconomic structure with an emphasis on its societal structure. The next chapter (Chapter IV) describes procedures of the field research including the delineation of the study area, data tabulation, and the data reliability. Chapter V consists of a discussion on analytical techniques used for this research. The next chapter (Chapter VI) interprets important results of the analytical techniques (factor analysis and analysis of variance) in examining the socioeconomic ecology

of Kathmandu. The last chapter (Chapter VII) furnishes the summary and conclusions of this study. Appendixes at the end of the text contain important details of this research that were too lengthy to include in the text.

II. CONCEPTUAL FRAMEWORK

A. Theoretical and Empirical Background

Most of the literature on urban ecology has developed over the last fifty years.[1] During this period, geographers, sociologists, economists and others have produced a number of studies on socioeconomic structure of cities. Varieties of techniques ranging from the use of traditional descriptive language to sophisticated multivariate methods the advancement of computer technology, have been used in exploring the common objective of understanding urban ecology. Knowledge from these varied contributions have been cumulative and complementary for urban ecological research and many relevant insights can be gathered from these studies for a socioeconomic ecological study of Kathmandu.

1. The Classical Models

An inquiry and understanding of the urban structure was started long ago since man by his nature is curious to know about his surroundings and even a casual observation can discover various patterns in the city reflecting such characteristics as ethnic groups, land values, accessibility, history of urban growth and other socioeconomic variation of the population. For example, Marco Polo has described the town of Lut, an Iranian oasis southeast of Kerman, in terms of seven circles of concentric walls.[2] But systematic approaches to understand the structure of

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[1] The idea of urban ecology as a formal discipline was introduced by Park in 1915. See Park, "The City," 577-612.

[2] See Xavier de Planhol, The World of Islam (Ithaca, New York: Cornell University Press, 1959), pp. 10-11.

the city did not probably start until the nineteenth century.[1] However, major developments in devising models to describe and explain spatial patterns of the city and their empirical varification started only after the First World War. Between 1920 and 1945 appeared three major classic descriptive models of the urban structure: (a) the concentric zone model; (b) the sector model; and (c) the multiple nuclei model.

a. The Concentric Zone Model. This model was propagated by a group of sociologists in Chicago led by E. W. Burgess[2] who devised it in the 1920's from his knowledge of Chicago to describe urban patterns employing the concentric ring idea. The basis of this model is that the city grows outward from its center forming a series of concentric zones. These concentric zones of Burgess that extend outward from the center may be generalized as follows: (a) the central business district; (b) the transition zone, where the city's principal slums and poverty areas are

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[1]Kohl who came up with a kind of theoretical notion to describe the urban structure during the mid-nineteenth century was probably the first person to look at the urban structure in a systematic way. According to him, urban structure might be viewed vertically as a series of layers: (a) the ground floor (Rez-de-Chausee) contains the establishments and living quarters; (b) the first floor (Bel Etage) is the "area of wealth and pleasure," and people with low income reside "upwards." Applying this idea to the spatial patterns of the city, he maintained that economic and social importance of the population declined outwards from the city center, but some outer rings might contain a wealthy population because of "growing sympathy for the countryside." See Berry and Rees, "The Factorial Ecology of Calcutta," 445-46.

[2]See Ernest W. Burgess, "The Growth of the City: An Introduction to a Research Project," in The City, by Park, Burgess, and McKenzie, pp. 47-62, hereinafter cited as Burgess, "The Growth of the City."

found and new immigrants with low income are attracted; (c) the zone of independent working men's homes, where residences of middle class people are found; (d) the zone of better residence; and (e) the commuter's zone, which consists of a ring of small cities beyond the city limit (satellite towns) where considerable proportions of the population are employed in the city. This model on the basis of ecological principles of competition such as "invasion" and "succession" maintains that socioeconomic status varies with distance from the city center. For new immigrants reside in older houses close to the city center and move outwards as their economic status improves, and the process of expansion continues as each inner zone extends its area by the invasion of the next outer zone and "this aspect of expansion may be called succession, a process which has been studied in detail in plant ecology."[1]

b. The Sector Model. Hoyt developed his sector model[2] on the basis of vast empirical work in which he used eight variables[3] for sixty-four American cities mapping them by blocks. Considering rent as a guide, he suggested that there was a spatial differentiation of high and low rent neighborhoods in the city. This differentiation was distributed in a sectoral pattern rather than a concentric fashion around the city center. In his view, this sectoral pattern developed because of the fact that only

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[1]Burgess, "The Growth of the City," p. 50.

[2]Homer Hoyt, The Structure and Growth of Residential Neighborhoods in American Cities (Washington: Federal Housing Administration, 1939), hereinafter cited as Hoyt, American Cities.

[3]The variables were: 1. Average rental for the block; 2. Percentage of residential structures that are 35 years old and over; 3. Percentage of dwelling units owner-occupied; 4. Percentage of residential structures in need of major repairs or unfit for occupancy; 5. Percentage of dwelling units with no private bath; 6. Percentage of non-white people; 7. Percentage of dwelling units with no central heat; and 8. Percentage of overcrowded dwelling units.

those people could reside in good quality residential areas, who could afford the highest rent. These people occupied lands along the "best existing transportation lines," high ground -- free from the risk of flood," and along lake, bay, river and ocean fronts where such water fronts are not used for industry."[1] He further believed that the growth of high rent neighborhoods continued in the same direction for a long period of time. In a recent evaluation of his sector model, he again concluded that higher income families were concentrated in certain sectors although idealized patterns were distorted to some extent by growth factors, especially the effective role of the automobile in increasing the flexibility of housing locations which resulted in the development of higher income communities beyond low income sectors.[2]

c. The Multiple Nuclei Model. Although the concentric zone and sector models have simplicity in their approach, the situation in most cities is more complex than they describe.[3] Probably realizing this difficulty in applying these models to most cities, C.D. Harris and E. Ullman came up with the idea of their multiple nuclei model[4] to explain the urban land use pattern which, they suggest concentrates around several nuclei

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[1]Hoyt, American Cities, pp. 118-19.

[2]Homer Hoyt, "Recent Distortions of the Classical Models of Urban Structure," Land Economics, XL (May, 1964), 199-212.

[3]James Johnson, Urban Geography: An Introductory Analysis (Oxford, England: Pergamon Press, 1967), p. 170, hereinafter cited as Johnson, Urban Geography.

[4]C. D. Harris and E. Ullman, "The Nature of Cities," Annals of the American Academy of Political and Social Sciences, CCXLII (November, 1945), 7-17.

within the city rather than a single core. The multiple nuclei pattern develops, they believe, because of the fact that certain activities require specialized facilities; certain like activities group together because they profit from cohesion; certain unlike activities are detrimental to each other; and certain activities are unable to afford the high rents of the most desirable sites. Under this scheme it is possible to come up with innumerable variations in the city.

2. General Remarks on the Classical Spatial Models of Urban Structure

The concentric zone model appears to be similar to three other models of urban growth and structure: (a) The centrifugal and centripetal forces model of Colby;[1] (b) The population density model of Clark;[2] and (c) The land value model.[3] Colby suggests that centrifugal force has

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[1]See C.C. Colby, "Centrifugal and Centripetal Forces in Urban Geography," in Readings in Urban Geography, ed. by H.M. Mayer and C.F. Kohn (Chicago: University of Chicago Press, 1959), pp. 287-98, hereinafter cited as Colby, "Centrifugal and Centripetal Forces."

[2]Colin Clark, "Urban Population Densities," Journal of the Royal Statistical Society, CXIV, Series A (1951), 490-96. For further development in the population density model, see Brian J.L. Berry, James W. Simmons and Robert J. Tennant, "Urban Population Densities: Structure and Change," Geographical Review, LIII (July, 1963), 389-405, hereinafter cited as Berry, Simmons, and Tennant, "Urban Population Densities;" Bruce E. Newling, "Urban Growth and Spatial Structure: Mathematical Models and Empirical Evidence," Geographical Review, LVI (April, 1966), 213-25; and Brian J.L. Berry and Frank E. Horton, eds., Geographic Perspectives on Urban Systems with Integrated Readings (Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1970), pp. 276-305, hereinafter cited as Berry and Horton, eds., Urban Systems.

[3]See William Alonso, Location and Land Use (Cambridge: Harvard University Press, 1964); and Walter Isard, Location and Space-Economy (New York: John Wiley, 1956).

created the outward movement of manufactural, residential and recreational functions in American cities, often to avoid the congestion and high rents of the core. He further suggests:

> The human equation acts both as a centripetal and as a centrifugal force. Choice, for example, leads some people to commute from outlying residential districts while it leads others in similar financial circumstances to occupy apartments near the central business district. The human desire to be in the center of things probably leads to an overestimation of the value of a location in the central zone. Sentiment and perhaps stubborness leads some wealthy families to cling sites in the central zone long after the residential function as a whole has moved out of the area.[1]

The idea that population density declines with the distance from the city center, which was originally suggested by Colin Clark[2] is further developed by Berry, Newling and others.[3] Their findings tend to conform with the concentric pattern. The explanation of the land value model concerns the residential land use curve which involves a similar concept of the location rent. Location rent deals with the idea that different uses experience different savings in the cost of transportation through central location and therefore have different bid rent curves,[4] and that an area will be under that particular use which has the highest bid rent since that particular use outbids other uses in bid-rent competition. In this sense, rich people tend to compare transport cost with land value and living amenities. As a result, to consume a greater proportion of land and enjoy living amenities, they live on relatively inexpensive

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[1]Colby, "Centrifugal and Centripetal Forces," pp. 296-97.

[2]Clark, "Urban Population Densities," 490-96.

[3]See Berry, Simmons and Tennant, "Urban Population Densities;" Newling, "Urban Growth;" and Richard F. Muth, "The Variation of Population Density and Its Component in South Chicago," Papers and Proceedings of the Regional Science Association, XV (1965), 173-83.

[4]Berry and Horton, eds., Urban Systems, pp. 298-301.

land away from the city center although they spend more on transportation in reaching the center of the city. On the other hand, poor people cannot pay high transportation costs to live at the periphery of the city. So they live near the city center on expensive land consuming little of it, and creating a high density in this section of the city.

The basic idea of the concentric zone model is present also in the preindustrial city model of Sjoberg; for he says that there is "the pre-eminence of 'central' area over the periphery, especially as portrayed in the distribution of social classes" in preindustrial cities.[1]

There are some empirical evidences which show varied success in the application of the concentric and sector models to the spatial structure of the urban population. Davie[2] concluded in testing the Burgess model on the basis of land use maps of some twenty cities in the United States and Canada that there was no universal pattern, but rather, only general principles governing the distribution of urban land use. Patterns that he found were (a) central business districts of square or rectangular shape; (b) commercial land use along radial streets forming subcenters at certain strategic points; (c) industry located especially near the transportation line of water or railroads; (d) low-grade housing near industrial and transportation areas; and (e) second and first class housing elsewhere. In a study on the median family income patterns of the city

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[1]See Gideon Sjoberg, The Preindustrial City: Past and Present (New York: Free Press, 1960), pp. 95-103, hereinafter cited as Sjoberg, The Preindustrial City.

[2]Maurice R. Davie, "The Pattern of Urban Growth," in Studies in the Science of Society, ed. by G.P. Murdock, (New Haven: Yale University Press, 1937), pp. 133-61.

of Pittsburgh, Joshi concluded that spatial patterns of the income in some sections of the city varied with distance from the central business district in conformance with the concentric pattern idea of the concentric zone model.[1] Anderson and Egeland attempted to see more than just one dimension of urban ecology using a number of socioeconomic variables in their studies of four medium sized American cities--Akron, Dayton, Indianapolis and Syracuse.[2] They performed analysis of variance by sectors and concentric zones in which it was revealed that "social rank" varied mainly by sector, and "urbanization" varied mainly by concentric pattern.[3] They succeeded in vestigating simultaneously two important dimensions of urban ecology at one time.

Emery Jones rejects both the concentric zone and sectoral models for their applicability in the ecological structure of Belfast, England. He comments:

> ...the exceptions are too big to contemplete, and the idealized pattern, whether concentric zonal or sector, falls to the ground both as a description of Belfast and as a suggestion for the possible explanation of the pattern. There are elements in the sector theory to which we will return, but for the moment, sectors and zones must be set aside as complete answers.[4]

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[1]Tulasi R. Joshi, "Spatial Distribution Pattern of Income in Pittsburgh: A Statistical Analysis," National Geographical Journal of India, XV (March, 1969), 7, hereinafter cited as Joshi, "Income in Pittsburgh."

[2]Theodore R. Anderson and Janice A. Egeland, "Spatial Aspects of Social Area Analysis," American Sociological Review, XXVI (June, 1961), 392-99.

[3]For the explanation of "social rank" and "urbanization," see infra, p. 16.

[4]Emrys Jones, A Social Geography of Belfast (London: Oxford University Press, 1960), pp. 273-74.

Johnson suggests that the sector model is a refinement rather than an alteration of the concentric zone model for the reason that although better class housing may extend outwards in a sector, at the same time the age of buildings is more likely to show a concentric arrangement, as layers of houses are added to the urban fringe. This leads to believe that the whole sector will not be geographically similar especially in the age structure of city housing at any one moment of time.[1] In his land use study of central Boston, Firey remarks that Beacon Hill remained a high-class residential area for social reasons that seemed to contradict various aspects of Hoyt's sector model.[2]

In a way, the multiple nuclei model, by combining the ideas of both the concentric zone and sector models, and other ingredients in explaining the urban land use patterns, has gone a step further in its schematic presentation by making it applicable to the "flexible modern urban scene." Especially in cases where the concentric zone and sector models are not capable of explaining urban patterns, the multiple nuclei model has proved to be more meaningful -- for example, in explaining ethnically segregated residential neighborhoods as suggested by Firey in his segregation model.

Thus although some investigators have appeared to contradict these models, and some have attempted to isolate one model from the rest of the models, recent empirical evidence from the work of "social area analysis,"[3]

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[1]See Johnson, Urban Geography, pp. 166-68.

[2]See W. Firey, Land Use in Central Boston, (Cambridge: Harvard University Press, 1947).

[3]Here "social area analysis" in its strict sense, refers to the works of Shevky, Williams, and Bell. See Shevky and Williams, Los Angeles; and Wendell Bell, "The Social Areas of the San Francisco Bay Region," American Sociological Review, XVIII (February, 1953), 29-47, hereinafter cited as Bell, "San Francisco."

and factorial studies of cities suggest that the three models[1] seem to complement urban ecological research, each describing a particular aspect of socio-economic patterns of the city. In this connection Berry remarks that "the three models are independent, additive contributors to the total socioeconomic structuring of city neighborhoods."[2] Concurrent to the three models, three important dimensions of urban ecology investigated later by social area analysis and factorial studies are (a) "economic status" (Hoyt); (b) "family status" (Burgess), and (c) "ethnic status" (Firey).[3]

These three major dimensions of urban ecology were first investigated by Shevky, Williams and Bell in their social area analysis of Los Angeles and the San Francisco Bay region.[4] However, it remained to

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[1]The three models refer to (a) the concentric zone model of Burgess, (b) the sector model of Hoyt, and (c) the segregation model of Firey associated with the idea of the multiple nuclei model of Harris and Ullman.

[2]Brian J.L. Berry, "Internal Structure of the City," Law and Contemporary Problems, XXX (Winter, 1965), 115.

[3]These terms were coined by Bell. Others have given various names to similar dimensions. Dimensions similar to "economic status" are often named as "social rank," "socio-economic rank," and "socio-economic status." In general these dimensions are associated with measures of education, occupation, and economic characteristics such as rent, income and housing quality. Dimensions similar to "family status" are labelled as "familism," "young family cycle stage," "stage in life cycle," "stage of the family cycle," "progeniture," "urbanism," and "urbanization." These dimensions are normally associated with measures of family characteristics such as family size and age composition. Dimensions similar to "ethnic status" are called as "segregation," "communal factor," and "ethnic background." These are related with language, origin and migration status, race, tribe, and caste.

[4]See Shevky and Williams, Los Angeles; and Bell, "San Francisco."

factorial studies (in which a mass of data can be examined to determine how many dimensions of variation are expressed by it) to provide a better insight of total urban structure, capturing all the previously mentioned major dimensions of the metropolis. Factorial studies have revealed in most of the American cities that indices which measure the socioeconomic status of the population vary mainly by sector, indices which measure the familial characteristics and age structure (family status) differ mainly by concentric zone, and indices which measure the ethnic characteristics tend to cluster in a particular part of the urban area. Regarding major findings of factorial studies in American cities, Berry says:

> ...In each of the studies the answer is the same: there are just three dimensions of variation. These are (a) the axial variation of neighborhoods by socioeconomic rank; (b) the concentric variation of neighborhoods according to family structure; and (c) the localized segregation of particular ethnic groups.[1]

3. Social Area Analysis

The term "social area analysis" strictly speaking means the mode of analysis that was first introduced by Shevky and Williams in classifying the Los Angeles area, and used by Wendell Bell in a study of the San Francisco Bay area, and later elaborated by Shevky and Bell.[2] From their analysis, they derived three basic constructs which they considered describe the differentiation of urban population in industrial societies. They also proposed that three endices, one per

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[1] Berry, "Internal Structure of the City," 115.

[2] See Shevky and Williams, Los Angeles; Bell, "San Francisco," and Shevky and Bell, Social Area Analysis.

construct, consisted of from one to three census variables. These three constructs were called social rank (economic status), urbanization (family status) and segregation (ethnic status);[1] and census tracts could be classified on the basis of scores of these indices. They have divided their "social space" into sixteen social areas by dividing family status and economic status each into four intervals.

Social area analysis in its strict definition has been criticized on theoretical grounds, as well as for empirical reasons. Hawly and Duncan argue that the social area analysis technique of Shevky and Bell lacks a carefully formulated theoretical basis, and it is only an "...ex post facto rationalization for their choice of indexes."[2] In addition, they mention that Shevky and Bell have been unable to provide reasons for residential differentiation within the city, and census tract data are not sufficient enough to present variations in urban ecological structure. Finally, they raise the question of the amount of hetrogenity within census tracts which might have distorted the picture of social space from reality, a problem felt by geographers and others in dealing with spatial patterns of the city.

Despite these criticisms, social area analysis has been looked upon favorably by others. Tiebout suggests that many of the questions raised by Hawley and Duncan are a matter of interpretation.[3] In a review

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[1]The terms within the parantheses are Bell's; the preceding terms are Shevky's.

[2]Amos H. Hawley and Ottis Dudley Duncan, "Social Area Analysis: A Critical Appraisal," Land Economics, XXIII (November, 1957), 339.

[3]Charles M. Tiebout, "Hawley and Duncan on Social Area Analysis: A Comment," Land Economics, XXXIV (May, 1958), 182-84.

regarding the utility of social area analysis, Timms concludes:

> The general significance and utility of the social area typology can only be established by an extension of comparative studies, but it is readily apparent that the technique represents one of the most promising attempts yet available to provide a coherent and logically demonstrable frame for an analysis of urban social structure.[1]

Regarding the contribution of social area analysis, Berry states:

> ...although social area analysis began simply in a "look-see" manner, with later work facilitated by advancing computer technology, their work has now laid the bases for a spatial model of the internal socioeconomic pattern of cities in which the relevance and role of the traditional concept is clear.[2]

The three major dimensions of urban ecology revealed by social area analysis have appeared as basic components in several empirical studies. Herburt attempted to evaluate social area analysis by applying it to the British city of Newcastle.[3] After mapping the index scores, he concluded that the social area analysis was meaningful and accurately differentiated the urban structure of the city, proving to be a useful tool. Bell used factor analysis in the Los Angeles and San Francisco metropolitan areas,[4] and Tyron used cluster analysis in the San

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[1]D. Timms, "Quantitative Techniques in Urban Social Geography," in Frontiers in Geographical Teaching, ed. by R. J. Chorley and P. Haggett (London: Methuen, 1965), p. 255.

[2]Brian J. L. Berry, "Cities as Systems within Systems of Cities," Regional Development and Planning: A Reader, ed. by John Friedman and William Alonso (Cambridge: M.I.T. Press, 1964), p. 129.

[3]D. T. Herburt, "Social Area Analysis: A British Study," Urban Studies, IV (1967), 41-60.

[4]Wendell Bell, "Economic, Family and Ethnic Status: An Empirical Test," American Sociological Review, XX (February, 1955), 45-52, hereinafter cited as Bell, "Economic, Family and Ethnic Status."

Francisco area.[1] Major dimensions that they investigated in these areas using the two different techniques were consistent with the formulation of social area analysis. In factorial studies of Chicago also, the three dimensions were revealed as the first three major factors.[2]

Factorial studies, however, suggest that although the three indices of social area analysis are necessary to describe major urban ecological differentiation in most Western cities, social area analysis does not seem to be applicable universally to all cities of the world, since it is believed that the number of major dimensions of urban ecology and their type change as cultural and technological conditions vary from city to city. Moreover, social area analysis did not seem good enough to describe all socioeconomic differentiation of the city, since it did not include a large enough number of variables to represent the total socioeconomic characteristics of the population. A few examples are the studies of Van Arsdol, Camilleri and Schmid;[3]

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[1]Robert C. Tryon, Identification of Social Areas by Cluster Analysis, (Berkeley: University of California Press, 1955).

[2]See Berry and Horton, eds., Urban Systems, pp. 319-389.

[3]See Maurice V. Arsdol, Santo F. Camilleri, and Calvin F. Schmid, "The Generality of Urban Social Area Indices," American Sociological Review, XXIII (June, 1958), 277-84, hereinafter cited as Arsdol, Camilleri, and Schmid, "Urban Social Area Indices."

Anderson and Bean;[1] Murdie;[2] and Abu-Lughod.[3] Van Arsdol, Camilleri and Schmid performed factor analysis on ten large cities in various parts of the United States. Six of these cities which were predominantly white and Northern communities confirmed that Shevky's indices were valid; but three southern cities and the "border city" of Kansas city, all with relatively high proportion of non-white, did not confirm it. Anderson and Bean performed factor analysis using thirteen census tract characteristics in Toledo, Ohio. The results confirmed the general structure of the Shevky-Bell typology except that the family status appeared to be separated into two different dimensions, identified as urbanization (comprised of variables such as type of dwelling) and family status (made up of variables related to fertility). Murdie in his study of the factorial ecology of Toronto, concluded that there were six important factors for both 1951 and 1961 socioeconomic data; the first three factors, however, were the same as that of social area analysis. Abu-Lughod on the other hand in her study of Cairo, Egypt discovered with clarity only two important factors using thirteen socioeconomic variables.

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[1]Theodore R. Anderson and Lee L. Bean, "The Shevky-Bell Social Areas: Confirmation of Results and a Reinterpretation," Social Force, XL (December, 1961), 119-24, hereinafter cited as Anderson and Bean, "Shevky-Bell Social Areas."

[2]Robert A. Murdie, Factorial Ecology of Metropolitan Toronto, 1951-1961: An Essay on the Social Geography of the City (Chicago: University of Chicago, Department of Geography Research Paper No. 116, 1968), hereinafter cited as Murdie, Metropolitan Toronto.

[3]Janet L. Abu-Lughod, "Testing the Theory of Social Area Analysis: The Ecology of Cairo, Egypt," American Sociological Review, XXXIV (April, 1969), 198-212, hereinafter cited as Abu-Lughod, "The Ecology of Cairo."

What all this suggests is that the factor analytical technique has added a new dimension to social area analysis by making it possible to explain the total structure of urban ecology. Regarding the importance of factor analysis in urban studies, Rees suggests:

> ...The fact that four cities [aforementioned in the study of Arsdol, Camilleri and Schmid] did not confirm their validity [validity of social area analysis], however, suggested that the existence of the constructs should be left to be empirically determined by the patterns of the variables rather than assumed. The logical extension of this argument is that many more variables detailing the socioeconomic characteristics of census tract populations should be included in the study, and the factor analysis should be used to isolate the fundamental patterns of variation in the data, be they Shevky's and Bell's construct and patterns or nay.[1]

4. Factorial Studies

Recent studies of urban ecology have been able to use a much wider range of socioeconomic characteristics in their analyses using multivariate techniques such as factor analysis because of advancements in computer technology which are easily accessable to research scholars at most educational and research institutes in the developed countries. In most factorial studies, as many relevant variables as possible are used to isolate the major dimensions of urban ecology. If a researcher in his factor analysis is able to use a set of variables that measures all possible aspects of urban ecology, conceptually it is possible that he will be able to come up with complete enough dimensions of the

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[1]Philip H. Rees, "Concepts of Social Space: Toward an Urban Social Geography," in Urban Systems, ed. by Berry and Horton, p. 316, hereinafter cited as Rees, "Concepts of Social Space."

ecology. However, in real life, it may not be possible to have a complete set of data that measure all aspects of urban ecology, but it may be possible to obtain a large set of pertinent data from census materials, field research and other sources, which can be considered fairly adequate for factor analysis in investigating major dimensions of the ecology. One important thing to bear in mind is that the selection of relevant variables should be handled carefully, otherwise factor analysis may not provide a good result. So it depends upon the researcher to decide how he can make the best use of the factor analysis technique, since the technique is a means but not an end.

Factor analysis, a superior methodology to social area analysis as aforementioned was introduced about three decades ago regarding its applicability to regional classification problems by Hagood and her associates who suggested that factor analysis offered an appropriate method for "synthesizing data on characteristics with respect to which subregions are to be homogenous."[1] However, it was not until the late 1950's that factor analysis was used popularly especially in place of social area analysis.[2] Soon after that in the 1960's, factor analysis took a full fledged position as a useful technique for ecological studies of cities, and is increasingly gaining importance although methods for selecting variables still remain unstandardized.

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[1]Margaret Hagood, Nadia Danilevsk, and Corlin Beum, "An Examination of the Use of Factor Analysis in the Problem of Subregional Delineation," Rural Sociology, VI (September, 1941), 216, hereinafter cited as Hagod, Danilevsk, and Beum, "Use of Factor Analysis."

[2]Abu-Lughod, "The Ecology of Cairo," 201.

Presently, there exists a large number of factorial studies of cities mostly on Western cities. To name but some of the factorial studies on the cities of the United States and Canada are those of Sweetser (Boston, Massachusetts); Schmid and Tagashira (Seattle, Washington); Anderson and Bean (Toledo, Ohio); Rees (Chicago, Illinois); Bell (Los Angeles and San Francisco, California); Carey (Manhatten, New York); Arsdol, Camilleri and Schmid (a sample of ten U. S. cities including three cities from the South); Murdie (Toronto, Ontario); and Berry and Tennant (Northeastern Illinois); Salins (Indianapolis, Indiana; Buffalo, New York; Spokane, Washington; and Kansas City, Kansas); and Bourne and Barber (eight small Canadian cities).[1] Some of the factorial studies on Western cities outside the United States and Canada include those of Gittus (Hampshire, England); Robson (Sunderland, England); Pederson (Copenhagen, Denmark); Sweetser (Helsinki, Finland);

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[1]See Frank L. Sweetser, The Social Ecology of Metropolitan Boston: 1950, and The Social Ecology of Metropolitan Boston: 1960 (Boston: Massachusetts Department of Mental Health, 1960-62); Calvin F. Schmid and Kiyoshi Tagashira, "Ecological and Demographic Indices: A Methodological Analysis," Demography, I (1964), 194-211, hereinafter cited as Schmid and Tagashira, "Ecological and Demographic Indices;" Anderson and Bean, "Shevky-Bell Social Areas;" Rees, "Concepts of Social Space;" Bell, "Economic, Family and Ethnic Status;" George W. Carey, "The Regional Interpretation of Manhatten Population and Housing Patterns through Factor Analysis," Geographical Review, LVI (October, 1966), 551-69; Arsdol, Camilleri and Schmid, "Urban Social Area Indices;" Murdie, Metropolitan Toronto; Brian J. L. Berry and Robert J. Tennant, Commercial Structure (Chicago: Northeastern Illinois Planning Commission, 1965); P. D. Salins, "Household Location Patterns in American Metropolitan Areas," Economic Geography, XLVII, Supplement (June, 1971), 234-48; and L. S. Bourne and G. M. Barber, "Ecological Patterns of Small Urban Centers in Canada," Economic Geography, XLVII, Supplement (June, 1971), 258-65, hereinafter cited as Bourne and Barber, "Small Urban Centers in Canada."

and Janson (twelve Swedish cities).[1] Only few factorial studies are known to the author on non-Western cities: Abu-Lughod (Cairo, Egypt); Berry and Rees (Calcutta, India); Berry and Spodek (six large Indian cities); Pitts (Seoul and Taegu, Korea); Morris and Pyle (Rio de Janeiro, Brazil); and Gradus (Haifa, Isreal).[2]

B. Statement of the Problem

Important conclusions that can be derived from the findings of the previously mentioned factorial studies are as follows:

(A) In all the factorial studies, the investigators using the factor analysis technique were able to derive a few major dimensions of

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[1]See Elizabeth Gittus, "The Structure of Urban Areas," Town Planning Review, XXXV (April, 1964), 5-20; Robson, Urban Analysis; Poul Ove Pederson, "An Empirical Model of Urban Population Structure: A Factorial Analytical Study of the Population Structure in Copenhagen," Proceedings of the First Scandinavian-Polish Regional Science Seminar (Warszawa: Polish Scientific Publishers, 1967); Frank L. Sweetser, "Factorial Ecology: Helsinki, 1960" Demography, II (1965), 372-85; idem, "Factor Structure as Ecological Structure in Helisinki and Boston," Acta Sociologica, VIII, No. 4 (1965), 205-25; and Carl-Gunnar Janson, "A Preliminary Report on Swedish Urban Spatial Structure," Economic Geography, XLVII, Supplement (June, 1971), 249-57.

[2]See Abu-Lughod, "The Ecology of Cairo," 198-212; Berry and Rees, "The Factorial Ecology of Calcutta," 445-91; B.J.L. Berry and H. Spodek, "Comparative Ecologies of Large Indian Cities," Economic Geography, XLVII, Supplement (June, 1971), 266-85, hereinafter cited as Berry and Spodek, "Large Indian Cities;" F. Pitts, "Factorial Ecology of Seoul and Taegu, Korea," Economic Geography, XLVII, Supplement (June, 1971), 300-03; F.B. Morris and G.F. Pyle, "The Social Environment of Rio de Janeiro in 1960," Economic Geography, XLVII, Supplement (June, 1971), 286-99; and Y. Gradus, "The Spatial Urban Ecology of Metropolitan Haifa, Isreal: A Factorial Approach" (Unpublished Ph.D. dissertation, University of Pittsburgh, 1971).

urban ecology from a large number variables, and it was possible to explain meaningful relationships among variables in each dimension.

(B) Economic status, family status and ethnic status or related aspects[1] appeared as major dimensions in most factorial studies of Western cities as well as non-Western cities.

(C) Socioeconomic status and family status were revealed as major factors more or less in all cities--Western as well as non-Western. However, there seemed to be deviations in factors other than these two factors for both the non-Western cities and several Western cities including even some U. S. cities. These deviations generally occured in cities of relatively low economic condition. In the study of Van Arsdol et al, on a sample of ten cities, it was found that ethnic status did not appear in four cities including interestingly three cities of the South and the "border city" of Kansas City[2] that had relatively a high proportion of non-white population, an aspect generally related with unfavorable economic situations. In this case, ethnic status was probably associated with socioeconomic status. In fact, the authors suggested an alternate factor model for these four cities in which occupation, education, and fertility were viewed as components of social rank (socioeconomic status), a hypothesis which, when tested, yielded a neater and virtually "orthogonal factor solution." Sweetser attempted to isolate the ethnic status dimension in his study

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[1]See supra, p. 16 for other terms used to indicate similar dimensions.

[2]See Arsdol, Camilleri, and Schmid, "Urban Social Area Indices," 277-84.

of Helsinki by using the Swedish speaking minority group and the Finnish speaking majority group, and Abu-Lughod studied Cairo with a similar approach using religious and nationality variables, but the ethnic status factor was not extracted in either case. In both of the cases ethnic variables loaded mainly on the socioeconomic status factor. In a similar context on their study of Calcutta, Berry and Rees remark:

> As the transitional process [from preindustrial to industrial] continues, however, one might reasonably expect the socioeconomic and ethnic bases of differentiation to separate. The expectation is, therefore, that differing urban ecologies related to differing factor combination can be arranged along a scale of urban development from pre-to post industrial forms, but testing of this notion awaits systematic comparative ecological analysis.[1]

(D) Moreover, there was no consistency in additional major factors, other than socioeconomic status and family status, regarding their nature or type. In other words, the type of additional factors differed from city to city in several ways. Some of these varied additional major factors were: new suburbs, distance density and housing vacancies in Berry and Tennant's study on Northeastern Illinois; maleness, residential stability in Schmid and Tagashira's study on Seattle; factors relating to various types of land use in Berry and Rees' study on Calcutta; population size and density, housing built in '40's-workers comute by car, mobility and quite a few factors relating ethnic aspects in Rees' study on Chicago; and social disorganization in Abu-Laghod's study on Cairo (see supra, pp. 24-25 for references on

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[1]Berry and Rees, "The Factorial Ecology of Calcutta," 491.

these studies). In connection to these varied additional factors, Abu-Lughod states:

> ...The appearance of these additional factors is due clearly to the initial "mix" of variables and to cultural differences too complex to be synthesized or explained on the basis of diverse studies undertaken without a common framework of analysis...The deviations are scattered and inconsistent.[1]

Based on findings of varied factor structures, Berry and Rees have generalized several alternative factor structures representing a permutation of the three basic set of variables--socioeconomic set; stage in life cycle or family status set; and minority group set (see Table 2-1). For example, in Table 2-1, "combination 2" indicates the association of the socioeconomic status and family status with factor 1 and factor 2 represents the minority group.

(E) Socioeconomic status dimensions or related aspects are found to be associated with the idea of sectoral patterns in most Western cities whereas they are associated more or less with the idea of concentric patterns in large Indian cities. Other two basic dimensions--family status and ethnic status, however, have revealed a tendency of concentric patterns and clustered patterns respectively in both Western and non-Western cities.

(F) One technical problem is that many of these factorial studies may not have captured all major dimensions of urban ecology for their respective cities, and they may not be perfectly comparable because of the fact that there was not a standardized methodology for variable selection; and a variety of additional factors may have

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[1]Abu-Laghod, "The Ecology of Cairo," 203.

TABLE 2-1

ALTERNATIVE FACTOR STRUCTURES REPRESENTING PERMUTATIONS OF THE THREE BASIC SETS OF VARIABLES (SOCIOECONOMIC STATUS, STAGE IN LIFE CYCLE OR FAMILY STATUS, AND MINORITY GROUP)

Variable Set	Correspondence (Highest Loadings of Variables on Factors)	Factor
Combination 1 (Shevky-Bell)		
Socioeconomic status	→	1
Family status	→	2
Minority group	→	3
Combination 2 (Abu-Laghod, "The Factorial Ecology of Cairo"		
Socioeconomic status	→	1
Family status		
Minority group	→	2
Combination 3 (American South, Montreal, Helsinki)		
Socioeconomic status	→	1
Family status	→	2
Minority group		
Combination 4 (Miami)		
Socioeconomic status	→	1
Family status	→	2
Minority group		
Combination 5 (Unidimensionality--Erewhon?)		
Socioeconomic status	→	1
Family status		
Minority group		
Combination 6 (Chicago)		
Socioeconomic status	→	1
Family status	→	2
Minority group	→	3
Combination 7 (Anderson and Bean, Toledo)		
Socioeconomic status	→	1 Family
	→	2 status
Family status		
	→	3 Urbanization
Minority group	→	4

Source: Berry and Rees," The Factorial Ecology of Calcutta," 468-69.

appeared not only because of cultural and technological differences but also due to different mix of variables. It is often possible that number of factors become smaller if the number of variables is smaller and vice versa. For example, Schmid and Tagashira in their study of Seattle came up with five interpretable factors from an original matrix of forty two variables. They reduced number of variables at each succeeding stage of factor analysis eliminating those variables which were not interpretable or showed "mixed" loadings. Even by reducing the number of variables with such a careful and objective basis, two dimensions (factors) did not appear in their final analysis in which variables were reduced to ten.[1] In many instances, whatever variables were easily available were used as variables in factorial studies of cities. Nevertheless, these factorial studies provide a basic framework especially with respect to the two or three basic dimensions, and their spatial patterns mentioned before, in which hypotheses can be framed and tested for various types of cities of the world towards a testing of these existing notions of urban ecology and formulation of a theory of the ecology.

These backgrounds provide a framework within which this factorial study of Kathmandu is developed. The major questions to be answered in this socioeconomic ecological study of Kathmandu are: Can the three basic dimensions of "social area analysis" (socioeconomic status, family status and ethnic status) or related aspects of these dimensions, that are found in most factorial studies of cities, be

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[1]See Schmid and Tagashira, "Ecological and Demographic Indices," 194-211.

derived as the basic dimensions of the socioeconomic ecology of Kathmandu? If these three basic dimensions exist in the socioeconomic ecology of Kathmandu, are there also other major factors? If the three basic dimensions exist in the socioeconomic ecology of Kathmandu, are their spatial patterns similar to their counterparts of American cities (tendency of sectoral patterns of the socioeconomic status dimension, concentric patterns of the family status dimension, and clustered, polynucleated patterns of the ethnic status dimension)? Beside these three dimensions, what are other basic socioeconomic dimensions of Kathmandu?

C. Hypotheses

1. Four Basic Dimensions

Factorial studies of Western cities, Third World cities and large Indian cities give some insights of factor structure of various types of cities. These studies provide a basis for hypothesizing the factor structure of Kathmandu, although these cities including even large Indian cities are different from Kathmandu in terms of social differentiation, intermixture of occupation, mode of urban technology and contrasting perception of the amenities of sites within the city area.

One common aspect of cities is the multidimensional structure of the socioeconomic ecology usually represented by several factors. The multidimensional structure of Western cities is the result of industrialization and "post-industrial development" which have worked as "pool" factors in attracting people of various socioeconomic backgrounds in the city. Kathmandu also has attracted various types of

people into the city area making its socioeconomic structure multidimensional. This has come about primarily through its role as the primate city and capital of the country with involvement in the international world, and under the impact of foreign aid. Therefore, it is hypothesized that the multidimensional socioeconomic structure of Kathmandu can be viewed in terms of at least four basic socioeconomic dimensions[1] represented by four basic factors via factor analysis.[2] These hypothesized dimensions are discussed below.

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[1]The basic three dimensions of "social area analysis" or related aspects have generally been revealed as important dimensions in factorial studies of both American and Indian cities. This provides a basis to believe that these three dimensions are basic dimensions in the multidimensional ecological complex of most cities and can be derived in the socioeconomic ecological study of Kathmandu as well. The author's familiarity with Kathmandu also supports this notion that these three dimensions or their related aspects exist as basic dimensions in the city's socioeconomic ecology. Therefore, basic characteristics of these three dimensions have been included in describing the first three fundamental socioeconomic dimensions of Kathmandu.

[2]Generally, factor analysis is not considered to be a hypothesis-testing procedure although it has been justified as a technique of hypothesis generation in the absence of a strong body of theory. However, it also seems reasonable to say that a factor structure (descriptive dimensions) can be hypothesized before performing a factor analysis if one has a good understanding of the area he is dealing with. In this research the descriptive dimensions are hypothesized on the following basis: (a) author's familiarity with the study area; and (b) comparative insights of factor structure from a large number of factorial studies of cities, which could be considered basic observations for forming a body of theory. For a discussion on the applicability of factor analysis in hypothesis-testing, see Rees, "Factorial Ecology," 22; R.J. Rummel, Applied Factor Analysis (Evanston, Illinois: Northwestern University Press, 1970), p. 13; and D.N. Lawly and A.E. Maxwell, Factor Analysis as a Statistical Method (London: Butterworth and Co. Ltd., 1963), cited by L.J. King, Statistical Analysis in Geography (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1969), p. 185, hereinafter cited as Lawly and Maxwell, Factor Analysis.

a. Ethnic-immobility Status Dimension. The Newars and the Parbates[1] are the two major ethnic groups of Kathmandu with different characteristics in their spatial distribution patterns and socioeconomic characteristics. The Newars are the dominant ethnic group of Kathmandu followed by the Parbates. The former consists of about 60 per cent of the total population of Kathmandu and are primarily concentrated in the old part of the Kathmandu city. The Parbates consist of about 35 per cent of the total population of Kathmandu and are mainly distributed outside the old part of the city. The Newars are characterized by a small degree of mobility as compared with the Parbates.

Therefore, it is hypothesized that the ethnic-immobility dimension is one of the most fundamental dimensions of the socioeconomic structure of Kathmandu, and is characterized by a centralized pattern. This hypothesized dimension is different from most ethnic status dimensions in the sense that it is not distributed in a polynucleated pattern, and its immobility aspect is very important. Beside the ethnic characteristics, number of years household heads lived in presently occupied houses, number of years household heads lived in Kathmandu, population density, and distance of dwelling units from the center of the central business district are other hypothesized variables related to this dimension.

b. Socioeconomic Status Dimension. Socioeconomic status of people in Kathmandu is not related with ethnic aspects or mobility

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[1]The Newars are the native people of Kathmandu and the Parbates are those who have come to Kathmandu from hilly areas of Nepal. See infra, Chapter III, pp. 61-69 for further details on these two groups of people.

aspects. For example, poor and illiterate people can be found in both groups--the Newari group and the Parbate group. Likewise, rich and educated people can be found in both of these groups. Moreover, because of the universal important role of socioeconomic status in urban ecology, it is reasonable to believe that the socioeconomic status dimension is another important dimension of the socioeconomic ecology of Kathmandu. Rich and educated people live in the central part of Kathmandu rather than in fringe areas substantiating Sjoberg's ideas of the preindustrial city.[1]

Therefore, it is hypothesized that the socioeconomic status dimension is another fundamental dimension of the socioeconomic ecology of Kathmandu, and varies with distance from the central business district in contrast to the sectoral variation of similar dimensions of American cities. Economic characteristics such as rent of occupied dwelling units, value of the house and land, number of rooms per person, housing condition, and gross annual income of the family; means of transportation to work such as cycle, bus and automobile; household items such as radio and transistor; and educational characteristics are some hypothesized variables associated with this dimension.

c. Family Status Dimension. The growth pattern of Kathmandu is similar to the growth pattern of most other cities of the world in the sense that the city grows outward successively from its core or point of origin. This growth pattern of Kathmandu is greatly associated with the age structure since the old section of Kathmandu is occupied by relatively a high percentage of elderly household heads, whereas

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[1]See Sjoberg, The Preindustrial City, pp. 95-103.

areas outside the old section of Kathmandu are occupied by relatively a high percentage of recently moved new, young household heads.

Therefore, it is hypothesized that another basic ecological dimension of Kathmandu is the family status or stage in life cycle dimension, which varies with distance from the central business district in conformance with the concentric interpretation of urban structure.

d. Employment Status Dimension. One very important aspect of the socioeconomic ecology of Kathmandu is its employment characteristics. As many as 48 per cent of the total household heads of Kathmandu are self-employed including businessmen and farmers, and about the same percentage of the total household heads are employed as salary workers (28 per cent in government positions and 19 per cent in private positions). The old part of Kathmandu contains relatively a high percentage of self-employed household heads, whereas areas outside the old section of the city consist of relatively a high percentage of household heads employed as salary workers.

Therefore, it is hypothesized that employment status also is an important dimension of the socioeconomic ecology of Kathmandu, which varies with distance from the central business district in conformance with the concentric interpretation of urban structure.

III. AN INTRODUCTION TO KATHMANDU

A. Introductory Remarks

1. Focal Point of the Nation

Kathmandu, the capital city of Nepal with a population of 150,000 (1971 census figure), is the largest urban nucleus and the nerve center of the country. In 1961, the city with a population of 121,000 which was greater than the combined total of the three other largest urban places of the country, accounted for about 44 per cent of the total population of Nepal's urban centers with over 10,000 population.[1] The city consists of concentrations of national, zonal, district and local government offices as well as offices of foreign and international organizations. It encompasses a broad variety of institutions and services and acts as the nation's prominent center of culture, finance, business and commerce. Its rich cultural legacies such as arts, temples, shrines and festivals act as great attractions for tourism. In sum, the position of Kathmandu in the national setting is so dominant that people from other parts of the country refer to it as "Nepal." Kirkpatrick who in 1792 was one of the first persons from Western world to visit Kathmandu and write about it, also has referred the Kathmandu Valley as "the Valley of Neaupal /Nepal/."[2] Above all, Kathmandu is the first

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[1] Census of population in Nepal was conducted in 1971, but population data on all urban areas were not available at the time of this writing. Therefore, 1961 data were used. In 1961, there were only seven urban places in Nepal with over 10,000 population; three of them were in the Kathmandu Valley--Kathmandu, Patan and Bhadgaon.

[2] See W. Kirkpatrick, An Account of the Kingdom of Nepaul, Being the Substance of Observations Made during a Mission to that Country in the Year 1793 (New Delhi: Manjusri Publishing House, 1811), pp. 147-65.

modern city of Nepal. In this context Joshi and Rose state:

> It became the first modern city in Nepal--and for a long time was the only city with electricity, telephones, automobiles, radios, and other appurtenances, few though these might be, of the twentieth century. Even in Kathmandu, exposure to the modern world is a recent phenomenon. The first high school and hospital were established only in the last decade of the nineteenth century. The first college was opened in 1918, and the first university in 1960. Electricity was introduced in 1904. The first modern highway linking Kathmandu with the outside world was completed in 1956.[1]

2. Locational Setting

The city of Kathmandu located at 27°49' North latitude and 85°21' East longitude is situated near the center of the country (Figure 3-1). It lies at an elevation of about 4,400 feet above sea level in the western section of the bowel shaped Kathmandu Valley. The Valley is encircled by steeply rising hills that reach up to heights of about 8,000 feet. Behind the hills to the north and east of the Valley rise the towering great Himalayas with some of the highest peaks of the world including Mt. Everest. The city is neighbored by other two notable cities of the Valley--Patan with a population of 59,000 (1971 census population) lying 3 miles south of it, and Bhadgaon (Bhaktapur) with a population of 40,000 (1971 census population) which is located about 9 miles east of it.

The city of Kathmandu is bounded by the Bagmati River in the south, by the Bishnumati River in the west and by the Dhobi Khola (brook) in the east. The Bagmati River to the east of the city area

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[1] B.L. Joshi and L.E. Rose, Democratic Innovations in Nepal: A Case Study of Political Acculturation (Berkely: University of California Press, 1966), p. 18. herinafter cited as Joshi and Rose, Democratic Innovation in Nepal.

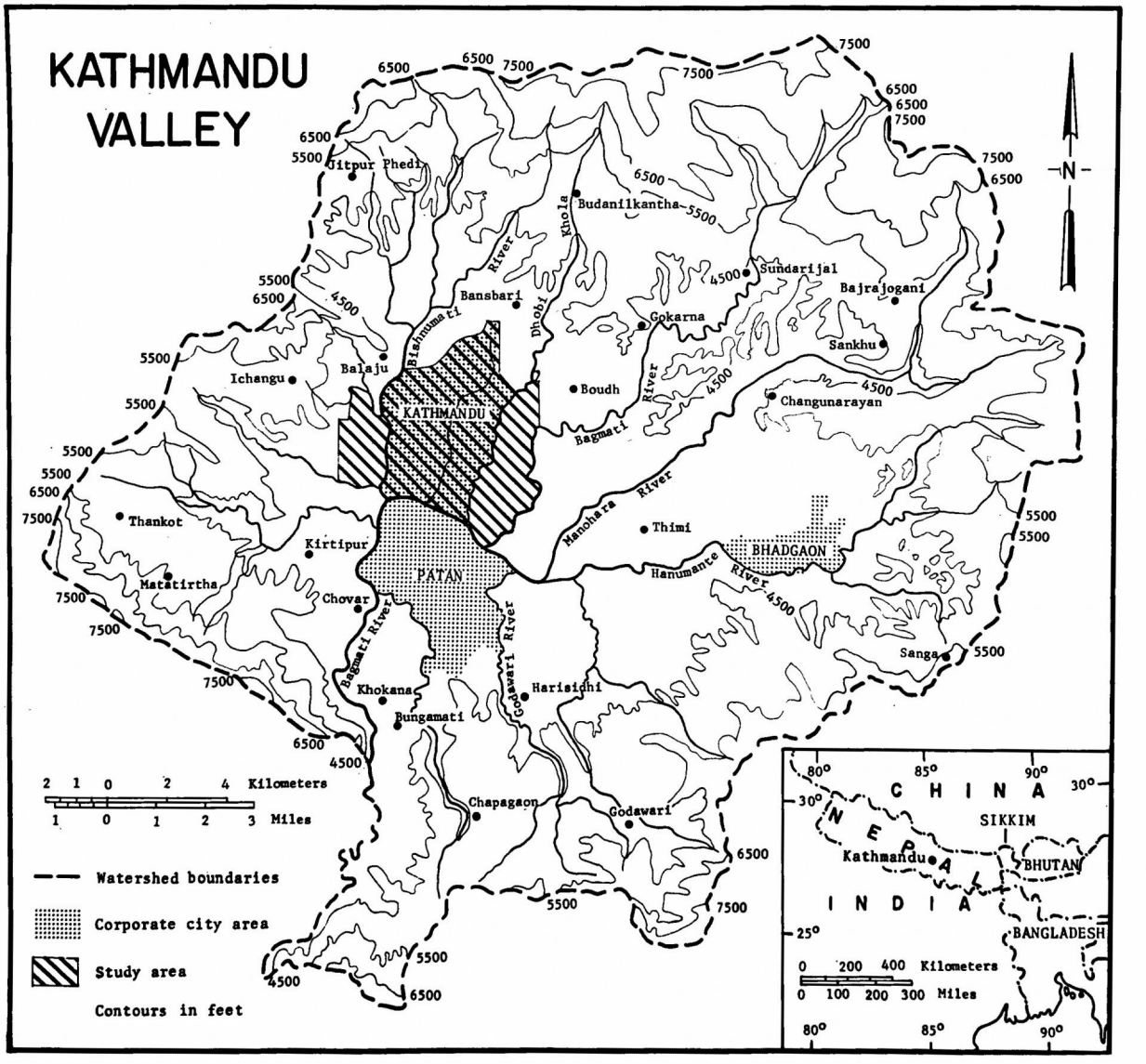

Figure 3-1. Location of the study area. Base map source: Department of Housing and Physical Planning, The Physical Development Plan for the Kathmandu Valley (Kathmandu: Department of Housing and Physical Planning, His Majesty's Government of Nepal, 1967).

flows from north to south and then makes almost a right angle bend to the west meeting almost at right angles its major tributaries that flow from north to south almost parallel to one another in the city area (Figures 3-1 and 3-2). Between the streams are flat uplands with heights of about 100 feet above the streams. These uplands are mainly under settlement whereas lowlands along the streams are mainly used for agriculture although the latter are being encroached by urban development every day.

B. Origin and Development

1. Origin and Early Development

Fertile soils of the Kathmandu Valley for agriculture, strategic location as a trade center between India and Tibet, and natural protection against any outside invasion, combined together were preconditions for Kathmandu to develop into an urban settlement at an early period. The rich soils of the Valley with favorable climatic conditions and water supply, and improved agricultureal techniques supplied surplus food for city dwellers who in turn devoted their time towards the development of political system, religions, literature, arts and crafts. The cross road location for its trade between Tibet and India might have played even more important role than the fertility of soils in the historic past to foster an urban way of life in Kathmandu as it is evident from Kautilya's (chronicler of the fourth century B.C.) writings that the early economy of Kathmandu was based more upon trade and

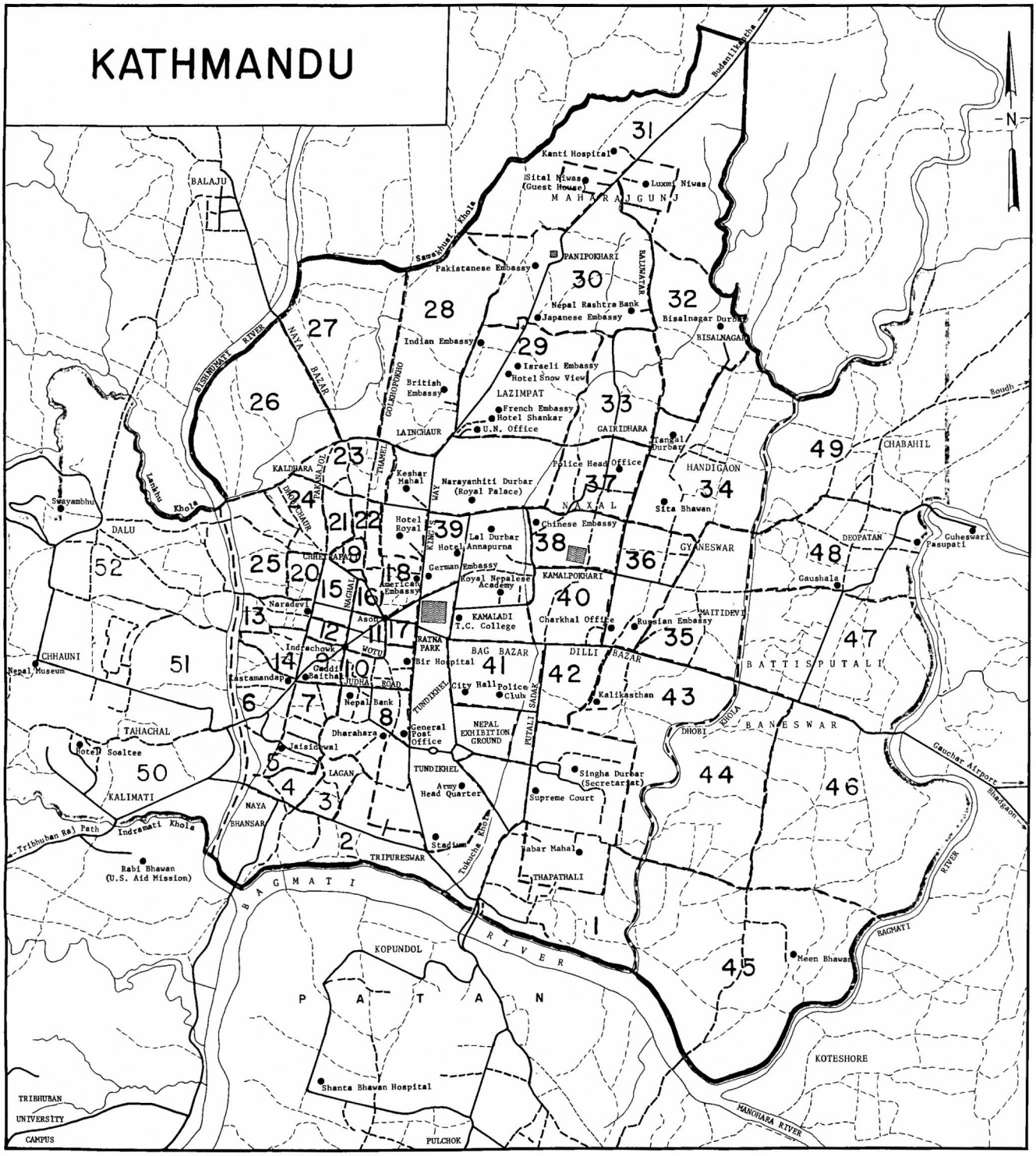

Figure 3-2. General reference map of Kathmandu.

commerce than on agriculture.[1] The malarial jungle of the Terai and the high ranges of the Mahabharat Lekh in the south, and the almost impassable high Himalayas in the north, protected the Kathmandu Valley from being invaded from outside; this physical setting helped develop the urban culture of Kathmandu without any outside obstructions. Consequently, from the earliest time (long before the birth of Christ), its arts and architecture were so developed that they were introduced to India, Tibet and even China.[2] For example, the pagoda style architecture is said to be an exclusively Nepalese contribution to architecture. Kazami mentions that it was a Newar of the Kathmandu Valley, who built the famous white Pagoda in far-away Peking.[3]

The early history of the Kathmandu Valley is shrouded in the mists of antiquity; only legends and myths throw some lights on its past. From geological evidences as well as mythological tales, it is apparent that the Valley was once occupied by a circular lake. A legend says that Manjushree who is believed to be a Chinese piligrim to the Valley, drained the water of the lake by cutting the ridge at the Katwaldaha gorge (near Chovar), and then established a town halfway between the Swayambhu hill and Guheswari, to which were added two other

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[1] Department of Housing and Physical Planning, The Physical Development Plan for the Kathmandu Valley (Kathmandu: Department of Housing and Physical Planning, His Majesty's Government of Nepal, 1967), p. 42, hereinafter cited as Department of Housing and Physical Planning, Kathmandu Valley.

[2] Ibid., p. 48.

[3] T. Kazami, The Himalayas: A Journey to Nepal (Palo Alto, California: Kodansha International, 1968), p. 24.

towns at later dates.[1] These three towns together were called Bishalnagar (it literally means large town), which stretched from Budanilkantha in the north to Katwaldaha in the south. "Although no one as yet has found any archeological evidence, it is thought that at a later time the large town /Bisalnagar/ was split into different parts due to a series of calamities, and these parts incorporated into the scattered settlements of the Valley."[2]

Although definite dates of early settlements in the Kathmandu Valley have not been determined yet, it is believed that early settlements in the Valley were established between the tenth and the seventh centuries B.C. The Swayambhu stupa, a notable Buddhist temple which was originally built by disciples of Manjushree probably in the beginning of the settlement history of the Valley[3] stands even today on a hillock to the west of the city of Kathmandu as the Valley's oldest cultural landmark. Historians agree that by the time of Gautam Buddha's birth in 563 B.C., the Valley was well populated.[4] Among existing settlements at present, Deopatan and Chabahil which are believed to have been established by King Devapal and his wife Charumati, daughter of Emperor Asoka of India during late in the second century, are regarded as the earliest settlements of Kathmandu. At a later

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[1] Department of Housing and Physical Planning, Kathmandu Valley, p. 42.

[2] Ibid., pp. 42-43.

[3] N.B. Thapa, A Short History of Nepal (Kathmandu: Ratna Pustak Bhandar, n.d.), p. 5.

[4] P.P. Karan, Nepal: A Cultural and Physical Geography (Lexington, Kentucky: University of Kentucky Press, 1960), p. 4.

period, settlements were established in the present city core of Kathmandu on the upland between the Bagmati and Bishnumati Rivers to the northeast of their confluence.

For a long period of time in the past, the Kathmandu Valley itself signified as the entire kingdom of Nepal although actual political boundaries extended beyond it. The Valley was governed by kings of various dynasties. Often the Valley itself was divided into small kingdoms, each being restricted to a city. For example, at the end of the Malla period (thirteenth century to 1768), the Valley was divided into four small kingdoms--Kathmandu, Patan, Bhaktapur and Kirtipur. The rest of the country also was divided into numerious small principalities. It was only after the Gorkha conquest of the Kathmandu Valley in 1768 that Kathmandu became the capital of one unified entire Nepal.[1]

2. Development of the Present Urban Landscape

Rulers of the Kathmandu Valley belonging to different dynasties during different historic periods and their fellow inmigrants have

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[1] Gorkha was one of the numerous small principalities, located about 40 miles west of Kathmandu and it was the Gorkha King Prithibi Narayan Shaha, the ancestor of the present King of Nepal, who laid the foundation of the united kingdom of Nepal by conquering small principalities and uniting them into his Gorkha kingdom. His top priority was to take over the principalities of the Kathmandu Valley as the first step towards the unification. His victory over the Valley was a great asset for annexation of other principalities into the kingdom of Nepal. But it was left to his successors to fulfil his dream of a great united Nepal since he died within few years after the conquest of the Valley. By 1795, the territory of Nepal was extended from Kashmir in the west to Bhutan in the east, from Tibet in the north to India in the south. However, after few years of this expansion, the country was reduced to its present size in 1816 as a result of Nepal's war with British India.

played a great role in various ways in shaping the urban complex of Kathmandu. The outgrowth, however, of the present urban landscape of Kathmandu is primarily a result of the interplay of the last three important historic periods: (a) the Malla period (thirteenth century to 1768), (b) the Shaha-Rana period (1768-1950), and the modern period (after 1950). Morphological patterns of Kathmandu that developed during these periods are distinct from one another. Like any other city, the city core of Kathmandu was developed first, and its outer parts were developed at later periods, although the latter contain a few clusters of old settlements such as Deopatan, Chabahil and Handigaon. On the basis of this successive development of settlements, the present landscape of Kathmandu can be divided into three morphological sections: (a) the inner city or city core or old city, (b) the outer city, and (c) the city fringe or fringe areas (Figure 3-3).[1]

a. The Inner City. The inner city section extends from the Bishnumati River in the west to the Tundikhel (parade ground) in the east, and from Chhetrapati in the north to the Tripureswar-Naya Bhansar road in the south.

The inner city stands out with the highest population density in Kathmandu. It is three-fourth of a square mile in area which is only 8 per cent of the total area of Kathmandu, but it houses 50 per cent of the 172,000 population of the latter, thereby making the gross population density as high as 200 persons per acre. The net density (density for groww area less circulation area) for some blocks in the inner city has

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[1] Hereinafter, the given terms for each of the morphological sections are used interchangably to refer to the respective section of Kathmandu.

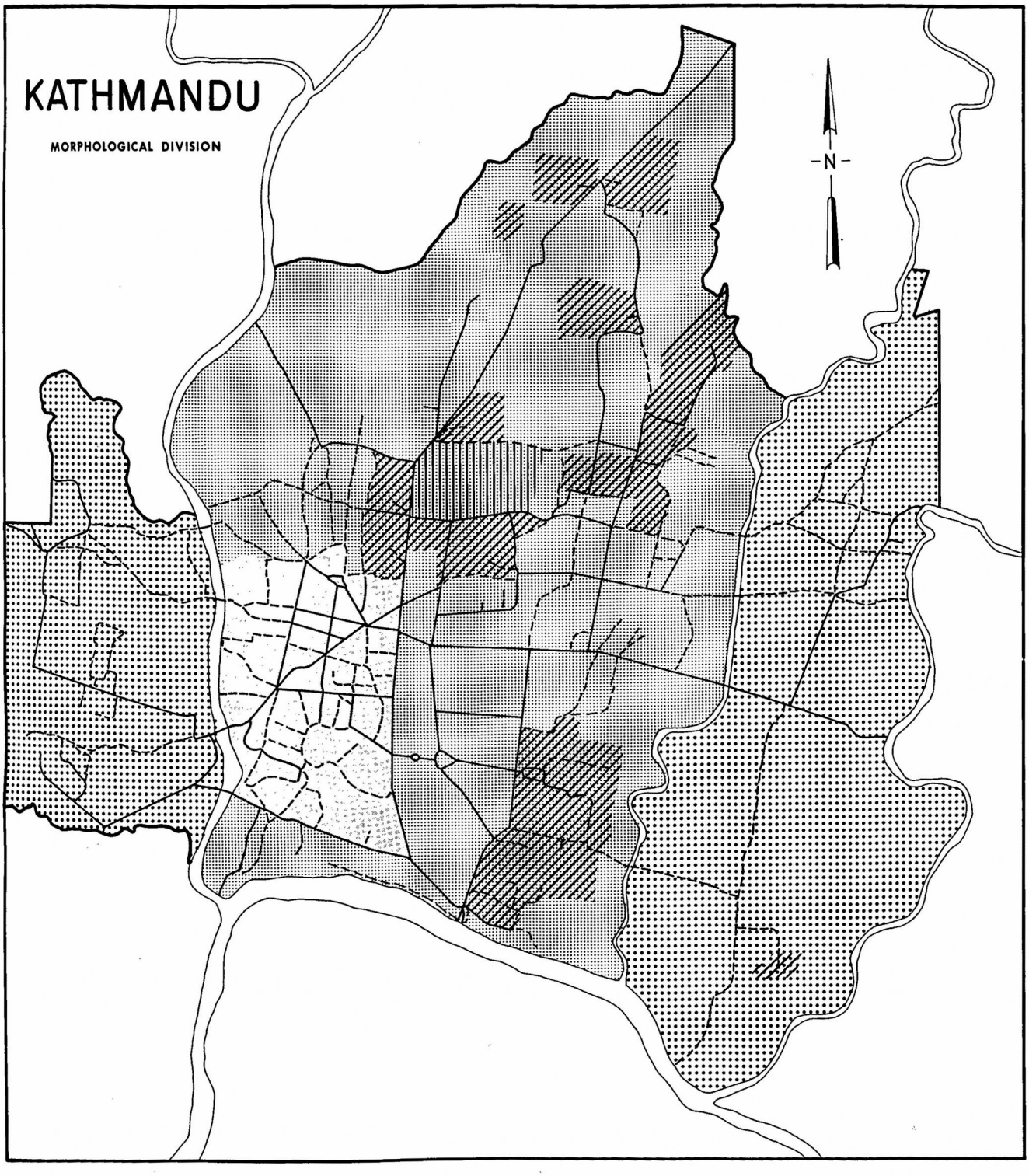

Figure 3-3. Morphological divisions of Kathmandu.

reached up to 300 persons per acre.[1] It should be noted that these densities in the inner city of Kathmandu are relatively high in the absence of high rise construction (houses in Kathmandu rarely exceed five stories) even as compared with large Indian cities. For example, Calcutta which is one of the largest cities of India with a population of 3,000,000 (1968 estimate), and one of the most crowded cities of the world, had a gross population density of 150 persons per acre in 1968.

The street network in general is arranged in rectangular patterns with a few diagonally intersecting roads, thus reducing traveling time between points, and creating some important nodes such as that of Ason, Indrachowk, Chhetrapati, and Kastamandap, where as many as six streets meet (Figure 3-2). Temples, shrines and shops are generally located around squares of these nodes and other converging points of streets. These nodal squares provide open spaces for religious and other cultural activities, and are important shopping centers as well. Although shops are distributed throughout the inner city along almost all streets, the dominating district of business extends along the Judha Road and the throughfare that runs northeast from one end to another of the inner city via Ason and Indrachowk.

The prominent compact settlement pattern consisting of almost entirely of the Newars (the native people of the Kathmandu Valley), and the arrangement of street networks in this section of Kathmandu, that exist today were developed during the Malla period before the middle of the eighteenth century. Since then there has not been any significant change in its major morphological arrangement except the widening of the

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[1] Department of Housing and Physical Planning, Kathmandu Valley, p. 72.

Judha Road after the 1934 earthquake of Nepal, and the establishment of businesses and construction of new houses along the Road.

The inner city acts as a museum of Nepalese history, culture and arts. Here the unique architecture of the palace and temple structures dominate both physically and symbolically. These temple and the old palace serve as fine examples of the skill of the city's artisans and the Nepalese architecture. The name of Kathmandu itself was derived from a building called Kastamandap,[1] which lies to the southwest of the Gaddi Baithak, the old palace (Figure 3-2). The old palace still has retained its importance as a palace of various state and religious functions and ceremonies despite the transfer of most of the royal functions to the new palace of Narayanhiti, and administrative functions to several dispersed buildings in Kathmandu.

The Kathmandu city was restricted to the inner city before the Gorkha conquest of the Kathmandu Valley in 1768. The spatial distribution of social classes of the inner city as described below for this

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[1]The Kathmandu name was derived after a corrupted form of Kastamandap (it literally means wooden square house), the name of a wooden building. The Kastamandap building is also called as Maru Sattal, again a corrupted form of Mul Sattal (it means rest house). This building was built during the reign of King Laxmi Narasingh Malla in 1610's with pagoda architecture and square base, and still stands majestically near the old palace. According to a legend, it is believed that the Kastamandap building was built out of a single sal tree (Shorea robusta) gifted by Kalpabrikshya, a heavenly tree. See D.B. Shrestha and C.B. Singh, Picturesque Kathmandu (Kathmandu: H.M.G. Press, 1969), pp. 1-2. Originally, the name of Kathmandu or Kastamandap was restricted only to the old palace or Kastamandap area; even at present, the restricted usage is often in practice among people of the city core. Before the town was named Kastamandap or Kathmandu, it was called Kantipur, the name given by King Gunakama Deva in the 10th century A.D. It has retained the Kantipur name also but with less popularity in its usage. Kathmandu is also called Yendaise by the Newars of the Kathmandu Valley.

period (the Malla period) seems to be a quite good fit to the Sjoberg model of preindustrial cities.[1]

> Residences close to the centre were generally the most prestigious and favoured their residents with ready access to the centre of government, religious and economic activities. Furthest from the centre often, at least symbolically detached from the city were the lowest classes and out-castes. Imposed throughout this distribution were additional sub-divisions called toles--often delineating or reflecting specific ethnic, class or occupational groups within the society.[2]

This spatial arrangement in the inner city can still be seen although new changes are slowly taking place to disrupt this classical setting under Kathmandu's move on modernization.

b. The Outer City. The outer city encircles the inner city in all directions except in the west, and consists of all the areas of the Kathmandu city outside the inner city. It was developed mostly during and after the Rana period (1847-1951). Since the inner city was already crowded, the only choice left to the new ruling families of the Ranas and new immigrants, was to occupy lands outside the inner city. The Ranas, for their large palace compounds, acquired considerable lands of the outer city lying mainly east of it (Figure 3-3). The development of numerous palaces in the outer city led to the subsequent growth of housing for palace employees around these palace compounds. These palace developments established a road system linking these palaces with one another and the city core. Thus, the outer city became the site for most of the recent development in the east and northeast of the city core. Settlements also grew along transportation lines but their

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[1] See Sjoberg, The preindustrial City, pp. 95-106.

[2] Department of Housing and Physical Planning, Kathmandu Valley, p. 72.

continuity was impeded by the presence of palace compounds. After the end of the Rana period in 1951, the movement of new inmigrants in the outer city has greatly increased as a result of the emergence of Kathmandu into a new phase of socioeconomic development and political change.[1] According to the sampling survey for this research, as much as 34 per cent of the total occupied dwelling units of the outer city were built during 1951-70.

The economic power and influence of most of the Rana families have waned since their ouster from political power; so has been the physical condition of their palace compounds. Many of the large palaces have been vacated by the Ranas and now are occupied by others for different uses such as for government offices, hotels and hospitals. Many of these palaces including their compounds are under the control of the Government of Nepal, and some palace compounds are in the process of division for small bungalow type houses.

Although small shops are scattered along principal streets, outstanding characteristics of the outer city are that it is the high quality residential area; it consists of several magnificent palaces including the Narayanhiti Royal Palace, and Singh Durbar, the residence of the Rana Maharajas (prime ministers) which is now the secretariat of the Nepal Government; it contains almost all the residences and chanceries of foreign diplomates; and it houses most of the government office buildings and a large number of social service buildings. Despite these functional importance, the outer city has experienced

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[1] For further discussion on the Kathmandu's role in the modernization of the country, see infra, pp. 54-56; and T.R. Joshi, "Urban Transportation Problems with Reference to Kathmandu," Journal of Nepal Engineers' Association, II (February, 1970), pp. 30-31.

haphazard and aimless development of housing. In this context, it is stated:

> New houses are mushrooming haphazardly. Buying land and constructing house seem to be the main interest of most of the people who can afford to do it. Although they would like to have an easy access to their houses, it is not possible without the implementation of a sound urban development planning, zoning law and other land regulation policy by the Government. Many of the newly built houses are facing the problem of poor accessibility which is correlated with other urban services. Their access is through winding narrow lanes. On one hand, this has made the transportation inconvenient and on the other hand, it has increased the distance between origin and destination of travel costing more money and time for the trip.[1]

c. The City Fringe. The city fringe of Kathmandu lies outside the boundary of the corporate city of Kathmandu, and is characterized by a few places of old settlements such as Deopatan-Pasupati and Chabahil; linear patterns of settlements developed during and before the Rana period along principal roads leading to religious centers and other places; and recent phenomenal housing development from the sprawling of the Kathmandu city. Here lie the two famous temples of Nepal--the Swayambhu temple and the Pasupati temple located at the western and eastern margins of Kathmandu respectively. Some years ago the fringe areas were so rural in their characteristic that they were not a desirable place to live for city people. But this rural characteristic of these fringe areas is not true any more. Now these areas are served with regular bus services, and the paving of old roads, and construction of new roads are already in progress. The extensive agricultural areas of Baneswar, Battisputali, Deopatan and Chabahil lying east of the Kathmandu city, and the Kalimati and Tahachal areas lying west of the

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[1] Ibid., 30-31.

city are in the process of being covered by new houses. The Meen Bhawan area which is mainly under agricultural use is also experiencing housing development as an impact of the new Chinese road construction which passes through this area. Thus both the eastern and western fringe areas of Kathmandu are experiencing the suburbanization type development although they lie within a distance of less than three miles from the city center.

3. Urbanization

In Nepal, only 3.6 per cent of the total population (9.4 million) lived in urban areas according to the census report of 1961,[1] but it is remarkable to note that the annual growth rate of the urban population in the country during the 1952/54[2]-1961 period was 5.2 per cent as compared with the 1.4 per cent annual growth rate of the total population of the country during the same period. The city of Kathmandu, of course, got the lion's share of the total urban population growth with about half of the population of all the urban centers with population of over 10,000.[3]

In Kathmandu, the population growth rate has been quite high in the outer city and the fringe areas over the last twenty years whereas the inner city has experienced a relatively low growth rate. As a

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[1]At the time of this writing, population figures for urban areas of the 1971 census were not available. So 1961 figures have been used.

[2]Because of some practical difficulty, the 1952 census was conducted only in the eastern part of Nepal, and the census for the western part of Nepal including the Kathmandu Valley was conducted in 1954.

[3]There were all together only seven urban centers in Nepal in 1961, with over 10,000 population.

result, the growth rate of the city of Kathmandu (combining both the inner city and the outer city) is not so impressive; the annual increase was only 1.9 per cent to 121,000 during the 1954-61 period and 2.4 per cent to 150,000 during the 1961-71 period as compared to the 4.3 per cent increase during the 1941-54 period (Table 3-1). The main reason for this decline was that as the city especially the inner city was progressing near the "sturation point of housing," the growth rate was declining because there was less and less space left every year for additional housing. But the annual growth rate of the Kathmandu District for the same periods was higher--the annual growth rate of the District was 4.6 per cent to 196,000 population for the 1941-54 period, 2.1 per cent to 225,000 for the 1954-61 period, and 5.8 per cent to 354,000 for the 1961-71 period. The annual growth rate of the District during the 1961-71 period was quite high indeed; it was more than the double of the annual growth rate of the city of Kathmandu. Here it is assumed the annual growth rate for rural areas of the district was about the same as the national one, because the population growth in both cases was mainly due to the natural grwoth of population (total births minus total deaths). On this basis, the remarkable population growth of the District can be considered mainly because of the phenomenal population growth in the outer city and the fringe areas of Kathmandu,[1] where not

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[1]Data were not available for smaller units to calculate population growth rates for the inner city, the outer city, and the fringe areas. Some of the estimates on the growth rate given in this Chapter were based on the field research and different sources including the population figures obtained from the Kathmandu Nagar Panchayat, Village Panchayats, and Department of Housing and Physical Planning, Kathmandu Valley.

TABLE 3-1

POPULATION OF NEPAL AND THE KATHMANDU VALLEY

Years	Total Population				Annual Growth Rate (%)		
	1941	1952/54	1961	1971	1941-52/54	1952/54-61	1961-71
Nepal	6,283,649	8,473,478	9,412,996	11,289,000	2.9	1.4	2.0
Urban	N.A.	238,015	336,222			5.2	
Rural	N.A.	8,235,463	9,076,774			1.3	
Kathmandu Valley	323,336	415,761	459,990	618,911	2.9	1.5	3.5
Urban	131,143	181,082	202,609	240,563	2.9	1.7	1.9
Rural	192,193	236,679	257,381	378,348	1.8	1.3	4.7
Kathmandu District	122,340	195,983	224.867	353.756	4.6	2.1	5.8
Urban (Kathmandu City)	68,594	106,579	121,019	150,402	4.3	1.9	2.4
Rural	53,746	89,404	103,848	203,354	5.1	2.3	9.6
Lalitpur District	119,499	135,569	145,301	154,998	1.0	1.0	0.7
Urban (Patan City)	34,685	42,183	47,713	59,049	1.7	1.9	2.4
Rural	84,814	93,386	97,588	95,949	0.8	0.6	-0.2
Bhaktapur District	81,497	84,209	89,822	110,157	0.3	1.0	2.3
Urban (Bhadgaon City)	27,864	32,320	33,877	40,112	1.2	0.7	1.8
Rural	53,633	51,889	55,945	70,045	-0.3	1.1	2.5

Source: Central Bureau of Statistics, Nepalko Janaganana (Population Census of Nepal, 1952/54) Kathmandu: Central Bureau of Statistics, 1957); and Idem, Rashtriya Jana-Ganana: 2018 Ko Parinam (National Census: Result of 1961) (3 vols., Kathmandu: Central Bureau of Statistics, Ministry of Economic Planning, His Majesty's Government of Nepal, 1966-67). The census population figures for 1971 were obtained by personal communication. At the time of this writing, population figures of 1971 for Nepal by urban and rural areas could not be obtained, so spaces have been left out blank.

only new arrivals find a place to live but also people from the city core are making flight to escape from the congestion of the core. In the fringe areas, it is estimated that the population increased by more than 60 per cent to 24,000 during the 1961-70 period. Although these areas are not included in the city boundary of Kathmandu, their accelerated population growth presents in fact the sprawl of the city of Kathmandu. As it was mentioned earlier that the annual population growth rate of the Kathmandu District was 5.8 per cent during the 1961-71 period, which means a net increase of 129,000 people in the District for the 1961-71 period. Relatively a large proportion of this increase was shared by the outer city and the fringe areas, where new houses have been mushroomed to accomodate the increasing population. It is estimated from the field research of this study that as much as 16 per cent of the total occupied dwelling units in Kathmandu were built during 1960-70. The dramatic population growth of Kathmandu was mainly because of the heavy inflow of inmigrants as a result of its dominant role in Nepal's development.

For over a century before 1951, the Ranas, who were entitled as the Maharaja (great king) of Nepal, ruled the country as hereditary prime ministers and autocratic rulers, although the Shaha kings entitled as the Maharajadhiraj (king of great kings) were the legel head of the state; the latter were deprived of political and administrative powers. Socioeconomic development of the country during this period was greatly retarded since the Ranas did not pay any significant attention for the country's welfare. Frequently, they even supressed some Nepalese

people who wanted to pursue higher education.[1] However, as the wave of independence and democracy swept India after World War II, the Ranas could not protect their oligarchic, autocratic rule against the overwhelming desire of Nepalese elites and intelligentsia with the support of the late King Tribhuban B.B. Shaha. As a result, the Rana regime came to an end in 1951.[2] After the end of the Rana regime, Nepal experienced a dramatic shift in national goals and aspirations. In this context, it is appropriately stated:

> Nepal's goals have altered since the pre-1950 period in a number of aspects: from international national isolation to participation in the international scene; from indifferences toward massive poverty and disease to concern for a better standard of living; from almost universal illiteracy to a goal of functional literacy for all. The first phrase of these is a reflection of the actual situation that was the deliberate choice of the ruling class. The goal actively pursued by the nation's government before the 1950 revolution was poverty and ignorance for almost all the people. Since the 1950 revolution Nepal was changed from an almost completely authoritarian, tyrannical political system to one seeking greater popular participation; from a provincial population involved in only family, village, and tribal affairs to a growing awareness of national problems and a developing nationalism; from an economy of nearly 100 per cent agricultural to one aspiring to some degree of industrialization and modernization; from a feudal land system to the aim of greater control of land by the workers.[3]

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[1]For some examples of the Ranas' supressions of Nepalese people against their socioeconomic development, see Joshi and Rose, Democratic Innovation in Nepal, pp. 50-53; and A. Gupta, Politics in Nepal: A Study of Post-Rana Political Developments and Party Policies (Bombay: Allied Publishers Private Ltd., 1964), pp. 17-18. For economic and social conditions in Nepal during the Rana regime, see S. Kumar, Rana Policy in Nepal: Origin and Growth (New York: Asia Publishing House, 1967), pp. 132-41.

[2]Beside the autocratic rule of the Ranas, there have been found several other reasons such as the conflict between the Rana family and the Shaha family, groups outside the usual political factions, and dissident elements within the Rana family itself, for the fall of the Rana regime. See Joshi and Rose, Democratic Innovation in Nepal, pp. 40-56.

[3]H. Reed and M.J. Reed, Nepal in Transition: Educational Innovation (Pittsburgh: University of Pittsburgh Press, 1968), pp. 1-2.

In this modernizing process of the country, Kathmandu has played a leading role. Before 1951, Kathmandu was not only isolated deliberately by the Rana ruling class from the outside world,[1] but also its sphere of influence within Nepal itself was very limited. After 1951, Kathmandu has experienced increasing interaction with foreign countries; it has served as the focal point of socioeconomic development for the country; it has acted as the diffusing center of new ideas and aspirations. It has been the locus of political and economic powers, and the national center for education and administration. It has been the home and sanctuary of Nepalese elites. In addition, Nepal's increasing relationships with foreign countries and international organizations, have added their offices and activities in Kathmandu. All these factors working together have contributed to the viability of Kathmandu. Probably, it has more employment opportunities outside the agricultural sector than the rest of the country. Consequently, people have poured into Kathmandu not only from rural areas but also from other urban areas--some in search of employment, some business purpose, and some to receive better jobs and education.[2]

In the process of the growth of Kathmandu, it is interesting to note that it has not faced the squatter problems faced by many large cities of developing countries such as Calcutta, India; Karachi, Pakistan; Manila, the Philippines; and Caracas, Venezuela.[3]

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[1]See Joshi and Rose, Democratic Innovation in Nepal, p. 18. But a few representatives of the British Government to Nepal were allowed to visit Kathmandu, and the first British Mission arrived in Kathmandu as early as 1792 under Colonel Kirkpatrick.

[2]See Joshi, "Urban Transportation," pp. 29-30.

[3]See Charles Abrams, Man's Struggle for Shelter in an Urbanizing World (Cambridge: The M.I.T. Press, 1964), pp. 12-24.

There are two basic reasons that squatters have not developed in Kathmandu. First, law and property rights were firmly rooted in the metropolis, and it was not possible for poor people from the country side to come here and build shacks for shelter at their will. Second, and even more important reason was that only "selective migrants" who had some kind of skill or enterprising capacity or were from well-to-do family or bright youths, came to Kathmandu for better opportunities. Therefore, virtually all people who came to Kathmandu from different parts of the country belonged to the Brahmin and Kshatriya castes, the highest Hindu castes, who were socioeconomically much better off than their lower caste counterparts and other ethnic groups of Nepal and managed to live in a sound structure. The Brahmin and Kshatriya castes combined together form the second largest community in Kathmandu (see infra pp. 68-69). It was not just possible or worth the risk for poor people without skills to come to Kathmandu in search of a haven because of the high transportation cost. Kathmandu is poorly linked by transportation networks with different parts of the country.[1] Only a few places in the country have airways, motor roads and rail roads. Even then the transportation cost especially that of airways which is the only mode of transportation to connect Kathmandu with some remote and distant places of the country, in formidable for poor people. In general, from most parts of the country, it takes from several days to several weeks to travel to Kathmandu. Thus traveling in Nepal is not so easy as going to Calcutta by a train from a village in northern West Bengal.

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[1] See T.R. Joshi, "A Brief Account of Transportation in Nepal," Dyaurali (Kathmandu), II (June, 1964), pp. 18-24.

C. Societal Structure

1. Scene of Confrontation

On one hand, there are illiterate farmers who still apply their old methods of agriculture; craftsmen who have inherited their skills traditionally and have a small workshop on their first floor of the house; and very conservative Hindus who just do not like to change their attitude from their traditional Hindu norms and value system such as caste system and other ways of life. On the other hand, there is a group of young people with new aspirations, higher education and often training from Western countries, who want to bring about change in the societal structure for modernization. Thus Kathmandu is the scene of a major confrontation between enduring institutions of the traditional society and now values arising from the process of modernization, a product of Western education and increasing contact of Nepal with the international world.

Kathmandu has a number of characteristics of the preindustrial society as outlined by Sjoberg for his preindustrial city model.[1] The administration and the politics of the country are in the hands of the ruling class and a few elites. High ranking military positions are restricted only to a few selective groups who are close to the ruling family. The caste system in which different castes still perform their traditional functions, prevails in the society forming "guilds." For example, Brahmins who belong to the highest caste hierarchy perform religious functions; Pores who belong to one of the lowest castes do the job of cleaning streets; and Jyapus grow vegetables and food grain

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[1] See Sjoberg, The Preindustrial City.

crops. Regarding the spatial distribution of social classes, it is already mentioned that in the old city, people of high social status associated generally with high castes, live near the center whereas lower caste people are clustered in its peripheral areas such as southern, western and northeastern edges of the old city. Regarding industrial development, Kathmandu does not have a strong base of manufacturing industry; for that matter the country as a whole is in its infancy industrial stage. Although the Kathmandu Valley is considered a very important industrial area of Nepal comprising about 23 per cent of the total industrial establishment in the country with about 10 per cent of the total national value added, its industrial establishments are characterized by only small scale workshops operated on family basis, cottage industries, and a few medium sized industries that include the industrial estates of Balaju and Patan, and the Bansbari Shoe Factory.[1] In 1965, out of 291 establishment in the Valley, 223 employed not more than 9 persons and only five establishments employed more than 200 persons.[2]

But at the same time, Kathmandu displays many features of Western cities. Despite the low level industrial development, it has most of the luxurious goods and conveniences of the West--telephones, automobiles, refrigerators, and electronic goods, although only few elites, members of the ruling class and foreigners can afford to possess them. Moreover, it has employed over 65 per cent of the

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[1] Department of Housing and Physical Planning, Kathmandu Valley, p. 91.

[2] Ibid., p. 91.

household heads in the tertiary sector (business and services), that overshadows the proportion of household heads employed in other categories--primary and secondary sectors. Thus it comes to the trend of Western cities where the percentage of people employed in the tertiary sector tends to increase as compared to the percentage of people employed in the primary and secondary sectors. In addition, suburban development similar to that of Western cities is taking place in Kathmandu. High quality residential areas have emerged outside the old city such as Kamaladi and Kalimati; and urbanization has extended beyond the city limit. The old city with slum characteristics--high degree of congestion, poor facility of sanitation and dilapidated housing conditions, seem ripe for urban renewal. What all this suggests is that probably Kathmandu is bypassing the industrial stage in its process of modernization in catching up the characteristics of Western cities. Industrialization provided the energy to launch Western cities into the post-industrial orbit. But for Kathmandu to develop its new urban way of life, the vitality is directly transferred from industrialized countries in the form of education, and technical and economic assistance for Nepal's development.

Thus one interesting feature of Kathmandu is that it reveals the penetration of post-industrial characteristics into the preindustrial societal landscape without having passed through the stage of industrial development. Second, it is a place where one can see the product of the Western know-how confronting the preindustrial society.

2. Ethnic Groups

The societal structure of Kathmandu is characterized by the two distinct Nepalese groups--the Newars and Parbates,[1] and people of few other groups including a very small fraction of alien residents.

a. The Newars. The Newars who embrace features of both Mongoloid and Indo-Aryan types are believed to be the indigenous inhabitants of the Kathmandu Valley. They are the majority ethnic group in Kathmandu consisting of about 60 per cent of its population. Their mother tongue is Newari, a Tibeto-Burman language,[2] which is quite distinct from their second language, Nepali, the official and national language of Nepal. The basic affinity of Newari with Tibetan and other languages of the Tibeto-Burman family is unmistakable despite the strong influence of both Sanskrit and Nepali.[3] It is interestingly true that the Newars do not speak Nepali, the national and official language of the country, as their mother tongue although they are native of the capital city of

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[1]The Newars are the people native to the Kathmandu Valley, whereas the term "Parbates" refers to the people of the Valley who trace their origin in hilly areas of Nepal. After the Gorkha conquest of the Valley, people from hilly areas have been pouring into the Valley. These people after their original place of residence, are called Parbate or Khencha (hilly people) by the Newars of the Valley; now the Parbate appelation has been an accepted usage to refer to these people.

[2]D.B. Bista, People of Nepal (Kathmandu: Department of Publicity, His Majesty's Government of Nepal, 1967), p. 15.

[3]C. Furer-Haimendore, "Elements of Newar Social Structure," Journal of the Royal Anthropological Institute of Great Britain and Ireland, XXCVI (July-December, 1961), p. 15.

Nepal, and they are not the Gurkhas,[1] a fact of disappointment to foreign people who often have the fallacy of conceiving Nepalese and Gurkhas as synonymous[2] or are "usually under the impression that the country is inhabited solely by Gurkhas and Sherpas."[3]

The Newars are an amalgamation of a number of ethnic groups who have, through centuries of interbreeding, been welded into a homogeneous community with common traditions of language and other social heritage.[4] Regarding their origin, there are several reasons substantiated by their physical features and cultural traits to believe that they were migrants from both Tibet and India,[5] and over a long period of time they were assimilated as the Newars. Nepali suggests that they are drawn from the Abhiras, the Kiratis, the Lichhavis, the Vaishya Thakuris and the Karnataks although it is very difficult to say who were the first forerunners of the present Newars.[6] It is therefore, a gross oversimplifi-

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[1]Nepal has been renowned for her brave soldiers who are designated by the name "Gurkha." Foreigners often speak of Nepal as the home of the Gurkhas as if Nepalese and Gurkhas were synonymous. This widespread error was probably because of the fact that the British Army applied the name Gurkha to all the soldiers recruited in Nepal. This appellation, of course, is after the small hilly town of Gorkha situated about 40 miles northwest of Kathmandu, from which the unification of Nepal was began in 1760's.

[2]T. Hagen, F.T. Wahlem, and W.R. Corti, Nepal: The Kingdom in the Himalayas (Berne: Kummerly & Frey, Geographical Publishers, 1961), p. 60.

[3]F. E. Okada, "The Newar of Nepal," Natural History, April, 1957, p. 196.

[4]See G.S. Nepali, The Newars: An Etno-Sociological Study of a Himalayan Community (Bombay: United Asia Publications, 1965), p. 18, hereinafter cited as Nepali, The Newars.

[5]See Furer-Haimendore, "Elements of Newar Social Structure," p. 15.

[6]Nepali, The Newars, p. 27.

cation to regard them as belonging to one single racial origin as suggested by some experts such as Sylvain Levi who advocates that the Newars had migrated to Nepal from "regions north of the Himalayas,"[1] and Regmi who believes that they might have moved to the Kathmandu Valley from the south.[2]

It seems reasonable to believe that Hindu religion has been prevalent in the Kathmandu Valley since early historic period, which is evident from the presence of Hindu temples built during different periods in the past and the affiliation with Hindu religion of different ruling dynasties--the Kiratis (seventh century B.C. to second century A.D.), the Lichhavis (third century A.D. to twelfth century), the Mallas (thirteenth century to eighteenth century), and the Shahas (eighteenth century to present). However, it appears that before the Malla period, Buddhism was the principal religion with casteless characteristics of most of the people of the Kathmandu Valley. But it was Jaya Sthiti Malla, the Newar King from 1350 to 1395, who belonged to a Hindu ruling caste origin, divided the Newar society into four Varnas (major castes) and sixty-four occupational castes, probably under the influence of Indian Brahmin scholars and priests who were at his court. Thus the Buddhist society of the Valley adopted many features of the Indian caste system,[3] and "the casteless character of Buddhist society in general underwent a kaleidescopic

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[1]See S. Levi, Le Nepal: Etude Historique d'un Royaume Hindou (2 vols.; Paris, 1905-08), I, pp. 220-22, cited by Furer-Haimendore, "Elements of Newar Social Structure," 15.

[2]Department of Housing and Physical Planning, Kathmandu Valley, p. 42.

[3]Furer-Haimendore, "Elements of Newar Social Structure," p. 17.

change and gave to rigid caste structure."[1] In this process of propogation of Hindu religion, a greater proportion of the Buddhists might have changed their religion to Hinduism whereas the remaining proportion retained their Buddhist religion but adopting features of caste system. Thus the present Newar society consists of two religious groups--Hindus (Shivamargi) and Buddhists (Buddhamargi).

But this religion division does not create any cleavage in the Newar community. As a matter of fact, Hindu temples and Buddhist temples stand side by side, and both Hindus and Buddhists participate in each others religious affairs and festivals. Often the same deity such as Manjushree is regarded as a Hindu deity by Hindus and a Buddhist deity by Buddhists. This sysntehsis of Hinduism and Buddhism prevails not only in the Newar community, but also in other Nepalese communities as well. In this respect, Nepal presents a good example of the peaceful coexistence and mutual respect between two religions in keeping people intact. Even the minority group of Moslems unlike in India have lived peacefully in Kathmandu with Hindus and Buddhists. To the Newars, more important thing than the religion is their ethnocity for maintaining their social structure against any incursion by other groups. In this respect, Okada observes that whether a Newar considers himself a Hindu or a Buddhist, he is first of all a Newar, thus ethnic solidarity overrides all consideration of religion.[2]

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[1] D. R. Regmi, Ancient and Medieval Nepal (Kathmandu, 1952), pp. 71-72, cited by Furer-Haimendore, "Elements of Newar Social Structure," 17.

[2] Okada, "The Newar of Nepal," p. 199.

Despite this mutual respect for each others religion, Buddhist Newars and Hindu Newars have their own separate social structure with their caste hierarchy. For example, each of the groups has its own priestly classes--Gubhaju for Buddist Newars, and Deo-Brahmin and Jha Brahmin for Hindu Newars. Each of these priestly classes is restricted to its own religious group to perform religious and social functions and does not crossover the religious line; intermarriage between these two groups of people does not take place as a rule. Certain social affairs such as marriage and participation in a feast, and serving certain foods such as boiled rice, take place only between the people of the same caste level.

In the process of introducing and outlining the caste system in the Newar society, it appears that most of the Buddhist Newars who were assigned to lower caste hierarchy such as the Jyapus (farmers), the Chitrakars (painters), the Kumahas (potters) and the Sikarmis (carpenters) did not join the Hindu religion since they had nothing to gain by doing so. Thus most of the castes of Buddhist Newars belong to lower castes as compared to their Hindu counterparts. Even Gubhaju, the priestly class of the Buddhist Newars is considered below the level of Deo-Brahmin, the priestly class of Hindu Newars.[1]

People with varied ethnic and caste backgrounds who moved to the Kathmandu Valley were absorbed by the Newar society until the end of the Malla period. Most of the migrants who came from India to the Valley belonged to the same Hindu castes of the Nepali speaking Parbates. The Lichnavi kings (third century A.D. to twelfth century A.D.) of Nepal

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[1]Nepali, The Newars, p. 151.

were the Somabanshi Rajput from India, who had brought with them people of all the castes prevalent in North India such as Brahmins, Baniyas (traders, cultivaters and artisans), Susadhas and Doms (menials).[1] The Mallas who were regarded as the Suryabanshi Kshatriya, were known to have flourished in the western part of Nepal perior to their advent in the Kathmandu Valley as the Malla kings.[2] Present Newar Mallas are the descendant of these Malla kings of Nepal. It seems logical to believe that these Newar Mallas may not perhaps be different in blood from the Nepali speaking Parbate Mallas, a Kshatriya caste. "For a long time they /Newar Mallas/ were said to have refused to intermarry with other Chhatharia /the high caste/ Newars and to have retained their Kshatriya status. But later they went the same way as their predecessors, the Lichhavis, and the Thakurs, and are now bracketed along with the Newars."[3] In the same way, the Joshi, Achaju (Acharya) and Deo-Brahmin (Sharma) castes of the Newars can be considered originally to be Brahmins of the same Joshi, Acharya and Sharma castes of the Parbate Brahmins respectively, which is evident from their identical functions. However, after the Shaha takeover of the Kathmandu Valley, the Parbate inmigrants who were mainly Brahmins and Kshatriyas, did not assimilate into the Newar society. They retained their identity considering themselves superior to the Newars since the ruling dynasty had emerged from their Parbate group. At this point, it may be of interest to note that after two centuries of the

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[1] Department of Housing and Physical Planning, Kathmandu Valley, p. 43.

[2] The Mallas were known also in India from 400 B.C. See Nepali, The Newars, p. 155.

[3] Nepali, The Newars, p. 156.

Parbate rule, the Parbates consider the Newars as a whole at a caste level somewhere below their Kshatriya caste although the Newars have their own caste hierarchy equivalent to the caste hierarchy of the Parbates. The Newars also have retained their identity from mixing with the Parbates.

This social gulf between the Newars and the Parbates is further widened by their emotional behavior towards each other. For example, the Newars call the Parbates as "Pakhe" that means barbaric or without culture and civilization.[1] The Parbates on the other hand, retaliate calling the Newars timid and cowardly people. However, at present the caste system, and resentfulness of the Newars and Parbates for their assimilation are under the process of breaking down with the modernization trend of Nepal.

The Newars are noted for their enterprise and talent in business, craftmanship, architecture and even in farming. Especially, it is in their business pursuit that they have played a dominating role not only in all the towns and cities of Nepal but also in Tibet and India. At the same time, agriculture is the primary occupational interest of the bulk of the Jyapu Newars. The Newars are mostly self-employed in their economic pursuit, thereby accounting for a relatively large proportion of self-employed people of Kathmandu. Nevertheless, they work in all

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[1]It is of course true that in terms of cultural development, the Newars are not matched by other communities of Nepal. Actually, it is the Newari culture of the Kathmandu Valley that Nepal boasts about calling it the Nepalese culture.

other sectors of employment but the Nepalese army,[1] and hold important government and private positions.

b. The Parbates. People of the Brahmin (priest) and Kshatriya (warrior) castes combined together form the bulk of the Parbate group with 30 per cent of the population of Kathmandu. Their mother tongue is Nepali, the official and national language of Nepal. The Brahmins and the Kshatriyas who rank highest in the Hindu caste system came to Nepal from India mostly during and after the twelfth century when their superiority in the Hindu society of India and religion were endangered by the Moslem takeover of India. After entering Nepal, the Kshatriyas managed successfully to form small principalities in different parts of western Nepal. Finally, it was the Kshatriya King Prithibi Narayan Shaha, the ancestor of the present King of Nepal, who laid the foundation of the present Nepal by defeating small principalities of Nepal and uniting them. The Brahmins whose high caste rank was safeguarded by their Kshatriya kings, also played a very important role to bring about Nepal under the influence of the Hindu religion and caste system. As a result, the Brahmins and the Kshatriyas maintained their supreme social and political position amidst the people of Nepal. Today they occupy most of the important positions in the government; they are the wealthiest and most educated people of all the Nepalese people, only matched by the Newars. The royal family of Shaha, and the Ranas who became autocratic

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[1] The Newars were denied employment in the Nepalese army till 1951, probably because they were originally the enemy group of the ruling Parbate group. Even today, there are hardly any Newars in the army partly because of the reluctance of the Newars to join the army, who rather prefer other occupations such as business and civil service, and partly because of the traditional resentfulness of recruiters to bring the Newars in the army.

rulers of Nepal for over a century, and their right-hand men are from the Kshatriya caste. The Kshatriyas still hold virtually all important positions in the military.

Other notable Parbate groups of Nepal include the Gurungs, the Magars, the Kirantis, the Sherpas, the Tamangs and the Lamas. All these together form only a very small proportion (about 5 per cent) of the total population of Kathmandu. They share some common characteristics in that they show racial affinity with the Tibetan origin which is quite evident from their physical characteristics; they do not practice the rigid caste system of the Newars or the Parbate Hindus (Brahmins and Kshatriyas) of Indian origin although they "are tempted to rank themselves with the traditional Hindu caste hierarchy, seeking a relatively high position either equal or just beneath that of the Chhetris /Kshatriyas/;"[1] and they are either Hindus or Buddhist for their religion adoption. But each of them has developed its own distinct language, social customs and attitudes.

All these Parbate groups except the Brahmins have been noted as good soldiers, and most of the Gurkha soldiers recruited for both the Nepalese and British armies come from these Parbate groups.

c. Other Groups of People. The Moslems and the Marwaris are other noteworthy groups of people of Kathmandu, both originally from India and well noted for their business enterprise. Some of them have achieved higher education and are employed in government positions and other professional jobs. These people as the rivals of the Newars in handling business and commerce in Kathmandu, have succeeded in occupying

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[1] Bista, People of Nepal, pp. xv-xvi.

strategic locations in the old city for both residence and stores. Therefore, one can often encounter in the old city of the Newar agglomeration, a few enclaves of relatively high proportion of the Marwaris and the Moslems. Especially, the Marwari group that belongs to the Baishya caste (trading caste) is one of the two dominating business groups of Kathmandu, only rivalled by the Newars.

The first Moslems to arrive in Kathmandu were the Kashmiri traders who came here via Tibet in the late fifteenth century and early sixteenth century.[1] During the seventeenth and the eighteenth century, the Moslems were brought to Nepal from India to train Nepalese soldiers in the use of firearms. However, today's large number of the Moslems in Kathmandu are descendant of yet another group who came from India as sellers of bangles, glass beeds and leather goods during and after the Indian Mutiny of 1857. They speak Urdu as their mother tongue which is a language quite similar to Hindi but with different script. In the early times, the total number of the Moslems traders and instructors could hardly have been more than a few dozen,[2] but today they are estimated to be about 900 in total, that is over one half per cent of the total population of Kathmandu.

Apart the multifold Nepalese society, a separate set of societal structure is composed of alien residents in Kathmandu. This set consists of diplomats, and technical experts from different countries including the United States, United Kingdom, Soviet Union, China, India, and the United Nations. High quality residences of these alien residents in

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[1] Bista, People of Nepal, p. 129.

[2] Ibid.

several parts of Kathmandu such as Kamaladi and Kalimati, and their high socioeconomic status communities stand out distinctly from other Nepalese societal setting.

IV. FIELD RESEARCH AND DATA TABULATION

A. Delineation of the Study Area

Kathmandu and Patan are the twin cities of the Kathmandu Valley (Figures 3-1 and 3-2). Their contiguously built-up areas together form a metropolitan area which could be called the Kathmandu-Patan metropolitan area. Although it would be desirable to use the metropolitan area as an areal unit for the purpose of this research, only the city of Kathmandu and contiguously built-up areas around it excluding Patan in the south were selected as the study area for this research because of limited time and resources for the field work. The delineated boundaries of the study area agreed roughly with the corporate city boundaries in the north, and coincided exactly with the municipal boundary in the south where the Bagmati River acts as the boundary line separating Kathmandu from Patan (Figure 3-1). But in the east and west, the study area consisted of additional areas to that of the corporate city. These additional areas included Chabahil, Deopatan-Pasupati, Battisputali, Baneswar and the Meen Bhawan area in the east, and the Dallu-Swayambhu area, Tahachal and Kalimati in the west (Figure 3-2). In most cases streams were used as genuine boundary lines for the study area, such as the Bagmati River in the east and south, the Indramati Khola in the southwest, the Lankhu Khola in the northwest and the Samakhusi Khola in the northwest (Figure 3-2). Lowlands along these streams which were mainly used for agriculture ideally separated contiguous built-up areas of Kathmandu. Wherever such natural features were not available, the study area was delineated by a straight line such as

its eastern boundary lying east of Chabahil, and its western boundary that passes through the Dallu-Swayambhu, Tahachal and Kalimati areas (Figure 3-2). The study area as a whole consisted of about ten square miles.

B. The Questionnaire Design

The major objective of this research was to investigate basic dimensions of the socioeconomic ecology of Kathmandu, and the success of this research depended mainly upon the quality of the questionnaire design and the field work since information from the Nepal census and other sources was not adequate for this research. So the making of a good questionnaire was an important task at least for two reasons. First, the questionnaire had to be designed such a way that it would not leave important variables out for factor analysis since major dimensions of the socioeconomic ecology would depend upon the original mix of variables in factor analysis. Second, the questionnaire had to be short enough so as to be able to complete the field research within the limited time and resource. The selection of socioeconomic items for the questionnaire was based upon a knowledge of other factorial studies of cities,[1] the questionnaire sample of the U.S. census for 1970, and the author's own experience with the socioeconomic setting of Kathmandu

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[1]Murdie's Factorial Ecology of Metropolitan Toronto was considered to be a good reference book in this respect, in which he has listed 109 variables.

The first draft of the questionnaire was prepared in the Department of Geography, University of Pittsburgh with suggestions of its faculty. This was later presented for comments and suggestions in a meeting of the Department of Housing and Physical Planning, His Majesty's Government of Nepal, Kathmandu, which was attended by both the United Nations and Nepalese experts of the Department and a few other interested individuals. During the meeting, a few items were added to the earlier draft of the questionnaire to make it more useful. Selected socioeconomic aspects of the questionnaire included information on the household head regarding his age, education, employment, mother tongue, caste, place of birth, father's place of birth, means of transportation to work, etc.; dwelling characteristics; mobility; household items; age structure, education and employment of the household members; income of the household; and so on (see Appendix I).[1] All items of the questionnaire were printed in English with Nepali subtitles using the letter head of the Department of Housing and Physical Planning. The letter head was used for the simple reason that the field research was partly sponsored by the Department of Housing and Physical Planning. All the selected socioeconomic items were squeezed in a single page for the convenience of interviewers, and for creating an easy feeling on interviewees as it was believed that if interviewees were to respond to several pages, they might not be psychologically as comfortable as to answer a single page.

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[1]See Appendix II for a glossary of terms used in the questionnaire.

C. Field Research

1. Sampling

A sampling survey was conducted for this research as a time and money saving device to obtain desired socioeconomic information on Kathmandu since adequate information on the study area did not exist.

a. Sample Size. In this research it was decided to include about 1,200 households which was assumed to be 4 to 5 per cent of the total households of Kathmandu. It was believed that a sample size in this neighborhood of 1,200 would yield a fairly good picture of Kathmandu, reducing sampling errors to a satisfactory level (see infra, p. 76.

Although the researcher attempted to include 5 per cent of the total households in the sample, it seemed that about 4 per cent of the households of the population were included in the sample of the inner city,[1] mostly because some residential houses were not shown in the map which was used for drawing samples, and in some cases, household heads or other people were not available to complete questionnaires during the time of the sampling survey. For other parts of Kathmandu, the sample turned out to be about 5 per cent of the population as expected. As a whole the total sample was 4.2 per cent of the population (Table 4-1). This sample consisted of 1256 households with 7,264 people out of the estimated 172,000 population of the study area.

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[1]Throughout this research work, the inner city is referred to the conjested old part of the municipal city of Kathmandu, which extends from the Tundikhel to the Bishnumati River, and from the Tripureswar-Naya Bhansar street to Chhetrapati; the outer city is referred to other areas of the city; and the study areas beyond the city limit are called the city fringe or fringe areas (see Figure 3-3, and supra, pp. 44-51.

TABLE 4-1

PERCENTAGE OF SAMPLE IN DIFFERENT AREAS OF KATHMANDU

	Total Estimated Population for 1970	Total Sampled Population	Percentage of Sampled Population of Total Population
Kathmandu (Study Area)	172,000	7,264	4.2
Kathmandu City	148,000	6,067	4.1
Inner city	88,000	3,305	3.8
Outer city	60,000	2,762	4.6
City Fringe (Fringe Areas)	24,000	1,197	5.0

The population estimates were prepared from the following sources: Department of Statistics, Nepal Census of Population, 1952-54 (Kathmandu: Central Bureau of Statistics, 1957); Department of Housing and Physical Planning, Kathmandu Valley; Central Bureau of Statistics, National Census of Population, 1961, Part 2 (Kathmandu: Ministry of Economic Planning, His Majesty's Government of Nepal, 1967); official records of the Kathmandu Town Panchayat, and village Panchayats of fringe areas (Baneswar, Battisputali, Pasupati-Deopatan and Chabahil); and the 1971 census population of the city of Kathmandu.

The sample size of 1,256 was found statistically large enough for the purpose of this research. For example, the estimated household size from this sample would be within an accuracy of $\pm$ 0.2 people as compared with the census family size at the 95 per cent confidence level.[1]

[1]The following formula was used for this statistical evaluation:

$$\text{Interval estimate} = \frac{1.96\ (\ \sigma)}{\sqrt{N}} = \frac{1.96\ (4.04)}{\sqrt{1256}} = 0.2$$

Where 1.96 is 95 per cent confidence level in the normal distribution curve; σ is the standard deviation of the population substituted by the sampling standard deviation; and N is the sample size. See Hubert M. Blalock, Social Statistics (New York: McGraw-Hill Book Company, Inc., 1960), p. 166.

b. Stratified Sampling. The investigation of spatial patterns of major socioeconomic dimensions of Kathmandu was a major aspect of this research. One beginning step towards this goal was to aggregate socioeconomic variables in small areal divisons (statistical tracts).[1] For this purpose, a stratified sampling method was preferred to simple random or systematic sampling methods[2] for the reason that the former assures a more representative sample and gives more reliable results than might be expected under the latter sampling methods. In a simple random or systematic sampling, there are two sources of sampling errors--errors within each stratum and errors between strata with respect to the relative numbers selected. In stratified sampling, errors between are eliminated and are left only within each stratum. If the stratum is homogeneous, stratified sampling will give correct results not possible in a simple random or systematic sampling.[3] Therefore, stratified sampling is desirable if strata tend to be

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[1]Small areal divisions of the study area designed to aggregate data for the sampling survey of this research were called "statistical tracts" (see infra, p. 85).

[2]In a stratified sample, all individuals (in this case houses of the Kathmandu) should be divided into groups (in this case statistical tracts), and then independent sample should be selected within each group or stratum using a simple random sample or a systematic sample. In a simple random sampling, the sample is taken for the whole area at one time using random tables whereas in systematic sampling, sample is taken by going down a list of individuals or entities such as household heads and dwelling units taking every kth individual or entity instead of using a table of random numbers. Systematic sampling is often used interchangeably with simple random sampling and also is considered to be equivalent to the latter although there is some difference in sampling procedure between them. For more discussion on sampling, see Blalock, Social Statistics, pp. 263-316; S. Gregory, Statistical Methods and the Geographer (London: Longmans, 1963), pp. 90-150; and M.J. Moroney, Facts from Figures (Baltimore: Penguin Books, 1951), pp. 120-140, 173-215.

[3]See Blalock, Social Statistics, pp. 399-400.

relatively homogeneous since it assures a greater accuracy for a given sample size, and stratified sampling can be considered an improved design over simple random and systematic sampling methods, especially for a case like this study in which data were to be aggregated for different statistical tracts.

One important criterian in any good sampling technique is that each individual of the population should have an equal chance of being selected in the sample. This criterian was met by performing stratified sampling in the inner city and some part of the outer city, and stratified systematic sampling in the fringe areas and most part of the outer city (Figure 4-1). In both cases residential houses were used as sampling units and all households of the sampled houses were interviewed in the sampling survey.

There were practical reasons for performing the stratified random sampling in the inner city, and stratified systematic sampling in the fringe areas and most part of the outer city. A complete listing of households or household heads or housing units or houses which could be used for random sampling were not available for Kathmandu. The only listing available was of household heads prepared about six years ago for Kathmandu Nagar Panchayat election purposes, which did not apparently include household heads not eligible to vote. Moreover, the listing was out of date becasuse many new arrivals have lived in Kathmandu since then. Therefore, this listing was considered inadequate for the sampling purpose of this research. Fortunately, the Department of Housing and Physical Planning of His Majesty's Government of Nepal had just finished preparing a large scale housing map of the inner city and a section of the outer city (scale 1 inch to 40 feet) in which

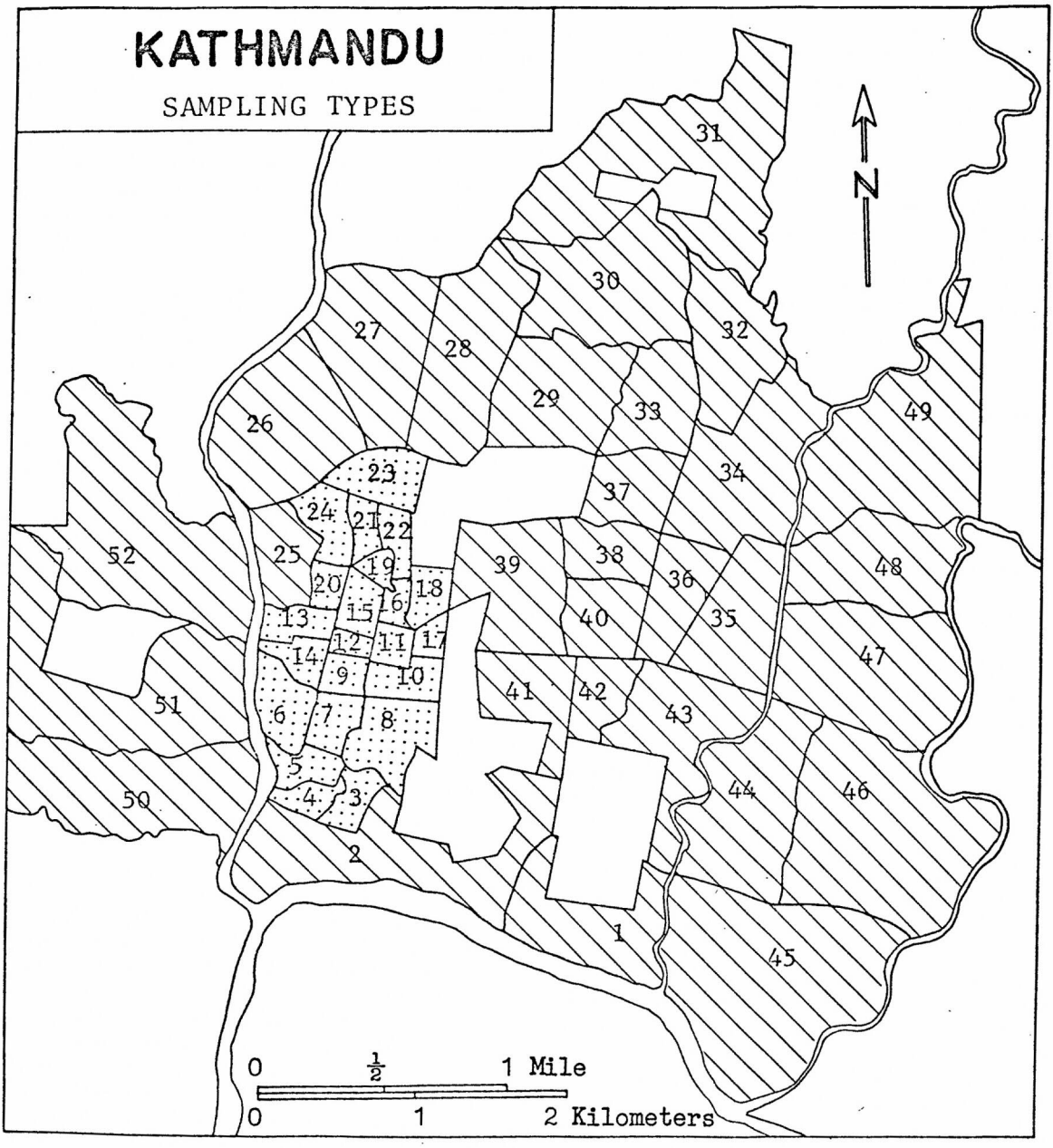

Figure 4-1. Statistical tracts and their sampling types.

every residential house was mapped (Figure 4-2). This map adequately furnished a listing of residential houses for the stratified random sampling in the inner city, where it seemed to be very difficult to perform systematic sampling because of the complex of compactly built houses (Figure 4-2). On the other hand, the situation was suitable for conducting systematic sampling in the outer city and fringe areas, where the distribution of houses was not so dense, and an interviewer could easily select every kth house walking along the streets and tracks. Random sampling could not be conducted in the fringe areas and most part of the outer city because the housing map was not prepared for these areas.[1] Thus it was felt that an efficient way of handling the sampling problem was to perform stratified random sampling in the inner city and a section of the outer city, and stratified systematic sampling in most part of the outer city and the fringe areas, given the existing two different situations. Moreover, it was believed that both sampling methods would give comparable results because of the fact that differences between them are relatively minor in principle.[2]

In order to conduct a stratified random sampling survey and a stratified systematic sampling survey, the whole study area was divided into sections. For the random sampling, residential houses including houses of mixed uses such as residential-commercial and residential-religious of each section were numbered, and a 5 per cent sample was

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[1]Housing map was available only for a small section of the outer city. This was the only portion outside the inner city under stratified random sampling.

[2]See Blalock, Social Statistics, pp. 393-99.

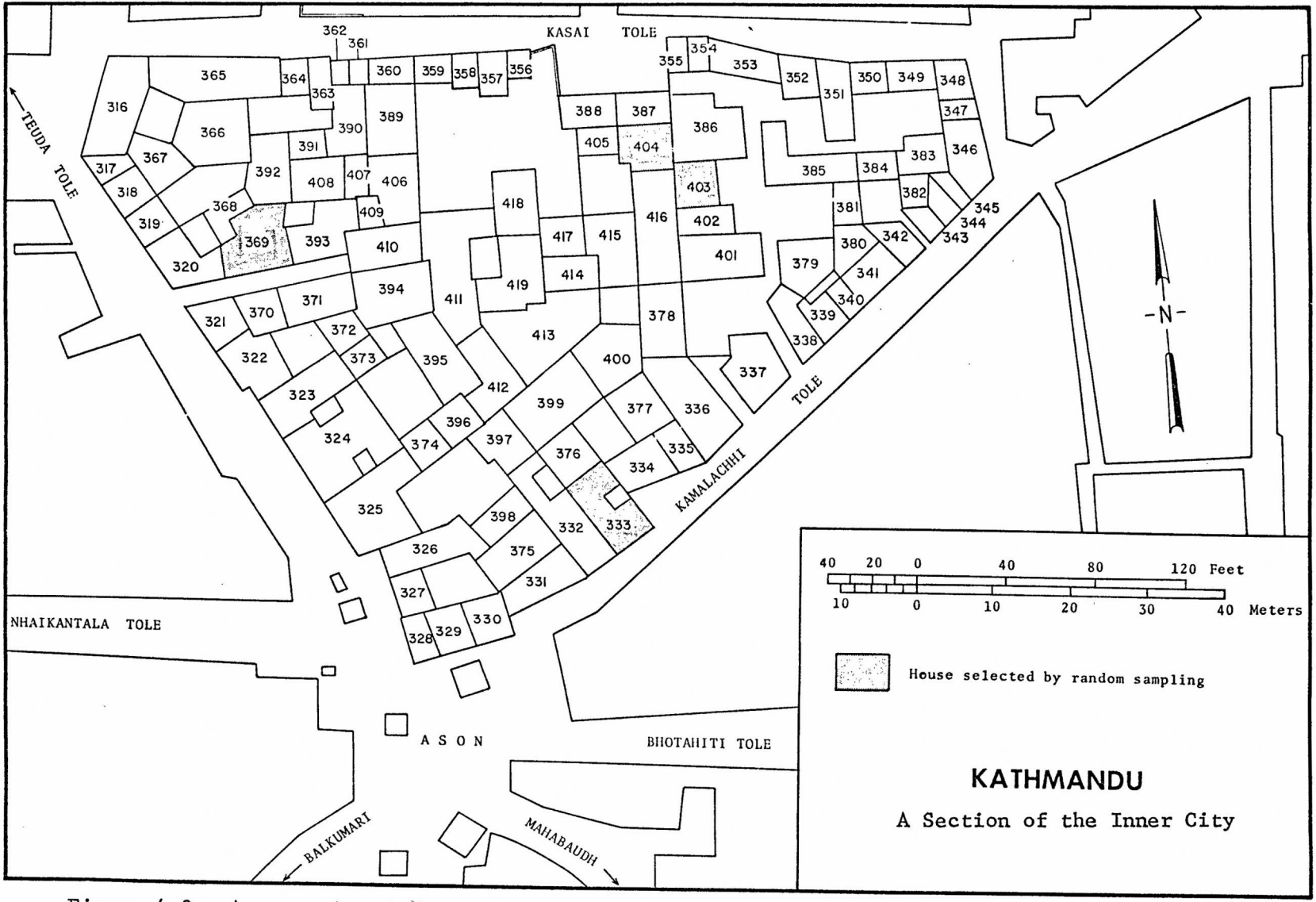

Figure 4-2. An example of the random sampling of residential houses conducted in a section of the

taken using random tables[1] (Figure 4-2). The starting row and column of the random numbers for each section (block) was decided separately, to give each house an equal chance of being selected, thereby performing independent sample within each section. For the stratified systematic sampling, enlarged maps one for each section were prepared using enlarged aerial photos and other available maps of Kathmandu. In each of the maps, routes for the interviewer were indicated by arrows, along which he walked to select every 20th house for the systematic sampling, and located the selected houses on the map with an identification number (Figure 4-3). Houses on only one side of streets and tracks were sampled first, then houses on the other side were sampled while returning along the same route. For example, Figure 4-3 shows that the interviewer first completed sampling in area A starting from the bottom left-hand corner and walking along the left-hand side of the Dilli Bazar road, then he went to area B following the route shown by the arrows, and so on. Here again, the number of the first house in this section was assigned by a random process to give every house an equal chance of being selected in this section.

2. Conduct of the Sampling Survey

Graduate and undergraduate students and a few other persons were employed as interviewers. They were given basic guide lines so as to make the sampling survey a success. It was also made sure that they understood the questionnaire right. To avoid subjective biases,

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[1]Random numbers were used from W. Allen Wallis and Harry V. Roberts, Statistics: A New Approach (London: Methuen and Co., Ltd., 1956).

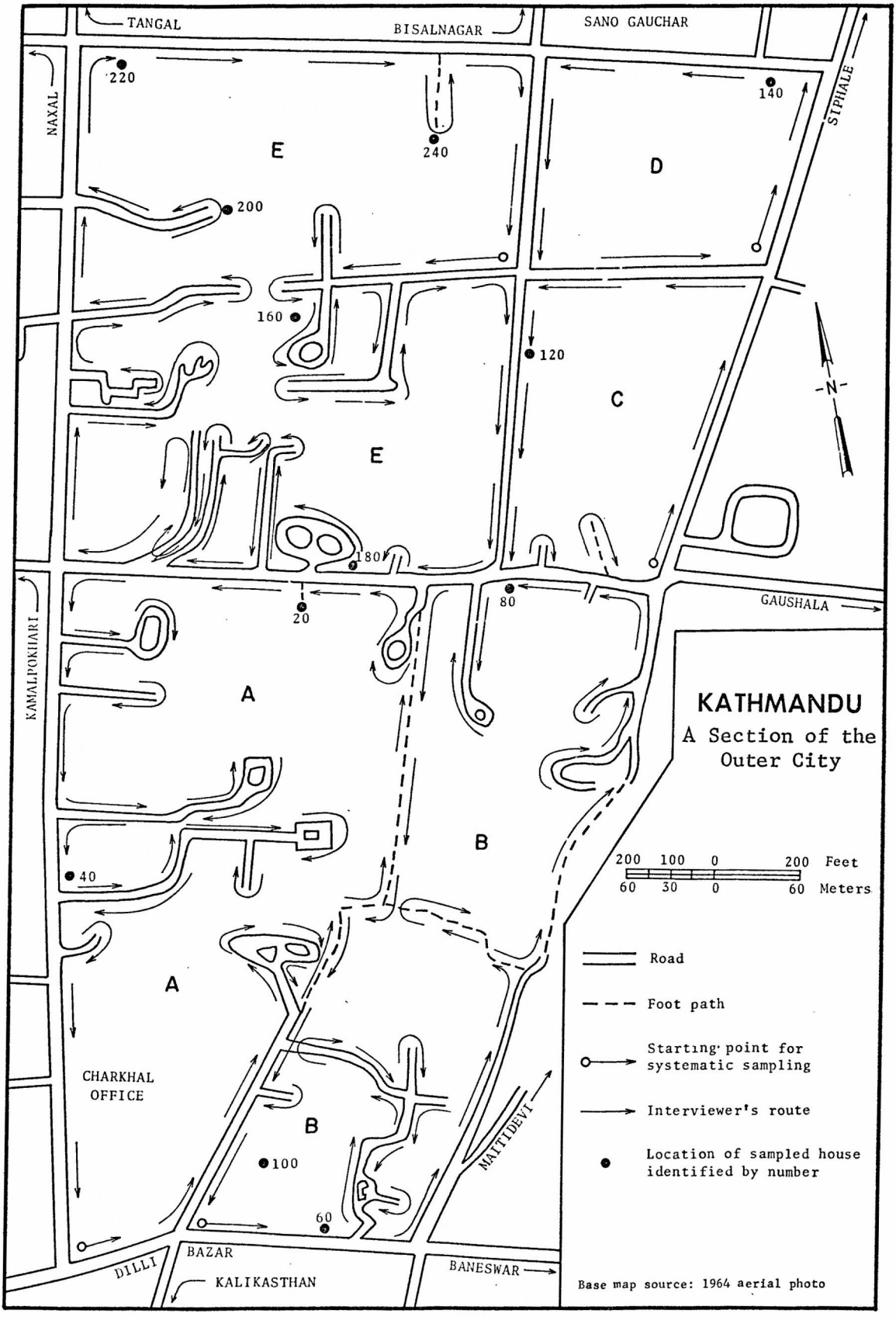

Figure 4-3. A schematic presentation of the systematic sampling of residential houses in a section of the outer city.

some yard sticks were developed for classification problems, such as in determining the employment and occupation of household heads, and housing conditions (see Appendix II). The author showed them in the field how to identify a sample house on the map, how to select a house for the systematic sampling and locate it on the map, and how to interview them. Moreover, the author often accompanied interviewers in the field, and also checked their work with the help of a research assistant to make sure that the sampling survey was progressing satisfactorily.

D. Processing of Completed Questionnaires

1. Remarks on Completed Questionnaires

a. Uncompleted Items. There were a small number of items of the questionnaires, which were not completed in the field (Table 4-2). There were only 65 items in total that were not completed in the field out of possible 65,312 items. Of these, 47 items were completed by examining answers of other items in the questionnaires. For example, if item 2 was completed and item 23 was checked in "All life" in the questionnaire, it was possible from this information to complete items 9, 10 and 24 of the questionnaire if they were not completed. The remaining 18 items were treated like missing data.

b. Age of the Household Head. In most cases, interviewers were told the approximate age of household heads, and their age was recorded in questionnaires accordingly. There were a very few cases in which the age of household heads was not recorded, but it was checked in the applicable age group in item 2 of the questionnaire. In such cases, the midpoint of the age group was coded as the age of household heads in tabulating the average age of household heads for statistical tracts.

TABLE 4-2

UNCOMPLETED ITEMS

Questionnaire Item Number	Total Items Uncompleted in the Field	Total Items Completed after the Field Work	Total Incomplete Items
3	1	0	1
5	3	3	0
6	1	0	1
8	20	17	3
9	2	0	2
10	3	3	0
11	3	3	0
12	1	1	0
17	1	1	0
18	1	0	1
21	1	1	0
23	1	1	0
24	22	16	6
26	1	0	1
27	1	0	1
28	1	0	1
51	1	0	1
Total	65	47	18

2. Design of Statistical Tracts

Although Nagar Panchayat[1] wards for the city and Gaon Panchayats[2] for the fringe areas could be assigned as statistical tracts, the author felt that his own designed statistical tracts might be better than those aformentioned in terms of relative homogeneity, and would assure a greater accuracy in the data aggregation. Therefore, the author

[1]Nagar Panchayat is the Nepali name for a corporate city.

[2]Minor political divisions in rural areas (outside Nagar Panchayat) are called Gaon (village) Panchayats

designed his own statistical tracts which were 52 in total (Figure 4-1). To begin with, the size of statistical tracts in the inner city were attempted to make equivalent the size of Nagar Panchayat wards, and it was interesting to note that statistical tracts agreed with several wards in the inner city. Streams, streets and in some cases even foot paths were used as boundary lines in delineating the statistical tracts (see Figure 3-2). Although streets often divided similar areas into two parts, thus working as a disturbing factor from making a statistical tract more homogeneous, they were used for boundary lines of statistical tracts since there was no other means for determining distinct boundary lines. Considerable areas mainly under non-residential uses such as recreational areas, and areas under government activities including the Royal Palace were not included in the statistical tracts. But agricultural areas were included in statistical tracts since they were considered as vacant land for future residential expansion of Kathmandu.

There is no question that subjective biases might have entered in designing the statistical tracts, and an area that is homogeneous on the basis of one variable may not be homogeneous on the basis of other variables. Nevertheless, in evaluating the relative homogeneity of the statistical tracts on the basis of some twenty variables by comparing their standard deviations of each tract with the standard deviations of Kathmandu, it was found that most of the 52 statistical tracts appeared to be relatively homogeneous (Table 4-3). Table 4-3 can be explained by saying that if the standard deviation of a tract is smaller than the standard deviation of Kathmandu for a particular variable, it means that the statistical tract is relatively homogeneous; if not, it is relatively heterogeneous.

TABLE 4-3

HOMOGENEITY AND HETEROGENEITY OF STATISTICAL TRACTS

Variables	Total statistical tracts with smaller standard deviation than that of Kathmandu	Total statistical tracts with equal or greater standard deviation than that of Kathmandu
1. Distance from the C.B.D.	52	0
2. Age of household head	33	19
3. Cultivated land of household head	50	2
4. Years household head lived in Kathmandu	35	17
5. Rooms in dwelling unit	35	17
6. Monthly rent of dwelling unit	40	12
7. Estimated value of house	43	9
8. Land value	42	10
9. Rent of tenant occupied dwelling	52	0
10. Years head lived in the house	38	14
11. Age of occupied house	40	12
12. Number of people in household	35	17
13. Number of males in household	40	12
14. Number of females in household	31	21
15. Number of married people	41	11
16. Number of people under 5 years	38	14
17. Number of people between 20-49 years	38	14
18. Number of people between 50-64 years	40	12
19. Number of illiterate people	36	16
20. Annual family income from salaries	49	3

3. Data Tabulation

Information of completed questionnaires were coded on IBM coding sheets, and later were recorded on punch cards for computer processing. A program in Fortran language was written for the data tabulation. From the information of the questionnaires, 196 variables were created (see Appendix III) for each of the 52 statistical tracts and Kathmandu. Most data for the variables were transformed to percentages, some in averages, and a few in ratios (Appendix III). The computing methods of the following variables is given below because of the special nature of their

computation, whereas the computation of the rest of the variable data is self-explanatory.

a. Economic Ranking of Household (Variable 13). Since information on household income, because of its sensitive nature, was found to be misleading from the experience of the field research, and since it was believed that the economic status of households was reflected by "household items" on which information was more reliable, the economic status of each household was established by computing its economic rank on the basis of its household items, by giving roughly a proportionate weight to each item according to its value except for "electricity" and "telephone" (Table 4-4). The weight of 1 was given to electricity which was considered to be a basic household item since most households possessed electricity, spending about 150.00 rupees yearly in average. Since telephone was a highly income elastic consumer item in Nepal, it was believed to be appropriate to give the weight of 6 to this item, although its annual rate was only about 500.0 rupees. In addition, every household was given a bonus weight of 1 whether it had any of these items or not. Thus if a household possessed all these items, its economic ranking would be 51, the sum of the weights of all the items. On the other hand, if a household did not have any of these items, its economic ranking would be 1.

b. Population Density (Variable 44). The area of each statistical tract was calculated using a planimeter on a base map with a scale of 4 inches to 1 mile. Total population for each statistical tract was estimated on the basis of the sampled population. Thus

population density of each statistical tract was calculated dividing the population by the area.

TABLE 4-4

WEIGHTS FOR HOUSEHOLD ITEMS TO COMPUTE ECONOMIC RANKING OF HOUSEHOLDS

Household Items	Approximate price in Kathmandu	Weights
Electricity	150.00 rupees*	1
Radio	300.00-1000.00 rupees	2
Bicycle	300.00-1000.00 rupees	2
Transistor radio	300.00-1000.00 rupees	2
Tape recorder	300.00-1000.00 rupees	2
Scooter/motorcycle	2500.00-4500.00 rupees	5
Telephone	500.00 rupees*	6
Automobile	Over 25000.00 rupees	30
Bonus to every household		1
Total		51

*Approximately annual rate.

c. Distance from the Center of the C.B.D. (Variable 1).

The nodal point of Indrachowk which is located in the center of the main business district of Kathmandu with one of the highest land values in the city was considered as the center of the central business district (C.B.D.). Locations of all the sampled houses and the center of the C.B.D. were mapped on a map with a scale 4 inches to 1 mile, and their X and Y coordinates were ascertained using graph paper. Then the distance of each household from the center of the C.B.D. was computed using the following formula (Figure 4-4):

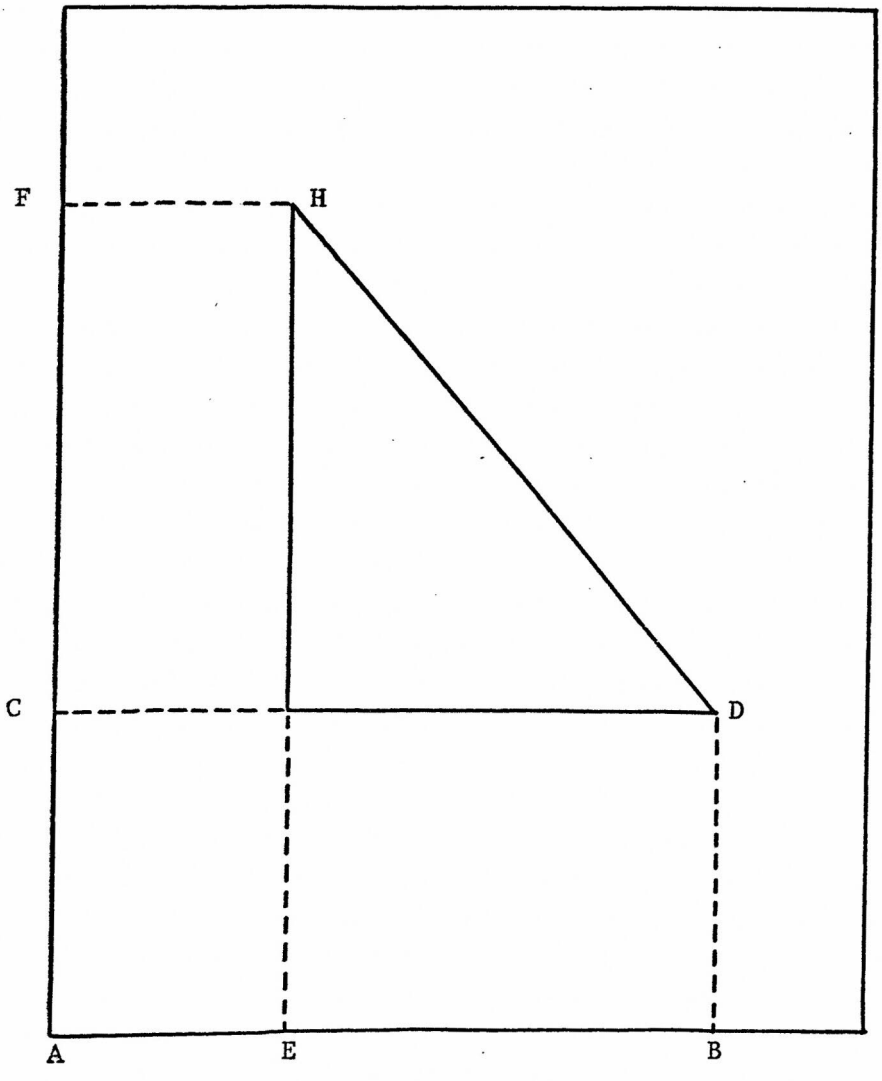

Figure 4-4. Illustration of computing distances between dwelling units and the center of the central business district.

$$DH = \sqrt{(AB - AE)^2 + (AC - AF)^2}$$

Where D = the center of the C.B.D.
H = the location of household
DH = the distance between D and H
AB = the distance along X axis of D
AC = the distance along Y axis of D
AE = the distance along X axis of H
AF = the distance along Y axis of H

E. Data Reliability

1. Sampling Errors

The data tabulation was on a little over a 4 percent sample of the total population; thus there was a possibility of sampling errors to be incurred in the estimates. In testing the sampling error on the family size for the total aggregation of Kathmandu the sampling error was found to be statistically very small. The family size in the Kathmandu District[1] according to the 1961 census of Nepal was 5.6 as compared to 5.78 for Kathmandu based on the sample estimate. In the statistical test, it was assumed that average family size of Kathmandu was representative to that of the Kathmandu District, and that family size remained the same over the nine-year period; and the following t-test formula was used to determine statistically whether the sampled estimate was significantly different from the census figure:

$$t = \frac{\bar{X} - \mu}{s/\sqrt{N - 1}} = \frac{5.78 - 5.6}{5.037/\sqrt{1256 - 1}} = 1.4$$

Where $\bar{X}$ = sampled mean
μ = population (census) mean
s = sampled standard deviation
N = number of observations

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[1]As the urbanized area of the Kathmandu District, the study area of Kathmandu with a population of 172,000 (1970 estimate) consists of the 340,000 population (1970 estimate) of the District. The census population of the District in 1971 was 354,000.

Using a t table, it was found that the sampled mean was not different from the census mean even at the 5 per cent significant level (one-tailed test).[1] This level of reliability was assumed to hold true for the other variables also, except for a few sensitive variables such as those related to household incomes. Sampling errors tend to increase as the level of aggregation decreases.[2] For this reason, the error would have increased at a greater degree for statistical tracts where the sample size were fairly small, ranging mostly from 10 to 29 (Table 4-5). But more accuracy was assured for a given sample size because of the stratified sampling and since most statistical tracts were relatively homogeneous (see supra, pp. 77-78). For example, in a statistical test on family size even for a statistical tract with a sample size as small as 10, the degree of accuracy was considered to be impressive -- it was inferred with 95 per cent confidence that the estimated family size for this tract would be within an accuracy of ± 1.6 persons. This degree of accuracy increased fantastically for a statistical tract with a sample size of 47; it was inferred with 95 per cent confidence that the estimated family size for this tract would be within an accuracy of ± .4 person. For the total aggregation of the Kathmandu study area with a sample size of 1,256 which can be considered a large sample size as a rule of thumb, the estimated house-

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[1]For the application of the t test, see Blalock, Social Statistics, pp. 144-49.

[2]See Murdie, Metropolitan Toronto, p. 187.

hold size would be within an accuracy of ± 0.2 person at the 95 per cent confidence interval (see supra. pp. 76).[1]).[1]

TABLE 4-5

SAMPLE SIZE DISTRIBUTION OF STATISTICAL TRACTS

Sample size (Number of households)	Total statistical tracts
7	1
10 - 19	21
20 - 19	17
30 - 49	13

2. Non-Sampling Errors

a. Coverage Errors. An undercount of the population might have occured, particularly in the inner city. For example, an undercount of greater than 10 per cent was noticed in a 20 per cent sample survey of Toronto, Canada.[2] An undercount was noticed in this study in drawing samples also for the inner city (see supra, pp. 75-76).

b. Response and Assessment Errors. Errors in responses of interviewees and assessments of interviewers could have been incurred in this sampling survey. For example, biases of interviewers in assessing the housing conditions could not have been avoided. Another case would be the rough estimate of the land value in the completely built-up part of the inner city where respondents could not tell the

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[1]The following formula was used for these statistical tests: Interval estimate = $\mu \pm \frac{1.96\ (\sigma)}{\sqrt{N}}$. Where 1.96 = 95% confidence level σ = standard deviation; N = sample size; μ = true mean. See Blalock, Social Statistics, p. 166.

[2]See Murdie, Metropolitan Toronto, p. 187.

land value in almost all cases. Responses concerning family incomes were seriously misleading. The "type category" of items 27 and 28 in the questionnaire (Appendix 1) proved to be ambiguous in the Nepalese situation; so answers on these items were regarded as of little value.

c. Processing Errors. Errors might have been attributed to coding and keypunching although satisfactory checks were conducted to uncover major processing errors.

3. Overall Reliability

Despite the possibilities of these aforementioned errors, the data reliability was believed to be satisfactory for this research. Earlier mentioned statistical tests (see supra, pp. 91-93) showed that at the 95 per cent confidence level, the estimated family size was within an accuracy of 1.6 persons for a statistical tract of sample size 10, within an accuracy of 0.4 person for a statistical tract of sample size 47, and within an accuracy of 0.2 person for Kathmandu of sample size 1,256. These intervals within which the true figures would lie were considered adequate for this research. Moreover, for a qualitative evaluation of this sampling survey, a cross examination was performed with some comparable data from the 1961 census of Nepal (Table 4-6). This table indicates that there is a very small difference between the estimated figures from the sampling survey and the figures obtained from the 1961 census of Nepal for all variables except the percentages of Hindus and Buddhists. All this led the researcher to believe that other data of the sampling survey also should be of the same quality, and thus the quality of this sampling survey as a whole was believed to be satisfactory for this research.

TABLE 4-6

COMPARISON BETWEEN SAMPLING ESTIMATES AND CENSUS FIGURES ON SOME VARIABLES[1]

Variable name	*1961 Census figures for the Kathmandu District	1970 Sampling estimates for Kathmandu
Male/female ratio	1.06	1.02
Family size	5.6**	5.78
Percentage of people by religion		
Hindus	73.8	81.1
Buddhists	25.3	17.7
Moslems	0.5	0.6
Others	0.4	0.6
Percentage of people by age group		
Between 0- 4 years	12.27	13.08
Between 5-14 years	22.66	23.28
Between 15-19 years	10.15	11.21
Between 20-49 years	41.74	40.57
50 and more years	12.10	12.05

*Source: Central Bureau of Statistics, Rashtria Jana-Ganana: 2018 Ko Parinam (National Census: Result of 1961) (3 vols., Kathmandu: Central Bureau of Statistics, Ministry of Economic Planning, His Majesty's Government of Nepal, 1966-67). **Family size in 1971 was 5.83 according to the 1971 census.

[1]The reader should be cautious in comparing the data in this table because of the difference in time and areal unit. The time difference between the two sets of data is nine years, and Kathmandu consists of only about 50 per cent of the population of the Kathmandu District.

V. ANALYTICAL APPROACHES

A. Factor Analysis

1. Application

It is generally recognized that in the continuing effort of science to establish theoretical systems which will account for observed phenomena, identification and measurement of basic variables are of paramount importance.[1] Now in various fields of social and natural sciences, factor analysis technique is considered as a useful means to achieving this scientific goal, since it is a rigorous tool to identify fundamental and meaningful dimensions of a multivariate domain. Guilford appropriately remarks:

> More and more it is being realized that the end product of science is in the form of statements concerning the interrelationships between things. It is also realized that the most fruitful type of concept of the things related is in the form of variables or dimensions.... In psychology and the social sciences, where the number of potential variables is very large and the useful variables that we need for economical dependable descriptive purposes are overlaid with multiplex manifestations, the demand for some method that will facilitate the discovery of those underlying variables is very great. It is in the fulfillment of this objective that we find factor-analysis methods to be of greatest value.[2]

Regarding application of factor analysis, Rummel sums: "interdependencies between variables can be delineated. Masses of data can be reduced to a parsimonious subset. Data can be scaled or transformed.

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[1] B. Fruchter, Introduction to Factor Analysis, with a Foreword by J. P. Guilford. (Princeton, New Jersey: D. Van Nostrand Company, Inc., 1954), p. 1.

[2] J. P. Guilford, "Foreword," in Introduction to Factor Analysis, by Fruchter, p. vii.

Hypotheses and theories can be tested. An empirical domain can be explored and mapped. Causal analysis can be done. And an empirical typology can be defined."[1]

Since procedure of factor analysis entails a considerable amount of computation, and becomes impractical without the help of a computer when the date matrix is of 10 or greater, the technique, inspite of its merits as mentioned above, was not widely used until recent years when the advancement of computer technology made computing a lot easier. Now, many a computer center can handle a data matrix of an order as big as almost 200 for factor analysis. In the beginning, application of factor analysis was mainly in the field of psychology because of the fact that it had its origin in that field. However, in recent years, there has been an ever increasing application of factor analysis to a variety of fields other than psychology, such as sociology, political science, economics, urban affairs, geography, geology, meteorology, engineering, biology and medicine.

Although a study of a geographic nature applying factor analysis was started at an early date,[2] geographers have used it in their analyses on a wider scale only recently. A recent survey indicated that between 1954 and 1965, there were only five doctoral dissertations written for geography departments at U. S. universities and only three articles published in the major geographical periodicals in the United

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[1]Rummel, Applied Factor Analysis, p. 13.

[2]See Hagood, Danilevsk, and Beum, "Use of Factor Analysis," 216-33.

States that used factor analysis or other multivariate techniques as a research tool.[1] But after the mid 1960's, the number of geographical studies using factor analytical techniques has increased tremendously. Now there exist a large number of factorial studies on cities alone[2] (see Chapter II, pp. 27-28). Examples of factorial studies conducted by geographers include economic regionalization,[3] climatic regionalization,[4] classification of cities,[5] and analysis of commodity flow patterns.[6]

2. Selection of Variables

There are two basic components of factor analysis: (a) common factors which are derived from correlated variables and account for the explained proportion of the total variance of the data matrix, and (b) a unique factor which accounts for the remaining variance (unexplained

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[1]P. Lavalle, H. McConnell, and Robert G. Brown, "Certain Aspects of the Expansion of Quantitative Methodology in American Geography," Annals of the Association of American Geographers, LVII (June, 1967), 423-36.

[2]For an extensive list of factorial studies on cities, see Berry, Guest ed., Comparative Factorial Ecology, 256-367.

[3]J. H. Thompson, at. el., "Toward a Geography of Economic Health: The Case of New York," Annals of the Association of American Geographers, VII (March, 1962), 1-20.

[4]Dieter Steiner, "A Multivariate Approach to Climatic Regionalization and Classification," Tijdschrift van Het Koninklijk Nederlandsch Aardrijkskundig Genootschap, XXCII (1965), 329-47.

[5]Qazi Ahmad, Indian Cities: Characteristics and Correlates, (Chicago: University of Chicago, Dept. of Geog. Research Paper No. 102, 1965); C. A. Moser and W. Scott, British Towns (London: Oliver and Boyd, 1961); Leslie King, "Cross-Sectional Analysis of Canadian Urban Dimensions: 1951 and 1961," Canadian Geographer, X (1966), 205-24.

[6]B. J. L. Berry, Essays on Commodity Flows and the Spatial Structure of the Indian Economy, (Chicago: University of Chicago, Department of Geography Research Paper No. 111, 1966).

proportion of the total variance). The unique factor consists of two kinds of variance--that due to the particular selection of variables in the study, and that due to the unreliability of measurement. If additional variables are added to the data matrix which would be correlated with variables accounting for the uniqueness, their correlations might formulate further common factors. In general, if uncorrelated variables are used for factor analysis, the result may end up with a unique factor whereas correlated variables will result in common factors. Therefore, it was inferred by the researcher that inclusion of variables with low intercorrelations would contribute little in deriving common factors. Also the inclusion of highly intercorrelated variables does not add too much in increasing the number of common factors. Since the primary concern of this research was with common factors, redundant variables were excluded from factor analysis as follows:

(A) If two or more variables were highly correlated with $r \geq |.95|$ only one of them was selected and others were dropped. But exceptions were made for four sets of variables each consisting of two variables because their high degree of association was considered to be interesting. These four sets of variables consisted of birth places of household heads and their fathers, Newari mother tongue, and Newar household heads.

(B) Variables were grouped under major socioeconomic subheadings such as age group, marital status and education (see Appendix IV). If certain variable of a group explained virtually all other variables (excluding its group variables) better than other variables of its group did, this variable was selected while other variables of its groups were deleted.

(C) More than one variable from some groups were selected if they showed different degrees of association with other variables.

(D) Variables which did not have correlation coefficients $\geq|.5|$ with any other variable or variables except their group variables, were deleted.

Thus 196 variables were reduced to 100 variables. Reducing the number of variables in the rational basis mentioned above (especially in this case with a large number of variables) was considered to be an initial stage of sorting out redundant variables as well as economically desirable since the reduction of the number of variables reduces the computer time at a geometrical rate in performing factor analysis program, thereby making the use of computer time more efficient.

When results of factor analysis, in which 100 selected variables from the correlation matrix were used, was examined, it was discovered that some unimportant variables which did not seem to be meaningful in interpreting the result, were still included. A variable was considered unimportant if its factor loading was $<|.5|$ on any of the factors even with the varimax rotation or if it was difficult to interpret the variable in a meaningful way. Such 20 unimportant variables were eliminated by examining the result of the first step factor analysis,[1] and only 80 variables were used in the final factor analysis (see Appendix IV).

3. Nature of the Analysis

Factor analysis was used to identify basic socioeconomic dimensions of Kathmandu, and factor scores were computed employing

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[1]Schmid and Tagashira also have used a similar technique in selecting 10 important variables out of 42 variables in their five-stage factor analysis study. See Schmid and Tagashira, "Ecological and Demographic Indices," 194-211.

a special method to examine their spatial patterns. Only pertinent aspects of factor analysis, and the method used to compute factor scores are presented here since there are several excellent books and articles on factor analysis.[1]

a. Important Steps Involved in the Analysis. Factor analysis model[2] was used in its strict sense which can be written as:

$$Z_{ji} = a_{j1}F_{1i} + a_{j2}F_{2i} + \ldots + a_{ip}F_{pi} + d_jU_{ji}$$

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[1]See Harry H. Harman, Modern Factor Analysis (Chicago: University of Chicago Press, 1967); W.W. Cooley and P.R. Lohnes, Multivariate Procedures for the Behavioral Sciences (New York: John Wiley & Sons, Inc., 1962), pp. 151-85, hereinafter cited as Cooley and Lohnes, Multivariate Procedures; Fruchter, Introduction to Factor Analysis; Rummel, Applied Factor Analysis; and R.J. Rummel, "Understanding Factor Analysis," Journal of Conflict Resolution, XI (1967), 444-80.

[2]Factor analysis in its general sense includes both "component analysis" and "factor analysis" methods, that transform a set of intercorrelated variables in a small number of basic dimensions called factors. Although there are many things in common between principal component analysis and factor analysis, there are important mathematical and conceptual differences between them. See King, Statistical Analysis in Geography, pp. 165-66. In its strict sense, factor analysis is different from component analysis in the use of its communalities in the principal diagonal of correlation matrix. In component analysis, unities are employed in the principal diagonal as communalities and there may be as many factors as there are variables, thereby explaining 100 per cent variance of the data matrix, and there are no error terms in this model. But in factor analysis, communalities which are usually less than unity are estimated, the total number of common factors are smaller than the number of variables, and there is usually a proportion of variance unexplained by its common factors (see supra, p. 98). Thus the basic advantage of factor analysis over component analysis is that the former comes closer to real world in term of indicating the explained proportion of the total variance of a system by its factors. Moreover, Lawley and Maxwell exphasize that factor analysis can be used to test hypotheses as to the number of common factor underlying the set of variables in the research problem. See Lawley and Maxwell, Factor Analysis, cited by King, Statistical Analysis in Geography, p. 185.

where z_{jl} = standard score on variable j for individual i; a_{jl} = factor coefficient for the first factor on variable j; F_{1i} = factor score for individual i on the first factor; p = number of common factors; i = number of individuals; j = number of variables; and $d_j U_{ji}$ = residual error (unique factor). In this expression, the standard score on variable j for individual i is expressed as a linear function of p common factors and a unique factor.[1] The analysis was performed at the University of Pittsburgh Computer Center using a factor analysis program called BMDX72.[2] Some important steps involved in the analysis were as follows:

(A) The analysis started with a raw data matrix of 52 cases and 80 variables (Appendix IV). Correlation coefficients between all the variables were computed.

(B) Unities were used as initial estimates of communalities[3] for the diagonal elements in the correlation matrix. These unities

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[1]See Cooley and Lohnes, Multivariate Procedures, p. 160; Harman, Modern Factor Analysis, p. 15.

[2]W. J. Dixon, ed., BMD: Biomedical Computer Programs, X-series Supplement (Los Angeles: University of California Press, 1970), pp. 90-103.

[3]There are two kinds of communality estimates popularly used in factor analysis problems: unities and the square of the multiple correlation. Cattell insists that the former is the upper limit of any communality and the latter is the lower limit, and that the true value lies between these two limits. He further argues that for a data matrix of 50 or even 100 variables, the square of the multiple correlation is likely to be decidedly short of unity. See R. B. Cattell, "Factor Analysis: An Introduction to Essentials I and II," Biometrics XXI (1965), 198-199, cited by King, Statistical Analysis in Geography, p. 186.

were replaced by new estimated communalities by iteration. This step of iteration was repeated from the beginning and was continued until the maximum change in the communality estimates was less than .001.

(C) Factors were extracted in a descending order of magnitude and were orthogonal or uncorrelated to one another. Technically, the procedure of extracting orthogonal factors is that factor which accounts for as much of the total variance as possible is derived first from the correlation matrix, then residual matrix (unexplained by the first factor) is formed. A second factor is extracted from the residual matrix, which explains as much of the total variance as possible in the residual matrix. By definition the second factor must be orthogonal (uncorrelated) to the first. This process continues until all the possible common factors are extracted. The matrix that shows the

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Nevertheless, Haynes discovered in his analysis that the difference produced by the two methods of solving the community problem was insignificant. See K.E. Haynes, "Spatial Change in Urban Structure: Alternative Approaches to Ecological Dynamics," Economic Geography, XLVII, Supplement (June, 1971), 325-26, hereinafter cited as Hynes, "Urban Structure." In this research also the difference was found to be insignificant. Tyler and Micheal believed that unities were a good estimate for their study and they also suggested that unities might be good estimate for a large set of data exceeding 10 variables. See F. Tyler and W.B. Micheal, "An Empirical Study of the Comparability of Factor Structure When Unities as Communality Estimates Are Used," Educational and Psychological Measurement, XVIII (1954), 347-54, cited by Rummel, Applied Factor Analysis, p. 347. Rummel suggests, "Perhaps if the number of variables is greater than around 70 or so, the off-diagonal elements may be so numerous relative to the diagonal values that the factor structure and interpretation is invariant of choice of estimate." See Rummel, Applied Factor Analysis, p. 320. One of the advantages of using unities for communality estimates was that a simple straightforward method could be employed in computing factor scores. See Cooley and Lohnes, Multivariate Procedures, p. 164. Therefore, unities were used in the principal diagonal as the initial communality estimates in this research.

proportion of each of the variables by extracted factors is called the factor matrix (see Appendix VII). In this factor matrix, variables are listed along the first column and factors along the first row. Elements of the factor matrix are called loadings and their squares are the proportion of the respective variable explained by each of the factors. The sum of the squares of loadings of each row is called the communality, the proportion of the variable explained by common factors. The sum of the squares of loadings along column for each factor is called the eigenvalue. The proportion of the total variance in the original data matrix explained by a factor can be obtained dividing its eigenvalue by the total number of variables.

(D) In the unrotated factor matrix, the first factor had high loadings ($\geq |.5|$) for more than 50 per cent of the variables, and at the same time, a large number variables had high loadings (over $|.50|$) on more than one factor. In such a situation, different "clusters" were not distinguishable to test the proposed hypotheses. In this case, orthogonal varimax rotation[1] was preferred to other types of rotations in obtaining

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[1]Rotation techniques are used to achieve "simple structure" in which highly intercorrelated variables are grouped into distinct clusters. There is a number of rotation techniques such as orthogonal (quartimax and varimax) and oblique rotations (oblimax, quartiman, covarimin, biquartimin, binormanin, maxplane, promax and target). See Rummel, Applied Factor Analysis, pp. 368-422. There has been some controversy over whether orthogonal or oblique rotation is better approach. Some grounds for the orthogonal rotation as noted by Rummel are its nature of simplicity, mathematical elegance in the result, conceptual clarity, and amenability to subsequent manipulations and analysis. See Rummel, Applied Factor Analysis, pp. 386-89. The varimax criterion for orthogonal rotation which was developed by Kaiser comes closest to the graphical simple structure (Thurston's simple structure goal). See H. F. Kaiser, "The Varimax criterion for Analytic Rotation in Factor Analysis," Psychometrika, XXIII (1958), 187-200; Rummel, Applied Factor Analysis, pp. 391-93. In this research, factor matrix from orthogonal varimax rotation was considered satisfactory, and other rotations were not attempted.

distinct clusters, by using the Kaiser normalization to transform the unrotated factor matrix to a pattern of "simple structure."[1] Rotations were performed for several combinations of factors as a trial and error method to discover the "best" combination of factors. These combinations of factors were: six factors, seven factors, eight factors, nine factors, and ten factors.[2] Results from the seven factors combination appeared to be more satisfactory than any other combination. The selection of seven factors for the rotation purpose was a good fit to the scree test criterion as well[3] (Figure 5.1). Moreover, these first seven factors with eigenvalues more than 2.00 accounted for as much as 70 per cent of the total variance, and each additional factor added very little in explaining the variance (see Table 5-1) although there were derived twenty-eight common factors in total accounting for 85 per cent of the

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[1]The simple structure goal of rotation is achieved by rotating the factors around the origin until each factor is maximally colinear with a distinct cluster of vectors delineating separate groups of highly intercorrelated variables. In doing so, there are several requirements that simple structure should satisfy. The idea of simple structure was developed by L. L. Thurston more than two decades ago. See Rummel, Applied Factor Analysis, pp. 376-81; L. L. Thurston, Multiple-Factor Analysis (Chicago: University of Chicago Press, 1947).

[2]After the tenth factor, eigenvalue for all additional factors was less than 1.0; hence they were not used for rotation since usually only factors with eigenvalue more than 1.0 are considered statistically significant.

[3]If the number of factors is plotted against the proportion of variance it explains, the curve levels off in the scree test when trivial factors (random error factors) are reached. The point where the curve starts leveling off is the factor cutoff point. See Rummel, Applied Factor Analysis, pp. 361-62.

Figure 5-1. Selection of the best number of factors for the rotation purpose by the scree test criterion.

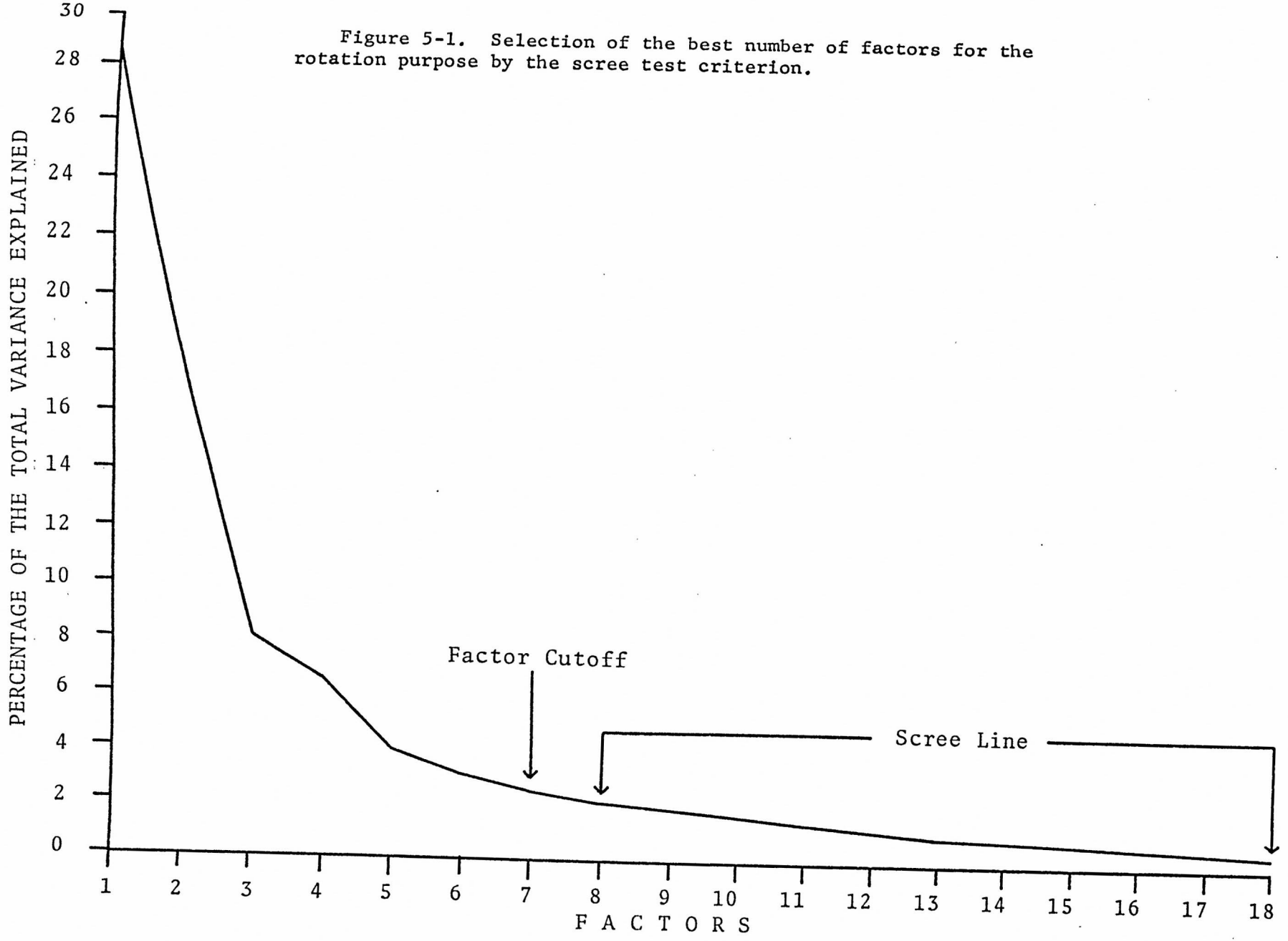

TABLE 5-1

EIGENVALUES AND CUMULATIVE EXPLAINED PERCENTAGES OF THE TOTAL VARIANCE OF UNROTATED FACTORS

Unrotated Factors	Eigenvalues	Cumulative Percentages of the Total Variance
1	22.7321	28.42
2	14.0475	45.98
3	6.4485	54,04
4	5.2872	60.64
5	3.2297	64.68
6	2.6725	68.02
7	2.0895	70.63
8	1.8291	72.92
9	1.4284	74.71
10	1.2372	76.25
11	0.9679	77.46
12	0.9190	78.61
13	0.8937	79.73
14	0.7708	80.69
15	0.6724	81.53
16	0.5552	82.23
17	0.4917	82.84
18	0.4165	83.36
19	0.3726	83.83
20	0.3443	84.26

total variance. Therefore, the first seven factors were considered to be the most satisfactory number for the rotation purpose.[1]

(E) A conventionally used method of computing factor scores was modified to compute factor scores which appeared to be more meaningful in showing spatial patterns of factors for this research. The modification used is described below.

b. Computing Factor Scores. When factor scores computed by the BMD factor analysis program were mapped, it was difficult to interpret their spatial patterns, especially of minor factors with small eigenvalues although it was possible to interpret the factor matrix resulting from the orthogonal varimax rotation, in which important variables with high loadings on each factor were quite meaningful and considered to be representative of the real world. Thus the question arose as to why these contradictory conclusions were derived from the same analysis.

By using a significance test of the correlation coefficient,[2]

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[1]Rotations can create distorting results if enough attention is not given to selecting the "best" number of factors. In rotation the exclusion or inclusion of even a small factor may change the rotated factor structure, and loadings and interpretation of all selected factors may differ from the same data. But there is not a perfect method of selecting the "best" number of factors and "the best number of factor to use depends on the researcher's judgment." However, there are several rules of thumb that can be employed to select the "best" number of factors such as residual, loading distributions, scree test, interpretability, strength of reliability, eigenvalue-one, discontinuity, and overfactoring. See Rummel, Applied Factor Analysis, pp. 349-67.

[2]See Blalock, Social Statistics, pp. 302-305.

it was found that a factor loading of $|.3|$ was not significant at .01 level, but $|.4|$ was significant. Therefore, $|.4|$ loading was considered as a dividing line between important variables and unimportant variables of a factor. Some researchers have considered only factor loadings greater than $|.6|$ to avoid spurious loadings in their factorial studies.[1] Here the logic was that variables which do not load over a specified minimum value should be eliminated in a factor analysis problem[2] to get a picture representative of reality. This logic is consistent with generally used basis in identifying a factor with the help of factor loadings, in which variables only with high loadings are used in identifying a factor and variables with low loadings are completely ignored. So the same thing was considered appropriate in computing factor scores by using only variables with high loadings (in this case $\geq|.4|$) and ignoring unimportant variables.

At this point it was conjectured that the inclusion of unimportant variables in computing factor scores might not be meaningful since their loadings could be spurious, and their cumulative effect would overshadow the net contribution of important variables since absolute factor loadings for many of them were greater than zero. Especially, such factor scores may distort extremely spatial patterns of minor factors with small eigenvalues in a factor analysis in which there is a large set of variables. In this study, the cumulative total

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[1]See Bourne and Barber, "Small Urban Centers in Canada," 265.

[2]See Haynes, "Urban Structure," 326.

of squared loadings of unimportant variables for the rotated Factor VII was 1.548 which was 50 per cent larger than the cumulative total (1.035) of squared loadings of important variables. This finding revealed that the inclusion of unimportant variables in computing factor scores which is done generally in computer programs, had distorted spatial patterns of factors. Therefore, unimportant variables were eliminated assigning zero values for their loadings, and only important variables were used to compute factor scores[1] employing the following formula:

$$F_{ij} = A_{ik} \cdot B_{kj}$$

where F_{ij} = factor score matrix in standardized form; A_{ij} = original data matrix in standard form; B_{jk} = factor loading matrix; i = number of cases; j = number of factors; k = number of variables. This is a straightforward method of computing factor scores if unities are used for initial communality estimates in diagonal elements of correlation matrix.[2]

Spatial patterns revealed by these "controlled factor scores"[3] turned out to be more meaningful than the factor scores computed by the

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[1]Cattell has highly recommended a similar approach of computing factor scores called "composite estimates" which involves selecting a group of variables with high loadings on the particular factor and summing their values for each case. Variants of this approach entail weighting the data by the variable loadings on the factors and standardizing the data prior summation. This sum is the factor score estimate. See R. B. Cattell, Personality and Motivation Structure and Measurement (Yonders-on-Hudson: World Book, 1957), pp. 287-96, cited by Rummel, Applied Factor Analysis, p. 441; Ibid, p. 172 and pp. 441-42. See also Tulasi R. Joshi, "Toward Computing Factor Scores," in International Geography 1972, Vol. II, ed. by W. Peter Adams and Frederick M. Helleiner (Toronto: University of Toronto Press, 1972), pp. 906-08.

[2]See Cooley and Lohnes, Multivariate Procedures, p. 164

[3]Hereinafter "controlled factor scores" refer to the factor scores computed by the author's modified method of computing factor scores.

BMD program. Results from both methods were about the same for the first two factors, but their degrees of association decreased for minor factors with smaller eigenvalue (Table 5-2). For minor factors with small eigenvalue, controlled factor scores exhibited more meaningful spatial patterns than the factor scores computed from the BMD program. For example, spatial patterns of Factor VII from the factor scores of the BMD program appeared to be extremely distorted in this research whereas they seemed to be representative of the real world from the controlled factor scores.

TABLE 5-2

CORRELATION COEFFICIENTS BETWEEN CONTROLLED FACTOR SCORES AND BMD FACTOR SCORES

Factors	1	2	3	4	5	6	7
Correlation Coefficients	.933	.941	.883	.831	.835	.769	.564

B. Analysis of Variance

Spatial patterns of geographic phenomena have been examined in several ways including the use of cartographic techniques[1] and

[1]See R. J. Johnston, "The Location of High Status Residential Areas," Geografiska Annaler, XLVII, Series B (1966), 23-35; P. D. Peters, Residential Sectors and Urban Expansion (Ithaca, New York: Centre for Housing and Environmental Studies, Division of Urban Studies, Cornell University, 1964), cited by Murdie, Metropolitan Toronto, p. 152.

analysis of variance.[1] The latter can be used to test for differences among the means of two or more samples. In other words, it helps examine whether two or more groups are different from one another at the desired significant level. Murdie suggests that probably an analysis of variance design is the most useful methodology for examining spatial patterns.[2] Rees also suggests that factorial studies need to be supplemented by analysis of variance for spatial characteristics of cities.[3] Moreover, in order to test the concentric and sector models in this study, an analysis of variance design was considered an appropriate technique. Therefore, it was employed in this research using the controlled factor scores on each of the socioeconomic dimensions of Kathmandu. Since statistical treatment on analysis of variance can be found in any standard statistical book,[4] only essential aspects of the methodology that were used to perform analysis of variance for this research are described below.

(A) Three concentric zones were established drawing circles from the center of the central business district (Figure 5-2). The

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[1]See Dennis C. McElrath, "The Social Areas of Rome: A Comparative Analysis," American Sociological Review, XXVII (August, 1962), 276-91; Dennis C. McElrath and John W. Barkey, "Social Physical Space: Models of Metropolitan Differentiation," Northwestern University, October, 1964. (Mimeographed.), cited by Murdie, Metropolitan Toronto, p. 25; Anderson and Ageland, "Social area analysis"; Joshi, "Income in Pittsburgh."

[2]Murdie, Metropolitan Toronto, p. 152.

[3]See Rees, "Factorial Ecology," 220.

[4]See Blalock, Social Statistics, pp. 242-72; King, Statistical Analysis in Geography, pp. 72-81; Gregory, Statistical Methods and Geography, pp. 133-50; Moroney, Facts from Figures, pp. 371-457.

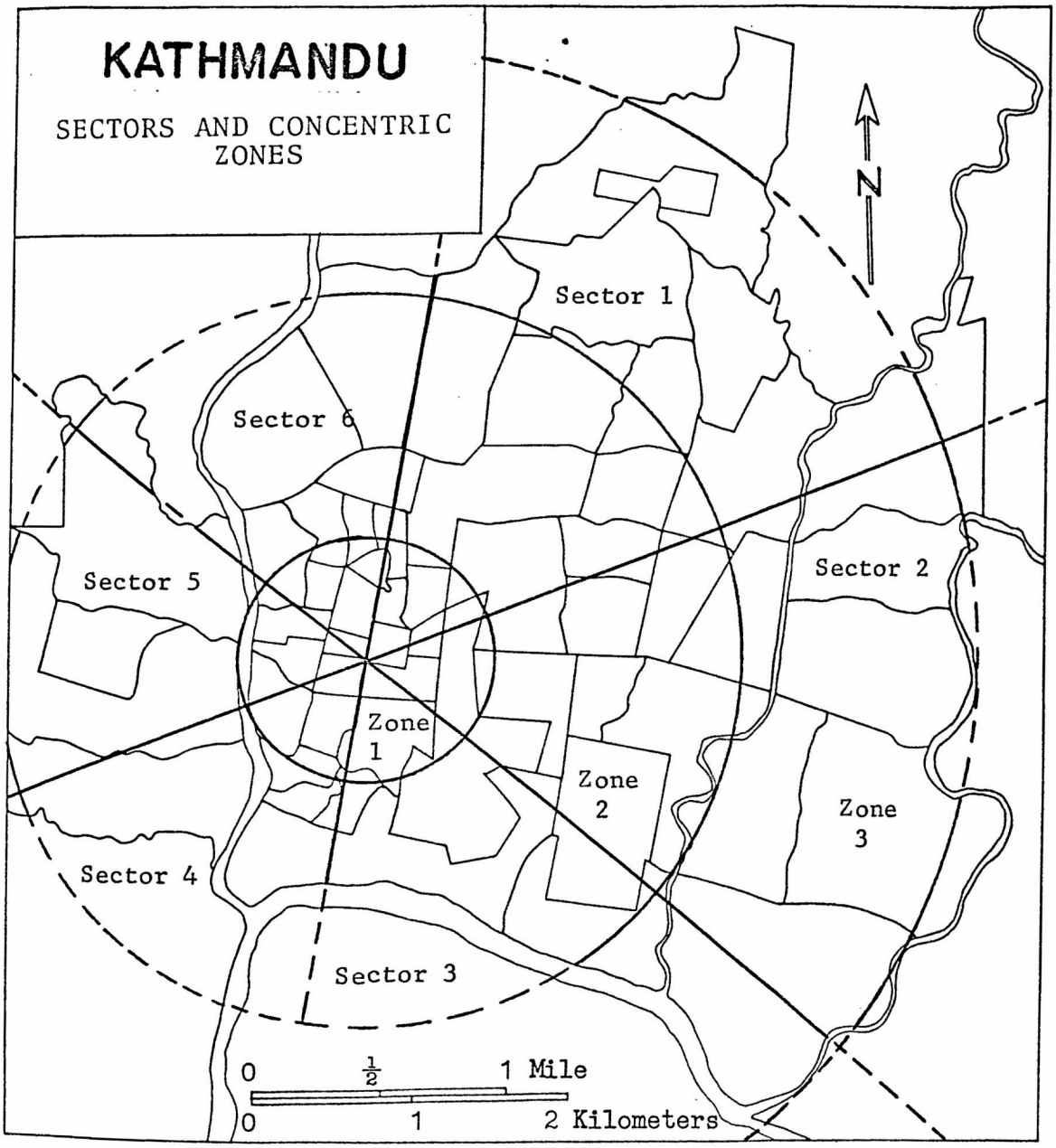

Figure 5-2. Design of sectors and concentric zones.

innermost concentric zone was determined drawing a circle with a radius of half a mile, which included almost all of the old city (inner city). The other two outer concentric zones were designed drawing circles at an interval of a mile. The middle concentric zone included all parts of the outer city and the western fringe area, and the outer concentric zone consisted of the eastern fringe area.

(B) To establish sectors, a north-south base line was drawn along a street passing through Indrachowk, and six sectors were marked off at 60° interval (Figure 5-2).

(C) A pie shaped dimension of 60° for sectors, a radius of half a mile for the innermost concentric zone with a high population density, and an interval of a mile for the two outer concentric zones with relatively low population density were considered suitable to establishing concentric zones and sectors for the following reason:

> If the smoothing or filtering function is too fine, there will be no difference between the original data distribution and the processed data, and as a consequence the patterns will be no clearer. Similarly, if the smoothing or filtering function is too coarse, all the important variations will be 'washed out' and no pattern will emerge. To be specific, if the sectors are so small that each tract is in a sector by itself, no averaging or smoothing will occur. At the other extreme, if there are only two 180° sectors, pattern differentiation is likely to be obliterated.[1]

(D) In testing the concentric zone and sector models for each of the socioeconomic dimensions, null hypotheses at the .05 significant level formulated in analysis of variance were as follows:

(a) Concentric zone means are equal or

$$C_1 = C_2 = C_3$$

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[1]Haynes, "Urban Structure," 330.

where C_1 = inner concentric zone, C_2 = middle concentric zone, and C_3 = outer concentric zone (Figure 5-2). Rejection of these null hypotheses would tend to confirm the concentric interpretation of the urban socioeconomic structure.

(b) Sector means are equal or

$$S_1 = S_2 = S_3 = S_4 = S_5 = S_6$$

where $S_1, \ldots, S_6$ represent respective sectors starting with the north-east sector in a clock-wise direction (Figure 5-2). Rejection of these null hypotheses would tend to confirm the sectoral interpretation of the urban socioeconomic structure.

(E) A BMD program for analysis of variance--one way design[1] was used to test the null hypotheses mentioned above. Results of the analysis are discussed in next chapter.

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[1] W.J. Dixon, ed., BMD: Biomedical Computer Programs (Los Angeles: University of California Press, 1967), pp. 486-94.

VI. SOCIOECONOMIC ECOLOGY OF KATHMANDU

Seven fundamental socioeconomic factors (dimensions) were revealed for the socioeconomic ecology of Kathmandu, by performing factor analysis on the 80 selected socioeconomic variables for the 52 statistical tracts. These seven factors accounted for 70 per cent of the total variation of the variables (Table 6-1). Descriptive names that were given to these factors on the basis of variables on which the factors were highly loaded (associated) were as follows:

Factor I: Ethnic-immobility Dimension

Factor II: Economic Status Dimension

Factor III: Stage in Life Cycle Dimension

Factor IV: Educational Status Dimension

Factor V: Salary Worker Status Dimension

Factor VI: Self-employed Status Dimension

Factor VII: Foreign Origin Dimension

Hereinafter, the two names of each dimension, e.g., Factor I and the Ethnic-immobility Dimension are interchangably used.

A. Ethnic-immobility Dimension (Factor I)

1. Structure

Variables with high loadings on Factor I were related to ethnic characteristics such as percentage of the Newar household heads, and immobility characteristics such as percentage of household heads not moved (Table 6-2). Because of the dominating association of the ethnic and immobility characteristics with Factor I, it was labeled as the

Ethnic-immobility Dimension. This Dimension was closely associated with the Newars and their related characteristics and was found to be the most prominent socioeconomic ecological dimension accounting for as much as 20 per cent of the total variance of the 80 variables. Structural component of this Dimension could be classified as: (a) ethnic characteristics; (b) mobility characteristics; (c) housing characteristics; and (d) other characteristics (Table 6-2).

TABLE 6-1

EIGENVALUES AND EXPLAINED PERCENTAGES OF TOTAL VARIANCE FOR THE ROTATED FACTORS

Rotated Factors	Descriptive Names for the Rotated Factors	Eigenvalues	Explained Percentages of Total Variance
I	Ethnic-immobility Dimension	16.243	20.30
II	Economic Status Dimension	15.085	18.85
III	Stage in Life Cycle Dimension	7.270	9.08
IV	Educational Status Dimension	6.429	8.03
V	Salary Worker Status Dimension	4.437	5.54
VI	Self-employed Status Dimension	4.460	5.57
VII	Foreign Origin Dimension	2.583	3.22
Total		56.507	70.59

a. Ethnic Characteristic. Factor I was highly associated with percentage of Newar household heads (.87) and percentage of household heads with Newari as the mother tongue (.85). The high positive loading of this Factor on percentage of household heads of the Buddhist religion (.70) indicated that there was relatively a large proportion of Buddhists in the Newari group than in any of the other major ethnic groups of Kathmandu (see supra, pp. 63-64); this was apparent also from the positive correlation between percentage of Newar household heads and percentage of Buddhist household heads (.64). Conversely, the Ethnic-

TABLE 6-2

ROTATED FACTOR STRUCTURE OF ETHNIC-IMMOBILITY DIMENSION (FACTOR I)*

Variable No.	Variable Names	Factor Loadings	r with Controlled Factor Scores
	Ethnic Characteristics:		
50.	Hindu household heads (%)	-.72	-.72
51.	Buddhist household heads (%)	.70	.73
53.	Household heads of Newari mother tongue (%)	.85	.89
54.	Household heads of Nepali mother tongue (%)	-.84	-.83
57.	Newar household heads (%)	.87	.91
58.	Brahmin household heads (%)	-.70	-.70
59.	Kshyatriya household heads (%)	-.61	-.63
60.	Household heads of other categories excluding above castes (%)	-.55	-.67
	Mobility Characteristics:		
3.	Number of years household heads lived in Kathmandu	.44	.67
9.	Number of years household heads lived in same house	.72	.86
42.	Household heads lived 0-20 years in Kathmandu (%)	-.40	-.59
44.	Household heads born in Kathmandu Valley (%)	.78	.88
46.	Household heads' fathers born in Kathmandu Valley (%)	.77	.87
47.	Household heads born in Nepal outside Kathmandu Valley (%)	-.80	-.83
48.	Household heads' fathers born in Nepal outside Kathmandu Valley (%)	-.83	-.84
49.	Household heads lived in Kathmandu Valley before to move to present houses including those not moved (%)	.44	.55
66.	Household heads lived alllife in same house (%)	.83	.89
67.	Household heads lived 0-20 years in same house (%)	-.70	-.83
68.	Household heads not moved (%)	.88	.93
69.	Household heads moved from same locality (%)	-.68	-.64
71.	Household heads moved from Kathmandu Valley (%)	-.79	-.79
	Housing Characteristics:		
10.	Age of occupied dwelling units	.57	.71
63.	Owner occupied dwelling units (%)	.57	.70
64.	No-cash-renter occupied dwelling units (%)	-.54	-.50
65.	Occupied dwelling units in more than two family housing units (%)	-.47	-.57
72.	Occupied dwelling units, 41 and more years old (%)	.66	.78
73.	Occupied dwelling units, 0-20 years old (%)	-.54	-.65
	Other Characteristics:		
1.	Distance of occupied dwelling units from the C.B.D.	-.73	-.68
22.	Population density	.71	.72
40.	Household heads who went to work by automobiles (%)	-.48	-.56
74.	Households with radio (%)	.42	.36

*Only variables with $\geq |.40|$ loading on the factor are included.

immobility Dimension had a high negative association with non-Newar characteristics such as percentages of household heads with Nepali as the mother tongue (-.84), Brahmin household heads (-70), Kshatriya household heads (-61) and other household heads -.61). These associations revealed that the Newar community consisted of different characteristics from that of the non-Newars.

b. Immobility Characteristics. The Ethnic-immobility Dimension included several characteristics of immobility (Table 6-2). Its highest positive loading was with percentage of household heads not moved from the house (.88) which was highly correlated with percentage of Newar household heads (.76). This high association meant that relatively a large proportion of Newar household heads did not change their place of residence from the original house in which they were born. This immobile situation for most Newar household heads was quite a natural outcome for several reasons. First, the Newars were the native people of Kathmandu with social linkages and attachments in their own community. Second, they have traditional rights of inheriting parental houses and other property.[1] Third, it was not usually easy for most of them to find a house elsewhere where they could move, because of their low economic condition. So it was just convenient and desirable for them to settle down in their parental houses rather than to move elsewhere. Consequently, quite a large number of these people would spend their whole life in the same house where they were

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[1]Only men are entitled to inherit parental property. However, legally, females can inherit parental property after the age of 35 years if they remain unmarried.

born. In the inner city where mainly Newars were concentrated, many of the statistical tracts were observed having from 60 per cent to 87 per cent of the household heads who did not move from their house of birth. Furthermore, this immobile nature of the Ethnic-immobility Dimension was substantiated by the extremely high correlation between its two highly loaded variables--percentage of household heads born in the Kathmandu Valley and percentage of household heads' fathers forn in the Kathmandu Valley; the correlation coefficient was as high as .97. The loading of the Dimension was .78 on percentage of household heads born in the Kathmandu Valley and .77 on percentage of household heads' fathers born in the Kathmandu Valley. The Dimension was positively related with also the number of years household heads lived in the same house (loading .72).

The Dimension showed negative associations with mobility characteristics--it was negatively loaded on percentage of household heads born in Nepal outside the Kathmandu Valley (-.80), percentage of household heads' fathers born in Nepal outside the Kathmandu Valley (-.83), percentage of household heads lived in the same house less than 21 years (-.70), and percentage of household heads moved to the house from the Kathmandu Valley (-.79).

As a whole, the Ethnic-immobility Dimension portrayed two major groups of people--the native Newars with relatively immobile characteristics, and the Parbates with relatively mobile characteristics, that included mainly the Brahmins and the Kshatriyas who migrated to Kathmandu from hilly areas of Nepal.[1]

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[1]For further discussion on major ethnic groups of Kathmandu, see supra, pp. 61-70.

c. Housing Characteristics. Housing characteristics such as age of occupied dwelling units, percentage of occupied dwelling units over 40 years old, percentage of occupied dwelling units less than 21 years old, and percentage of owner occupied dwelling units, showed a fairly strong association with the Ethnic-immobility Dimension; the loadings ranged from $|.47|$ to $|.66|$ (Table 6-2). In general, statistical tracts with high values of the Dimension consisted of relatively few new houses (less than 2 years old), relatively large number of old houses (over 40 years old), and relatively large proportion of owner occupied dwelling units.

d. Other Characteristics. The distance of occupied dwelling units from the center of the central business district (loading -.73), and population density (loading .71) were among the outstanding variables highly associated with the Ethnic-immobility Dimension. These negative and positive loadings suggested that statistical tracts with high values of the Dimension were concentrated in the inner city (Figure 6-1) with a high population density.

2. Spatial Patterns

As it was mentioned above, the Ethnic-immobility Dimension was negatively associated with distance of occupied dwelling units from the center of the central business district. This centralized pattern of the Dimension can be clearly seen in Figure 6-1. Spatial patterns of the Dimension were further examined by analysis of variance. The analysis of variance for all the concentric zones indicated that variation between the concentric zones was significant even at the .001 level (Table 6-3). Furthermore, the analyses of variance between

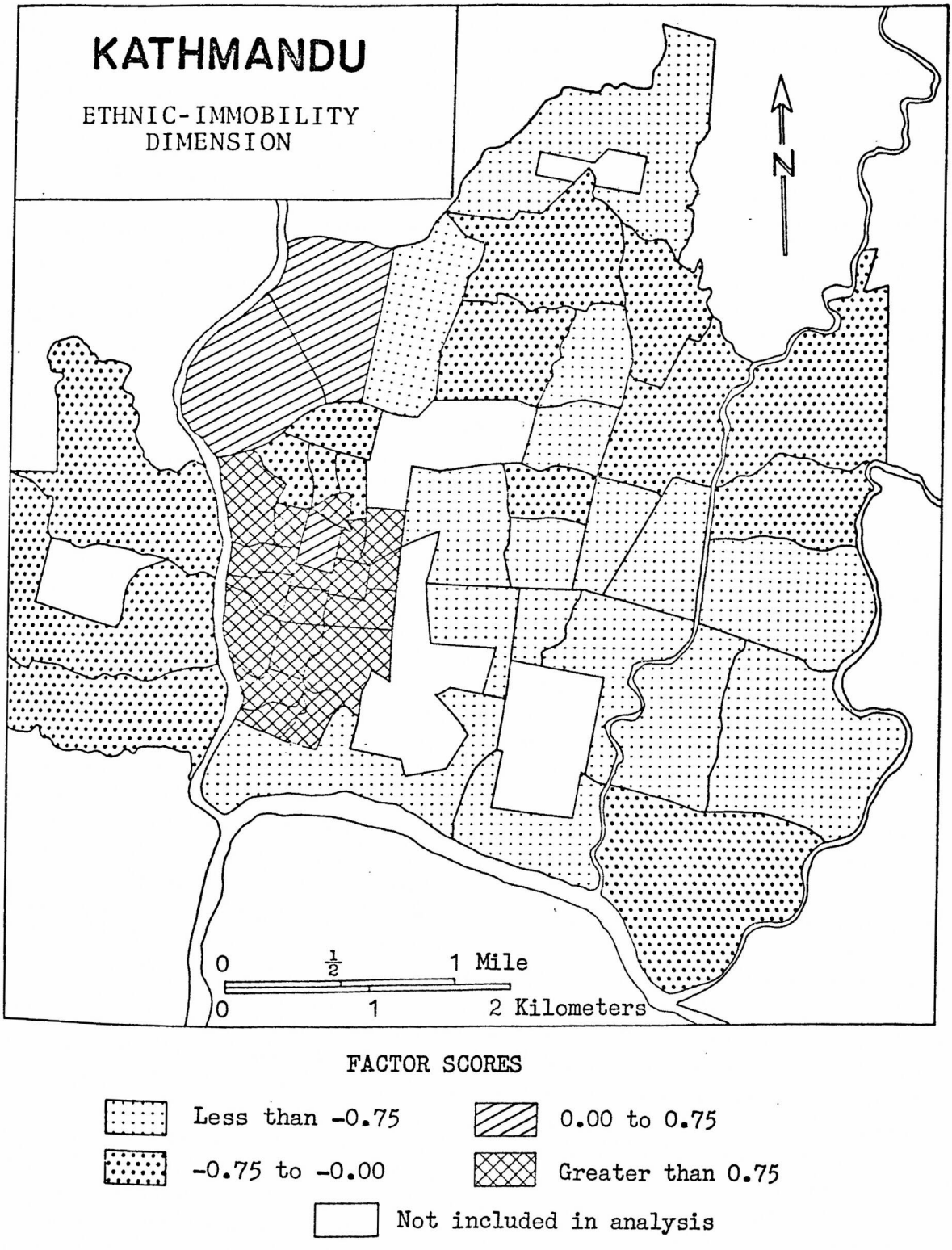

Figure 6-1. Spatial patterns of Factor I (Ethnic-immobility Dimension).

TABLE 6-3

ANALYSES OF VARIANCE FOR CONTROLLED FACTOR SCORES OF ETHNIC-IMMOBILITY DIMENSION CLASSIFIED BY ZONES AND SECTORS

		Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio
Zones:					
All Zones	Between Groups	29.3013	2	14.6506	31.6273 ***
	Within Groups	22.6981	49	0.4632	
1 and 2	Between Groups	22.5100	1	22.5100	43.6138 ***
	Within Groups	20.1287	39	0.5161	
2 and 3	Between Groups	0.8019	1	0.8019	1.3167
	Within Groups	21.3153	35	0.6090	
3 and 1	Between Groups	21.9649	1	21.9648	133.3802 ***
	Within Groups	3.9523	24	0.1647	
Sectors:					
All Sectors	Between Groups	17.7374	5	3.5475	4.7628 **
	Within Groups	34.2621	46	0.7448	
1 and 2	Between Groups	1.2841	1	1.2841	1.5095
	Within Groups	20.4163	24	0.8507	
2 and 3	Between Groups	3.5634	1	3.5634	5.2794 *
	Within Groups	10.1244	15	0.6750	
3 and 4	Between Groups	1.4735	1	1.4735	1.9617
	Within Groups	6.7603	9	0.7511	
4 and 5	Between Groups	0.2389	1	0.2389	0.3679
	Within Groups	5.8456	9	0.6495	
5 and 6	Between Groups	0.4404	1	0.4404	0.8081
	Within Groups	7.0855	13	0.5450	
6 and 1	Between Groups	2.3489	1	2.3489	2.8251
	Within Groups	18.2921	22	0.8315	

* Significant at the .05 level.
** Significant at the .01 level.
*** Significant at the .001 level.

concentric zones showed that the inner concentric zone was significantly different at the .001 level from both the middle and outer concentric zones, whereas the latter two zones were not different even at the .05 significance level. These conclusions suggested that the Ethnic-immobility Dimension was distributed in a highly clustered pattern with its high values in the inner city and low values in the outer city and fringe areas. As a matter of fact, all areas outside the inner city except the Naya Bazar area, experienced negative values of the Dimension.

The analysis of variance for all sectors indicated that sectors were significantly different at the .01 level but not at the .001 level (Table 6-3). Among adjoining sectors, only sector 2 and sector 3 were significantly different at the .05 level but not at the .01 level, while other adjoining sectors were not significantly different even at the .05 level.

From the analyses of variance and cartographic representation, the Ethnic-immobility Dimension appeared to be in conformance more with the concentric interpretation than the sectoral interpretation of urban structure.

B. Economic Status Dimension (Factor II)

1. Structure

Highly loaded variables on Factor II were related to housing characteristics, luxurious household items, income characteristics, and foreign origin characteristics (Table 6-4). Since all these variables were related to economic aspects of households, Factor II was named as the Economic Status Dimension. Variables with loading

TABLE 6-4

ROTATED FACTOR STRUCTURE OF ECONOMIC STATUS DIMENSION (FACTOR II)*

Variable No.	Variable Names	Factor Loadings	r with Controlled Factor Scores
	Housing Characteristics:		
4.	Number of rooms in occupied dwelling unit	.49	.55
5.	Monthly rent of occupied dwelling unit	.94	.95
6.	House value	.67	.76
8.	Rent of renter occupied dwelling unit	.80	.80
12.	Rooms per person	.63	.73
61.	Occupied dwelling units in good condition (%)	.73	.81
73.	Occupied dwelling units 0-20 years old (%)	.45	.46
	Household Items:		
11.	Economic ranking of households	.81	.88
74.	Households with radio (%)	.47	.52
75.	Households with radio or transistor radio (%)	.46	.56
76.	Households with tape recorder (%)	.56	.61
77.	Households with scooter or motorcycle (%)	.66	.71
78.	Households with telephone (%)	.78	.86
79.	Households with automobile (%)	.74	.78
	Income Characteristics:		
19.	Annual family income from salaries and wages	.90	.84
20.	Annual family income from renting house and land	.67	.64
21.	Gross annual family income	.52	.55
80.	Households with family income 20,000 rupees or more (%)	.76	.85
	Foreign Origin Characteristics:		
43.	Household heads born in foreign countries (%)	.73	.79
45.	Household heads' fathers born in foreign countries (%)	.75	.81
52.	Household heads of other than Hindu, Buddhist and Moslem religions (%)	.64	.58
55.	Household heads of Hindi mother tongue (%)	.61	.72
56.	Household heads of other than Newari, Nepali and Hindi mother tongues (%)	.56	.52
70.	Household heads moved in from foreign countries (%)	.78	.76
	Educational Characteristics:		
16.	Persons high school pass or more education (%)	.58	.69
27.	Household heads high school pass or more education (%)	.45	.58
	Other Characteristics:		
7.	Value for a ropani of land	.54	.56
32.	Household heads of business occupation (%)	.40	.42
39.	Household heads having scooter or motorcycle as means of transportation to place of work (%)	.62	.53
40.	Household heads having automobile as means of transportation to place of work (%)	.61	.75
49.	Household heads lived in Kathmandu Valley before to move in the house, including those not moved (%)	-.55	-.60

*Only variables with $\geq|.40|$ loading on the factor are included.

over $|.70|$ on the Dimension included monthly rent of occupied dwelling units (.94), monthly rent of renter occupied dwelling units (.80), annual household income from salaries and wages (.90), percentage of households with income over 20,000 rupees (.76), percentage of household heads born in foreign countries (.75), percentage of occupied dwelling units in good condition (.73), percentage of household heads moved to Kathmandu from foreign countries (.78), economic ranking of households (.81), percentage of households with a telephone (.78), and percentage of household heads with an automobile (.74).

a. Housing Characteristics. Variables related to housing characteristics with high loadings on the Economic Status Dimension revealed the fact that high economic status people had occupied dwelling units of high rent, high value and good condition with relatively more rooms per person; the reverse was true for low economic status people. Since percentage of occupied dwelling units less than 21 years old had a loading of .45 on the Dimension, it was believed that significant proportion of high economic status people lived in new dwelling units whereas the association between percentage of occupied dwelling units over 40 years of age and the Economic Status Dimension was not significant; the loading was only -.28.

b. Household Items. Household items such as radio, tape recorder, scooter, motorcycle, telephone and automobile, as indicated by their high loadings on the Economic Status Dimension (Table 6-4) appeared to be good indicators of that Dimension. The economic ranking variable (loading .81) which was created combining selected household

items including those mentioned above[1] was consequently highly associated with the Dimension. Among the selected household items, telephone and automobile with loadings .78 and .74 respectively were found to be specially very sensitive variables of the Dimension as these were very luxurious items possessed by only people of a high income bracket in Kathmandu.

c. Income Characteristics. Annual household income from salaries and wages, with an outstanding loading as high as .90 on the Economic Status Dimension, was considered to be an important explanatory variable of the Dimension. This high positive loading led to the interpretation that for most of the statistical tracts, the higher economic status was determined by the annual income of households attributed to salaries. About 42 per cent of the total household heads in Kathmandu were employed as salary workers in 1970. Government positions in which about 28 per cent of the total household heads were employed in 1970, semi-government positions, and some private positions at the University, colleges, high schools and banks were not only sources of good incomes for most well-to-do families but were also a symbol of social status. As a result, many of the educated and highly qualified people were lured to these positions. In general, if a household received little or no income from salaries, it meant that the family was in financial trouble or had a low economic status. Since annual family income from renting land and houses had a fairly high loading on the Dimension (.67), it also was believed to be a factor in determining the

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[1]For the method used to create the variable "economic ranking of households," see supra, pp. 88-89.

economic status of households. Other variables related to income characteristics that were significantly associated with the Dimension were gross annual family income (.52) and percentage of households with an annual income of over 20,000 rupees (.76). The relatively low loading of gross annual family income could be mainly because of the fact that information on this variable was not reliable.

d. Foreign Origin Characteristics. The Economic Status Dimension was positively associated with variables related to foreign origin aspects such as percentage of household heads born in foreign countries (loading .73), percentage of households' fathers born in foreign countries (.75), percentage of household heads of other than the Hindu, Buddhist and Moslem religions (.64), percentage of household heads moved to Kathmandu from foreign countries (.78), percentage of household heads of the Hindi mother tongue (.61), and percentage of household heads of other than the Nepali, Newari and Hindi mother tongues (.56). These high loadings could be easily explained on the basis that people coming to Kathmandu from foreign countries had a high economic status. These people were mostly Indians who resided in Kathmandu engaging in business or occupying positions with the Government of India in Kathmandu, and diplomates and technical experts from other foreign countries and international organizations.

e. Educational Characteristics. Educational aspects were not so highly associated with the Economic Status Dimension. The loading of percentage of persons with high school or more education on the Dimension was .58 and the loading of percentage of household heads with high school or more education was .45. This relatively weak association of these educational variables with the Dimension was considered as a function

of the opportunity for higher education available to most people of Kathmandu, ranging from lower middle class to rich families. The desire for education in Kathmandu was rather a recent phenomena, for the bulk of the high schools and colleges as well as the university were established only within the last twenty years. The education system was very inexpensive; for example, the tuition even for the university level was about 15 rupees (U.S. $1.50) per month. Because of this inexpensive education setup, even a lower middle class family could afford to send its students to a high school and the university. But suppose a person from a lower middle class family recently received higher education, it did not mean that he could raise the economic level of his family right away. Generally, he would have to wait some years to get a high salary job.

f. Other Characteristics. Beside the variables mentioned above, there were several other variables significantly associated with the Economic Status Dimension. These variables were land value (loading .54), percentage of household heads in a business occupation (.40), percentage of household heads who went to work by scooter or motorcycle (.62), percentage of household heads who went to work by automobile (.61), and percentage of household heads who lived all their lives in the Kathmandu Valley (-.55). The reverse of the last variable--percentage of household heads moved to presently occupied dwelling units from outside the Kathmandu Valley was considered psotiviely associated with the Dimensions (.55). This positive association led the author to believe that people who came to Kathmandu from outside the Kathmandu Valley including both foreigners and Nepalese, were relatively of a high economic level as compared to the overall economic level of the people native to Kathmandu.

2. Spatial Patterns

The analysis of variance for all the concentric zones indicated that variation between zones was not significant even at the .05 level (Table 6-5). Moreover, the analyses of variance between each pair of concentric zones also revealed that the variation was not significant even at the .05 level except between the outer zone and the inner zone that were significantly different from each other at the .05 level (Table 6-5). The analyses of variance for all sectors and between each adjoining sectors revealed that the Economic Status Dimension was not distributed in sectoral patterns at all since sectors of the Dimension were not significantly different from one another even at the .05 level (Table 6-5). Although the analysis of variance for all concentric zones did not indicate a strong concentric pattern of the Dimension, the analysis of variance between the inner and outer concentric zones have clearly indicated that these two zones are significantly different at the .05 level, thereby giving some promise for concentric patterns.

It is noticed in Figure 6-2 that as Kathmandu generally experienced most its urban growth in the east from the inner city, so was the movement of high quality prestigeous residential areas with high value statistical tracts of the Economic Status Dimension in the central part of Kathmandu. So when two concentric zones were redesigned on the visual basis of the cartographic presentation of the Dimension, centering near the geographical center of Kathmandu (Figure 6-2), the result of the analysis variance indicated that the redesigned inner zone was significantly different at the .05 level from the redesigned outer zone (Table 6-5), thereby confirming the concentric interpretation of the socioeconomic urban structure.

TABLE 6-5

ANALYSES OF VARIANCE FOR CONTROLLED FACTOR SCORES OF ECONOMIC STATUS DIMENSION CLASSIFIED BY ZONES AND SECTORS

		Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio
Zones:					
All Zones	Between Groups	2.5840	2	1.2920	1.2811
	Within Groups	49.4157	49	1.0085	
1 and 2	Between Groups	0.4471	1	0.4471	0.3671
	Within Groups	47.4948	39	1.2178	
2 and 3	Between Groups	2.5617	1	2.5617	1.9163
	Within Groups	46.7887	35	1.3368	
3 and 1	Between Groups	0.8174	1	0.8174	4.3136 *
	Within Groups	4.5479	24	0.1895	
Redesigned Zones	Between Groups	5.4817	1	5.4817	5.8920 *
	Within Groups	46.5180	50	0.9304	
Sectors:					
All Sectors	Between Groups	4.5690	5	0.9138	0.8862
	Within Groups	47.4306	46	1.0311	
1 and 2	Between Groups	0.4808	1	0.4808	0.3129
	Within Groups	36.8781	24	1.5366	
2 and 3	Between Groups	1.8251	1	1.8251	2.7655
	Within Groups	9.8992	15	0.6599	
3 and 4	Between Groups	0.8000	1	0.8000	0.9932
	Within Groups	7.2488	9	0.8054	
4 and 5	Between Groups	0.5165	1	0.5165	1.4588
	Within Groups	3.1863	9	0.3540	
5 and 6	Between Groups	0.0018	1	0.0018	0.0072
	Within Groups	3.3038	13	0.2541	
6 and 1	Between Groups	1.7892	1	1.7892	1.1461
	Within Groups	34.3452	22	1.5611	

* Significant at the .05 level.

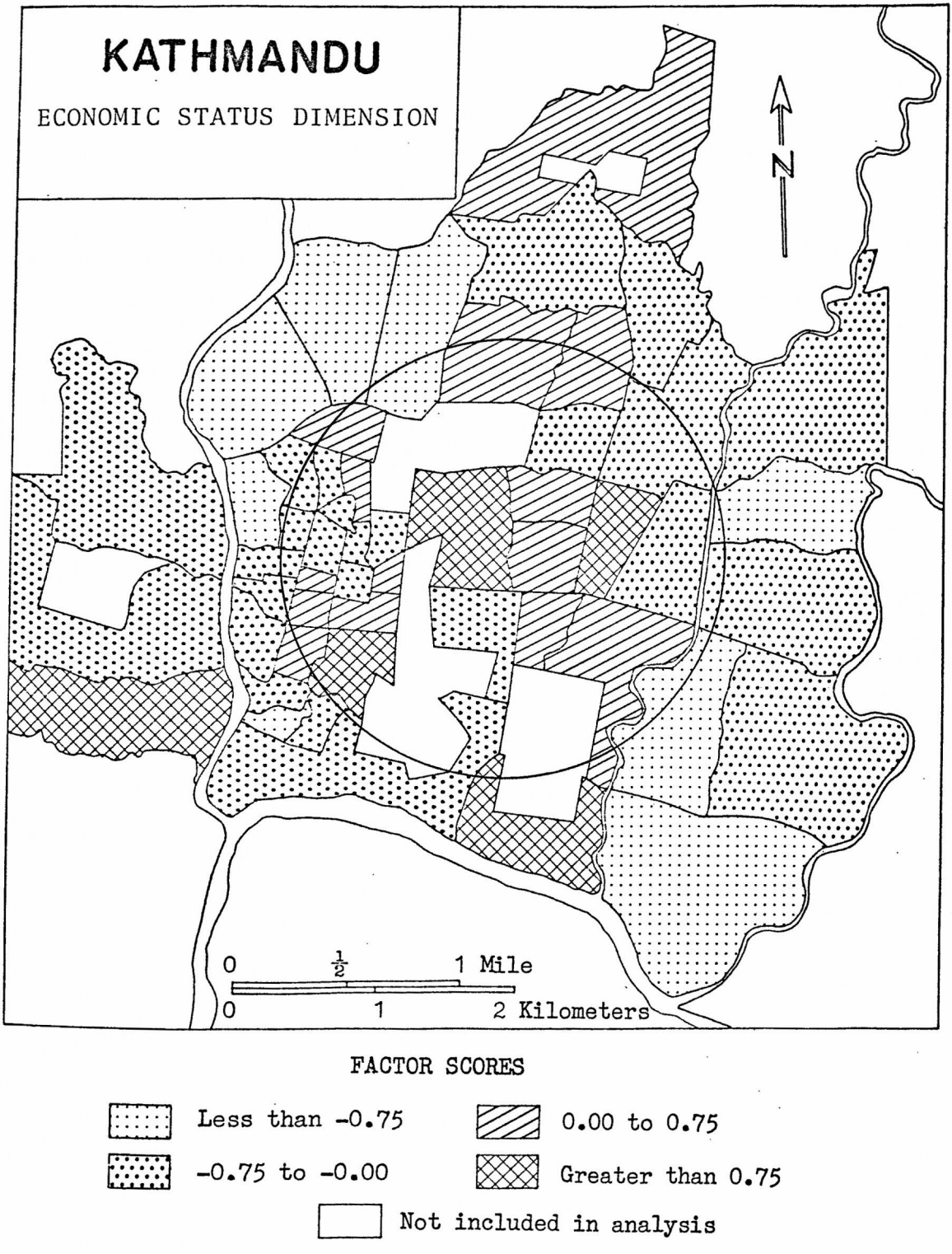

Figure 6-2. Spatial patterns of Factor II (Economic Status Dimension).

Spatial patterns of the Economic Status Dimension in Kathmandu can be explained in part under the frame work of the preindustrial city model of Sjoberg.[1] Prestigious and higher socioeconomic status people have occupied the central part of Kathmandu, Maharajgunj and Kalimati. All statistical tracts but the three lying outside the central part of Kathmandu are characterized by low economic status.

During last twenty years in the growth process of Kathmandu, the outer city areas lying immediately east, northeast and southeast of the inner city, and the Kalimati area have been high quality residential areas for simple reasons that they have had the amenity of paved roads and open grounds with a comfortably low population density, and land available for building new houses. Moreover, these areas are close (within a walking distance of less than 15 minutes in most cases) to functional centers such as social service centers, business centers, and government offices. As a result, the land value has skyrocketed. Here only people who can afford the high rent or the high cost of the land and building the house, reside in good quality houses.

The central eastern section of the inner city has statistical tracts with high values of the Economic Status Dimension (Figure 6-2). These high values have appeared for several reasons. First, the nearness of this section to the open ground of Tundikhel in the east have made it a better residential area than other parts of the inner city. Second, the renewal of the Judha Road area after the earthquake of 1934 have made this area very attractive for both residence and business.

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[1] See Sjoberg, The Preindustrial City, pp. 95-103.

Third, this section is very close to most functional centers of Kathmandu such as business centers, hospitals, schools and government offices. All these factors have increased the value of land and houses in this section. Therefore, only those people have been able to occupy houses here, who either have inherited the property from their parents or can afford to pay a high rent or price for the houses.

The fringe areas have already experienced the urban growth of Kathmandu, but they have been less favored than the outer city for the building of residential houses because of their relatively distant location from most of the functional centers of Kathmandu. All the fringe areas except Kalimati were noticed mainly under agricultural use with relatively large proportion of poor farmers and other people of low economic level. Statistical tracts with such characteristics were also noticed in some peripheral sections of the outer city, such as the Naya Bazar, Handigaon-Gairidhara, Maitidevi and Naya Bhansar-Tripureswar areas. The primary reason for the Bag Bazar area to have low values of the Dimension might be because of the fact that it was an outskirt of the old city residing people mainly of lower economic status such as butchers, tailors, blacksmiths and carpenters.

C. Stage in Life Cycle Dimension (Factor III)

1. Structure

Since Factor III was mostly related to age characteristics with the highest loading on the age of household heads (Table 6-6), this Factor was labeled as the Stage in Life Cycle Dimension. Other variables related to age characteristics with high loadings included number of

TABLE 6-6

ROTATED FACTOR STRUCTURE OF STAGE IN LIFE CYCLE DIMENSION (FACTOR III)*

Variable No.	Variable Names	Factor Loadings	r with Controlled Factor Scores
	Age Characteristics:		
2.	Average age of household heads	-.83	-.83
13.	Persons 20 to 49 years of age (%)	.63	.64
14.	Persons 50 years and over 50 years of age (%)	-.60	-.61
23.	Household heads 20 to 49 years of age (%)	.71	.71
24.	Household heads 50 years and over 50 years of age (%)	-.79	-.80
	Other Characteristics:		
3.	Number of years household heads lived in Kathmandu	-.78	-.92
16.	Persons high school pass or more education (%)	.41	.58
25.	Single household heads (%)	.49	.59
27.	Household heads high school pass or more education (%)	.47	.63
41.	Household heads lived in Kathmandu 41 or more years (%)	-.67	-.80
42.	Household heads lived in Kathmandu 0 to 20 years (%)	.62	.79
63.	Owner occupied dwelling units (%)	-.49	-.71
65.	Occupied dwelling units in more than two family housing units (%)	.59	.75

*Only variables with $\geq |.40|$ loading on the factor are included.

years household heads lived in Kathmandu (-.78); percentage of persons over 49 years of age (-.60); percentage of household heads over 49 years of age (-.79); percentage of household heads lived in Kathmandu over 40 years (-.67); and percentage of household heads lived in Kathmandu less than 21 years (.62). These loadings and other high loadings on the Dimension indicated a two-fold component of the population in term of the stage in the life cycle of household heads--young stage in the life cycle and elderly stage in the life cycle. There were revealed statistical tracts with comparatively high percentage of young household heads, that were relatively characterized by families

with small number of elderly people (loading -.60); high percentage of household heads with high school or more education (loading .47); high percentage of single household heads (loading .49); high percentage of household heads living in more than two family housing units (loading .59); and large percentage of household heads lived in Kathmandu less than 21 years (loading .62). Converse relationships of these variables was true for statistical tracts with relatively large percentage of elderly household heads.

2. Spatial Patterns

In Figure 6-3, it was apparent that statistical tracts with high values of the Stage in Life Cycle Dimension indicating relatively a large percentage of young household heads were mostly distributed in the outer city whereas the inner city and the fringe areas were mostly characterized by households in their elderly stage of the life cycle. The analysis of variance for all the concentric zones also indicated that the concentric zones of the Dimension were significantly different even at the .01 level (Table 6-7). In a closer examination of this differentiation, the middle concentric zone was also significantly different from the inner concentric zone at the .01 level (Table 6-7), but was not significantly different from the outer concentric zone even at the .05 level. In sum, these findings suggested that the spatial pattern of the Dimension was in conformance more with the concentric interpretation than the sectoral interpretation of urban structure.

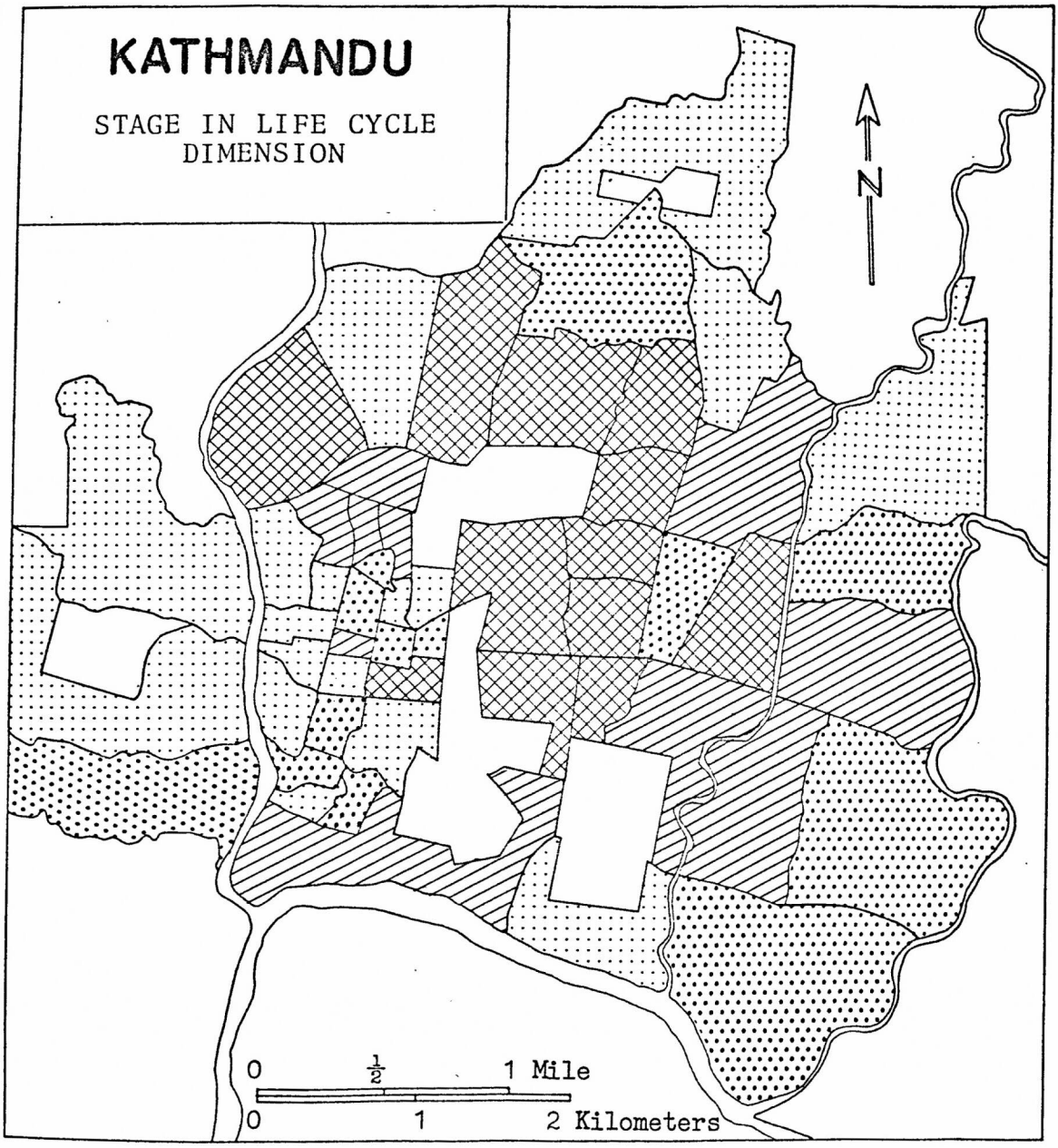


Figure 6-3. Spatial patterns of Factor III (Stage in Life Cycle Dimension).

TABLE 6-7

ANALYSES OF VARIANCE FOR CONTROLLED FACTOR SCORES OF STAGE IN LIFE CYCLE DIMENSION CLASSIFIED BY ZONES AND SECTORS

		Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio
Zones:					
All Zones	Between Groups	11.9023	2	5.9511	7.2724 **
	Within Groups	40.0977	49	0.8183	
1 and 2	Between Groups	11.1521	1	11.1521	11.7054 **
	Within Groups	37.1565	39	0.9527	
2 and 3	Between Groups	3.6827	1	3.6827	3.9612
	Within Groups	32.5392	35	0.9297	
3 and 1	Between Groups	0.9778	1	0.9778	2.2350
	Within Groups	10.4997	24	0.4375	
Sectors:					
All Sectors	Between Groups	11.0302	5	2.2060	2.4769 *
	Within Groups	40.9698	46	0.8906	
1 and 2	Between Groups	0.5788	1	0.5788	0.4856
	Within Groups	28.6046	24	1.1919	
2 and 3	Between Groups	1.7035	1	1.7035	1.6120
	Within Groups	15.8509	15	1.0567	
3 and 4	Between Groups	0.1955	1	0.1955	0.3057
	Within Groups	5.7550	9	0.6394	
4 and 5	Between Groups	1.0004	1	1.004	1.7776
	Within Groups	5.0652	9	0.5628	
5 and 6	Between Groups	2.5325	1	2.5325	4.9805 *
	Within Groups	6.6103	13	0.5085	
6 and 1	Between Groups	0.9202	1	0.9202	1.0095
	Within Groups	20.0538	22	0.9115	

* Significant at the .05 level.
** Significant at the .01 level.

This spatial differentiation of the Stage in Life Cycle Dimension seemed to be associated with the growth or expansion of Kathmandu. The old city contained a relatively large percentage of elderly household heads, for they were rooted traditionally to their community and parental house. But as young people became more educated or modernized and improved their economic level, they attempted to break off from their traditional joint family system. As a result, they took a flight to the outer city or the fringe areas to get rid of the slum environment of the old city. Moreover, the outer city and fringe areas were noticed to be a place of residence for enterprising young people coming to Kathmandu from outside the Kathmandu Valley. The outer city experienced the highest growth in the absolute term followed by the fringe areas in the last twenty years. However, sections of the fringe areas such as Chabahil, Dallu-Swayambhu, Deopatan-Pasupati, the eastern Baneswar, the Meen Bhawan area, and some areas of the outer city did not appear to have experienced high degree of new wave of inmigrants. Therefore, statistical tracts that included these areas were relatively characterized people in their elderly stage of the life cycle.

D. Educational Status Dimension (Factor IV)

1. Structure

There were two basic types of variables associated with Factor IV--variables related to educational characteristics, and variables related to living style characteristics (Table 6-8). Since the highest loadings of the Factor were on the first type of variables, it was called the Educational Status Dimension.

TABLE 6-8

ROTATED FACTOR STRUCTURE OF EDUCATIONAL STATUS DIMENSION (FACTOR IV)*

Variable No.	Variable Names	Factor Loadings	r with Controlled Factor Scores
	Educational Characteristics:		
15.	Persons 1 to 10 years schooling (%)	.70	.62
16.	Persons high school pass or more education (%)	.48	.73
17.	Persons illiterate (%)	-.79	-.86
18.	Persons attending school (%)	.73	.77
26.	Household heads illiterate (%)	-.74	-.78
27.	Household heads high school pass or more education (%)	.48	.65
	Living Style Characteristics:		
4.	Number of rooms per occupied dwelling unit	.63	.77
12.	Number of rooms per person	.41	.66
22.	Population density	.41	.41
34.	Household heads in first class non-gazetted to second class gazetted positions of total service holder household heads (%)	.55	.57
62.	Occupied dwelling units in poor condition (%)	-.52	-.69
74.	Households with radio (%)	.53	.69
75.	Households with radio or and transistor radio (%)	.51	.68

*Only variables with $\geq |.40|$ loading on the factor are included.

a. Educational Characteristics. The variables that were highly loaded on the Educational Status Dimension were percentage of people with 1 to 10 years of schooling (.70), percentage of illiterate people (-.79), percentage of people attending school (.73), and percentage of illiterate household heads (-.74). Other educational variables with significant loadings were percentage of people with high school or more education (.48), and percentage of household heads with high school or more education (.48). These loadings clearly indicated that there were two fundamental groups of people in Kathmandu--illiterate people

who did not know to read and write (these people formed 43 per cent of the total population) and literate people ranging from bare literacy to university education (these people formed 57 per cent of the total population). This strong dichotomy in the Dimension of literate and illiterate people as indicated by high loadings of their related variables was mainly because of the fact that Nepal's goal of education for all was started only very recently; despite the phenomenal development of education in Kathmandu, there were considerable proportion of illiterate people in Kathmandu as stated earlier. These people were generally elderly people who did not have a chance of being educated or going to school while they were young, or they were low caste people such as the Jyapus (farmers), the Kasains (butchers) and the Chyames (street cleaners), who did not change their traditional way of life yet and had not been exposed to the value of education. Moreover, from the correlation matrix (Appendix IV), it was revealed that percentage of illiterate household heads was highly correlated with percentage of illiterate people (r=.71), and percentage of household heads with high school or more education was highly associated with the percentage of people in the family with high school or more education (r=.83). But percentage of people attending school was not so highly associated with percentage of illiterate household heads (r=.48). It could be inferred from these relations that although there was a tendency of illiterate household heads to send their children to schools but not for the high school or college education; the high school and college education was mainly confined in families whose household heads had obtained such a high level of education.

b. Living Style Characteristics. Some interesting living style characteristics were noticed in the Educational Status Dimension. The Dimension was highly associated with number of rooms in occupied dwelling units (loading .63), number of rooms per person (.41), percentage of household heads in fairly good government positions--first class non-gazetted to second class gazetted positions (.55), percentage of occupied dwelling units in poor condition (-.52), and percentage of households with radio or transistor radio (.51). Although these loadings were not so high, they were good enough to suggest that educated people were on the move to enjoying better living style with modern items such as radio despite their relatively weak positive association with economic aspects (see supra. pp. 128-29).

2. Spatial Patterns

Statistical tracts with high values of the Educational Status Dimension were mainly distributed at or around the central part of Kathmandu (Figure 6-4) whereas statistical tracts with low values of the Dimension were mostly distributed in pheripheral sections of the outer city and the fringe areas. The distribution of statistical tracts with high values of the Dimension in the central part of Kathmandu was partly for socioeconomic reasons (see supra, pp. 130-34) and partly for the reason that the central part being close to schools was desirable place for students to reside.

The analysis of variance for all concentric zones indicated that the zones were not significantly different from one another at the .05 level (Table 6-9), and the inner concentric zone was not significantly different from the middle concentric zone at the same level. However,

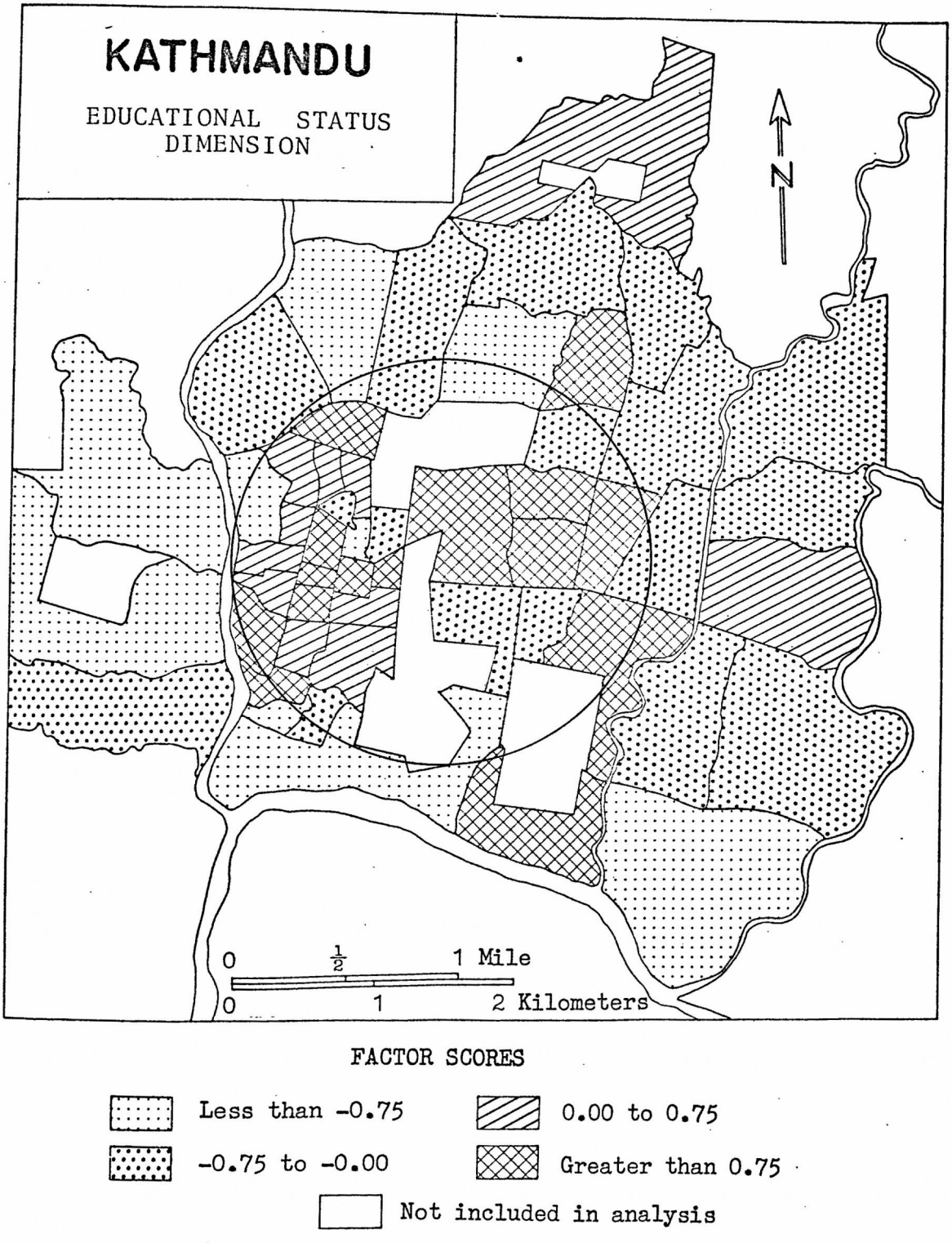


Figure 6-4. Spatial patterns of Factor IV (Educational Status Dimension).

TABLE 6-9

ANALYSES OF VARIANCE FOR CONTROLLED FACTOR SCORES OF EDUCATIONAL STATUS DIMENSION CLASSIFIED BY ZONES AND SECTORS

		Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio
Zones:					
All Zones	Between Groups	4.2859	2	2.1429	2.2007
	Within Groups	47.7135	49	0.9737	
1 and 2	Between Groups	2.9710	1	2.9710	2.6366
	Within Groups	43.9474	39	1.1269	
2 and 3	Between Groups	0.2643	1	0.2643	0.2276
	Within Groups	40.6358	35	1.1610	
3 and 1	Between Groups	3.5107	1	3.5107	7.7699 *
	Within Groups	10.8439	24	0.4518	
Redesigned Zones	Between Groups	8.5602	1	8.5602	9.8530 **
	Within Groups	43.4394	50	0.8688	
Sectors:					
All Sectors	Between Groups	1.7938	5	0.3588	0.3287
	Within Groups	50.2057	46	1.0914	
1 and 2	Between Groups	0.1621	1	0.1621	0.1822
	Within Groups	21.3457	24	0.8894	
2 and 3	Between Groups	0.0004	1	0.0004	0.0005
	Within Groups	11.2865	15	0.7524	
3 and 4	Between Groups	0.3413	1	0.3413	0.3284
	Within Groups	9.3550	9	1.0394	
4 and 5	Between Groups	1.2092	1	1.2092	0.8184
	Within Groups	13.2970	9	1.4774	
5 and 6	Between Groups	0.0284	1	0.0284	0.0189
	Within Groups	19.5050	13	1.5004	
6 and 1	Between Groups	0.0154	1	0.0154	0.0132
	Within Groups	25.6221	22	1.1646	

* Significant at the .05 level.

the inner concentric zone was found to be significantly different from the outer concentric zone at the .05 level (Table 6-9). Moreover, when two concentric zones were redesigned on the visual basis of the cartographic presentation of the Dimension, centering near the geographical center of Kathmandu (Figure 6-4), and analysis of variance was performed, the result of the analysis of variance indicated that the redesigned two concentric zones were significantly different from each other even at the .01 level (Table 6-9). Thus these findings suggested that the spatial pattern of the Dimension was in conformance with the concentric interpretation of urban structure.

E. Salary Worker Status Dimension (Factor V)

1. Structure

Factor V was named as the Salary Worker Status Dimension since it was highly associated with percentage of household heads employed as salary workers in non-government positions (loading .80), and percentage of household heads employed as salary workers in government positions (loading -.74). There were also other couple variables related to salary worker characteristics, that were significantly loaded on the Dimension (Table 6-10). The negative correlation between percentage of household heads employed as salary workers in non-government positions and percentage of household heads employed as salary workers in government positions (r= -.58) indicated that these two variables were supplementary to each other for the Salary Worker Status Dimension. For example, a statistical tract with relatively large percentage of household heads employed in government positions generally would have

TABLE 6-10

ROTATED FACTOR STRUCTURE OF SALARY WORKER STATUS DIMENSTION (FACTOR V)*

Variable No.	Variable Names	Factor Loadings	r with Controlled Factor Scores
	Salary Worker Characteristics:		
29.	Household heads in government service (%)	-.74	-.66
30.	Household heads working as private wage and salary worker (%)	.56	.70
33.	Household heads in below first class non-gazetted positions of total service holder household heads (%)	-.59	-.80
35.	Household heads working as salary worker in non-government positions of total service holder household heads (%)	.80	.95
	Other Characteristics:		
71.	Household heads moved from Kathmandu Valley (%)	.43	.62
73.	Occupied dwelling units 0-20 years old (%)	.44	.57

*Only variables with $\geq |.40|$ loading on the factor are included.

relatively a small percentage of household heads employed in non-government positions, and vice versa. Other variables related to the Dimension were percentage of household heads employed as private salary and wage workers (loading .56), percentage of household heads employed in low government positions--below first class non-gazetted positions (loading -.59), percentage of household heads moved to the house from the Kathmandu Valley (loading .43), and percentage of occupied dwelling units less than 21 years old (loading .44). The most basic variable of the Dimension--percentage of household heads employed as salary workers in non-government positions was associated with number of years household heads lived in the same houses (r= -.49), percentage of household

heads lived in the Kathmandu Valley before to move to presently occupied houses (r=.54), and percentage of occupied dwelling units less than 21 years old (r=.53). These correlations indicated that in relative terms, statistical tracts with high percentage of household heads employed as salary workers in non-government positions had a high percentage of household heads who experienced some mobility within the Kathmandu Valley, had lived few years in the same houses, and had occupied newly built houses, and vice versa.

2. Spatial Patterns

Statistical tracts with high values of the Salary Worker Dimension were mostly distributed outside the inner city especially in the western fringe area and the northern outer city (Figure 6-5). Since most household heads in the southern portion of the eastern fringe area, and the inner city, were farmers and businessmen respectively, it was quite natural for these areas to be in a category of low values of the Dimension.

In evaluating spatial patterns of the Salary Worker Dimension by the analysis of variance for all concentric zones, it was revealed that the zones were significantly different at the .05 level (Table 6-11). The inner zone was significantly different from the middle zone even at the .01 level and from the outer zone at the .05 level; the middle zone and the outer zone were not significantly different from each other even at the .05 level (Table 6-11). From the analyses of variance for all sectors and each adjoining sectors, it was clear that the sectors were not significantly different from one another at the .05 level. Thus the spatial pattern of the Dimension was considered to be in conformance with the concentric interpretation of urban structure.

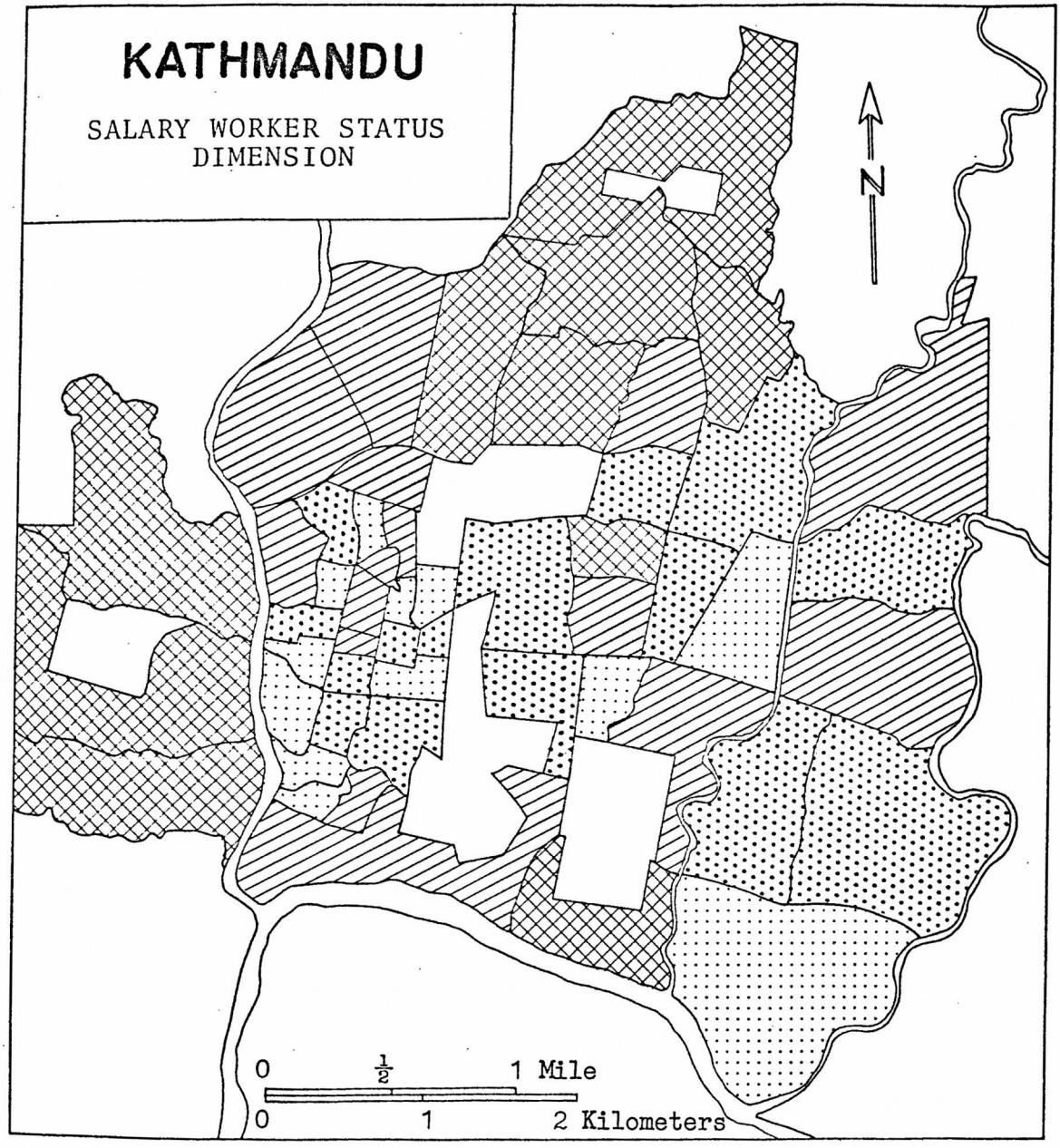


Figure 6-5. Spatial patterns of Factor V (Salary Worker Status Dimension).

TABLE 6-11

ANALYSES OF VARIANCE FOR CONTROLLED FACTOR SCORES OF SALARY WORKER STATUS DIMENSION CLASSIFIED BY ZONES AND SECTORS

		Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio
Zones:					
All Zones	Between Groups	7.2680	2	3.6340	3.9808 *
	Within Groups	44.7315	49	0.9129	
1 and 2	Between Groups	7.0698	1	7.0698	7.3870 **
	Within Groups	37.3254	39	0.9571	
2 and 3	Between Groups	0.2085	1	0.2085	0.1894
	Within Groups	38.5393	35	1.1011	
3 and 1	Between Groups	3.0907	1	3.0907	5.4547 *
	Within Groups	13.5984	24	0.5666	
Sectors:					
All Sectors	Between Groups	4.9618	5	0.9924	0.9705
	Within Groups	47.0378	46	1.0226	
1 and 2	Between Groups	3.2366	1	3.2366	3.7770
	Within Groups	20.5665	25	0.8569	
2 and 3	Between Groups	1.6697	1	1.6697	2.0284
	Within Groups	12.3471	15	0.8231	
3 and 4	Between Groups	1.4148	1	1.4148	0.6852
	Within Groups	18.5837	9	2.0649	
4 and 5	Between Groups	0.8741	1	0.8741	0.5207
	Within Groups	15.1078	9	1.6786	
5 and 6	Between Groups	0.0050	1	0.0050	0.0082
	Within Groups	7.8877	13	0.6067	
6 and 1	Between Groups	0.2639	1	0.2639	0.2965
	Within Groups	19.5829	22	0.8901	

* Significant at the .05 level.
** Significant at the .01 level.

G. Self-employed Status Dimension (Factor VI)

1. Structure

Since percentage of self-employed household heads had the highest loading on Factor VI (.80) indicating significant correlations of various degrees with other significantly loaded variables of the Factor as well (see correlation matrix, Appendix V), the factor was labeled as the Self-employed Status Dimension. There were two types of variables associated with this Dimension--variables related to employment characteristics, and variables related to modes of transportation to places of work of household heads (Table 6-12).

TABLE 6-12

ROTATED FACTOR STRUCTURE OF SELF-EMPLOYED STATUS DIMENSION (FACTOR VI)*

Variable No.	Variable Names	Factor Loadings	r with Controlled Factor Scores
	Self-employed Characteristics:		
28.	Household heads self-employed (%)	.80	.93
32.	Household heads in business occupation (%)	.53	.66
	Other Characteristics:		
29.	Household heads in government service (%)	-.40	-.48
30.	Household heads working as private salary or wage worker (%)	-.55	-.59
31.	Household heads working as salary worker (%)	-.73	-.87
36.	Household heads who walk to the place of work (%)	.70	.79
37.	Household heads who go by bus to place of work (%)	-.53	-.66
38.	Household heads who go by bicycle to place of work (%)	-.57	-.64

*Only variables with $\geq |.40|$ loading on the factor are included.

Of the total household heads in Kathmandu, about 42 per cent were employed as salary workers, and 38 per cent were self-employed. So it was not surprising that percentage of household heads employed as salary workers was negatively correlated with percentage of self-employed household heads (-.88), and the former variable had a negative loading on the Dimension (-.73). Moreover, percentage of household heads in government positions, and percentage of household heads employed as private salary and wage workers turned out to be negatively related with the Dimension (Table 6-12) because these variables had a considerable proportion of overlap with the second important variable of the Dimension (percentage of household heads employed as private salary or wage workers).

Transportation aspects of the Self-employed Status Dimension also were noticed to be an interesting feature of the Dimension. The Dimension indicated a strong positive association with percentage of household heads who walked to their places of work (loading .70). This positive association was mainly because of the fact that most of the self-employed household heads consisted of businessmen, farmers and students who generally walked to their places of work. Most of the businessmen had their shops at their places of residence or within a walking distance of few minutes, so it was not necessary for them to use other means of transportation rather than walking. The value of time was not so important for farmers, so they would walk to reach their even distant fields. Most student household heads were located within walking distance to their schools, so they also preferred walking to other means of transportation for going to school. Moreover, low level economic condition of most household heads especially students and farmers did not permit them to use other modes of transportation such

as bicycle, bus and automobile. For these reasons, the Self-employed Dimension was negatively loaded on the percentage of household heads who went to their places of work by bicycle (-.57) and the percentage of household heads who went to their places of work by bus (-.53).

2. Spatial Patterns

Statistical tracts with high values of the Self-employed Dimension were mostly distributed in the inner city, western fringe areas, and some other scattered locations (Figure 6-6). In evaluating spatial patterns of the Dimension by the analysis of variance for all concentric zones of the Dimension, it was revealed that the zones were significantly different even at the .001 level (Table 6-13). Moreover, the inner concentric zone was significantly different from both the middle and outer concentric zones at the .01 level, and the middle concentric zone was significantly different from the outer zone at the .05 level (Table 6-13). While evaluating spatial patterns of the Dimension by the analysis of variance for all sectors, it was found that sectors were not significantly different even at the .05 level. All adjoining sectors except sectors 4 and 5, also were not significantly different from each other even at the .05 level. Sector 4 was significantly different from sector 5 at the .05 level but not at the .01 level. All these analyses of variance suggested that spatial pattern of the Dimension was in conformance more with the concentric interpretation than the sectoral interpretation of urban structure.

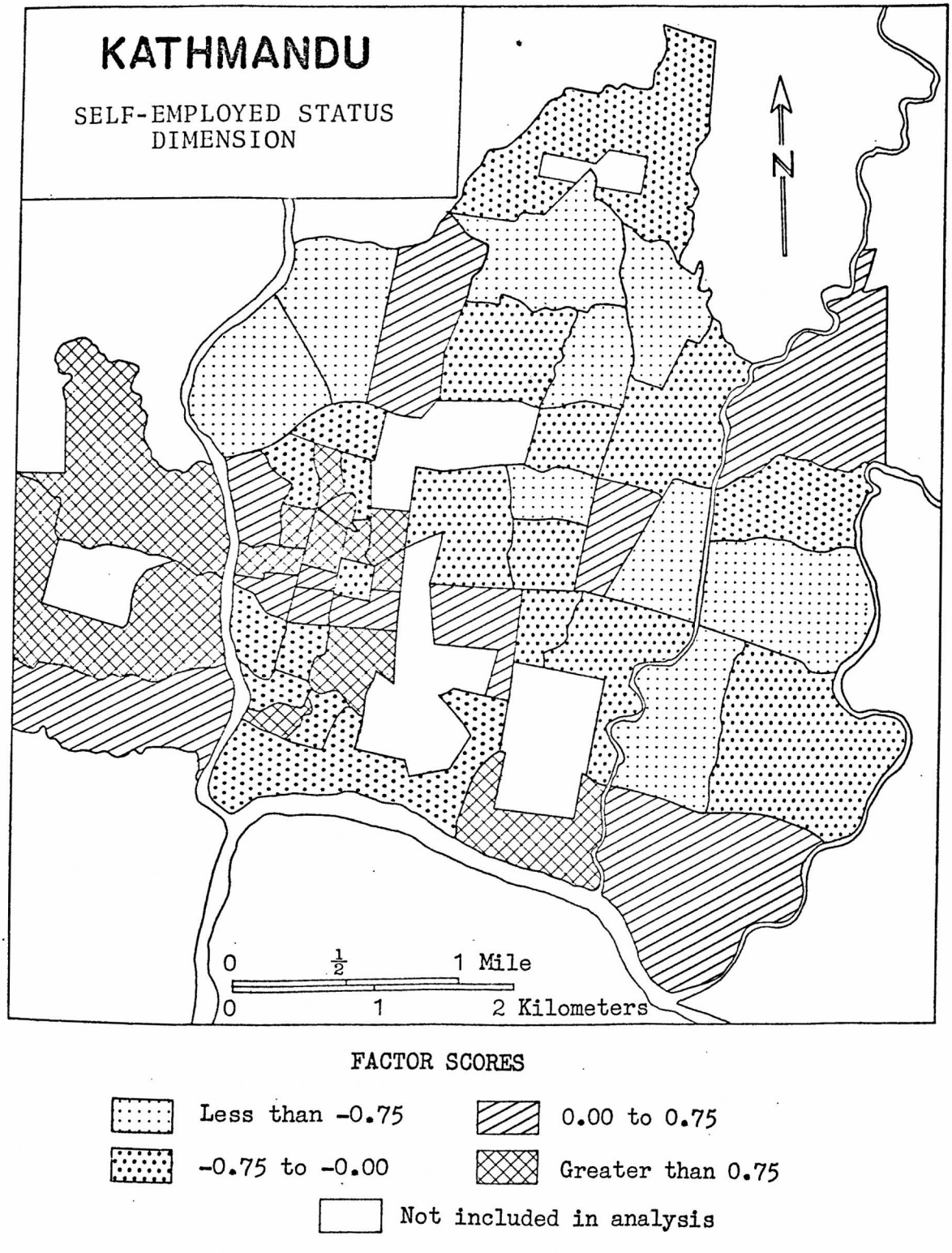


Figure 6-6. Spatial patterns of Factor VI (Self-employed Status Dimension).

TABLE 6-13

ANALYSES OF VARIANCE FOR CONTROLLED FACTOR SCORES OF SELF-EMPLOYED STATUS DIMENSION CLASSIFIED BY ZONES AND SECTORS

		Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio
Zones:					
All Zones	Between Groups	18.3170	2	9.1585	13.3234 ***
	Within Groups	33.6828	49	0.6874	
1 and 2	Between Groups	7.3618	1	7.3618	12.1461 **
	Within Groups	23.6381	39	0.6061	
2 and 3	Between Groups	4.9722	1	4.9722	6.1844 *
	Within Groups	28.1398	35	0.8040	
3 and 1	Between Groups	17.9492	1	17.9492	27.6360 ***
	Within Groups	15.5876	24	0.6495	
Sectors:					
All Sectors	Between Groups	9.5720	5	1.9144	2.0756
	Within Groups	42.4278	46	0.9223	
1 and 2	Between Groups	0.0686	1	0.0686	0.0687
	Within Groups	23.9743	24	0.9989	
2 and 3	Between Groups	2.2538	1	2.2538	2.2525
	Within Groups	15.0085	15	1.0006	
3 and 4	Between Groups	0.2513	1	0.2513	0.4737
	Within Groups	4.7745	9	0.5305	
4 and 5	Between Groups	1.5060	1	1.5060	7.4188 *
	Within Groups	1.8270	9	0.2030	
5 and 6	Between Groups	1.8736	1	1.8736	1.7806
	Within Groups	13.6790	13	1.0522	
6 and 1	Between Groups	2.0442	1	2.0442	1.7572
	Within Groups	25.5923	22	1.1633	

* Significant at the .05 level.
** Significant at the .01 level.
*** Significant at the .001 level.

G. Foreign Origin Dimension (Factor VII)

1. Structure

Factor VII was mainly associated with variables related to foreign aspects (Table 6-14), so it was named as the Foreign Origin Dimension. The variable with the highest loading on the Dimension was percentage of household heads with Hindi as the mother tongue (.68). Other variables highly related to the Dimension were percentage of household heads born in foreign countries (.52) and percentage of household heads' fathers born in foreign countries (.55). All these three variables were highly loaded on the Economic Status Dimension (Factor II) as well, and they were significantly correlated with several variables of the Economic Status Dimension also. Therefore, although Factor VII was resulted as a "separate dimension" in the factor analysis, it could be considered very well as a part of the Economic Status Dimension. Since the three variables of the Foreign Origin Dimension were already discussed in the discussion of the Economic Status Dimension (see supra, p. 128). they are not discussed further in this section.

TABLE 6-14

ROTATED FACTOR STRUCTURE OF FOREIGN ORIGIN DIMENSION (FACTOR VII)*

Variable No.	Variable Names	Factor Loadings	r with Controlled Factor Scores
	Foreign Origin Characteristics:		
43.	Household heads born in foreign countries (%)	.52	.97
45.	Household heads' fathers born in foreign countries (%)	.55	.98
55.	Household heads of Hindi mother tongue (%)	.68	.97

*Only variable with $\geq |.40|$ loading on the factor are included.

2. Spatial Patterns

From the analyses of variance for both the concentric zones and sectors (Table 6-15), it was concluded that the Foreign Origin Dimension was distributed neither in a concentric fashion nor in a sectoral pattern, thereby giving some promises for multiple nuceius patterns. There were noticed some isolated statistical tracts with high values of the Dimension in the inner city and the northern section of the outer city, and almost a contiguous distribution of such tracts to the east, south and southwest of the inner city (Figure 6-7). Statistical tracts with high values of the Dimension in the inner city can be interpreted as a result of the penetration of people from India who have succeeded in occupying some strategic locations for business. High valued statistical tracts of the Dimension lying outside the inner city were high quality residential areas where people from foreign countries including the United States with high economic status had resided because they could afford to pay high prices for high quality residential houses.

H. Social Areas of Kathmandu

One good way to see the relationship between any two factors is through a scatter diagram by plotting their factor scores. The space so formed in a socioeconomic ecological study of the city is called "social space" as originally devised by Shevky and Bell (see supra, pp. 17-18). Such a social space is considered to be helpful to define a set of communities and to arrange them in some meaningful typology. Here a scatter diagram is prepared by using the controlled factor scores of the first two major factors (Figure 6-8). Applying the procedure of

TABLE 6-15

ANALYSES OF VARIANCE FOR CONTROLLED FACTOR SCORES OF FORREIGN ORIGIN DIMENSION CLASSIFIED BY ZONES AND SECTORS

		Sum of Squares	Degrees of Freedom	Mean Squares	F Ratio
Zones:					
All Zones	Between Groups	5.2283	2	2.6142	2.7387
	Within Groups	46.7724	49	0.9545	
1 and 2	Between Groups	3.1054	1	3.1054	2.6284
	Within Groups	46.0782	39	1.1815	
2 and 3	Between Groups	3.8286	1	3.8286	3.1222
	Within Groups	42.9181	35	1.2262	
3 and 1	Between Groups	0.1113	1	0.1113	0.5870
	Within Groups	4.5485	24	0.1895	
Sectors:					
All Sectors	Between Groups	3.2374	5	0.6475	0.6108
	Within Groups	48.7635	46	1.0601	
1 and 2	Between Groups	0.3639	1	0.3639	0.3036
	Within Groups	28.7655	24	1.1986	
2 and 3	Between Groups	0.8732	1	0.8732	0.5268
	Within Groups	24.8644	15	1.6576	
3 and 4	Between Groups	1.4357	1	1.4357	0.7875
	Within Groups	16.4085	9	1.8232	
4 and 5	Between Groups	0.0058	1	0.0058	0.0252
	Within Groups	2.0920	9	0.2324	
5 and 6	Between Groups	0.0570	1	0.0570	0.2065
	Within Groups	3.5895	13	0.2761	
6 and 1	Between Groups	0.1645	1	0.1645	0.1660
	Within Groups	21.8071	22	0.9912	

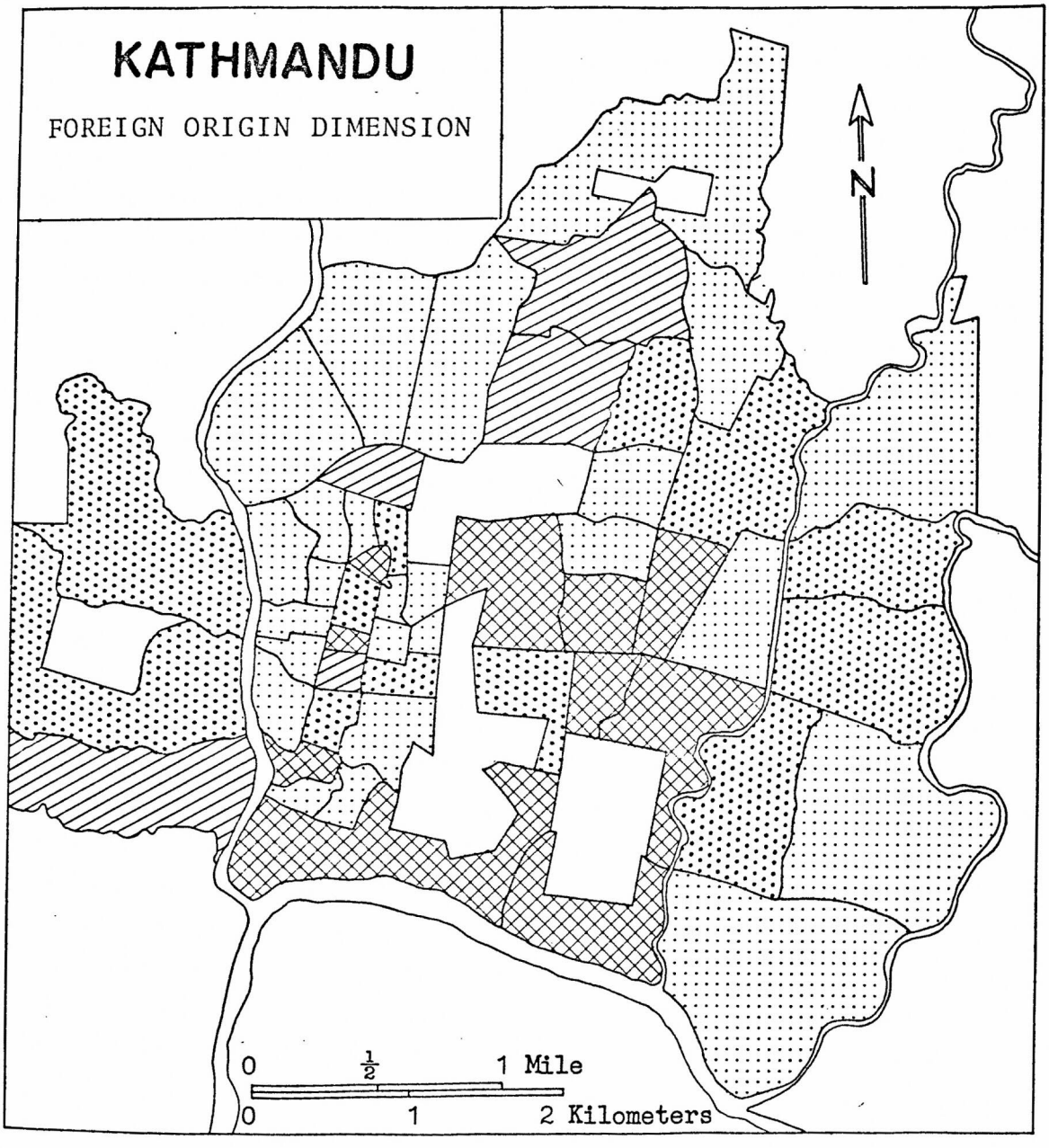
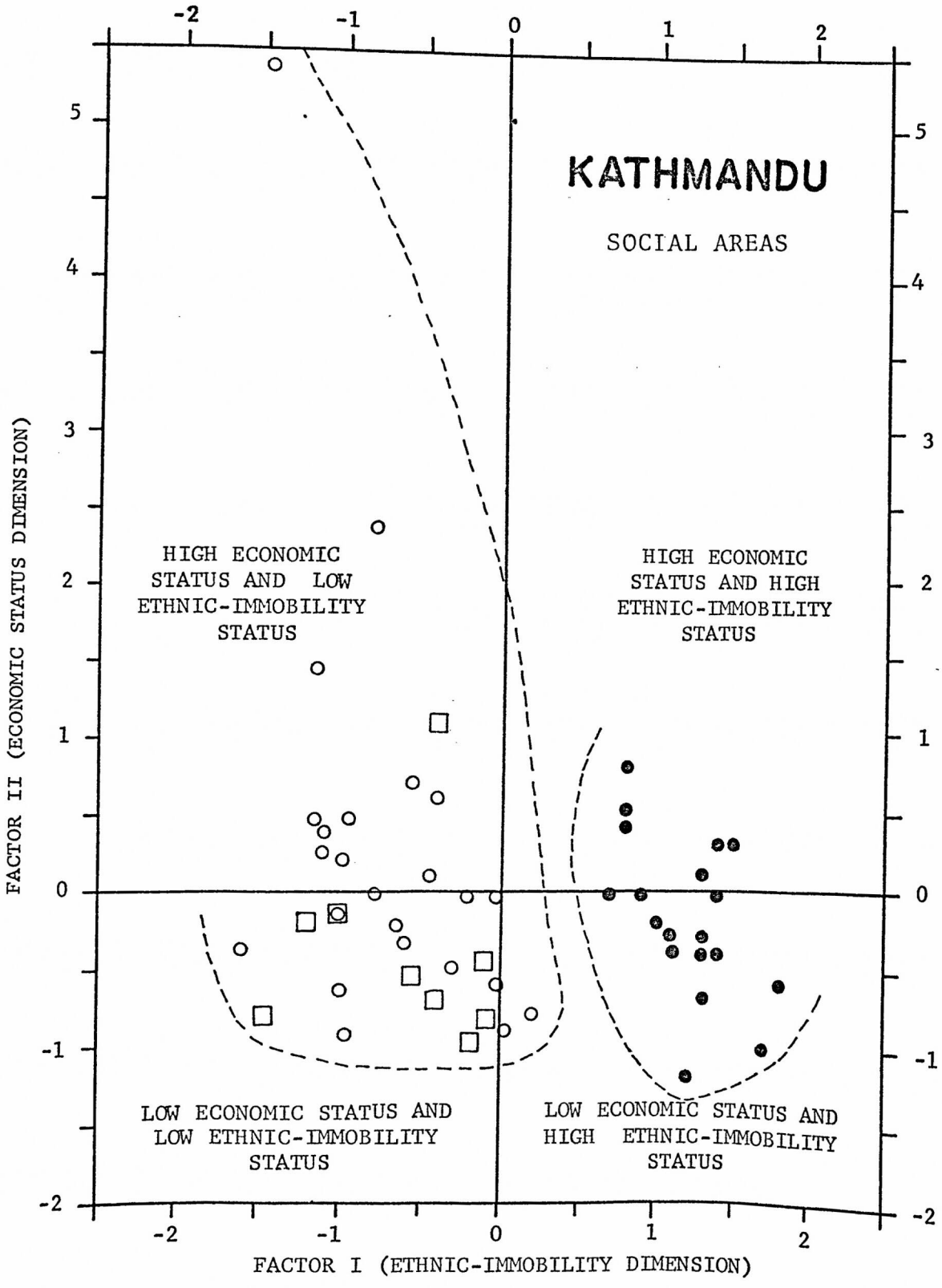


Figure 6-7. Spatial patterns of Factor VII (Foreign Origin Dimension).



● Statistical tracts of the inner city
○ Statistical tracts of the outer city
□ Statistical tracts of the city fringe

Figure 6-8. Social areas of Kathmandu based on the Ethnic-immobility Dimension and the Economic Status Dimension.

the social area analysts, it was possible to divide the social space into a number of categories, which could be called social areas. However, in this case, the map of the social space based on the two dimensions was divided into a very general four quandrants that indicated four broad types of communities of Kathmandu: (a) communities of low ethnic-immobility and high economic status; (b) communities of high ethnic-immobility and high economic status; (c) communities of low ethnic-immobility and low economic status; and (d) communities of high ethnic-immobility and low economic status.

Figure 6-8 provides a summary picture of the broad types of community present in Kathmandu. The inner city is characterized mainly by high ethnic-immobility status representing the Newar community, whereas the outer city and fringe areas are characterized by low ethnic-immobility status representing non-Newar communities. Although half of the statistical tracts of the outer city are characterized by high economic status, and the other half are characterized by low economic status, it is interesting to note that about two-third statistical tracts of high economic status lie in the outer city. One of the tracts (which partly represents the prime residential area of Kamaladi where mostly foreign people of high economic status reside) with extremely high value of the Economic Status Dimension and remarkably great economic distance from its closest neighbor, outstands in the upper left hand corner of Figure 6-8. All statistical tracts of the fringe areas but one are characterized by low economic status. The tracts of the fringe areas with high economic status partly represents the high class residential area of Kalimati. In the inner city, statistical tracts of low economic status outnumber the tracts of high economic status by 13 to 6. In sum,

Figure 6-8 presents simulteneously the two important aspects of the socioeconomic ecology of Kathmandu: (a) concentration of the Ethnic-immobility Status Dimension representing primarily the Newari group in the inner city, and (b) the dominance of the outer city (mainly central section of Kathmandu) over its surrounding areas in terms of high economic status.

VII. SUMMARY AND CONCLUSIONS

The main objective of this study was to identify and explain underlying fundamental dimensions of the socioeconomic ecology of Kathmandu, and to examine their spatial patterns by using factor analysis.

Recently social scientists have been increasingly interested in socioeconomic ecological studies of cities. Classical models of urban structure (concentric zone, sector, and multiple nuclei models), social area area analysis (the technique introduced by Bell and Shevky), and factorial models have been used to understand urban ecology. The factorial ecological approach has integrated ideas of both the classical models and social area analysis by identifying and explaining fundamental dimensions of urban ecology, thereby becoming a useful tool for urban analysis. Most factorial studies of urban areas have been limited to the Western world. There have been relatively few studies on cities of the Third world including Asia, and none on preindustrial cities of landlocked countries such as Kathmandu, where the impact of recent modernization and urbanization has brought about new changes in the socioeconomic structure. There has been little attempts to examine the socioeconomic structure of preindustrial cities of landlocked countries as they begin to modernize although the scale of urban development from pre- to post-industrial form has been a generally recognized concept.[1] This study has attempted to fill this gap by an urban ecological study of Kathmandu.

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[1]See Berry and Rees, "The Factorial Ecology of Calcutta," 491.

A sample survey of 1256 households, which represented 4.3 per cent of the total estimated households of Kathmandu, was conducted to obtain desired socioeconomic information for this research. Although data were initially aggregated for 196 variables on 52 statistical tracts (areal units similar to census tracts), only 80 selected variables were used for the factor analysis because the redundant variables were eliminated. Seven factors accounted for over 70 per cent of the total variance, and were considered fundamental dimensions of the socio-economic ecology of Kathmandu.

A. Socioeconomic Ecology of Kathmandu

In the transitional stage from a nationally and internationally isolated, preindustrial city to a modern city, and in its process of urban development, Kathmandu has experienced a variety of modern characteristics in its preindustrial setting. Its sphere of influence and interaction has widened to an international scene from the national isolation. Educational programs have been designed for all rather than a selective group. Modern technical know-how and its products have been introduced to the people of Kathmandu. Above all, in its modernizing and developing process, Kathmandu has acted as the diffusing center of new ideas and aspirations for the country; it has been the focal point of the country in the socioeconomic development; and it has served as the locus of political and economic power, and national center for education and administration. These developmnet factors that have emerged within the last two decades, have been responsible in bringing about new changes in the traditional setting of Kathmandu, thereby creating a blend of traditional characteristics and modern features in

the socioeconomic structure of Kathmandu, which has been revealed in terms of the population composition, economic structure, urban development, and the way of life of the people. Fundamental dimensions of the socioeconomic structure of Kathmandu as identified and explained under the framework of the factor analysis, along with other findings, are summarized below.

1. Ethnic-immobility Dimension

The most prominent dimension of the socioeconomic ecology of Kathmandu was the Ethnic-immobility Dimension, which represented the two major ethnic groups of Kathmandu--the Newars and the Parbates,[1] accounting for 20 per cent of the total variance. Its loading on percentage of Newar household heads was .87, and -.84 on percentage of household heads with Nepali as the mother tongue, the mother tongue of the Parbates. In this Dimension, it was interesting to note that these two groups of people were found to be negatively related (different from each other) in cultural, economic, and spatial characteristics, thereby substantiating that they were just two different types of people. Their outstanding differentiating characteristics revealed in this Dimension are briefly presented below.

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[1]In 1970, the Newars and the Parbates (Brahmins and Kshatriyas) consisted of about 60 per cent and 30 per cent of the total population of Kathmandu. Although the inflow of the Parbates into Kathmandu started as early as 1768 with the conquest of Kathmandu by a Parbate king, Prithvi Narayan Shaha, its accelerated rate of increase occured mainly after 1950 associating with modern developments of Kathmandu.

(A) The Newars have diffused from the Kathmandu Valley to all towns and commercial centers of Nepal in their business pursuit, showing a great deal of mobility. But at their native place of Kathmandu, their intra-urban mobility was of much small degree as compared to that of the Parbates. It was found that as much as 50 per cent Newari household heads had never moved from their original residences as compared to only 17 per cent Parbate household heads. Most of the Newars were concentrated in the old city in a over crowded condition with a gross population density as high as 200 people per acre. In the old city, houses were so packed that many of them did not have even direct access to fresh air. Even in such a suffocating condition, they had not attempted to move to more open areas in the outer city or fringe areas because of their low economic condition and their cultural ties to their original locations and communities. Contrasting characteristics between the Newars and the Parbates in terms of mobility were revealed by their places of origin also. About 90 per cent Newar household heads' fathers were born in the Kathmandu Valley as compared to 49 per cent Parbate household heads' fathers. This immobility aspect of the Newars was clearly revealed by the Ethnic-immobility Dimension with its high positive loadings on variables related to immobile characteristics such as percentage of household heads not moved from their original residences (loading .88), percentage of household heads born in the Kathmandu Valley (.78), and number of years household heads lived in the same house (.72). The negative loadings of the Dimension on percentages of households heads and their fathers born in Nepal out side the Kathmandu Valley (loadings -.80 and -.83 respectively) suggested the mobility characteristics of the Parbates. There were primarily two simple

reasons for the relatively high degree of mobility of the Parbates. First, when Parbates arrived in Kathmandu from hilly areas, they did not have a permanent place in the city to live, so they were forced to keep moving from one house to the other until they were able to find a permanent residence. Second, most Parbate household heads qualified for a mobility characteristic by tracing their origin outside the Kathmandu Valley whereas virtually all Newar household heads were native to Kathmandu.

(B) These two groups were found to be different in terms of mother tongue, religion, and social interaction. The Newars spoke Newari as their mother tongue which was distinct from the Parbates' mother tongue--Nepali, the national and official language of Nepal. Virtually all the Parbates in Kathmandu belonged to the upper Hindu castes (Brahmin and Kshatriya) whereas the Newars were divided into two religious groups--Hindus (73 per cent) and Buddhists (27 per cent), each having its own caste structure. These differentiating characteristics of the two groups of people were revealed by the Ethnic-immobility Dimension with high positive loadings on percentage of household heads with Newari as the mother tongue (.85) and percentage of Buddhists household heads (.70), and high negative loading on percentage of household heads with Nepali as the mother tongue (-.85). Moreover, these two groups were isolated from each other in terms of social interaction such as marriage and traditional festivals. For example, the high correlation between percentage of Newari household heads and percentage of household heads with Newari as the mother tongue ($r = .99$) suggested that there was hardly any marriage between the Newars and the Parbates.

(C) The Newars and the Parbates were found to be differentiated in their spatial distribution. In the process of settlement development of Kathmandu, a large percentage of Parbates in general occupied lands outside the old city whereas the Newars continuously made a strong hold of the old city without trying to compete Parbates in occupying lands for housing outside the old city although there were some exceptions to this pattern along business streets outside the old city, where the Newars predominated because of their foothold in commercial activities. It was found that most statistical tracts in the old city had over 75 per cent Newar households as compared to less than 50 per cent Newar households for most statistical tracts in the outer city and fringe areas. This concentration of the Newars in the old city was also suggested by the high loading (-.73) of the Ethnic-immobility Dimension on distance of households from the center of the central business district.

(D) These two groups possessed, to a certain degree, different competing interests in economic pursuits. It was found that about 80 per cent of the household heads in business occupation were from the Newari group as compared to less than 10 per cent household heads from the Parbate group. As a result, it was revealed that percentage of household heads with Nepali as the mother tongue was negatively correlated with percentage of household heads in business ($r = -.39$). About 30 per cent of the Newari household heads were employed as salary workers as compared to over 55 per cent of the Parbate household heads in the same occupation category. Moreover, as the business was monopolized by the Newars, so was the military sector by the Parbates because the former were not traditionally encouraged in the military service.

2. Economic Status Dimension

The second most important socioeconomic dimension of Kathmandu was found to be the Economic Status Dimension which was highly associated with economic indexes of households such as monthly rent of occupied dwelling units (loading .94), annual family income from salaries (loading .90), and "economic ranking " of households (loading .81).

The high loading of the Economic Status Dimension on annual family income from salaries suggested that the economic level of most households in Kathmandu was primarily determined by their amount of income from salaries, because a large percentage of households (42 per cent) were employed as salary workers as compared to 25 per cent in business and 13 per cent in agriculture. In the Nepalese situation, salary paying jobs were a source of good income and a matter of social prestige. Therefore, people of all walks of life (whether they belonged to the traditional business group or farmer group) were lured to these jobs.

The second most important economic aspect in Kathmandu for the balance of economic level of most households was related to features of housing rents. Rents of dwelling units in Kathmandu were tremendously high as compared to incomes of households. For example, it was found that even a college professor would generally spend about 30 to 50 per cent of his net income for a newly built ordinary three room housing unit. In this situation, if a family owned a dwelling unit (which was the case for as many as 64 per cent households in Kathmandu under the property inheriting system of Nepal), it was saved from this heavy burden of paying rent; otherwise, the family was forced to pay an exorbitant rent. On the other hand, households which had houses or

extra rooms to rent were making a good income. Consequently, it was not surprising that such households were found to be positively associated with a high level economic status. This economic aspect of Kathmandu was substantiated by the positive loading of the Economic Status Dimension on annual income of households from renting houses (loading .67).

Third, the high positive loadings of the Economic Status Dimension on variables related to foreign origin aspects such as percentage of household heads born in foreign countries (.73), percentage of household heads' fathers born in foreign countries (.75), percentage of household heads moved to Kathmandu from foreign countries (.78), and percentage of household heads Hindi as the mother tongue (.61) suggested that people coming from foreign countries including India were associated with high economic status.

The recent growth of Kathmandu was mostly eastward from the old city; so was noticed to be the movement of prestigious residential areas. The central section of the old city was not any longer the highest quality residential area, rather it was the central part of Kathmandu lying east of the old city as revealed by the spatial patterns of the Economic Status Dimension. Thus geographical central section of Kathmandu was found to be the most prestigious area in consistence with the spatial preindustrial characteristic of Sjoberg--"the pre-eminence of 'central' area ... as portrayed in the distribution of social classes."[1] Foreigners and Nepalese of high income brackets lived in these high quality residential areas.

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[1]See Sjoberg, The Preindustrial City, pp. 95-103.

3. Foreign Origin Dimension

Foreign origin characteristics were grouped as a separate dimension of the socioeconomic ecology of Kathmandu, which was labeled as the Foreign Origin Dimension. The basic variables associated with this Dimension were: percentage of household heads born in foreign countries (loading .52), percentage of household heads' fathers born in foreign countries (loading .55), and percentage of household heads with Hindi as the mother tongue (loading .68). These variables as mentioned earlier, were positively related with the Economic Status Dimension suggesting that people of foreign origin belonged to high economic status. Household heads of foreign origin were only a little over 4 per cent of the total household heads in Kathmandu, and were found to be clustered at different places. Most people of foreign origin in the old city were associated with the Hindi language, and their distribution could be interpretated as a result of the penetration of Indians who succeeded in occupying strategic locations for business. In high quality residential areas of the outer city and the western fringe area such as Kamaladi, Lazimpat, and Kalimati, people from overseas countries especially the United States with high economic status were found to be concentrated.

4. Educational Status Dimension

The recent development of education was found to be one of the most outstanding features of modernization in Kathmandu. Most high schools and colleges as well as the University were established within the last twenty years. Because of the inexpensive educational setup, even lower middle class families could afford to send their

children to high schools and colleges, thereby increasing the number of high school and college graduates. A substantial proportion of these graduates were unemployed since there were not enough suitable jobs and they were reluctant to do manual labor. For these reasons, educational acievement did not necessarily mean security for income, and was not found to be highly associated with the economic status. As a result, a separate dimension of education and its related characteristics was revealed in the socioeconomic ecology of Kathmandu.

The most basic educational variables associated with this Dimension were percentage of persons with literate to 10 years of schooling (loading .70), percentage of illiterate persons (loading -.79) percentage of illiterate household heads (loading -.74), and percentage household heads with high school or more education (loading .48). These loadings clearly indicated that there were two basic types of people in Kathmandu--literate people and illiterate people, towards revealing the Educational Status Dimension. Moreover, the Educational Status Dimension was found to be positively associated with percentage of households with radio (loading .53), number of rooms per occupied dwelling unit (loading .63), and percentage of household heads in middle class government positions (loading .55). These relationships inferred that educational development, to some degree, had brought about changes in the lifestyle of the people suggesting that educated people were giving up their hereditary occupations and wanted to enjoy better living styles with modern items such as radio and new occupation.

It was revealed that percentage of illiterate household heads was highly correlated with percentage of illiterate people ($r = .71$),

and percentage of household heads with high school or more education was highly associated with percentage of people in the family with high school or more education (r = .83). But percentage of people attending school was not so highly associated with percentage of illiterate household heads (r = -.48). It was inferred from these relations that although there was a tendency of illiterate household heads to send their children to schools but not for high school or college education; the high school and college education was mainly confined in families whose household heads had obtained such an education.

5. Stage in Life Cycle Dimension

Age characteristics of household heads and their length of time lived in Kathmandu were grouped into a separate dimension of the socio-economic ecology of Kathmandu, and this dimension was called as the Stage in Life Cycle Dimension. Most basic variables of this Dimension were: age of household heads (loading -.83), percentage of household heads over 49 years of age (-.79), and number of years household heads lived in Kathmandu (-.78). This Dimension revealed that most statistical tracts in the outer city had a relatively high percentage of young household heads, and were characterized in relative terms, by families with small number of elderly people--persons over 49 years of age (loading -.60), high percentage of household heads with high school or more education (loading .47), high percentage of single household heads (loading .49), and large percentage of household heads lived in Kathmandu less than 21 years (loading .62). Converse relationships of these variables would be true for most statistical tracts of the old

city and fringe areas that possessed a relatively large percentage of elderly household heads--over 49 years of age.

This Dimension also revealed the resulting pattern of the urban growth process of Kathmandu. The old city contained a relatively large percentage of elderly household heads, for they were rooted traditionally to their community and parental houses. But as young people became more educated or modernized and improved their economic level, they attempted to break off from their traditional joint family system. As a result, they took a flight to the outer city or fringe areas to get rid of the slum environment of the old city. Moreover, the outer city and fringe areas were noticed to be prime choice for residence of enterprising young people coming to Kathmandu from outside the Kathmandu Valley.

6. Salary Worker Status Dimension and Self-employed Status Dimension

In Kathmandu, it was found that over 40 per cent household heads were employed mainly as salary workers (30 per cent in government positions and 12 per cent in private positions), and 50 per cent household heads were self-employed (25 per cent in business, 14 per cent in agriculture, and 11 per cent in others). Each of these two employment categories revealed different degree of association with their related variables, and was identified with its own separate socio-economic dimension of Kathmandu. These two dimensions after the two basic variables were called as the Salary Worker Status Dimension, and the Self-employed Status Dimension.

The most basic variable of the Salary Worker Status Dimension, percentage of household heads employed as salary worker (loading .80)

was associated with number of years household heads lived in the same houses (r = -.49), percentage of household heads lived in the Kathmandu Valley before to move to presently occupied houses (r = .54), and percentage of occupied dwelling units less than 21 years old (r = .53). These correlations indicated that in relative terms, statistical tracts with high percentage of household heads employed as salary workers in non-government positions had a high percentage of household heads who experienced some mobility within the Kathmandu, had lived few years in the same houses, and had occupied newly built houses. A relatively high proportion of household heads employed as salary workers were noted to be distributed mostly in the outer city and the western fringe area.

The most basic variable of the Self-employed Status Dimension was percentage of self-employed household heads (loading .80). Transportation aspects of the Dimension were noticed to be an interesting feature. The Dimension indicated a strong positive association with percentage of household heads who walked to their place of work (loading .70). This positive association was mainly because of the fact that most of the self-employed household heads consisted of businessmen, farmers and students, who generally walked to their places of work. Most businessmen had their shops at their places of residence or within a walking distance of few minutes. Most student household heads also were located within walking distance of their schools. The value of time was not so important for farmers, so they would walk to reach their even distant fields. It was revealed that statistical tracts with a relatively high percentage self-employed household heads were distributed mostly in the inner city, western fringe area, and some scattered locations.

6. Other Findings

(A) New inmigrants who mostly belonged to the Parbate group were reluctant to select the old section of Kathmandu as the first choice of residence probably for the following two reasons. First, they were from the open countryside, and preferred open areas outside the old city to the conjested old section. Second, they felt socially uncomfortable to live in the Newar dominated community because of cultural differences. As a result, they were mostly distributed in the outer city and fringe areas. This kind of locational choice for residence of new inmigrants in Kathmandu was different from the locational choice of new inmigrants of other cities where the first choice is normally the old part of the city.

(B) The minority group of the Moslems did not show any remarkable differentiation in the economic structure of Kathmandu, whereas the minority group identified by foreign origin characteristics was found to be outstandingly of high economic status.

(C) As an impact of inmigrants on the growth pattern, it was interesting to note that Kathmandu had not faced the squatter problems of many cities of developing countries. For mainly "selective inmigrants" who possessed some kind of skill and enterprising capacity, were from well-to-do families, and were bright youths, had come to Kathmandu from various parts of the country. These people mainly belonged to the Parbate group of the Brahmin and Kshatriya castes, the upper Hindu castes associated generally with high socioeconomic level. These inmigrants were able to live in adequate structures without creating squatter districts.

(D) Kathmandu is a city of preindustrial society, but as the capital city of Nepal, it has captured many features of industrial society without having passed through the stage of industrial development. For example, high quality residential areas have emerged outside the old city; urbanization has extended beyond the city limit; bulk of household heads are employed in the service sector; and the people of Kathmandu have the privilege of enjoying products of the industrial society such as automobile, telephone, telecommunication, radio, and electricity.

B. Some Planning Implications

Eventhough this study is not aimed at specific urban issues or problems of Kathmandu, it has several planning implications. It is not possible to work towards specific urban problems without having general understanding of the city, which is necessary even to prepare a feasibility survey for planning programs. At a time when Kathmandu is experiencing a rapid, haphazard development, a general socioeconomic understanding of the city area is of prime importance for the preparation of its sound urban development planning. Especially in this respect, this research provides a basic reference for general understanding of Kathmandu by covering a wide range of socioeconomic aspects. Several urban problems of Kathmandu have appeared in the earlier discussions and elsewhere in this study. One basic problem is how to cope with the rapid growth of Kathmandu in providing jobs, shelters, transportation and public services to its ever increasing number of people from heavy inmigrants and natural population growth rate. Some aspects of these planning problems are presented below.

(A) It is estimated that in 1970, only 22 per cent of the population over 14 years of age had high school or more education. This precentage figure will continue rising at the present trend of educational emphasis. But even at such a low educational level, high school and college graduates are having trouble finding jobs since there are not enough jobs for the increasing number of graduates, and getting a college degree has not necessarily become a means for improving economic condition. The major sector in providing jobs is His Majesty's Government of Nepal that had employed almost 70 per cent of the salary worker household heads in 1970. This situation poses a serious question. Without an industrial base of some kind, how long can Kathmandu grow by providing jobs mainly in the public sector? At present, external forces such as foreign aid have played a significant role in influencing the economic system of Kathmandu, e.g., by creating jobs and housing market. But how long can foreign aid continue to provide the impetus for sustained growth of Kathmandu? Foreign aid may be even cut off in future. Therefore, in the wake of the increasing unemployment problem, if some positive action is not undertaken to create a larger job market for the increasing labor force, the prospective economic health of Kathmandu may not be so sound. Indeed, it is already plagued by a problem of over urbanization with a population of only 172,000.

(B) Inadequate housing is considered to be one of the acute problems of Kathmandu,[1] although it has not faced the squatter problems of many cities of developing countries. This problem seems to be

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[1]On the average, about two persons share a room in Kathmandu. But more than two persons are found sharing a room for over half of the statistical tracts. Often it is not uncommon for more than five persons to share a room.

related partly to the cultural background and partly to the low economic condition of the people. The first aspect especially applies to most Newars of the old city. Some Newar families in the old city could afford to moving out to open areas in the outer city or fringe areas from the conjested old city. But they have not done so because of their cultural attachment to their parental houses and communities, and have remained content consuming very little space. The second aspect applies to most people of Kathmandu and is more important concerning the housing situation. The cost of houses in Kathmandu is enormous as compared to family incomes. For example, a college graduate if he is fortunate, can earn about 5,000 rupees a year from his salary, which is barely enough to support his family including the rent of his dwelling unit which would be at least 30 per cent of his net income. In this situation, it becomes even more difficult for him to own an ordinary house which might cost at least 30,000 rupees. What about other less fortunate people, especially new inmigrants, who do not have jobs. In general, families who do not own houses, have to pay exorbitant rents and are being deprived of other basic necessities of life. At present, there is no plan for low cost housing, and some kind of low cost housing program for Kathmandu is very important in the light of the serious housing situation.

(C) As much as 80 per cent of household heads of Kathmandu walk to their places of works, and only a small proportion of them use modern means of transportation (6 per cent use buses and 5 per cent use automobiles). Even for such a small percentage use of automobiles, there is not enough parking space along the Judha Road, the commercial hub of Kathmandu. Automobiles can hardly pass through the heavy

pedestrian traffic in narrow streets of the old city which consists of most commercial activities of Kathmandu. The opening of the new supermarket at the Judha Road might make the transportation problem even worse. Under this situation, it seems reasonable to encourage locations of new shopping centers in the outer city and fringe areas so as to relieve the old city from further conjestion and to promote the growth of areas lying outside the old city. For example, the Meen Bhawan-Baneswar area which has a good location for serving the other two cities also--Patan and Bhadgaon, could be considered a possible site for a new shopping area.

(D) On the assumption that Kathmandu is a viable city and its further economic growth is certain, Kathmandu with increasing number of automobiles and buses will continue to grow. But if it continues to grow in the present haphazard manner, these modern means of transportation would not be used effectively, and housing development patterns would look like pieces of a zigzag puzzle. Therefore, to save Kathmandu from chaotic development, there is an urgent need for urban regional planning. To reach this goal, there has to be cooperation between the planning agency (Department of Housing and Physical Planning) and residents since most land in Kathmandu is under private ownership.

(E) Despite Kathmandu's move on modernization, a substantial proportion of households still do not have the privilege of certain basic things of modern life such as public water supply and electricity. About 10 per cent of the total households of Kathmandu drink water from wells, natural springs and streams, and about 16 per cent of the households do not have the electricity in their homes. These findings call for the attention of further works toward providing the public utilities

to the remaining households who do not have the privilege of enjoying them.

C. Evaluation of the Analytical Techniques and Hypotheses

1. Variable Selection

Most factorial studies of cities have been limited to the use of variables for which data are easily available from censuses or other sources. In this study, first data were aggregated on 196 variables that were considered important for deriving fundamental dimensions of the socioeconomic ecology of Kathmandu, and then methodologically 80 variables were selected by eliminating the redundant ones, for the final factor analysis. This methodology of variable selection was found to be useful in capturing fundamental dimensions of the socioeconomic ecology of Kathmandu.

2. Factor Analysis

Ideas of factor analysis were introduced during the very beginning of this century. Since then, there has been continued effort towards the improvement of factor analytical techniques. Within the last ten years with the advancement of computer technology, there has been an ever increasing application of factor analysis to a variety of fields. However, factor analytical techniques have not been perfected to the satisfaction of all researchers. For example, several aspects of factor analysis, such as problems dealing with communalities, rotation types, the best number of factors for rotation, and computing methods of factor scores, are still at a controversial stage. Despite

these technical problems, factor analysis has been regarded as a useful tool for identifying and explaining underlying fundamental dimensions of a system by reducing the compexity of a large number of variables to a small managable number of factors, and at the same time extracting important elements of the system.

In this research also, the factor analysis with varimax rotation was found to be adequate in identifying and explaining fundamental dimensions of the socioeconomic ecology of Kathmandu, which were seven in number as compared to the original set of 80 variables. Moreover, it was possible to identify the few most important basic variables for each of the dimensions.

The conventional factor scores from the rotation were not found to be as meaningful, especially for minor factors. To facilitate the interpretation, factor scores were computed from the varimax factor matrix by eliminating low loadings (smaller than $|.4|$); these "controlled" factor scores were found to be more meaningful in portraying the spatial patterns of factors than the factor scores computed in the conventional way.

In general, with the controlled factor scores, each of the factors had a higher degree of association with its basic variables (variables with high loadings on the factor) than in the rotated varimax factor matrix. Each of the factors in the controlled factor scores had correlation coefficients more than $|.85|$ with the most basic variable. Such high correlation coefficients could be considered a sound basis for making an effective use of the correlation matrix for further explanation of factors, especially in a case where the objective would be to make statements concerning relationships among specific variables of

interest, because in the summary process of factor analysis, some information about variables is lost, and correlation methods would appear to be more appropriate for making statements about specific variables.[1]

3. Analysis of Variance

Spatial patterns of the socioeconomic dimensions in this study were examined by cartographic presentation and analysis of variance. These techniques complemented each other in presenting spatial patterns of the dimensions. For example, the analyses of variance helped make decision in determining the types of spatial patterns of the dimensions, which generally corresponded with the visual picture derived from the cartographic comparisons. However, for the Economic Status Dimension (Factor II) and the Educational Status Dimension (Factor IV), the association between the results of these two techniques was not so strong in the first trial. This deviant picture was considered to be the result of the unsound basis used to design concentric zones for the dimensions. When concentric zones were redesigned on the basis of the cartographic presentation of both dimensions, centering near the geographical center of Kathmandu, the results of the analyses of variance became significant.

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[1]See D.R. Meyer, "Factor Analysis Versus Correlation Analysis: Are Substantive Interpretations Congruent?" Economic Geography, XLVII, Supplement (June, 1971), 336-43.

4. Evaluation of the Hypotheses

Socioeconomic structures of Western cities have been complex because their industrialization has attracted people of various socioeconomic backgrounds. The same kind of attracting force has been exerted by Kathmandu and various types of people have moved into the city area, and have contributed to making its socioeconomic structure complex through its role as the primate city and capital of the country with the involvement in the international world and foreign aid. In this respect, the basic hypotheses that at least four fundamental socioeconomic dimensions would be derived via factor analysis for Kathmandu to show its socioeconomic complex was tenable since seven were derived. The hypothesized dimensions were: (a) ethnic-immobility status dimension, (b) socioeconomic status dimension, (c) family status (stage in life cycle) dimension, and (d) employment status dimension. The Ethnic-immobility Dimension and the Stage in Life Cycle Dimension as derived from the factor analysis were similar to their hypothesized counterparts whereas other hypothesized dimensions were split between different factors. The hypothesized socioeconomic dimension was split into the Economic Status Dimension, Educational Status Dimension, and Foreign Origin Dimension. The hypothesized employment status dimension was split into the Salary Worker Status Dimension and the Self-employed Status Dimension. All these dimensions resulted seemed to vary with distance from the central business district except the Economic Status Dimension and Educational Status Dimension, which varied with distance from the geographical center of Kathmandu. These findings were considered to be in confirmation with the concentric interpretation of urban spatial patterns as hypothesized.

E. Concluding Remarks

Ethnic factors have been found in most factorial studies of cities--both Western and non-Western (Table 7-1), but they have not revealed so strong association with immobility characteristics as the Ethnic-immobility Dimension of Kathmandu. The Ethnic-immobility Dimension in this study was the most important factor accounting for as much as 20 per cent of the total variance and represented the majority groups of people, whereas ethnic factors in most other factorial studies such as those on Chicago and Toronto, represented minority ethnic groups and were not so prominent.[1] In some factorial studies including those on Chicago and Toronto, more than one ethnic factor appeared associating with different ethnic groups. In Kathmandu, the two important ethnic groups--Newars and Parbates, were integrated into one ethnic factor, although people born in foreign countries were associated with a separate factor--the Foreign Origin Dimension; the basic variables of this Dimension were associated with economic aspects as well. In the case of large Indian cities, the Brahmin caste was found to be associated with high socioeconomic status[2] whereas it was not associated with the Economic Status Dimension in Kathmandu, rather it was negatively associated with the Ethnic-immobility Dimension. Spatial patterns of the Ethnic-immobility Dimension was found to be distributed in a highly

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[1]See Rees, "Concepts of Social Space," pp. 326-27 for ethnic factors of Chicago; and Murdie, Metropolitan Toronto, p. 27 for ethnic factors of Toronto.

[2]See Berry and Spodek, "Large Indian Cities," 270-82.

TABLE 7-1

COMPARATIVE SUMMARY OF SPATIAL PATTERNS OF THE THREE BASIC DIMENSIONS OF SELECTED URBAN AREAS

Dimensions	Anglo-American Urban Areas							European Urban Areas			Asian Urban Areas			
	Toronto (R.A. Murdie, 1969)	Chicago (D.C. McElrath and J.W. Barkey, 1964)	Akron, Dayton, Indianapolis and Syracuse (T.R. Anderson and J. Egeland, 1961)	Boston (F.L. Sweetser, 1961 and 1962)	Northeastern Illinois (B.J.L. Berry and R.J. Tennant, 1965)	Indianapolis, Buffalo, Spokane and Kansas City (P.D. Salins, 1971)	Small urban centers in Canada (L.S. Bourne and G.M. Barber, 1971)	Rome (D.C. McElrath, 1962)	Copenhagen (P.O. Pederson, 1965)	Swedish cities (C.G. Janson, 1971)	(B.J.L. Berry and H. Spodek, 1971)		Haifa, Isreal (Y. Gradus, 1971)	Kathmandu, Nepal (T.R. Joshi, 1972)
											Madras, Ahmedabad, Kanpur and Bombay	Poona		
Socioeconomic Status or Similar	S	C	S	S	S	S		C & S	S	C & S	C	C	S	C
Family Status or Similar	C	C	C	C	C	C	C	C & S	C	C	C1	C1	C	C
Ethnic Status or Similar	C1	S			C1	C1						C1	C1	C & C1

C = concentric patterns; S = sectoral patterns; and C1 = clustered or seggregated patterns. Authors who have conducted the studies, and years in which the studies were published or completed, are given in parentheses. Complete references on these works are included in the bibliography.

centralized cluster in contrast to the dispersed cluster pattern of ethnic factors found in Western as well as Indian cities. Thus the ethnic factor of Kathmandu was found to be characteristically different from ethnic factors of other cities. However, the Foreign Origin Dimension, in general, seemed to be distributed in clustered patterns, thus resembling the spatial pattern of ethnic factors of other cities

The Economic Status Dimension of Kathmandu was one of the most important factors, a typical result of urban factorial studies. However, the Dimension was different from similar dimensions of Western cities and large Indian cities in that education aspects were not as strongly associated with it, and its distribution pattern was closer to concentric type in contrast to more nearly sectoral patterns for Western cities (Table 7-1). The separation of educational aspects from economic aspect in Kathmandu was considered to be attributed to the recent educational development in Nepal, and shortage of jobs for the increasing number of college and high school graduates.

The Stage in Life Cycle Dimension of Kathmandu was similar to its counterparts of Western cities in component and spatial distribution (Table 7-1). However, family size which is generally found to be an important attribute to similar dimensions of the latter was not found to be so in the former; the correlation of family size on the two most basic variables of the Dimension was very low--.15 on age of household heads, and .11 on percentage of household heads over 49 years of age. This Dimension was also different from similar dimensions found in Indian cities in terms of male-female ratio and spatial patterns. Male-female ratio was an important variable of the familism dimension (a dimension similar to the stage in life cycle dimension) in the Indian

cities of Bombay, Kanpur and Madras;[1] but the variable was not as important in Kathmandu because the correlation of the variable on the most basic variable of the Dimension (age of household head) was low ($r = -.42$). The distribution pattern of the Dimension varied with distance from the center of the central business district in Kathmandu as compared to the clustered pattern of similar dimension in Poona, India.

In this study, two factors were derived from employment characteristics--the Self-employed Status Dimension and the Salary Worker Status Dimension. To the present knowledge of the author, no such dimensions were derived in previous factorial studies of cities.

This research has revealed aspects of the three indices of social area analysis (socioeconomic status, family status and ethnic status) which have been found in most Western and non-Western cities, and suggests that these indices are important dimensions of modernizing preindustrial cities of landlocked countries as well, although it is a premature generalization without the study of other such cities. Some interrelating characteristics of these indices or dimensions, however, may differ from city to city because of the difference in cultural aspects, process of modernization and historical development of cities.

Social areas based on the Ethnic-immobility Dimension and the Economic Status Dimension provided a neat picture of the two important aspects of the socioeconomic ecology of Kathmandu: (a) concentration of statistical tracts with high values of the Ethnic-immobility Dimension

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[1]See Berry and Spodek, "Large Indian Cities," pp. 276-79

in the inner city, representing primarily the Newar concentration, and (b) dominance of the outer city (mainly the central section of Kathmandu) over its surrounding areas in terms of high economic status. Thus the design of social areas was found to be an effective approach to integrate the relationship between the two factors and their spatial patterns, and helpful in defining a set of communities.

One interesting finding of this research was that Burgess' concentric pattern idea of urban structure of highly developed Western cities, was in conformance with spatial patterns of the modernizing preindustrial city of Kathmandu as well. Most socioeconomic dimensions of the latter such as the Ethnic-immobility Dimension, Economic Status Dimension and Stage in Life Cycle Dimension tended to vary systematically with distance from the center of the central business district.

The societal structure of Kathmandu has a very unique characteristic. It is mainly a Hindu city, but unlike Indian Hindu cities, it consists of two parallel Hindu groups (the Newars and Parbates, who are very different from each other according to spatial distribution and several socioeconomic characteristics). They have separate caste structures, which is partly a result of unique historical developments.

There are at least two unique characteristics of new inmigrants of Kathmandu. First, most new inmigrants belong to the"selective groups", the Brahmin and Kshatriya castes who are socioeconomically better off than their lower caste counterparts, have some kind of skill or enterprising capacity, or are from well-to-do families. Therefore, they have managed to live in sound structures in Kathmandu without creating squatter areas. Thus interestingly enough, Kathmandu does not have the squatter problem faced by many cities of developing countries. Second,

most new inmigrants in Kathmandu have selected the outer city as their first place of residence rather than the old section of the city. This locational choice of new inmigrants is different from the locational choice of new inmigrants of Western cities where the first choice is normally in the central or old part of the city.

This study is just a beginning step towards the understanding of socioeconomic structure of modernizing preindustrial cities of land-locked countries with a case study of Kathmandu. Moreover, this research is the first attempt of its kind in understanding the socioeconomic structure of Kathmandu, and it is hopefully anticipated that this study will provide a background to initiate research on specific problems of Kathmandu such as housing, transportation, and commercial activities.

APPENDIXES

APPENDIX I

श्री ५ को सरकार, निर्माण, संचार तथा यातायात मंत्रालय
आवास तथा भौतिक परियोजना विभाग

QUESTIONNAIRE ON SELECTED SOCIO—ECONOMIC ASPECTS
छनौट गरिएका सामाजिक—आर्थिक विषय-वस्तु बारे प्रश्नावली

Serial No._____ House No._____ Household No._____ Ward No._____

INFORMATION ON THE HOUSEHOLD HEAD
परिवारको प्रधान मानिस बारे जानकारी

1. Address (ठेगाना) : _____
2. Age (उमेर) : Below 20____, 20–49____, 50–64____, 64+____
3. Marital status (वैवाहिक सम्बन्ध) : Single____, Married____, Widow or Widower____, Separated____, Divorced____
4. Education (शिक्षा) : Illiterate____, Literate to 10 years of schooling____, High school pass or more education____
5. Employment (काम) : Unemployed____, Self employed____, Government service____, Employed as private wage or salary worker____
6. Occupation (पेशा) :
   Service (नोकरी) : Below 1st class non-gazetted____, 1st class non-gazetted to 2nd class gazetted____, 1st class gazetted or above____, Others (specify)_____
   Business (व्यापार) : What is the total amount of monthly sales in rupees ? Below 2,500____, 2,500–4,999____, 5,000–9,999____, 10,000–14,999____, Over 14,999____
   Agriculture (खेती) : How much land do you have under cultivation and where ? Kath. Valley_____*Ropani*, Terai _____*Bigha*, Hilly area_____, Others (अरू) (specify)_____
7. Location of place of work (काम गर्ने ठाउँको ठेगाना) : _____
8. Means of transportation to the place of work (काम गर्न जाने साधन) : Foot__, Bicycle____, Scooter or Motorcycle____, Automobile____, Bus____, *Riksha*____
9. How long have you been living in Kathmandu (काठमाडौंमा कति वर्षदेखि) ?_____
10. Place of birth (जन्मस्थल) : Town or Village_____, District_____
11. Place of birth of head's father (घरमूली बाबुको जन्मस्थल) : Town or Village _____, District_____
12. Religion (धर्मावलम्बी) : Hindu____, Buddhist____, Muslim____, Others (Specify)____
13. Mother tongue (मातृ भाषा) : Nepali____, Newari____, Others (Specify)_____
14. Caste (जात) : *Newar*____, *Brahman*____, *Kshatriya*____, Others (Specify)_____
15. Subcaste (थर). e.g. *Thapa, Shrestha*, etc_____

OCCUPIED DWELLING CHARACTERISTICS
बसोबास भएको घरखण्डको चित्रण

16. Total number of rooms in the dwelling unit (not counting bath-room) (घरखण्डमा भएको जम्मा कोठा)_____
17. Approximate monthly rent of the dwelling unit (घरखण्डको करीब मासिक भाडा)_____
18. Approximate value of the house in current price (घरको करीब मोल) : _____
19. Approximate price for a *ropani* of land near your house (घर नजिकको एक रोपनी जग्गाको करीब मोल) : _____
20. Housing condition (घरको अवस्था) : Excellent____, Good____, Fair_____, Poor_____
21. Tenure of the housing unit (घरखण्डको स्वामित्व) : Owned____, Rented____, No cash rent____
22. Type of the housing unit (घरखण्डको प्रकार) : 1 Family____, 2 Families____, More than 2 families____
23. How long have you been living in this unit (यस घरखण्डमा कति वर्षदेखि) ? All life____, Years____
24. Where did you live before you moved here (यहाँ सर्नु भन्दा पहिले कहाँ बस्नुभो) ? (give the name of locality if in Kathmandu, and place and district if not in Kathmandu)_____
25. How old is this house (यो घर बनाएको कति वर्ष भयो) ?_____years.

CONVENIENCE AND LUXURIOUS ITEMS OF THE HOUSEHOLD
(परिवारमा भएको सुविधाजनक र विलासी विषय - वस्तुहरू)

Item (विषय - वस्तु)	Type (किसिम)	Location (स्थिति)	Use (उपयोग)
23. Drinking water	Tap____, Well____, Others____	Within house____, Near house____, Distant____	For exclusive use____, Shared____
27. Bathing	Bathroom____, Open (Outside house)____	Within house____, Near house____, Distant____	For exclusive use____, Shared____
28. Latrine	Bathroom____, Open (Outside house)____	Within house____, Near house____, Distant____	For exclusive use____, Shared____

29. Electric supply : Yes____, No____
30. Radio : Yes____, No____
31. Transistor radio : Yes____, No____
32. Tape recorder : Yes____, No____
33. Bicycle : Yes____, No____
34. Scooter or Motorcycle : Yes____, No____
35. Telephone : Yes____, No____
36. Automobile : Yes____, No____

OTHER HOUSEHOLD CHARACTERISTICS
परिवारको अरू चित्रण

37–45. Number Of People in the Household Excluding Servants
नोकर बाहेक परिवारमा भएका मानिसको संख्या

37. Total जम्मा	38. Males पुरुष	39. Married (husband & wife count two) विवाहित	40–45 Age group (वयोसमूह) 0–4	5–14	15–19	20–49	50–64	64+

46–50. Education and Employment of the Household परिवारमा भएको शिक्षा र काम	Total number in the household
46. Literate or 1 to 10 years of school education	
47. High school pass or more education	
48. Attending school	
49. Employed as salary or wage worker (over 14)	
50. Females employed as salary or wage worker (over 14)	

51. Gross annual family income (परिवारको वार्षिक आम्दानी): Below 500 rupees____, 500–999____, 1,000–1,999____, 2,000–4,999____, 5,000–9,999, 10,000–19,999____, 20,000 and more_____

52. Gross annual family income from (परिवारको वार्षिक आम्दानीको श्रोत) : Approximately (करीब)
   Salaries and wages _____
   Retail sales and whole sales _____
   Renting house and land _____
   Agricultural products (cash value) _____
   Industry _____
   Others (pension, etc.) _____

Name of Interviewer_____

Date_____

APPENDIX II

GLOSSARY OF TERMS USED IN THE QUESTIONNAIRE

a. Household Head. The person who contributed the highest proportion of the household's annual income was considered to be the household head. If a person was residing in a dwelling unit in Kathmandu, and was supported by other persons such as his relatives who were living elsewhere, he (the person residing in Kathmandu) was considered as the household head. For example, a student residing in Kathmandu who was supported by his parents for his education was considered as the household head.

b. Household. A household was considered to consist of an individual or group of individual who shared their quarter and their principal meal as defined by the United Nations.[1]

c. Housing Unit or Dwelling Unit. A housing unit or dwelling unit was considered to consist of a house, an apartment or other groups of rooms or a single room when it was occupied or intended for occupance as separate living quarters.[2] Therefore, there was a one to one correspondence between household and occupied housing unit or dwelling unit.

d. Employment and Occupation Category. If the household head was a student he was considered self-employed. If a household head was involved in more than one activity, his occupation was considered that activity in which he devoted a greater proportion of his time.

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[1]United Nations, The Asian Population Conference 1963, 1964, p. 108. A similar definition for "household" is presented also by the U.S. Census Bureau. See U.S. Bureau of the Census, U.S. Census of Population and Housing, 1960 (Washington, D.C.: U.S. Government Printing Office, 1961).

[2]See U.S. Bureau of the Census, U.S. Census of Population and Housing, 1960.

e. Ropani and Bigha. Ropani is a measurement unit used to measure land in the Kathmandu Valley. One ropani is equal to 608 square yards. Bigha is a measurement unit used to measure land in the southern Nepal (Terai and Bhitri Madhes). One Bigha is equal to 8,208 square yards.

f. Gazetted and Non-gazetted. Gazetted and Non-gazetted terms refer to high ranked and low ranked positions respectively of His Majesty's Government of Nepal. Their classification in the questionnaire was done from low ranks to high ranks as follows: Below first class non-gazetted, first class non-gazetted to second class gazetted, and first class gazetted and above.

g. Rupees. The Nepalese monetary unit is called rupee. One American dollar was equal to ten Nepalese rupees during the time of the sampling survey.

h. Newar, Brahmin and Kshatriya. The Newars, who are the native people of the Kathmandu Valley are in majority in Kathmandu. They belong to both Hindu and Buddhist religions, and are segregated by other Hindu Nepalese groups in social relationships. Therefore, the Newars are put in a separate caste category although they have their own caste stratification.[1] Brahmins and Kshatriyas belong to the higher scale in the caste hierarchy of the other Hindu Nepalese groups.

i. Housing Condition. A house with a sound structure, good appearance and modern convenience such as flush toilet, and hot and cold running water was considered to be in excellent condition. A house with

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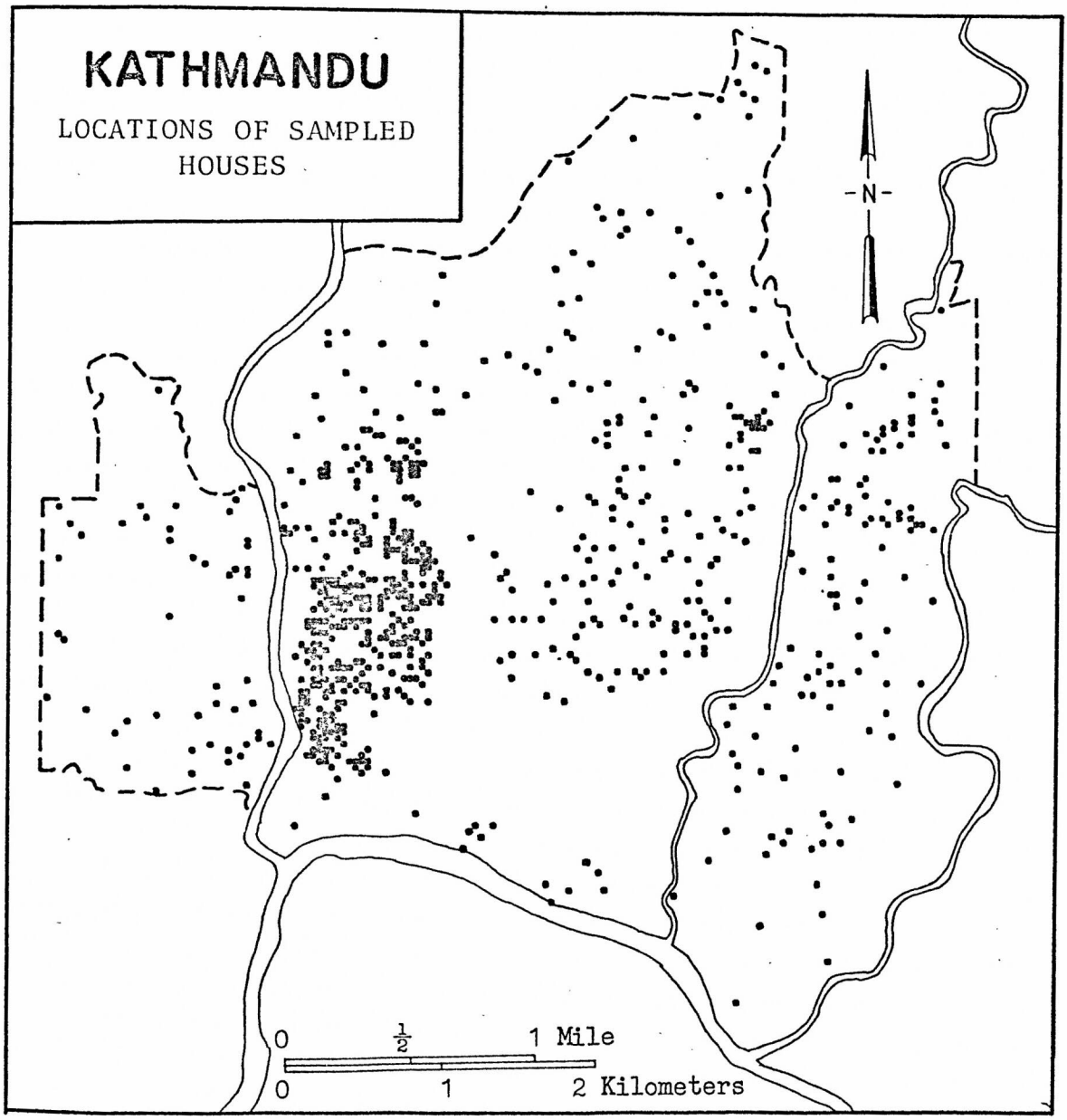
[1]See Bista, People of Nepal, pp. 15-28.

a fairly strong structure and fair appearance was considered to be in good condition. Recently built cemented houses of well to do Nepalese families were classified in this category. A house which was built of wood and baked bricks, and did not show a single crack was considered to be in fair condition. This was the housing condition for a majority of the people in Kathmandu. Houses that looked old, developed cracks in walls and had other evidences of deterioration in the structure, and showed need of repair were considered to be in poor condition.

j. "Near House" and "Distant". In items 26, 27 and 28 of the questionnaire, "near house" meant a walking distance of less than five minutes, and "distant" meant a walking distance of more than five minutes from the household's residence.

APPENDIX III

LOCATIONS OF SAMPLED HOUSES



APPENDIX IV

VARIABLES TABULATED FROM THE SAMPLING SURVEY OF KATHMANDU, MAY-AUGUST, 1970, AND VARIABLES SELECTED FOR THE FACTOR ANALYSES

Serial No. of Variables	Variables Used for Factor Analysis		Full Description of Variables	Figures in Average or Per Cent	Total Count in Sample
	Step 1	Step 2			
1	1	1	Distance of occupied dwelling unit from CBD (Indrachowk) in miles	0.9A	1256N
2	2	2	Age of the household head	41.0A	1256N
3	*	*	Household's cultivated lands in Ropani	14.0A	150N
4	3	3	Number of years household head lived in Kathmandu	34.1A	1254N
5	4	4	Number of rooms per occupied dwelling unit	2.9A	1256N
6	5	5	Monthly rent of occupied dwelling unit in rupees	116.3A	1256N
7	6	6	Value of occupied dwelling unit	35392.7A	1255N
8	7	7	Price for a ropani of land	17413.8A	1256N
9	8	*	Ratio between owner occupied and renter occupied dwelling units	2.2A	1155N
10	9	8	Rent of renter occupied dwelling unit in rupees	89.8A	357N
11	10	9	Number of years household head lived in presently occupied house	20.5A	1256N
12	11	10	Age of occupied dwelling unit	49.1A	1256N
13	12	11	Economic ranking of household	4.7A	1256N
14	13	*	Number of persons in household	5.8A	7264
15	14	*	Males in household	50.5%	3665
16	*	*	Females in household	49.5%	3599
17	*	*	Sex ratio (male/female)	1.0A	1256N
18	*	*	Married persons	39.4%	2860
19	15	12	Rooms per person	0.5A	1256N
20	16	*	Persons between 0-4 years	13.1%	950
21	17	*	Children between 0-4 years per family	0.8A	1256N
22	18	*	Families with 3 and more children between 0-4 years	4.5%	56

Asterisk (*) marks indicate the variables excluded from the factor analyses; "A" stands for average; "%" stands for per cent; and "N" stands for the total number of sampled households who answered the question.

APPENDIX IV--Continued

Serial No. of Variables	Variables Used for Factor Analysis		Full Description of Variables	Figures in Average or Per Cent	Total Count in Sample
	Step 1	Step 2			
23	*	*	Persons 5 to 14 years	23.3%	1691
24	*	*	Persons 0 to 14 years	36.4%	2641
25	*	*	Persons 15 to 19 years	11.2%	814
26	19	13	Persons 20 to 49 years	40.6%	2947
27	*	*	Persons 50 to 64 years	9.2%	668
28	*	*	Persons 65 years and over	2.8%	207
29	20	14	Persons over 49 years	12.0%	875
30	21	15	Persons literate to 10 years of schooling	42.6%	3091
31	22	16	Persons with high school or more education		
32	23	17	Persons with no education (Illiterate)	43.3%	3145
33	24	18	Persons attending school	23.9%	1738
34	25	*	Persons (15-64 years old) employed as salary or wage workers of labor force (persons 15-64 years old)	24.6%	1088
35	*	*	Females (15-64 years old) employed as salary or wage workers of labor force (persons 15-64 years old)	2.8%	125
36	*	*	Males (15-64 years old) employed as salary or wage workers of labor force (persons 15-64 years old)	21.7%	963
37	26	19	Annual family income from salaries and wages in rupees	5114.2A	770N
38	*	*	Annual family income from retail and whole sales	20678.4A	316N
39	27	20	Annual family income from renting lands and houses	3641.4A	127N
40	*	*	Annual family income from agriculture	2308.3A	351N
41	*	*	Annual family income from industry	8794.4A	9N
42	*	*	Annual family income from other sources	3070.1A	275N
43	28	21	Gross annual family income	10086.3A	1256N
44	29	22	Population density per square mile	18777.7A	
			Age Group of Household Heads:	100.0%	1256
45	*	*	1. Under 20 years	2.3%	29
46	30	23	2. 20 to 49 years	69.3%	870

APPENDIX IV--Continued

Serial No. of Variables	Variables Used for Factor Analysis		Full Description of Variables	Figures in Average or Per Cent	Total Count in Sample
	Step 1	Step 2			
47	*	*	3. 50 to 64 years	22.1%	278
48	*	*	4. 65 years and over	6.1%	76
49	31	24	5. 50 years and over	28.2%	354
			Marital Status of Household Heads:	100.0%	1255
50	32	25	1. Single	10.0%	
51	*	*	2. Married	81.0%	1017
52	*	*	3. Widow and Widower	7.6%	96
53	*	*	4. Separated	0.2%	3
54	*	*	5. Divorced	0.6%	8
			Education of Household Heads:	100.0%	1255
55	33	26	1. Illiterate	24.8%	312
56	34	*	2. Literate to 10 years of schooling	46.9%	589
57	35	27	3. High school or more	28.2%	354
			Employment Status of Household Heads:	100.0%	1256
58	*	*	1. Unemployed	5.7%	71
59	36	28	2. Self-employed	48.2%	606
60	37	29	3. Government service	27.9%	351
61	38	30	4. Private wage and salary workers	18.5%	228
			Occupation of Household Heads:	100.0%	1187
62	39	31	1. Service	41.8%	496
63	40	32	2. Business	25.3%	300
64	41	*	3. Agriculture	12.7%	151
65	*	*	4. Others	20.2%	240
			Sevice Status of Household Heads:	100.0%	499
66	42	33	1. Below 1st class non-gazetted	37.5%	187
67	43	34	2. Ist class non-gazetted to 2nd class gazetted	27.9%	139
68	*	*	3. First class gazetted and above	2.4%	12
69	44	35	4. Others (private salary workers)	32.3%	161

APPENDIX IV--Continued

Serial No. of Variables	Variables Used for Factor Analysis		Full Description of Variables	Figures in Average or Per Cent	Total Count in Sample
	Step 1	Step 2			
			Household's Monthly Sales in Rupees:	100.0%	293
70	45	*	1. Under 2500	73.0%	214
71	*	*	2. 2500 to 4999	16.0%	47
72	*	*	3. 5000 to 9999	4.1%	12
73	*	*	4. 10000 to 14999	1.0%	3
74	46	*	5. 15000 and over	5.8%	17
			Locations of Households' Cultivated Lands:	100.0%	151
75	*	*	1. Kathmandu Valley	86.1%	130
76	*	*	2. Hilly region	12.6%	19
77	*	*	3. Terai and Bhitri Madhesh	1.4%	2
			Household Heads' Means of Transportation to the Place of Work:	100.0%	1182
78	47	36	1. Foot	80.0%	946
79	48	37	2. Bus	5.8%	68
80	49	38	3. Bicycle	7.8%	92
81	50	39	4. Scooter or motorcycle	1.6%	19
82	51	40	5. Automobile	4.8%	57
			Number of Years Household Heads Lived in Kathmandu:	100.0%	1254N
83	*	*	1. Under 11 years	16.8%	211
84	*	*	2. 11 to 20 years	6.9%	86
85	*	*	3. 21 to 30 years	17.7%	222
86	*	*	4. 31 to 40 years	21.1%	265
87	52	41	5. 41 years and over	37.5%	470
88	53	42	6. Under 21 years	23.7%	297
89	*	*	7. 21 to 40 years	38.8%	487
			Household Heads' Birth Places:	100.0%	1256
90	*	*	1. Kathmandu	68.6%	862
91	*	*	2. Patan	2.0%	25
92	*	*	3. Bhadgaon	1.5%	19
93	*	*	4. Other places in Kathmandu Valley	4.3%	54
94	*	*	5. Eastern hilly region	9.6%	120
95	*	*	6. Western hilly region	6.4%	81
96	*	*	7. Eastern Terai	3.0%	38
97	*	*	8.Western Terai	0.3%	4
98	54	43	9. Foreign countries	4.2%	53
99	55	44	10. Kathmandu Valley (1-4)	76.4%	960
110	58	47	11. Nepal excluding Kathmandu Valley	19.3%	243

APPENDIX IV--Continued

Serial No. of Variables	Variables Used for Factor Analysis		Full Description of Variables	Figures in Average or Per Cent	Total Count in Sample
	Step 1	Step 2			
			Birth Places of Household Heads' Fathers:	100.0%	1256
100	*	*	1. Kathmandu	64.9%	815
101	*	*	2. Patan	2.2%	28
102	*	*	3. Bhadgaon	1.8%	22
103	*	*	4. Other places in Kathmandu Valley	5.4%	68
104	*	*	5. Eastern hilly region	11.1%	139
105	*	*	6. Western hilly region	7.2%	90
106	*	*	7. Eastern Terai	2.8%	35
107	*	*	8. Western Terai	0.3%	4
108	56	45	9. Foreign countries	4.4%	55
109	57	46	10. Kathmandu Valley (1-4)	74.3%	933
111	59	48	11. Nepal excluding Kathmandu Valley	21.4%	268
			Household Heads by Religions:	100.0%	1255N
113	61	50	1. Hindus	81.1%	1018
114	62	51	2. Buddhists	17.7%	222
115	*	*	3. Moslems	0.6%	7
116	63	52	4. Others	0.6%	8
			Household Heads by Mother Tongues:	100.0%	1256
117	64	53	1. Newari	59.1%	742
118	65	54	2. Nepali	36.1%	453
119	66	55	3. Hindi	2.1%	27
120	67	56	4. Others	2.7%	34
			Household Heads by Castes:	100.0%	1256
121	68	57	1. Newar	59.5%	747
122	69	58	2. Brahmin	18.0%	226
123	70	59	3. Kshatriya	10.8%	136
124	71	60	4. Others	11.7%	147
			Housing Condition of Occupied Dwelling Units:	100.0%	1256
125	*	*	1. Excellent	0.2%	3
126	72	61	2. Good	11.7%	147
127	*	*	3. Fair	45.6%	573
128	73	62	4. Poor	42.4	533

APPENDIX IV--Continued

Serial No. of Variables	Variables Used for Factor Analysis		Full Description of Variables	Figures in Average or Per Cent	Total Count in Sample
	Step 1	Step 2			
			Ownerships of Occupied Dwelling Units:	100.0%	1256
129	74	63	1. Owned	63.6%	798
130	*	*	2. Rented	28.4%	357
131	75	64	3. No-cash-rent	8.0%	100
			Types of Occupied Housing Units:	100.0%	1256
132	*	*	1. One family units	41.2%	518
133	*	*	2. Two families units	21.7%	273
134	76	65	3. More than two families units	37.0%	465
			Length of the Life Period Household Heads Lived in Presently Occupied Houses:	100.0%	1256
135	77	66	1. All life	29.5%	370
136	*	*	2. Not all life	70.5%	886
			Number of Years Household Heads Lived in Presently Occupied Houses:	100.0%	1256
137	*	*	1. Under 11 years	45.9%	577
138	78	67	2. Under 21 years	56.5%	710
139	*	*	3. 21 to 40 years	26.9%	338
140	*	*	4. 41 years and over	16.6%	208
			Places Household Heads Lived Before Moving to Presently Occupied Houses:	100.0%	1250N
141	79	68	1. Not moved	34.5%	431
142	80	69	2. Same neighborhood	39.3%	491
143	*	*	3. Kathmandu excluding same neighborhood	12.4%	155
144	*	*	4. Patan	1.4%	17
145	*	*	5. Bhadgaon	0.8%	10
146	*	*	6. Other places in Kathmandu Valley	3.0%	37
147	*	*	7. Eastern hilly region	2.6%	32
148	*	*	8. Western hilly region	1.7%	21
149	*	*	9. Eastern Terai	1.4%	17
150	*	*	10. Western Terai	0.6%	8
151	81	70	11. Foreign countries	2.5%	31
152	82	71	12. Kathmandu Valley excluding not moved (2-6)	56.8%	710
112	60	49	13. Not moved to Kathmandu from outside the Kathmandu Valley (1-6)	91.3%	1141

APPENDIX IV--Continued

Serial No. of Variables	Variables Used for Factor Analysis		Full Description of Variables	Figures in Average or Per Cent	Total Count in Sample
	Step 1	Step 2			
			Occupied Dwelling Units by Age Groups:	100.0%	1256
153	*	*	1. Under 11 years	16.3%	205
154	*	*	2. 11 to 20 years	8.8%	110
155	*	*	3. 21 to 30 years	9.2%	115
156	*	*	4. 31 to 40 years	18.9%	237
157	83	72	5. 41 years and over	46.9%	589
158	84	73	6. Under 21 years	25.1%	315
159	*	*	7. 21 to 40 years	28.0%	352
			Households' Sources of Drinking Water:	100.0%	1256
160	85	*	1. Taps	90.0%	1131
161	*	*	2. Wells	5.9%	74
162	*	*	3. Others (streams,springs)	4.1%	51
			Locations of Households' Drinking Water:	100.0%	1255N
163	86	*	1. Within house	28.4%	357
164	*	*	2. Near house	63.8%	801
165	*	*	3. Distant	7.7%	97
			Types of Uses of Households' Drinking Water:	100.0%	1256
166	*	*	1. For exclusive use	20.5%	258
167	87	*	2. Shared	79.5%	998
			Types of Households' Bathing Places:	100.0%	1256
168	*	*	1. Bathroom	40.6%	510
169	*	*	2. No bathroom (open)	59.4%	746
			Locations of Households' Bathing Places:	100.0%	1255N
170	88	*	1. Within house	27.9%	350
171	*	*	2. Near house	63.7%	800
172	*	*	3. Distant	8.4%	105
			Types of Uses of Households' Bathing Places:	100.0%	1256
173	*	*	1. For exclusive use	20.9%	262
174	89	*	2. Shared	79.1%	994

APPENDIX IV--Continued

Serial No. of Variables	Variables Used for Factor Analysis		Full Description of Variables	Figures in Average or Per Cent	Total Count in Sample
	Step 1	Step 2			
			Types of Households' Latrines:	100.0%	1256
175	*	*	1. Bathroom	45.5%	572
176	*	*	2. No bathroom	54.5%	684
			Locations of Households' Latrines:	100.0%	1255N
177	90	*	1. Within house	37.4%	469
178	*	*	2. Near house	47.3%	593
179	*	*	3. Distant	15.4%	193
			Types of Uses of Households' Latrines:	100.0%	1256
180	*	*	1. For exclusive use	29.5%	371
181	91	*	2. Shared	70.5%	885
			Households by Their Items:	100.0%	1256
182	92	*	1. Electricity	83.8%	1053
183	93	74	2. Radio	24.0%	301
184	94	*	3. Transistor radio	21.5%	270
185	95	75	4. Radio or transistor radio	38.4%	482
186	96	76	5. Tape recorder	3.4%	43
187	*	*	6. Bicycle	21.0%	264
188	97	77	7. Scooter or motorcycle	3.8%	48
189	98	78	8. Telephone	5.3%	67
190	99	79	9. Automobile	3.2%	40
			Households by Their Gross Annual Income:	100.0%	1255N
191	*	*	1. Under 1,000 rupees	6.2%	78
192	*	*	2. 1,000 to 1,999 rupees	19.8%	248
193	*	*	3. 2,000 to 4,999 rupees	40.6%	509
194	*	*	4. 5,000 to 9,999 rupees	20.8%	261
195	*	*	5. 10,000 to 19,999 rupees	6.9%	86
196	100	80	6. 20,000 rupees and over	5.8%	73

APPENDIX V

CORRELATIONS AMONG THE 196 SOCIOECONOMIC VARIABLES OF KATHMANDU

	1	2	3	4	5	6	7	8	9	10
1	1.00000									
2	-0.10640	1.00000								
3	-0.27692	-0.05842	1.00000							
4	-0.15709	0.74823	0.03877	1.00000						
5	-0.40904	0.31950	0.29492	0.21086	1.00000					
6	-0.13049	0.14767	-0.01955	-0.22649	0.63344	1.00000				
7	-0.26702	-0.02159	0.04628	-0.43901	0.42748	0.68927	1.00000			
8	-0.66091	0.11472	0.15280	-0.09559	0.61394	0.55762	0.67543	1.00000		
9	-0.08348	0.29188	-0.11682	0.50544	0.02250	-0.12189	-0.31853	-0.02718	1.00000	
10	0.12366	0.14603	-0.16180	-0.24320	0.28065	0.77503	0.47779	0.25348	-0.12782	1.00000
11	-0.48437	0.39664	0.19791	0.67356	0.25438	-0.27184	-0.23783	0.17752	0.51812	-0.45059
12	-0.54778	0.38853	0.26485	0.48906	0.25332	-0.22797	-0.00567	0.31443	0.23571	-0.39065
13	-0.06594	0.15239	0.00585	-0.19714	0.54587	0.86975	0.60519	0.41032	-0.15657	0.77236
14	-0.48162	0.36579	0.19817	0.56716	0.66336	0.14194	0.02046	0.39668	0.38991	-0.15138
15	0.10553	-0.40242	-0.02141	-0.49195	-0.13394	0.10894	0.21111	0.03265	-0.25298	0.07842
16	-0.10549	0.40241	0.02139	0.49194	0.13392	-0.10894	-0.21112	-0.03268	0.25297	-0.07841
17	0.10237	-0.41812	-0.04727	-0.52749	-0.16042	0.10904	0.22344	0.04287	-0.27312	0.02418
18	-0.01551	0.11471	-0.26441	-0.01253	-0.17035	0.13013	0.03962	-0.04585	0.07286	0.26686
19	-0.06588	0.06660	0.16599	-0.28866	0.66160	0.71290	0.54242	0.41836	-0.33074	0.53645
20	0.20346	0.01929	-0.39205	0.07081	-0.46642	-0.22058	-0.27408	-0.41443	0.07672	0.02776
21	-0.15902	0.30577	-0.22126	0.48045	0.09052	-0.07836	-0.23104	-0.06271	0.35269	-0.09461
22	-0.15921	0.33268	0.03305	0.36080	0.14241	-0.03910	0.00562	0.11058	0.22783	-0.06881
23	0.09741	0.26647	0.06428	0.20344	0.12521	0.06827	-0.01836	0.04442	0.17079	0.00262
24	0.23318	0.29007	-0.18683	0.25776	-0.17150	-0.07167	-0.19654	-0.22201	0.22757	0.02070
25	-0.27353	-0.21329	0.21519	0.06433	0.30180	-0.00112	0.01988	0.17209	-0.00383	-0.15030
26	-0.08918	-0.50764	0.15438	-0.55040	-0.13262	0.01038	0.23268	0.13898	-0.33716	-0.01444
27	0.12479	0.35344	-0.08658	0.32266	-0.04917	-0.12621	-0.22123	-0.24034	0.18986	-0.01250
28	0.00795	0.35811	-0.20826	0.12154	0.25164	0.32626	0.14186	0.15184	-0.05474	0.32677
29	0.11923	0.54023	-0.20508	0.36923	0.10679	0.08117	-0.11724	-0.12874	0.14106	0.18696
30	0.28792	0.03057	0.03376	-0.01249	0.30625	0.10784	0.12551	-0.06564	-0.05037	0.22418
31	-0.13439	-0.30887	0.09864	-0.55077	0.46644	0.62312	0.69888	0.52451	-0.33811	0.39567
32	-0.13439	0.15133	-0.08007	0.31871	-0.48553	-0.42892	-0.48439	-0.24699	0.22579	-0.38589
33	-0.19824	0.05710	0.26458	0.01706	0.58162	0.29913	0.35730	0.41571	0.03563	0.09853
34	0.29411	-0.03276	-0.22044	-0.13264	-0.27803	-0.27644	-0.15407	-0.28480	0.04517	0.01982
35	-0.07935	0.09534	-0.18944	0.00182	-0.18639	-0.08167	0.02829	0.03793	-0.07673	-0.08465
36	0.31183	-0.06853	-0.13645	-0.12736	-0.19264	-0.23204	-0.15816	-0.28676	0.07311	0.05104
37	-0.09003	0.08061	-0.11646	-0.30279	0.38289	0.81462	0.57984	0.42751	-0.17676	0.78314
38	-0.13947	-0.09867	0.54181	-0.19406	0.13825	0.16525	0.15376	0.34690	-0.10272	0.08886
39	-0.12210	-0.00356	0.04004	-0.24499	0.35900	0.68151	0.60938	0.49551	-0.14700	0.38837
40	-0.20240	-0.23825	0.20292	-0.33756	0.02828	0.01200	0.37531	0.24344	-0.13811	-0.02298
41	-0.25785	0.12787	-0.09749	0.10319	0.12251	0.05577	0.08936	0.17441	0.07193	-0.09173
42	-0.17162	-0.05411	0.21265	0.02276	0.23762	0.28752	0.26388	0.35178	-0.07374	0.11772
43	-0.19067	-0.07774	0.45400	-0.28430	0.32645	0.52378	0.38412	0.49036	-0.13579	0.39241
44	-0.72485	0.15586	0.31373	0.30404	0.46061	-0.01657	0.12591	0.56535	0.16881	-0.22666
45	0.00080	-0.33667	0.25808	-0.23308	0.22481	0.11643	0.15211	0.02772	-0.24903	-0.08753
46	0.13029	-0.65649	-0.09593	-0.54064	-0.28608	-0.12352	0.00882	-0.07461	-0.20858	-0.06767
47	-0.09108	0.48857	0.07856	0.45108	0.06246	-0.03604	-0.12330	-0.00514	0.34078	0.05638
48	-0.07645	0.70289	-0.08400	0.46403	0.30736	0.19666	0.05478	0.08016	0.01573	0.11380
49	-0.11437	0.75785	0.02599	0.60968	0.20292	0.06484	-0.07833	0.03463	0.28652	0.10303
50	-0.01817	-0.46460	0.16775	-0.46422	0.02985	0.00452	0.39434	0.25529	-0.36826	-0.03227
51	0.00680	0.24135	-0.19667	0.30647	0.04266	0.02325	-0.27545	-0.18780	0.41451	0.13107
52	0.00773	0.33242	0.03891	0.19894	-0.01015	0.01963	-0.05725	-0.03344	-0.06177	-0.08209
53	-0.09745	0.01226	0.12669	0.08479	0.10478	0.05717	0.08482	0.21774	-0.05631	-0.01143
54	0.07616	-0.16390	-0.00673	-0.09566	-0.32102	-0.20026	-0.25961	-0.22606	-0.10052	-0.18276
55	0.03200	0.20917	-0.28503	0.27867	-0.45273	-0.25900	-0.44102	-0.28596	0.24641	-0.21163
56	-0.02514	0.18025	0.17207	0.37877	0.13801	-0.25273	-0.16042	-0.08205	0.06451	-0.09935

57	-0.01190	-0.39158	0.14159	-0.64655	0.34456	0.50149	0.61095	0.38067	-0.31542	0.31521
58	0.12889	0.04783	-0.11451	-0.03549	-0.09812	0.13296	0.01687	-0.04202	-0.26165	0.06731
59	-0.44390	0.28117	0.15300	0.34712	0.31947	0.09781	-0.05545	0.20836	0.14431	-0.12208
60	0.10644	-0.12439	0.11888	-0.30443	-0.10538	-0.07409	0.24229	0.04857	-0.11312	-0.07178
61	0.34260	-0.22585	-0.22438	-0.10049	-0.21855	-0.16500	-0.16263	-0.25740	0.06155	0.17020
62	0.40740	-0.30707	-0.15220	-0.45776	-0.20838	-0.03133	0.20804	-0.12356	-0.18439	0.10285
63	-0.41493	0.35576	-0.01156	0.21702	0.43260	0.42509	0.24415	0.40707	0.05443	0.28641
64	0.08722	0.11508	0.01528	0.32509	-0.10760	-0.27969	-0.43480	-0.26140	0.14957	-0.30195
65	-0.10009	-0.18003	0.20775	-0.01930	-0.17371	-0.21701	-0.13301	-0.08660	0.01596	-0.19155
66	-0.07213	-0.05699	0.13826	0.05391	-0.20414	-0.25458	-0.14447	-0.05638	0.11193	-0.26765
67	-0.37295	0.14811	0.37000	0.11810	0.46722	0.05634	0.22068	0.38736	-0.03067	-0.16932
68	-0.01065	0.24599	-0.11287	0.06971	0.08043	0.09565	0.19070	0.09626	-0.03424	-0.02322
69	0.30239	-0.10398	-0.32907	-0.13649	-0.14172	0.15994	-0.06185	-0.22249	-0.07396	0.24337
70	-0.16112	-0.19850	0.06957	0.00132	-0.05605	-0.24740	-0.12605	0.01431	-0.00812	-0.35434
71	0.02585	0.23876	-0.02407	0.00544	0.07362	0.20327	0.26823	0.11367	0.03896	0.20010
72	0.13936	-0.09587	0.07603	-0.08748	-0.05661	-0.15700	-0.17105	-0.20734	-0.02521	-0.08969
73	-0.18485	0.08336	-0.05392	0.09248	0.18535	0.07725	0.02584	0.22530	0.00625	0.11865
74	0.21918	0.06646	-0.13719	0.02905	-0.00489	0.25997	-0.05733	-0.11008	-0.02859	0.49775
75	0.13415	-0.04634	0.12683	0.21984	-0.11279	-0.35995	-0.47359	-0.35181	0.07738	-0.29130
76	-0.04604	-0.14484	0.33459	-0.18951	0.07627	0.02365	0.22903	0.21993	-0.15854	-0.07945
77	-0.00278	-0.19429	0.04418	-0.29415	0.10840	0.01694	0.09066	0.11851	-0.08805	-0.00484
78	-0.50205	0.22112	0.08202	0.37866	-0.02819	-0.29381	-0.16379	0.10157	0.18262	-0.42299
79	0.40003	-0.38830	0.05632	-0.24071	-0.19056	-0.21203	-0.21296	-0.33696	-0.04458	-0.11828
80	0.34583	-0.06404	-0.01393	0.03155	-0.12635	-0.09856	-0.17104	-0.18605	-0.05175	0.19300
81	-0.10772	0.08598	-0.11049	-0.21498	0.21411	0.48319	0.42914	0.32067	-0.16274	0.43901
82	0.26573	-0.00592	-0.15484	-0.43289	0.28837	0.67943	0.52521	0.19120	-0.17972	0.64058
83	0.00342	-0.44606	0.04728	-0.84777	-0.02423	0.36427	0.55997	0.27711	-0.48934	0.35891
84	-0.01716	-0.25482	-0.08499	-0.28475	0.16090	0.08435	0.25482	0.09935	-0.18553	-0.14785
85	0.49893	-0.35023	-0.12864	-0.10914	-0.48197	-0.32869	-0.40055	-0.49262	0.06583	-0.13283
86	-0.21711	0.11727	0.11304	0.28281	-0.03568	-0.00012	-0.16165	0.00218	0.19598	0.08979
87	-0.17470	0.73246	0.00443	0.85968	0.29078	-0.18154	-0.30058	0.00682	0.39631	-0.24869
88	-0.00541	-0.50592	0.00036	-0.86634	0.05636	0.35407	0.60385	0.28616	-0.51046	0.23873
89	0.18711	-0.15675	-0.00422	0.13930	-0.36700	-0.23203	-0.40612	-0.34630	0.19634	-0.02576
90	-0.28221	0.37012	0.15004	0.81800	0.11413	-0.35544	-0.49480	-0.12814	0.42397	-0.39233
91	0.07298	-0.03747	-0.03246	-0.30580	-0.04291	0.10640	0.26353	0.14407	-0.19130	0.15067
92	-0.35478	0.01408	0.07179	-0.06579	0.34770	0.35709	0.38392	0.63469	0.17984	0.10404
93	-0.07591	-0.13296	0.03719	-0.20094	0.01618	0.03712	-0.00902	0.01336	-0.14000	0.03397
94	0.41350	-0.36627	-0.08607	-0.44537	-0.32831	-0.16595	0.06886	-0.12126	-0.10584	-0.01051
95	0.27927	-0.26792	-0.13729	-0.38016	-0.37387	-0.06287	-0.02130	-0.26582	-0.27218	0.01881
96	0.09610	-0.20158	0.06104	-0.44544	0.24955	0.39074	0.47821	0.16795	-0.36398	0.18347
97	-0.05978	0.08777	-0.06569	0.01892	0.14313	0.01021	0.01326	0.07037	-0.09257	-0.07435
98	-0.00695	0.03180	-0.16709	-0.45786	0.19478	0.65148	0.53667	0.27668	-0.27472	0.66641
99	-0.38700	0.36487	0.18626	0.77769	0.18525	-0.30301	-0.42764	-0.00122	0.42153	-0.38832
100	-0.43024	0.33045	0.14703	0.76085	0.13723	-0.35259	-0.40429	-0.01704	0.42690	-0.39469
101	0.07419	-0.00200	0.01655	-0.26609	-0.00716	0.14444	0.28285	0.14103	-0.09213	0.13467
102	-0.29262	0.07213	0.08614	-0.03962	0.24079	0.24454	0.30103	0.47475	0.11657	0.10527
103	0.14199	-0.08481	-0.02169	-0.05512	-0.05543	-0.03802	-0.13576	-0.14593	-0.19328	-0.05211
104	0.49778	-0.35985	-0.07749	-0.44814	-0.35275	-0.19262	0.02176	-0.18813	-0.12557	-0.00663
105	0.44233	-0.26195	-0.19247	-0.42062	-0.37929	-0.05035	-0.03389	-0.33149	-0.27016	0.01298
106	0.01553	-0.15201	0.01607	-0.39767	0.26852	0.41850	0.49732	0.21144	-0.34908	0.19221
107	-0.05978	0.08777	-0.06569	0.01892	0.14313	0.01021	0.01326	0.07037	-0.09257	-0.07435
108	-0.04716	0.02057	-0.08810	-0.41996	0.23075	0.69744	0.59742	0.29137	-0.24523	0.68587
109	-0.44542	0.33568	0.16725	0.74098	0.16616	-0.32462	-0.38024	0.03376	0.39228	-0.39899
110	0.46294	-0.45206	-0.12019	-0.64657	-0.33727	-0.03290	0.18405	-0.16503	-0.33378	0.04971
111	0.55279	-0.40751	-0.14207	-0.61190	-0.33824	-0.04963	0.13328	-0.21981	-0.30974	0.04535
112	-0.06117	0.23378	0.14038	0.64757	-0.04721	-0.52900	-0.55901	-0.32051	0.25630	-0.43265
113	0.56755	-0.15564	-0.06494	-0.31189	-0.18470	0.16761	0.16563	-0.18041	-0.15956	0.22525
114	-0.53709	0.16215	0.07914	0.33729	0.13506	-0.25277	-0.21300	0.12080	0.17457	-0.28413
115	-0.26600	0.09591	0.03407	0.06800	0.29713	0.10444	0.14410	0.38784	-0.00418	-0.08473
116	-0.01252	-0.12034	-0.13376	-0.27028	0.19639	0.61188	0.30658	0.22634	-0.13324	0.55542

117	-0.65471	0.31222	0.15977	0.59135	0.19094	-0.16223	-0.26978	0.22703	0.35428	-0.22279
118	0.72957	-0.33973	-0.11308	-0.46672	-0.26683	-0.05727	0.08687	-0.37808	-0.27741	0.01427
119	-0.01768	0.08096	-0.11276	-0.35170	0.24289	0.58166	0.46742	0.26072	-0.18398	0.60565
120	-0.26257	-0.01860	-0.14754	-0.35193	0.05738	0.48639	0.45778	0.45251	-0.30524	0.40420
121	-0.67271	0.31961	0.16328	0.60331	0.25452	-0.15672	-0.26228	0.24964	0.38167	-0.22958
122	0.60055	-0.26477	-0.03473	-0.42691	-0.07804	0.05692	0.14173	-0.23211	-0.20838	0.03761
123	0.48406	-0.14638	-0.14940	-0.33181	-0.18383	0.13477	0.18016	-0.22573	-0.31968	0.22317
124	0.36562	-0.27518	-0.21348	-0.57038	-0.22191	0.17905	0.27569	-0.08216	-0.34423	0.30218
125	-0.14427	-0.01568	-0.13774	-0.29828	0.25664	0.65519	0.60568	0.44341	-0.14446	0.53161
126	0.02006	0.13854	-0.15062	-0.27360	0.38966	0.71579	0.64532	0.35992	-0.16815	0.60682
127	-0.30975	-0.09422	0.33000	0.07000	0.38569	-0.02933	-0.04735	0.16031	0.07238	-0.11397
128	0.28417	0.02772	-0.21507	0.10241	-0.58944	-0.40611	-0.34764	-0.37287	0.03410	-0.26041
129	-0.16350	0.42617	0.03809	0.77142	0.22204	-0.19279	-0.53579	-0.06692	0.65486	-0.26368
130	-0.03765	-0.54522	0.07985	-0.79027	-0.12765	0.21836	0.48475	0.14342	-0.65496	0.23140
131	0.40751	0.08986	-0.20600	-0.18883	-0.23348	0.00962	0.24564	-0.11811	-0.19590	0.13332
132	-0.13441	0.46013	-0.10125	0.54432	0.45201	0.16678	-0.26407	0.09632	0.55992	-0.09159
133	-0.04023	0.21800	0.02700	0.37158	-0.07923	-0.21831	-0.36769	-0.21298	0.25217	-0.13039
134	0.12867	-0.48725	0.06423	-0.64153	-0.31026	-0.00591	0.41860	0.04646	-0.58517	0.00273
135	-0.57561	0.21079	0.25315	0.52505	0.29269	-0.18618	-0.14790	0.26543	0.39426	-0.39143
136	0.57561	-0.21079	-0.25315	-0.52505	-0.29269	0.18618	0.14790	-0.26543	-0.39426	0.39143
137	0.39564	-0.29161	-0.14159	-0.66706	-0.15250	0.35956	0.35578	-0.07890	-0.56832	0.53149
138	0.42115	-0.32237	-0.18297	-0.61256	-0.18209	0.30884	0.25888	-0.14548	-0.56309	0.41412
139	-0.21166	0.09517	0.07104	0.38231	-0.06156	-0.34375	-0.29183	0.01443	0.52646	-0.28553
140	-0.45055	0.41031	0.21595	0.58261	0.34442	-0.14590	-0.11910	0.21250	0.36463	-0.36725
141	-0.63525	0.20900	0.23029	0.50684	0.31060	-0.17813	-0.10330	0.35254	0.35979	-0.39103
142	0.59904	-0.16438	-0.13745	-0.69851	-0.41948	-0.24326	-0.30423	-0.55536	-0.20385	-0.00763
143	0.41681	0.03545	-0.19407	-0.28361	-0.06117	0.28023	0.20451	-0.17541	-0.19041	0.49965
144	0.04397	0.03615	-0.06937	-0.26876	0.22485	0.42383	0.27210	0.12572	-0.09227	0.47727
145	-0.33936	0.12258	0.15195	0.05480	0.12293	0.06567	0.24725	0.42800	0.16050	-0.11150
146	-0.23295	-0.03974	0.14117	-0.03018	0.02146	-0.11876	-0.08909	0.04544	-0.00883	-0.08703
147	0.07845	-0.27003	0.01966	-0.30950	-0.14410	-0.05247	0.01672	0.04403	0.04803	-0.10981
148	0.05474	-0.09916	-0.06465	-0.12231	-0.20537	-0.08316	-0.02803	-0.14777	-0.10556	-0.09343
149	0.10910	-0.23580	-0.12932	-0.35557	0.17018	0.29251	0.30527	0.16852	-0.25236	0.12775
150	-0.17376	-0.09328	-0.04331	-0.42859	0.14769	0.49014	0.54771	0.34931	-0.22783	0.42981
151	-0.00685	0.03631	-0.11923	-0.42650	0.18347	0.64606	0.59003	0.38617	-0.19275	0.63962
152	0.69061	-0.12901	-0.19603	-0.27581	-0.37311	-0.04160	-0.14006	-0.54619	-0.29027	0.24356
153	0.37123	-0.09577	-0.23568	-0.39346	0.01496	0.54618	0.23541	-0.06559	-0.30993	0.62698
154	0.21512	-0.08263	-0.06415	-0.10944	-0.22127	-0.04051	-0.06453	-0.17292	-0.02470	-0.05353
155	0.30099	-0.15034	-0.16444	-0.29268	0.02653	0.14373	0.14372	0.06328	0.03564	0.18095
156	0.17312	-0.22448	-0.07931	-0.07955	-0.32184	-0.31838	-0.11494	-0.21869	-0.05765	-0.13375
157	-0.57759	0.29399	0.30606	0.48996	0.25673	-0.24057	-0.13084	0.21866	0.24368	-0.41219
158	0.42010	-0.12234	-0.22894	-0.38301	-0.10161	0.43134	0.16139	-0.14474	-0.26961	0.49145
159	0.32431	-0.27476	-0.16471	-0.24288	-0.24668	-0.17252	-0.00634	-0.14004	-0.02526	0.00142
160	-0.73778	-0.00518	0.16712	-0.05569	0.31800	0.17980	0.32747	0.50608	-0.00356	-0.00671
161	0.66505	0.15892	-0.09473	0.10012	-0.22866	-0.08306	-0.16705	-0.39361	0.23699	0.15158
162	0.39873	-0.15792	-0.15209	-0.02521	-0.23608	-0.18317	-0.31883	-0.34279	-0.13401	-0.16853
163	-0.62688	0.12395	0.32726	-0.01898	0.70781	0.44260	0.48986	0.72579	0.03132	0.19217
164	0.44616	0.00056	-0.22779	0.11291	-0.56418	-0.39010	-0.43376	-0.56257	0.05711	-0.19699
165	0.43990	-0.24577	-0.23901	-0.16517	-0.38830	-0.17510	-0.19094	-0.42672	-0.16409	-0.00636
166	-0.25560	0.28856	0.07174	-0.04136	0.74235	0.71179	0.59970	0.57006	-0.03197	0.52900
167	0.25557	-0.28831	-0.07171	0.04149	-0.74255	-0.71189	-0.59984	-0.57007	0.03206	-0.52894
168	-0.71080	0.17471	0.31003	0.12116	0.67522	0.32502	0.35949	0.68674	0.15339	0.05781
169	0.71077	-0.17461	-0.31001	-0.12109	-0.67532	-0.32508	-0.35957	-0.68674	-0.15335	-0.05781
170	-0.63055	0.15762	0.28943	0.02129	0.73276	0.43603	0.43716	0.71387	0.04721	0.17405
171	0.46539	-0.05946	-0.21181	0.06841	-0.63146	-0.39939	-0.41158	-0.57920	0.04942	-0.17288
172	0.43423	-0.21278	-0.20280	-0.16954	-0.33885	-0.15807	-0.13819	-0.39607	-0.18678	-0.03640
173	-0.32568	0.31049	0.02951	-0.02018	0.75467	0.71113	0.59603	0.62410	-0.03176	0.50650
174	0.32563	-0.31024	-0.02849	0.02031	-0.75487	-0.71122	-0.59617	-0.62410	0.03184	-0.50644
175	-0.72593	0.18799	0.35042	0.14126	0.65825	0.28899	0.33087	0.67951	0.10962	0.02593
176	0.72593	-0.18799	-0.35042	-0.14126	-0.65825	-0.28899	-0.33086	-0.67951	-0.10962	-0.02593

177	-0.71056	0.14565	0.39477	0.08734	0.70885	0.37322	0.43640	0.74258	0.07348	0.09762
178	0.48321	-0.16734	-0.21290	-0.09679	-0.42562	-0.34897	-0.26413	-0.48080	-0.10569	-0.10352
179	0.41942	-0.00593	-0.29777	-0.00757	-0.48412	-0.10985	-0.29573	-0.46655	0.02200	-0.00021
180	-0.43571	0.38159	0.20239	0.25017	0.79445	0.52647	0.37999	0.60989	0.24147	0.25021
181	0.43457	-0.29217	-0.16847	-0.22589	-0.75223	-0.49190	-0.33031	-0.56443	-0.23816	-0.23578
182	-0.54352	-0.19043	0.24576	-0.12863	0.40217	0.24993	0.40819	0.53492	-0.00050	0.09886
183	-0.43792	0.28487	-0.00029	0.15302	0.67265	0.52728	0.44043	0.61929	0.21989	0.34542
184	0.00865	-0.01832	0.06801	-0.35126	0.27829	0.40676	0.38810	0.19329	-0.31356	0.34961
185	-0.34504	0.24786	0.05642	-0.05250	0.57309	0.45622	0.50336	0.53369	-0.04004	0.30060
186	-0.00954	0.24876	-0.05943	-0.10995	0.35723	0.56004	0.42072	0.27975	-0.07347	0.44381
187	0.15101	0.03765	-0.00435	0.09736	0.25030	0.11676	0.05940	-0.10011	0.03463	0.09655
188	0.06227	0.03666	0.01372	-0.16101	0.50099	0.67690	0.50842	0.25515	-0.13847	0.55292
189	-0.14199	0.16341	0.06478	-0.13464	0.62163	0.85958	0.64112	0.50096	-0.09197	0.71295
190	0.01547	0.14471	-0.03719	-0.19592	0.37971	0.79209	0.49094	0.29059	-0.16922	0.75591
191	0.22596	0.08050	-0.13947	-0.00042	-0.40626	-0.17363	-0.14230	-0.28149	-0.04514	0.01332
192	0.42549	-0.03897	0.07321	0.02456	-0.44146	-0.33547	-0.33379	-0.45964	-0.10639	-0.13525
193	-0.12189	-0.01674	-0.06625	0.19815	-0.31323	-0.33681	-0.36220	-0.24238	0.23597	-0.28292
194	-0.14156	-0.16744	0.10038	-0.05088	0.27911	-0.03581	0.04340	0.25732	0.06927	-0.17492
195	-0.17097	0.14682	0.14024	-0.10394	0.49456	0.40172	0.45922	0.42145	-0.23260	0.17839
196	-0.04334	0.02967	-0.08739	-0.27218	0.47580	0.77381	0.61601	0.36583	-0.09942	0.71422

	11	12	13	14	15	16	17	18	19	20
11	1.00000									
12	0.78339	1.00000								
13	-0.29936	-0.25254	1.00000							
14	0.65520	0.45909	0.09913	1.00000						
15	-0.27660	-0.15823	-0.01757	-0.26237	1.00000					
16	0.27657	0.15819	0.01757	0.26235	-1.00000	1.00000				
17	-0.30542	-0.17604	-0.01358	-0.29262	0.99523	-0.99522	1.00000			
18	-0.01293	-0.19665	0.21262	-0.16781	-0.21622	0.21622	-0.17497	1.00000		
19	-0.30528	-0.14528	0.64526	-0.10889	0.05611	-0.05611	0.05042	-0.04334	1.00000	
20	0.01225	-0.25134	-0.12033	-0.22294	-0.10108	0.10109	-0.07939	0.32992	-0.37496	1.00000
21	0.49300	0.11295	-0.02843	0.54000	-0.28921	0.28920	-0.29320	0.16603	-0.33535	0.68494
22	0.33098	0.16568	-0.00277	0.43359	-0.14562	0.14562	-0.13190	0.00752	-0.21999	0.23861
23	-0.03579	0.03448	0.07144	0.16500	0.13808	-0.13807	0.10864	-0.34230	-0.00998	-0.37380
24	-0.02935	-0.12675	-0.00347	0.02757	0.07840	-0.07839	0.06178	-0.14300	-0.25312	0.25796
25	0.20897	0.26243	-0.10859	0.32569	0.09866	-0.09868	0.06943	-0.31475	0.03394	-0.32058
26	-0.23652	-0.14381	-0.03133	-0.33347	0.02378	-0.02378	0.05682	0.23445	0.16370	-0.12760
27	0.22810	0.16819	-0.01601	0.03549	-0.29176	0.29176	-0.28787	0.19310	-0.07946	0.19222
28	-0.07295	-0.15704	0.27622	0.00158	-0.10951	0.10952	-0.10541	0.15334	0.36411	0.05287
29	0.16514	0.05945	0.16203	0.03350	-0.33363	0.33363	-0.32759	0.26962	0.14689	0.20817
30	-0.15178	-0.01225	0.23216	0.05779	-0.07630	0.07631	-0.09453	-0.24106	0.33491	-0.33019
31	-0.28566	-0.16332	0.45994	0.03792	0.33545	-0.33545	0.33278	-0.14628	0.59467	-0.40976
32	0.27124	0.10072	-0.42784	-0.06347	-0.13292	0.13292	-0.11813	0.25801	-0.57850	0.47112
33	0.07420	0.12783	0.24794	0.37792	0.10861	-0.10861	0.06971	-0.39813	0.39427	-0.59436
34	-0.04227	-0.03129	-0.24130	-0.31203	-0.03230	0.03230	-0.00349	0.14642	-0.06236	0.13337
35	0.06014	0.18194	-0.14644	-0.07929	-0.08286	0.08285	-0.05829	0.05279	-0.16863	0.29014
36	-0.06386	-0.10097	-0.17318	-0.26695	0.00154	-0.00153	0.01945	0.11918	0.00635	0.01397
37	-0.35726	-0.31531	0.64110	-0.02244	0.21430	-0.21429	0.21081	0.04056	0.56982	-0.05473
38	-0.06825	0.00860	0.17182	-0.04800	-0.19570	0.19569	-0.18998	0.04730	0.23369	-0.32896
39	-0.10903	-0.15953	0.51591	0.07533	0.19689	-0.19689	0.19357	0.07226	0.40657	-0.01249
40	-0.07639	0.06246	0.08933	-0.11124	0.08224	-0.08224	0.09100	0.09839	0.15194	-0.08880
41	0.25987	0.12863	0.02004	0.21319	0.14489	-0.14489	0.13899	0.15890	-0.05456	0.17183
42	-0.03308	-0.05629	0.24501	0.18155	0.01058	-0.01059	0.00354	-0.10944	0.13519	-0.19762
43	-0.14486	-0.08096	0.47776	-0.00642	-0.05902	0.05901	-0.05496	0.09087	0.45557	-0.27238
44	0.62184	0.68349	-0.01092	0.64264	-0.23050	0.23047	-0.24715	-0.20044	-0.02332	-0.34869
45	-0.08565	-0.05262	0.09488	0.06528	0.26052	-0.26051	0.25935	-0.12062	0.18561	-0.19755
46	-0.37503	-0.33697	-0.15284	-0.33610	0.23978	-0.23977	0.24106	-0.19235	-0.03687	-0.01933
47	0.35169	0.31221	-0.00225	0.24488	-0.23857	0.23856	-0.24003	0.18296	-0.14278	-0.00343

48	0.17211	0.17807	0.22941	0.19247	-0.30223	0.30223	-0.29720	0.15308	0.29299	0.12978
49	0.33306	0.35256	0.10976	0.30209	-0.34928	0.34927	-0.34815	0.22877	-0.02254	0.06000
50	-0.19100	-0.07607	-0.09799	-0.14944	0.30286	-0.30285	0.31238	-0.16595	0.17607	-0.16033
51	0.19864	0.05982	0.08795	0.23326	-0.33367	0.33367	-0.34162	0.21757	-0.16646	0.13569
52	0.02764	0.08096	-0.05385	-0.08500	0.01955	-0.01955	0.00799	-0.07755	0.07683	0.00525
53	-0.07488	-0.08217	0.10101	0.12407	-0.03591	0.03591	-0.04651	0.16769	0.00877	-0.21936
54	-0.17057	-0.14686	-0.22102	-0.21914	0.18437	-0.18436	0.21950	0.04222	-0.21125	0.15887
55	0.09950	-0.05474	-0.32199	-0.13732	0.09566	-0.09566	0.09401	0.11829	-0.45329	0.36424
56	0.25015	0.25498	-0.08140	0.22346	-0.37301	0.37300	-0.37351	0.03243	-0.05049	-0.06402
57	-0.32675	-0.17179	0.41136	-0.06062	0.24656	-0.24656	0.24868	-0.15186	0.51670	-0.32222
58	-0.26036	-0.14609	0.02467	-0.12829	0.15634	-0.15633	0.15807	0.02072	-0.00449	-0.11030
59	0.36053	0.19498	0.13617	0.41426	-0.01821	0.01819	-0.03637	0.20462	0.01560	-0.02019
60	-0.00379	0.08273	-0.13770	-0.21704	0.02557	-0.02557	0.02821	-0.01705	0.11065	-0.00474
61	-0.28024	-0.22482	-0.04089	-0.21127	-0.07625	0.07626	-0.05809	-0.22284	-0.11397	0.07769
62	-0.35157	-0.20690	-0.09906	-0.37015	0.06585	-0.06583	0.07804	-0.19150	0.09370	0.01920
63	0.02075	-0.02992	0.46098	0.35938	-0.21217	0.21216	-0.20844	0.21052	0.24870	-0.04383
64	0.32671	0.09381	-0.26486	0.16358	0.06285	-0.06285	0.02378	0.05139	-0.30708	0.09187
65	0.09566	0.22115	-0.18853	-0.15250	0.12479	-0.12480	0.14589	-0.07548	-0.12262	-0.06883
66	0.32296	0.11688	-0.25630	-0.04539	-0.04611	0.04611	-0.04700	0.35969	-0.18171	0.21999
67	0.32502	0.44450	-0.04135	0.41147	-0.04746	0.04744	-0.06945	-0.44076	0.19900	-0.40186
68	0.01142	0.21188	0.14483	-0.07226	0.21459	-0.21460	0.19703	-0.17317	0.19463	-0.30509
69	-0.48531	-0.43262	0.20767	-0.20360	0.01423	-0.01422	0.03354	0.01482	-0.01744	0.06607
70	0.18798	0.27117	-0.40567	0.02267	0.31794	-0.31794	0.31010	-0.05909	-0.16919	-0.19913
71	-0.01242	-0.12419	0.26418	0.11086	-0.08675	0.08675	-0.09087	0.04109	0.03908	0.11704
72	-0.12127	-0.13732	-0.06741	-0.02862	-0.29910	0.29911	-0.29111	0.11655	0.00683	0.10295
73	0.02794	0.13632	0.09024	0.14690	-0.13363	0.13364	-0.13499	-0.20830	0.08557	-0.12454
74	-0.27163	-0.27332	0.41136	-0.22747	-0.25536	0.25536	-0.23882	0.17531	0.24925	0.16439
75	0.13851	0.00800	-0.32311	0.13010	0.18189	-0.18189	0.14487	-0.19354	-0.29936	0.02369
76	-0.10451	0.08220	0.01444	-0.05551	0.01948	-0.01948	0.00489	-0.18234	0.12955	-0.37064
77	-0.08415	-0.13522	-0.07334	-0.00233	0.21244	-0.21243	0.21484	-0.18939	0.13773	-0.15911
78	0.47252	0.42813	-0.34893	0.21576	-0.02597	0.02595	-0.02570	0.16701	-0.27851	0.04107
79	-0.21449	-0.22637	-0.20236	-0.25363	-0.00264	0.00265	-0.00365	-0.16364	0.00399	-0.01532
80	-0.05391	-0.06355	-0.02380	0.01317	-0.08848	0.08849	-0.09411	-0.22787	-0.16614	0.07405
81	-0.16840	-0.14491	0.37240	0.03471	0.16177	-0.16178	0.15882	-0.02202	0.26276	0.06729
82	-0.56237	-0.48035	0.75679	-0.19969	0.06751	-0.06750	0.07579	0.10002	0.59654	-0.18659
83	-0.55695	-0.34945	0.32753	-0.43166	0.40102	-0.40101	0.45119	0.11450	0.39597	-0.13457
84	-0.11412	0.00987	0.07178	0.06500	0.20456	-0.20455	0.18294	-0.18941	0.12305	-0.23071
85	-0.21066	-0.26693	-0.27388	-0.42246	-0.01855	0.01856	-0.02361	-0.11612	-0.19739	0.26851
86	0.06581	-0.07127	0.04376	0.17497	-0.13304	0.13302	-0.14152	0.04639	-0.20304	0.08820
87	0.69355	0.57510	-0.20457	0.54988	-0.39771	0.39770	-0.42571	0.03630	-0.17438	0.01044
88	-0.53441	-0.29643	0.31669	-0.34082	0.44278	-0.44277	0.47564	0.00798	0.40039	-0.22607
89	-0.08265	-0.24244	-0.16365	-0.16404	-0.11473	0.11473	-0.12478	-0.04725	-0.29419	0.25894
90	0.72268	0.50814	-0.30376	0.56141	-0.52420	0.52418	-0.56329	-0.04561	-0.39758	0.09690
91	-0.17058	-0.15327	0.01015	-0.24350	0.32118	-0.32118	0.32608	-0.00596	0.18575	0.07954
92	0.21611	0.28282	0.22527	0.27270	0.04817	-0.04819	0.04644	0.02133	0.17666	-0.31547
93	-0.18540	-0.17339	-0.12226	-0.06348	0.02245	-0.02244	0.03899	-0.04863	0.03126	0.05559
94	-0.41562	-0.28429	-0.13531	-0.41064	0.40252	-0.40250	0.43672	0.01620	-0.06117	-0.11201
95	-0.44773	-0.30955	0.08238	-0.47638	0.30004	-0.30003	0.32197	0.01586	-0.03532	0.21745
96	-0.33966	-0.20124	0.27323	-0.08993	0.37632	-0.37632	0.36700	-0.27612	0.41236	-0.15916
97	-0.07555	0.13219	0.03831	-0.04434	0.08846	-0.08846	0.06955	-0.28235	0.28077	-0.29328
98	-0.42015	-0.36380	0.61637	-0.24912	0.06271	-0.06270	0.08528	0.28332	0.54206	-0.09297
99	0.75130	0.53009	-0.33892	0.60695	-0.50836	0.50834	-0.54603	-0.06511	-0.35179	0.08741
100	0.70588	0.59433	-0.31203	0.57251	-0.46199	0.46197	-0.49725	-0.08840	-0.38555	-0.00390
101	-0.12709	-0.14815	0.04103	-0.16784	0.36973	-0.36973	0.37132	-0.02263	0.15295	0.06755
102	0.18472	0.21946	0.12114	0.12130	-0.05276	0.05274	-0.05428	-0.02201	0.19771	-0.16122
103	-0.09277	-0.23468	-0.15962	-0.03860	0.01558	-0.01557	0.01908	-0.04146	-0.02648	0.28798
104	-0.43941	-0.32381	-0.15521	-0.44346	0.37282	-0.37279	0.40515	-0.02655	-0.05511	-0.09109
105	-0.49240	-0.41346	0.04703	-0.52524	0.31620	-0.31619	0.33868	0.03456	0.00268	0.20170
106	-0.28347	-0.16968	0.29779	-0.04064	0.40240	-0.40240	0.39313	-0.22392	0.38381	-0.10514
107	-0.07555	0.13219	0.03831	-0.04434	0.08846	-0.08846	0.06955	-0.28235	0.28077	-0.29328

108	-0.39477	-0.34752	0.70365	-0.26581	-0.02235	0.02236	-0.00012	0.36486	0.54676	-0.11194
109	0.73060	0.56410	-0.36200	0.58910	-0.43246	0.43244	-0.46892	-0.11718	-0.36147	0.08436
110	-0.63727	-0.40961	0.03061	-0.56994	0.56498	-0.56496	0.59606	-0.09195	0.09051	-0.04754
111	-0.61516	-0.44914	-0.00923	-0.56572	0.52204	-0.52202	0.55119	-0.08727	0.09693	-0.02976
112	0.51677	0.32503	-0.35806	0.39623	-0.55442	0.55442	-0.58152	-0.07203	-0.46817	0.15897
113	-0.48214	-0.37457	0.17293	-0.42173	0.32713	-0.32710	0.31991	-0.23631	0.15555	0.00556
114	0.50347	0.39472	-0.22025	0.40140	-0.36397	0.36394	-0.35451	0.24190	-0.20569	0.02482
115	0.13915	0.18127	0.01374	0.32601	0.11949	-0.11951	0.10427	-0.27101	0.06230	-0.23255
116	-0.29990	-0.29684	0.37411	-0.07284	0.26307	-0.26306	0.25296	0.06051	0.36799	-0.11007
117	0.62025	0.52029	-0.17857	0.51755	-0.38738	0.38735	-0.39714	-0.00269	-0.25042	-0.01186
118	-0.51495	-0.45977	-0.02361	-0.47419	0.36744	-0.36741	0.36771	-0.08992	0.10094	0.04472
119	-0.29497	-0.24284	0.66961	-0.13869	-0.05075	0.05074	-0.02666	0.34329	0.48467	-0.11246
120	-0.32674	-0.12195	0.27094	-0.16780	0.26510	-0.26511	0.28816	0.05836	0.23963	-0.32081
121	0.65462	0.53861	-0.18160	0.53726	-0.39299	0.39296	-0.40360	0.00896	-0.25326	0.00262
122	-0.44725	-0.32500	0.06714	-0.38131	0.26723	-0.26721	0.26697	-0.20973	0.23129	-0.14720
123	-0.47149	-0.40387	0.20542	-0.51402	0.17563	-0.17561	0.16897	0.14582	0.26980	0.11691
124	-0.54191	-0.49096	0.16220	-0.40798	0.42283	-0.42281	0.45474	0.13575	0.09218	0.09006
125	-0.19574	-0.17949	0.47684	0.01307	0.03172	-0.03172	0.05659	0.14312	0.35474	0.01126
126	-0.28152	-0.28513	0.68452	-0.00236	-0.00819	0.00819	-0.00420	0.18696	0.53651	-0.05548
127	0.21919	0.19297	-0.01321	0.29601	0.00204	-0.00206	-0.01145	-0.13328	0.19882	-0.20641
128	-0.03636	-0.01071	-0.30439	-0.26549	0.00128	-0.00127	0.01031	0.01241	-0.50257	0.22221
129	0.69854	0.35725	-0.21086	0.58113	-0.44920	0.44919	-0.48241	0.01636	-0.26529	0.05824
130	-0.62917	-0.39450	0.23594	-0.45471	0.44260	-0.44259	0.47492	0.04976	0.25880	-0.09089
131	-0.32519	-0.03622	0.01569	-0.39416	0.14183	-0.14181	0.15293	-0.12303	0.08765	0.04136
132	0.43673	0.19150	0.16021	0.61853	-0.35484	0.35482	-0.37070	0.10785	0.00626	0.00725
133	0.21036	0.03568	-0.22349	0.04636	-0.36209	0.36200	-0.36231	-0.05908	-0.17225	0.12176
134	-0.46432	-0.17130	0.00225	-0.51333	0.48677	-0.48676	0.49947	-0.05096	0.09387	-0.07534
135	0.92494	0.74298	-0.21702	0.63362	-0.25619	0.25616	-0.28462	0.02100	-0.23913	-0.10939
136	-0.92494	-0.74298	0.21701	-0.63362	0.25619	-0.25616	0.28462	-0.02100	0.23913	0.10939
137	-0.91823	-0.69202	0.34728	-0.60323	0.29185	-0.29183	0.32338	0.08157	0.37926	-0.08793
138	-0.95959	-0.72184	0.32763	-0.57571	0.29779	-0.29776	0.32432	-0.02073	0.31763	-0.05208
139	0.60972	0.38925	-0.29438	0.27985	-0.32284	0.32283	-0.33497	0.05403	-0.32745	0.16353
140	0.90191	0.74625	-0.22372	0.62633	-0.14918	0.14916	-0.17878	-0.01998	-0.17599	-0.07862
141	0.87703	0.69359	-0.19982	0.64038	-0.32437	0.32433	-0.34483	0.06641	-0.21214	-0.13241
142	-0.53026	-0.48265	-0.14511	-0.46020	0.13279	-0.13275	0.12887	-0.20450	-0.11093	0.17437
143	-0.51072	-0.37012	0.31921	-0.25281	0.03879	-0.03877	0.05957	0.12995	0.14701	0.10337
144	-0.30350	-0.35278	0.48330	-0.15943	-0.05579	0.05579	-0.03787	0.23941	0.46285	-0.00555
145	0.29802	0.40612	-0.01226	0.15770	0.09339	-0.09341	0.09425	0.08686	-0.01195	-0.09054
146	0.08446	0.10503	-0.16939	0.11019	-0.14154	0.14153	-0.13562	-0.12032	-0.37701	0.08192
147	-0.18210	-0.16699	-0.10981	-0.18935	0.44840	-0.44839	0.48142	0.06982	-0.02503	-0.15500
148	-0.11595	0.10649	-0.05821	-0.39546	0.26216	-0.26217	0.25984	-0.03726	0.11005	0.13796
149	-0.31584	-0.14308	0.15980	-0.09722	0.29962	-0.29962	0.29974	-0.26047	0.32857	-0.24995
150	-0.22176	-0.08429	0.42538	-0.09586	0.24401	-0.24401	0.26645	0.11023	0.30557	-0.04021
151	-0.38900	-0.34933	0.48900	-0.16609	0.17188	-0.17187	0.18546	0.17919	0.44228	-0.08561
152	-0.75476	-0.63534	0.06150	-0.54241	0.11217	-0.11213	0.12287	-0.10824	0.02484	0.22287
153	-0.72276	-0.72582	0.52004	-0.38945	0.05492	-0.05490	0.06801	0.23427	0.43288	0.04435
154	-0.32091	-0.31994	0.04759	-0.17142	0.31641	-0.31640	0.31890	-0.04886	-0.15342	0.08889
155	-0.32872	-0.38125	-0.02366	-0.14071	0.26965	-0.26963	0.26668	-0.16179	0.17568	-0.10075
156	-0.01758	-0.15837	-0.28636	-0.16111	-0.17964	0.17866	-0.15727	0.05203	-0.23058	0.34016
157	0.79089	0.89485	-0.20619	0.49617	-0.18862	0.18859	-0.20968	-0.10145	-0.17641	-0.22063
158	-0.76650	-0.76859	0.45569	-0.41219	0.21038	-0.21036	0.22249	0.16833	0.27842	0.06330
159	-0.21449	-0.36141	-0.25100	-0.21710	0.01784	-0.01781	0.03345	-0.05634	-0.08147	0.21685
160	0.13674	0.29478	0.18742	0.24208	-0.12376	0.12374	-0.10801	-0.00058	0.19212	-0.19124
161	-0.14323	-0.22609	-0.00194	-0.17842	-0.01382	0.01384	-0.03098	-0.05222	-0.14165	0.13181
162	-0.05193	-0.20308	-0.28608	-0.17493	0.20549	-0.20548	0.20028	0.05847	-0.13871	0.14814
163	0.32490	0.34730	0.36247	0.52147	-0.14712	0.14710	-0.14996	-0.01484	0.42552	-0.36483
164	-0.17265	-0.14433	-0.29200	-0.36264	0.06660	-0.06659	0.06095	-0.08174	-0.39462	0.28163
165	-0.33333	-0.42851	-0.19285	-0.38124	0.17189	-0.17186	0.18764	0.17593	-0.15175	0.22103
166	-0.03884	-0.01185	0.64163	0.30484	-0.22935	0.22933	-0.22905	0.08950	0.69668	-0.32589
167	0.03887	0.01185	-0.64172	-0.30503	0.22921	-0.22920	0.22893	-0.08941	-0.69671	0.32590

168	0.49406	0.48072	0.25159	0.61146	-0.20791	0.20788	-0.20967	0.07444	0.28570	-0.34206
169	-0.49403	-0.48070	-0.25165	-0.61153	0.20785	-0.20782	0.20962	-0.07440	-0.28574	0.34211
170	0.33932	0.36774	0.37389	0.57224	-0.17506	0.17503	-0.17788	-0.04525	0.40622	-0.37877
171	-0.21024	-0.20276	-0.31951	-0.46056	0.05752	-0.05751	0.05223	-0.04719	-0.36815	0.31800
172	-0.30730	-0.37897	-0.17772	-0.32402	0.25198	-0.25195	0.26741	0.17916	-0.15502	0.19057
173	0.01229	0.05657	0.63988	0.34410	-0.20987	0.20985	-0.20908	0.08935	0.67014	-0.28174
174	-0.01226	-0.05656	-0.63998	-0.34429	0.20973	-0.20972	0.20896	-0.08926	-0.67017	0.28195
175	0.50272	0.48253	0.23592	0.62853	-0.20737	0.20733	-0.20683	0.09591	0.23928	-0.37705
176	-0.50272	-0.48253	-0.23592	-0.62853	0.20737	-0.20733	0.20683	-0.09591	-0.23928	0.37705
177	0.41445	0.45139	0.32204	0.61208	-0.17862	0.17859	-0.17639	-0.06321	0.31857	-0.43192
178	-0.24761	-0.24785	-0.27807	-0.45119	0.02430	-0.02428	0.00359	-0.09113	-0.07932	0.19868
179	-0.28436	-0.33541	-0.12087	-0.32019	0.21838	-0.21836	0.23948	0.10450	-0.34964	0.36638
180	0.34397	0.26322	0.46909	0.63935	-0.23322	0.23320	-0.24768	0.04276	0.42663	-0.36591
181	-0.32716	-0.23871	-0.43505	-0.56564	0.27937	-0.27935	0.29256	-0.01177	-0.45175	0.33425
182	0.10804	0.13170	0.16956	0.36167	-0.21935	0.21934	-0.21965	0.09757	0.16251	-0.22512
183	0.32789	0.33705	0.49548	0.50513	-0.22492	0.22490	-0.22690	0.16442	0.39096	-0.21902
184	-0.37305	-0.23081	0.57117	-0.04707	-0.14445	0.14445	-0.13077	-0.00181	0.44084	-0.22920
185	0.05478	0.17799	0.51917	0.35174	-0.28410	0.28408	-0.27956	0.00143	0.42421	-0.29658
186	-0.25825	-0.14893	0.53623	-0.02021	-0.11574	0.11574	-0.10777	0.25652	0.52514	-0.24616
187	0.06027	-0.05405	0.20164	0.37427	-0.10379	0.10379	-0.12228	-0.19591	-0.01285	0.08977
188	-0.18657	-0.26815	0.75472	0.22171	-0.01072	0.01071	-0.02141	0.10596	0.46439	-0.02378
189	-0.21060	-0.18253	0.89444	0.21662	0.01492	-0.01492	0.01795	0.21197	0.60522	-0.21347
190	-0.35202	-0.29906	0.94648	-0.06058	0.05942	-0.05943	0.06566	0.22500	0.58372	-0.03342
191	-0.22705	0.01120	-0.17132	-0.42941	0.28622	-0.28621	0.30494	0.07472	-0.15682	0.21612
192	-0.05359	-0.12540	-0.31559	-0.34933	0.14055	-0.14053	0.14539	0.00993	-0.22476	0.29987
193	0.25020	0.14099	-0.24190	-0.11934	-0.16761	0.16761	-0.17482	0.09107	-0.31535	0.16051
194	0.11929	0.05764	-0.10692	0.37140	-0.18622	0.18621	-0.18723	-0.18038	0.01582	-0.25087
195	0.01647	0.05196	0.27965	0.25817	0.04722	-0.04722	0.04218	-0.12425	0.38916	-0.26467
196	-0.31935	-0.29867	0.83368	0.05442	0.00838	-0.00839	0.01187	0.23727	0.60774	-0.10695

	21	22	23	24	25	26	27	28	29	30
21	1.00000									
22	0.59974	1.00000								
23	-0.16396	0.00329	1.00000							
24	0.27259	0.19025	0.79970	1.00000						
25	-0.07424	-0.11380	-0.19407	-0.40967	1.00000					
26	-0.37711	-0.20834	-0.64564	-0.75514	-0.00176	1.00000				
27	0.20848	0.10872	-0.17948	-0.06253	-0.29804	-0.19730	1.00000			
28	0.08053	0.02324	0.07145	0.10865	-0.21930	-0.20388	-0.18530	1.00000		
29	0.23978	0.11372	-0.12145	0.00824	-0.40565	-0.30397	0.80513	0.43363	1.00000	
30	-0.23530	-0.13739	0.27861	0.07648	-0.03814	-0.16469	0.16323	0.02710	0.16603	1.00000
31	-0.31728	-0.13916	-0.09419	-0.36336	0.17570	0.33005	-0.17707	-0.04636	-0.19017	0.19573
32	0.34993	0.17841	-0.15021	0.14850	-0.07096	-0.06544	-0.01949	0.00614	-0.01417	-0.83341
33	-0.21263	0.03916	0.34389	-0.02652	0.24151	-0.12351	-0.02566	-0.05097	-0.05423	0.56973
34	-0.10930	-0.14517	-0.04706	0.03732	-0.29864	-0.01832	0.21837	0.07351	0.24461	0.28347
35	0.20808	0.13218	-0.26227	-0.08538	0.00664	-0.07583	0.28347	-0.00391	0.25757	-0.25836
36	-0.18567	-0.19026	0.05755	0.06900	-0.28774	0.01214	0.09774	0.07172	0.13291	0.37192
37	-0.05609	-0.09042	-0.00398	-0.03958	-0.00037	0.02935	-0.21953	0.41133	0.04695	-0.04445
38	-0.28729	-0.12783	0.02468	-0.18723	0.06266	0.26040	-0.07289	-0.09565	-0.12456	-0.00671
39	0.07159	0.11227	-0.03502	-0.04457	0.09575	0.04731	-0.24699	0.18574	-0.11438	-0.12426
40	-0.19750	-0.11002	-0.24550	-0.31321	0.25336	0.30830	-0.15939	-0.29401	-0.32360	-0.18582
41	0.31451	0.16391	-0.02428	0.08595	0.01554	-0.10132	0.02102	0.01319	0.02723	-0.07116
42	-0.03140	0.04091	0.01507	-0.11184	0.03421	0.05453	0.10969	-0.07653	0.05439	0.06436
43	-0.21458	-0.13582	0.01982	-0.15567	0.03322	0.22354	-0.15911	0.11081	-0.07902	-0.00409
44	0.15149	0.14411	0.00273	-0.22288	0.22925	0.04320	0.02084	-0.09217	-0.03651	0.04675
45	-0.14304	0.05163	0.05871	-0.06672	0.28369	-0.01610	-0.07100	-0.25375	-0.21826	0.08024
46	-0.27544	-0.40501	-0.16664	-0.18609	0.23323	0.43187	-0.55396	-0.08291	-0.55801	-0.05449
47	0.17892	0.24741	0.08022	0.08134	-0.25078	-0.32035	0.73221	-0.13754	0.59840	0.07565
48	0.27846	0.31818	0.14442	0.23444	-0.25856	-0.28215	0.01070	0.50849	0.31671	-0.01364

49	0.28759	0.36462	0.13962	0.18427	-0.33948	-0.41063	0.62775	0.13071	0.65452	0.25828
50	-0.25373	0.03803	-0.19762	-0.30964	0.01248	0.44177	-0.14129	-0.21270	-0.25794	0.11062
51	0.27374	-0.15427	0.19144	0.28725	-0.04758	-0.40123	0.12080	0.16737	0.21179	0.03851
52	-0.04385	0.13147	-0.03806	-0.03624	0.09247	-0.09526	0.00896	0.06521	0.04757	-0.17105
53	-0.08002	0.02304	0.02941	-0.11136	0.02238	-0.03198	0.24510	-0.11110	0.15769	0.12453
54	0.00132	0.11350	0.06035	0.16571	-0.12911	-0.00470	-0.11337	-0.00155	-0.10489	-0.16720
55	0.23941	0.09119	0.09352	0.33319	-0.13196	-0.27464	0.03160	0.06703	0.06943	-0.53901
56	0.06591	0.04310	-0.00662	-0.04833	-0.01933	-0.06581	0.24305	0.02554	0.23829	0.42267
57	-0.31043	-0.13571	-0.09161	-0.30402	0.15698	0.35035	-0.25278	-0.10668	-0.29619	0.19809
58	-0.17505	0.06509	-0.05821	-0.13204	0.09322	0.16571	-0.24108	0.09905	-0.16732	-0.13171
59	0.28973	0.08939	0.10563	0.09696	-0.05388	-0.17358	0.13460	0.05423	0.15616	-0.19141
60	-0.13147	0.02680	-0.13271	-0.14131	-0.16133	0.24882	-0.04931	-0.04677	-0.07344	-0.01052
61	-0.12654	-0.14963	0.02674	0.07814	0.16028	-0.12150	0.00598	-0.06064	-0.03112	0.28482
62	-0.24460	-0.05891	-0.06970	-0.06017	-0.05580	0.23193	-0.12915	-0.05851	-0.15374	0.21134
63	0.23617	0.11841	0.10892	0.08502	-0.19008	-0.04073	-0.04301	0.30524	0.14479	0.02778
64	0.24251	0.00261	0.03979	0.10082	0.15598	-0.23182	0.12786	-0.06220	0.07971	-0.23984
65	-0.20637	-0.07968	-0.09224	-0.14964	0.15829	-0.00869	0.09295	-0.29893	-0.07114	-0.06495
66	0.17617	0.11953	-0.30628	-0.17663	-0.15132	0.25789	0.03264	0.01996	0.04198	-0.42791
67	-0.04036	0.07382	0.14893	-0.10500	0.25377	-0.12342	0.10112	-0.16648	-0.00775	0.25980
68	-0.02359	0.09692	0.15667	0.15990	0.02868	-0.18345	-0.08982	0.02062	-0.06992	0.12530
69	-0.12070	-0.17541	0.13285	0.18115	-0.03825	-0.09765	-0.06990	0.07973	-0.01598	0.17171
70	-0.18226	-0.13136	-0.03572	-0.16611	0.24748	0.12125	-0.31085	-0.06825	-0.32623	-0.15102
71	0.21102	0.17279	0.02116	0.09781	-0.15741	-0.11619	0.25461	0.04284	0.25933	-0.03747
72	0.08965	0.00972	-0.02965	0.03576	-0.10004	-0.00911	0.05090	0.04812	0.07572	0.04480
73	-0.01870	0.01431	0.08690	0.00990	0.09900	0.04012	-0.22324	0.10859	-0.13916	-0.01955
74	-0.02737	-0.02001	0.03807	0.14700	-0.19332	-0.05933	0.22622	0.01143	0.21433	0.32693
75	0.10832	0.00122	0.12892	0.15287	0.15105	-0.17933	-0.04735	-0.20128	-0.16490	-0.12085
76	-0.31810	-0.14079	0.15592	-0.07945	0.09994	0.06754	-0.03757	-0.12641	-0.11074	0.18425
77	-0.12526	-0.00178	0.04834	-0.05263	-0.04329	0.17785	-0.28756	0.16582	-0.16360	0.12935
78	0.18543	0.15870	0.00477	0.03156	-0.01054	0.00256	-0.07214	-0.00750	-0.07067	-0.37803
79	-0.19324	-0.17838	-0.15050	-0.16668	0.11649	0.09430	0.10213	-0.12541	0.01795	0.24697
80	0.05617	0.07567	0.04121	0.09086	0.11813	-0.13380	0.11835	-0.16910	0.00646	0.22327
81	0.09506	0.01202	-0.18355	-0.14764	0.08370	0.02156	-0.05094	0.20804	0.07885	-0.19493
82	-0.28466	-0.22422	0.20341	0.09110	-0.27748	0.03138	-0.06755	0.22612	0.07453	0.35983
83	-0.43734	-0.13070	-0.18704	-0.28195	-0.23643	0.54262	-0.20639	0.01641	-0.17935	-0.05826
84	-0.12082	-0.10426	0.13273	-0.01109	0.31203	-0.05821	-0.21275	-0.12627	-0.27130	0.14825
85	-0.07517	-0.25094	-0.14745	0.02022	-0.00587	0.11614	0.00001	-0.15776	-0.09521	0.05832
86	0.15545	-0.09448	0.16004	0.22380	0.08298	-0.27186	0.01003	0.04552	0.03668	-0.07551
87	0.43421	0.42673	0.09370	0.10436	0.00572	-0.38105	0.31278	0.12623	0.36300	-0.00835
88	-0.43443	-0.16331	-0.09754	-0.24795	-0.05444	0.43918	-0.27954	-0.04594	-0.28406	0.02099
89	0.06623	-0.24813	0.01838	0.18547	0.05879	-0.12656	0.00847	-0.07572	-0.03794	-0.01637
90	0.49368	0.24422	-0.00678	0.05566	0.26248	-0.36611	0.29674	-0.09143	0.21692	-0.11062
91	-0.13483	-0.20163	-0.06099	-0.01204	-0.07892	0.13431	-0.35758	0.35625	-0.11288	-0.14378
92	-0.09736	-0.15433	0.05918	-0.14256	0.22134	0.07009	-0.12882	-0.04907	-0.14774	-0.08418
93	0.03203	0.03264	-0.13491	-0.10454	-0.03635	0.28963	-0.24030	0.07632	-0.17429	0.00031
94	-0.40024	0.06008	0.13067	0.06361	-0.15945	0.20628	-0.14346	-0.22657	-0.26830	0.13896
95	-0.16521	-0.14959	0.02059	0.16221	-0.27791	0.05511	0.07161	-0.15622	-0.02862	0.05991
96	-0.19308	-0.17882	-0.03651	-0.14106	0.22349	0.03358	-0.24616	0.08519	-0.17430	0.09512
97	-0.24981	-0.11716	0.28890	0.11108	0.02779	-0.14322	-0.03918	-0.02590	-0.05156	0.30626
98	-0.26579	-0.26442	-0.10267	-0.16706	-0.29036	0.26042	-0.07482	0.39669	0.17081	0.00752
99	0.51947	0.21740	-0.05286	0.00152	0.30465	-0.27648	0.16042	-0.01588	0.13752	-0.16501
100	0.41563	0.22250	0.04990	0.05130	0.33616	-0.38159	0.22929	-0.08880	0.15666	-0.10756
101	-0.09301	-0.09172	-0.01049	0.03280	-0.07263	0.08761	-0.35061	0.33415	-0.11982	-0.18503
102	-0.08469	-0.14406	-0.19551	-0.30906	0.09912	0.19846	0.08367	-0.02579	0.06116	-0.01937
103	0.24273	0.05930	-0.23728	-0.06075	-0.11261	0.25439	-0.14248	0.06208	-0.09318	-0.01928
104	-0.40027	0.03299	0.13770	0.08447	-0.18402	0.18346	-0.14553	-0.18957	-0.24786	0.16405
105	-0.21132	-0.16113	0.01306	0.14417	-0.28974	0.07894	0.11309	-0.18319	-0.00686	0.10322
106	-0.11293	-0.11675	-0.02545	-0.09459	0.23745	-0.01704	-0.26353	0.09552	-0.18490	0.03235
107	-0.24981	-0.11718	0.28890	0.11108	0.02779	-0.14322	-0.03918	-0.02590	-0.05156	0.30626
108	-0.24699	-0.27309	-0.08062	-0.15644	-0.29991	0.27856	-0.07398	0.35026	0.14356	-0.02322

109	0.49823	0.21855	-0.06281	-0.01082	0.32336	-0.27375	0.14792	-0.01449	0.12449	-0.15682
110	-0.45584	-0.09859	0.12286	0.09720	-0.18629	0.17226	-0.14493	-0.21973	-0.26552	0.19024
111	-0.43300	-0.08811	0.12311	0.10898	-0.19523	0.15028	-0.12809	-0.19439	-0.23478	0.19840
112	0.40610	0.15633	0.02898	0.13299	0.08749	-0.31397	0.26076	-0.04555	0.21162	0.34339
113	-0.28961	0.02908	0.31934	0.33624	-0.18271	-0.05888	-0.24063	-0.13465	-0.30192	0.21125
114	0.30028	-0.01165	-0.32090	-0.31820	0.15913	0.04632	0.27827	0.09775	0.31417	-0.18661
115	0.01995	0.10191	0.22264	0.08073	0.09512	-0.08953	-0.27125	0.07853	-0.26133	0.06936
116	-0.13266	-0.18027	-0.05510	-0.12865	0.10827	0.13233	-0.19010	0.21650	-0.03448	-0.19045
117	0.37087	0.23236	-0.00747	-0.01546	0.24562	-0.21132	0.16496	-0.01216	0.14393	-0.27052
118	-0.30808	-0.16698	0.03073	0.06096	-0.17249	0.13248	-0.10519	-0.10685	-0.16095	0.29930
119	-0.20105	-0.21635	-0.05598	-0.13111	-0.30842	0.22801	-0.01087	0.24852	0.14002	0.11753
120	-0.15095	-0.12177	-0.05311	-0.07462	-0.04887	0.18090	-0.36039	0.34314	-0.12336	-0.26708
121	0.39415	0.23728	-0.02778	-0.02724	0.25323	-0.19970	0.16432	-0.03023	0.13243	-0.29554
122	-0.35159	-0.15167	0.10855	0.01779	-0.07218	0.01063	-0.00663	-0.08343	-0.05643	0.38065
123	-0.26434	-0.24536	0.00024	0.07787	-0.31075	0.17974	-0.07653	0.01191	-0.06299	0.22720
124	-0.23062	-0.14437	-0.08168	-0.02744	-0.23462	0.30562	-0.31894	0.17708	-0.18558	-0.01283
125	0.33304	0.02595	-0.13094	-0.12910	-0.05565	0.14655	-0.16991	0.25760	-0.00033	-0.08003
126	-0.05688	-0.05410	-0.06491	-0.10352	-0.08103	0.08306	-0.03518	0.26904	0.13012	0.18579
127	-0.01156	0.01176	-0.15509	-0.29517	0.21472	0.18413	0.07479	-0.17496	-0.03701	0.12508
128	0.04067	0.01767	0.18695	0.33859	-0.15144	-0.22473	-0.04117	-0.00106	-0.03839	-0.21580
129	0.49116	0.18333	0.10067	0.14256	0.06525	-0.37290	0.23743	0.13663	0.30018	-0.01483
130	-0.42947	-0.17617	-0.19232	-0.25917	0.00095	0.50039	-0.29694	-0.13264	-0.35234	-0.09487
131	-0.25262	-0.06634	0.13487	0.16726	-0.13702	-0.12028	0.03803	-0.04774	0.00606	0.20035
132	0.48461	0.26091	0.14388	0.15457	0.02991	-0.47090	0.30712	0.24411	0.42896	0.02440
133	0.11055	0.01322	-0.01108	0.06728	-0.00644	-0.13753	0.24591	0.00793	0.23028	-0.01180
134	-0.44453	-0.21267	-0.10695	-0.16018	-0.01986	0.44950	-0.38279	-0.19659	-0.46966	-0.01272
135	0.36574	0.17785	-0.11998	-0.19579	0.34396	-0.07574	0.12650	-0.10147	0.05476	-0.20711
136	-0.36574	-0.17785	0.11998	0.19579	-0.34396	0.07574	-0.12650	0.10147	-0.05476	0.20711
137	-0.52623	-0.30876	0.01584	-0.04042	-0.21959	0.26659	-0.23011	0.18099	-0.10177	0.09801
138	-0.46141	-0.24581	0.12479	0.09628	-0.24287	0.17043	-0.21746	0.10671	-0.13500	0.12491
139	0.31994	0.04075	-0.23271	-0.13655	0.23418	-0.06281	0.18888	-0.19887	0.05317	-0.00614
140	0.40769	0.34428	0.03231	-0.01723	0.15044	-0.20457	0.15512	0.02775	0.15899	-0.18933
141	0.35082	0.15431	-0.17041	-0.26322	0.33723	-0.02019	0.13575	-0.06872	0.08300	-0.22534
142	-0.19419	-0.01403	0.17709	0.29734	-0.24085	-0.07465	-0.12470	0.00694	-0.11016	0.18940
143	-0.09220	-0.17247	0.19442	0.26943	-0.18787	-0.25043	0.17973	0.04215	0.19024	0.15895
144	-0.12974	-0.18312	-0.11832	-0.12685	-0.27441	0.19775	-0.03291	0.34764	0.17944	0.10539
145	0.01698	0.16715	0.06740	0.01161	0.05809	-0.04433	-0.04776	0.00657	-0.03983	-0.09521
146	0.16263	0.06198	-0.21666	-0.17265	0.05377	0.24471	-0.00765	-0.10472	-0.07022	0.05212
147	-0.26048	0.07024	0.14253	0.04814	-0.10917	0.15365	-0.12562	-0.10920	-0.18110	-0.04178
148	-0.15709	-0.24848	-0.11337	-0.02879	0.06345	0.07092	0.10130	-0.29885	-0.09748	0.04145
149	-0.23693	-0.11863	0.13406	-0.02215	0.05900	0.06403	-0.27836	0.01808	-0.24434	0.17535
150	-0.09274	0.04518	-0.13711	-0.16885	-0.13979	0.23755	-0.04739	0.10793	0.02168	-0.04042
151	-0.18819	-0.09728	-0.11225	-0.17234	-0.08752	0.24199	-0.22578	0.29241	-0.03055	-0.13415
152	-0.21027	-0.10273	0.20608	0.35894	-0.34133	-0.12147	-0.03374	0.05682	0.00336	0.27480
153	-0.25154	-0.33164	0.03910	0.06944	-0.25068	0.10324	-0.16050	0.32384	0.04827	-0.05031
154	-0.03264	0.17679	0.26165	0.33009	-0.24078	-0.06578	-0.03530	-0.09550	-0.09081	-0.01892
155	-0.17840	-0.05822	0.10719	0.04644	-0.01475	0.06201	-0.41842	0.28059	-0.21433	0.25154
156	0.14679	0.22100	-0.40313	-0.19973	0.03000	0.21252	0.15149	-0.28380	-0.03238	0.05873
157	0.18061	0.05133	0.04253	-0.09852	0.26820	-0.18978	0.21770	-0.14026	0.11497	-0.01320
158	-0.22534	-0.18256	0.16945	0.23043	-0.33368	0.05074	-0.15141	0.21862	-0.00690	-0.05104
159	0.01166	0.14545	-0.26419	-0.13482	0.01569	0.21109	-0.13057	-0.06125	-0.15669	0.07970
160	0.01454	0.15698	-0.12645	-0.25551	0.18132	0.10546	-0.03873	0.00970	-0.02966	-0.15622
161	-0.02405	-0.01635	0.24104	0.33640	-0.15233	-0.25701	0.17639	-0.05650	0.12764	0.27835
162	0.00411	-0.22326	-0.07238	0.02050	-0.11032	0.12236	-0.13540	0.04751	-0.09549	-0.06760
163	0.06095	0.04917	0.00826	-0.22886	0.23420	0.10510	-0.15374	0.10382	-0.07232	0.15650
164	-0.01253	0.01616	0.04418	0.22833	-0.20653	-0.19573	0.18133	-0.10521	0.10278	-0.14299
165	-0.09771	-0.12594	-0.09612	0.04296	-0.09385	0.14389	-0.02112	-0.01632	-0.02922	-0.05378
166	-0.04958	0.02489	0.07463	-0.13322	0.12559	0.01491	-0.13070	0.28920	0.05470	0.31600
167	0.04955	-0.02476	-0.07466	0.13325	-0.12603	-0.01476	0.13079	-0.28902	-0.05451	-0.31616
168	0.14619	0.08217	-0.07711	-0.30175	0.22025	0.09858	0.03564	0.04644	0.06071	0.08606

169	-0.14629	-0.08211	0.07709	0.35176	-0.22044	-0.09851	-0.03559	-0.04637	-0.06063	-0.08614
170	0.09142	0.02596	0.05775	-0.18503	0.23801	0.03706	-0.14815	0.13495	-0.05440	0.17760
171	-0.05815	0.01056	-0.04281	0.16126	-0.20310	-0.09020	0.15923	-0.13022	0.06741	-0.15079
172	-0.07987	-0.07127	-0.04006	0.08162	-0.11327	0.09012	0.01089	-0.03747	-0.01263	-0.08896
173	0.02098	0.06546	0.03835	-0.14243	0.13300	-0.00068	-0.07886	0.24952	0.07829	0.27360
174	-0.02090	-0.06533	-0.03838	0.14246	-0.13345	0.00023	0.07895	-0.24934	-0.07810	-0.27378
175	0.13185	0.11374	-0.07812	-0.32545	0.21062	0.13033	0.05225	0.02152	0.06090	0.05007
176	-0.13185	-0.11374	0.07812	0.32545	-0.21062	-0.13033	-0.05225	-0.02152	-0.06090	-0.05007
177	0.05749	0.09907	0.03908	-0.24825	0.21026	0.11848	-0.07625	0.03866	-0.04659	0.14503
178	-0.13058	-0.09083	-0.14094	-0.01848	0.00998	-0.00048	0.09791	-0.03146	0.07080	0.07945
179	0.07294	-0.03101	0.12241	0.36468	-0.30275	-0.16304	-0.00812	-0.01726	-0.01787	-0.29358
180	0.13803	0.10960	0.14757	-0.08315	0.16960	-0.12434	0.02957	0.10474	0.09034	0.19164
181	-0.10055	-0.06799	-0.01411	0.20167	-0.24560	0.01373	-0.03794	-0.08095	-0.03365	-0.19104
182	0.06140	0.11678	-0.30288	-0.46122	0.26758	0.37127	-0.13769	-0.08575	-0.17801	0.00003
183	0.17578	0.16472	-0.04825	-0.19139	0.14539	0.00025	0.11292	0.05372	0.13596	0.25382
184	-0.23569	-0.09004	0.06677	-0.07881	-0.17887	0.13892	-0.10820	0.18855	0.01458	0.22181
185	0.02838	0.13283	0.08139	-0.10720	-0.01924	0.01408	-0.01327	0.18134	0.09728	0.26535
186	-0.19543	0.00407	0.05651	-0.10048	-0.04422	0.09897	-0.02493	0.03583	-0.00124	0.04898
187	0.35130	0.29771	-0.05388	0.00134	0.26014	-0.19723	0.22753	-0.17399	0.10362	0.28619
188	0.14095	0.02743	-0.00554	-0.02117	-0.04959	-0.07734	-0.01600	0.12874	0.06302	0.23699
189	-0.04781	0.00753	0.05357	-0.08238	0.00121	-0.01747	-0.03891	0.21978	0.09696	0.23751
190	-0.06829	-0.05928	0.11715	0.10039	-0.23747	-0.07120	-0.01857	0.32560	0.18009	0.15741
191	-0.14589	-0.08922	-0.00163	0.13820	-0.09903	-0.04159	-0.03766	-0.02287	-0.04834	-0.06759
192	0.00710	0.07542	0.00006	0.19418	-0.29839	-0.05376	0.12610	-0.08772	0.06269	-0.09452
193	0.04904	-0.06806	0.01991	0.12453	-0.06229	-0.03702	0.06846	-0.02928	0.04510	-0.28607
194	0.09069	0.02391	-0.07053	-0.23586	0.18606	0.09170	0.08162	-0.03760	0.05215	0.18646
195	-0.01934	0.17026	-0.04078	-0.21381	0.12939	0.12987	-0.18816	0.13553	-0.09074	0.04316
196	-0.06776	-0.12789	-0.01410	-0.08390	0.03998	0.02379	-0.06260	0.14819	0.03204	0.24117

	31	32	33	34	35	36	37	38	39	40
31	1.00000									
32	-0.69757	1.00000								
33	0.54494	-0.72178	1.00000							
34	-0.09326	-0.15429	-0.16116	1.00000						
35	-0.08322	0.23554	-0.23298	0.08628	1.00000					
36	-0.05653	-0.23935	-0.06284	0.92111	-0.30839	1.00000				
37	0.56567	-0.28848	0.16835	-0.20657	-0.02391	-0.18789	1.00000			
38	0.13959	-0.07358	0.12668	-0.17867	-0.01097	-0.16632	0.06395	1.00000		
39	0.47758	-0.17786	0.18345	-0.33790	0.00121	-0.32310	0.57046	0.23684	1.00000	
40	0.32938	-0.04958	0.06628	-0.12894	0.00943	-0.12680	0.01597	0.21924	0.16209	1.00000
41	0.03689	0.03115	0.07428	-0.11597	0.02386	-0.12005	0.02290	-0.06457	0.40235	-0.01016
42	0.30147	-0.21640	0.31235	-0.47397	-0.11672	-0.40695	0.12436	0.17891	0.24513	-0.03968
43	0.29643	-0.16365	0.10767	-0.25717	-0.08596	-0.21196	0.43144	0.87526	0.46307	0.12326
44	0.10296	-0.00198	0.29770	-0.27234	-0.04745	-0.24150	-0.08358	0.12444	-0.05907	0.06281
45	0.32777	-0.24276	0.20705	-0.10209	-0.05106	-0.07752	-0.10903	-0.03406	0.05548	0.21451
46	0.14924	-0.04415	-0.11459	-0.01861	-0.23709	0.07487	0.06675	0.12980	0.01988	0.05565
47	-0.16970	0.04022	0.07910	0.08706	0.26626	-0.02092	-0.10134	-0.03279	-0.23655	-0.03717
48	-0.24478	0.14754	-0.05213	0.02595	0.08687	-0.00917	0.07867	-0.19101	0.11072	-0.22120
49	-0.26306	0.10537	0.04242	0.08691	0.26893	-0.02210	-0.04786	-0.12141	-0.14758	-0.14010
50	0.49410	-0.35841	0.20775	0.13151	-0.01639	0.13198	0.00667	0.07154	0.10560	0.33493
51	-0.33108	0.15803	-0.21365	0.08006	-0.02456	0.08604	0.00973	-0.04388	-0.17669	-0.12396
52	-0.15787	0.21348	0.01236	-0.24796	0.00939	-0.24043	0.02595	-0.06900	0.15732	-0.20813
53	0.24271	-0.22871	0.45006	-0.29385	0.00048	-0.28077	-0.04172	0.14063	0.01657	0.01135
54	-0.20986	0.23989	-0.18538	0.01577	0.14237	-0.04058	-0.11922	0.02858	-0.12483	-0.19319
55	-0.56493	0.71062	-0.47805	-0.13760	0.17963	-0.20158	-0.10632	-0.21675	-0.06759	-0.34776
56	-0.25940	-0.14781	0.13194	0.11102	-0.10550	0.14723	-0.31492	-0.01187	-0.39331	-0.01598
57	0.83430	-0.61344	0.38751	0.04661	-0.09429	0.08135	0.40036	0.23867	0.43354	0.38066
58	0.07585	0.05341	-0.01488	-0.18698	-0.01052	-0.17442	0.20867	-0.06082	0.16155	-0.33525
59	-0.20906	0.25709	0.06506	-0.46212	-0.09964	-0.40230	-0.04317	0.05110	0.07963	0.00288

60	0.30705	-0.16493	-0.03889	0.34630	0.06446	0.30547	0.06192	0.09981	0.09775	0.27582
61	-0.07517	-0.16543	-0.03152	0.29509	0.05858	0.25887	-0.10371	-0.11719	-0.25193	-0.09425
62	0.32553	-0.33766	0.03997	0.40712	0.03622	0.37458	0.10152	-0.06268	-0.00603	0.12722
63	0.00901	-0.02533	0.13637	-0.47719	-0.24710	-0.35907	0.33268	0.11928	0.20137	-0.10790
64	-0.37627	0.38568	-0.14045	-0.15102	0.08209	-0.17623	-0.22119	-0.06996	-0.06972	-0.15048
65	-0.04573	0.07366	-0.08251	0.24429	0.18985	0.15907	-0.33940	0.00433	-0.18366	0.13433
66	-0.16912	0.40711	-0.32621	0.04572	0.05904	0.02658	-0.16150	0.01707	-0.08783	0.13765
67	0.34683	-0.38442	0.50086	0.01729	-0.02958	0.02906	-0.01387	0.15505	0.18178	0.02684
68	0.00563	-0.09453	0.17764	-0.16535	-0.01935	-0.15032	0.04482	-0.09377	0.31391	0.18143
69	-0.07830	-0.08119	-0.09302	-0.01038	-0.02695	0.00062	0.13702	-0.08902	-0.11429	-0.18181
70	-0.06533	0.14685	-0.05380	-0.03706	0.02819	-0.04440	-0.25357	-0.17340	-0.12510	-0.03065
71	0.15957	-0.06238	0.11481	-0.01815	0.05613	-0.03926	0.22848	0.13421	0.18613	0.12137
72	-0.00196	-0.03157	-0.13951	0.16194	-0.06943	0.18175	0.00141	0.06626	-0.10992	0.12046
73	0.06875	-0.02439	0.10371	-0.22213	-0.18635	-0.13928	0.17528	-0.01033	-0.07440	-0.06483
74	-0.13225	-0.16405	0.00088	0.03697	-0.05541	0.05695	0.10440	0.08842	0.04727	-0.19632
75	-0.23534	0.22049	-0.17277	-0.11661	-0.41701	0.05161	-0.23771	-0.25718	-0.17369	-0.09162
76	0.26316	-0.28228	0.40542	-0.03370	0.25254	-0.13086	-0.03828	0.52346	0.07593	0.14408
77	0.19668	-0.20488	0.23125	0.14436	0.03625	0.12367	0.00246	-0.02947	0.02124	-0.01817
78	-0.34763	0.47107	-0.10593	-0.30731	-0.03522	-0.27967	-0.32758	-0.07301	-0.21449	0.06447
79	-0.00017	-0.17999	-0.06307	0.42896	0.03444	0.39612	-0.15223	0.02092	-0.06801	-0.02795
80	0.06085	-0.19701	0.04328	0.12228	0.07629	0.09694	-0.04582	-0.04808	-0.06556	-0.20147
81	0.38440	-0.07394	-0.01662	-0.02230	-0.00779	-0.01825	0.64965	-0.03598	0.48417	0.05901
82	0.43754	-0.50834	0.24444	0.04018	-0.04567	0.05621	0.53714	0.19624	0.32535	0.08999
83	0.56489	-0.27506	-0.04868	0.15988	-0.02342	0.16181	0.39260	0.20939	0.30722	0.33258
84	0.34916	-0.30382	0.37673	-0.13159	-0.00419	-0.12400	-0.02578	-0.04632	0.18661	0.18274
85	-0.23003	0.08679	-0.16951	0.14186	0.16960	0.06918	-0.21102	-0.08116	-0.25382	-0.06272
86	-0.34329	0.24804	-0.15965	-0.23953	-0.24542	-0.13281	0.05509	0.09766	-0.02805	-0.17441
87	-0.33916	0.19674	0.07394	-0.00735	0.09005	-0.04221	-0.26132	-0.19711	-0.21205	-0.25761
88	0.65289	-0.38232	0.13804	0.07540	-0.02240	0.08075	0.31760	0.15844	0.35380	0.37404
89	-0.42406	0.25032	-0.24035	-0.08205	-0.06691	-0.05219	-0.10647	0.01703	-0.20076	-0.17729
90	-0.51780	0.37173	-0.09710	-0.17770	-0.00430	-0.16799	-0.41289	-0.10042	-0.25375	-0.21190
91	0.16373	0.01281	-0.02087	0.12987	0.14091	0.06894	0.26805	-0.09813	0.08832	0.16699
92	0.34862	-0.13460	0.23157	-0.16709	0.03555	-0.17344	0.27041	0.32480	0.30229	0.30357
93	0.05359	-0.03035	-0.01572	0.03855	0.01161	0.03227	0.18618	0.11845	0.03827	-0.16332
94	0.11418	-0.16551	-0.03091	0.20010	-0.16210	0.25441	-0.16306	0.01720	-0.04607	0.11363
95	0.02862	-0.05977	-0.01799	0.12785	0.13958	0.06753	-0.05113	-0.06674	-0.09681	-0.02124
96	0.53193	-0.36838	0.20157	0.02133	0.05863	-0.00254	0.36785	0.00950	0.47411	0.30916
97	0.03645	-0.24381	0.26189	0.01767	-0.15122	0.07597	-0.00012	-0.06977	-0.05164	-0.00751
98	0.40187	-0.28198	0.05914	0.01179	0.00906	0.00772	0.64814	0.11426	0.30791	0.13463
99	-0.46919	0.38407	-0.07735	-0.18930	0.03186	-0.19319	-0.30163	-0.03618	-0.20252	-0.20571
100	-0.48208	0.34942	-0.03248	-0.17626	0.04305	-0.18512	-0.36507	-0.10610	-0.27905	-0.14178
101	0.14725	0.05215	-0.00083	0.07790	0.09468	0.03738	0.26138	-0.11552	0.21341	0.15095
102	0.27187	-0.13871	0.13595	-0.01403	0.03615	-0.02753	0.24910	0.26683	0.17871	0.16139
103	-0.01555	0.02280	-0.09001	0.01720	-0.04468	0.03388	0.09283	0.02955	0.03574	-0.24489
104	0.10583	-0.17911	-0.04216	0.23460	-0.14348	0.28007	-0.16245	0.00845	-0.06289	0.09721
105	0.07063	-0.11497	-0.01384	0.16805	0.13528	0.10760	-0.09486	-0.07761	-0.07931	-0.04632
106	0.52809	-0.32044	0.21689	-0.02647	0.08635	-0.05901	0.37247	-0.04456	0.55278	0.32992
107	0.03645	-0.24381	0.26189	0.01767	-0.15122	0.07597	-0.00012	-0.06977	-0.05164	-0.00751
108	0.45191	-0.23711	0.01285	-0.06044	-0.04628	-0.03962	0.61304	0.22126	0.31793	0.13069
109	-0.45007	0.36735	-0.04342	-0.16993	0.05327	-0.18307	-0.27092	-0.07912	-0.21937	-0.18468
110	0.26064	-0.28523	0.05576	0.21745	-0.04334	0.22457	-0.03277	-0.02579	0.05501	0.16304
111	0.25027	-0.28538	0.04327	0.23773	-0.03402	0.24028	-0.06053	-0.04331	0.06132	0.13620
112	-0.59778	0.20439	-0.14781	0.04574	-0.02853	0.05483	-0.56681	-0.08557	-0.47798	-0.24310
113	0.18257	-0.25666	0.12895	0.06982	-0.18170	0.13767	0.08561	0.03836	0.20435	0.02816
114	-0.25742	0.28077	-0.15176	-0.01947	0.18205	-0.08973	-0.18678	-0.03173	-0.26403	-0.01744
115	0.20239	-0.16435	0.29010	-0.12398	0.06373	-0.14328	0.03349	-0.07494	0.22418	-0.04562
116	0.48710	-0.13493	0.04295	-0.30632	-0.06226	-0.26815	0.75669	-0.00625	0.36357	-0.05270
117	-0.37952	0.41060	-0.04780	-0.25087	0.07495	-0.26982	-0.15668	-0.02420	-0.12660	-0.15749
118	0.24051	-0.35344	0.03639	0.28123	-0.09130	0.30420	-0.05570	-0.02905	0.00181	0.11862
119	0.40479	-0.31438	0.08741	0.09806	-0.00234	0.09455	0.44634	0.15183	0.18419	0.21254

120	0.31292	0.01885	-0.04582	-0.25296	0.07997	-0.27279	0.62978	0.09569	0.48322	-0.04157
121	-0.36967	0.42330	-0.04967	-0.25338	0.06065	-0.26564	-0.16224	-0.02397	-0.10704	-0.13410
122	0.32259	-0.46891	0.19044	0.30249	0.07765	0.25839	-0.01345	0.05103	-0.00994	0.14561
123	0.22930	-0.29457	0.01577	0.15399	-0.15945	0.26934	0.13767	0.02579	0.17155	0.07936
124	0.24221	-0.12679	-0.15650	0.05845	-0.11093	0.09916	0.28497	-0.03690	0.11661	0.05206
125	0.42627	-0.17471	0.02021	-0.05134	0.12638	-0.09840	0.68596	0.04396	0.60526	-0.05600
126	0.50674	-0.42033	0.25078	-0.26928	-0.09229	-0.16376	0.62618	0.10207	0.48051	0.13849
127	0.21464	-0.21187	0.24987	0.03858	-0.33701	0.16953	-0.11779	-0.00080	-0.12322	0.14218
128	-0.50444	0.44093	-0.37358	0.08355	0.35829	-0.06023	-0.27556	-0.05786	-0.18489	-0.20632
129	-0.44516	0.26105	0.01984	-0.03269	-0.10314	0.00909	-0.30999	-0.08176	-0.21674	-0.40955
130	0.46332	-0.19127	-0.02385	-0.06043	-0.05069	-0.03398	0.29358	0.11750	0.25295	0.34830
131	0.09567	-0.19987	0.00039	0.17646	0.32231	0.04254	0.11823	-0.04042	-0.00187	0.22774
132	-0.24288	0.11873	0.03075	-0.06778	0.00324	-0.06598	0.04010	-0.11089	-0.03981	-0.26429
133	-0.37372	0.21700	-0.08707	0.01633	-0.04954	0.03495	-0.20989	-0.06603	-0.20504	-0.26528
134	0.40387	-0.21776	0.02573	0.04388	0.02614	0.03168	0.08878	0.12518	0.14809	0.36015
135	-0.17458	0.24915	0.05076	-0.11132	0.05014	-0.12589	-0.29151	0.03164	-0.07057	0.01111
136	0.17458	-0.24915	-0.05076	0.11132	-0.05014	0.12589	0.29151	-0.03164	0.07057	-0.01111
137	0.37362	-0.27419	-0.08719	0.08193	-0.13161	0.12966	0.46183	0.06714	0.18649	0.14131
138	0.30419	-0.26200	-0.02866	-0.02606	-0.05740	-0.00245	0.35732	0.00237	0.12771	0.02708
139	-0.36196	0.20794	-0.08760	0.09957	0.07356	0.06633	-0.34579	0.10833	-0.13461	0.05517
140	-0.12047	0.20577	0.13045	-0.05678	0.01835	-0.06139	-0.21956	-0.11009	-0.06798	-0.09607
141	-0.16422	0.25662	0.06222	-0.17112	0.03243	-0.17606	-0.28523	0.04889	-0.04610	0.06567
142	-0.19883	-0.02633	-0.12039	0.14147	-0.11924	0.18167	-0.10672	-0.14597	-0.26937	-0.26922
143	0.15642	-0.20384	-0.08423	0.13938	0.11997	0.08620	0.22265	-0.02444	0.13004	0.13335
144	0.18805	-0.18256	-0.02209	0.18939	-0.11995	0.22770	0.37089	0.02655	0.15750	0.04903
145	0.01607	0.06039	0.00003	-0.07035	0.12778	-0.11711	-0.04274	0.30776	0.23671	0.24108
146	-0.06511	-0.00141	0.09101	-0.04313	0.04153	-0.05741	-0.01246	0.14123	-0.11449	-0.14151
147	0.09157	-0.02101	-0.00984	-0.01706	-0.19716	0.06075	-0.09218	0.10727	0.06967	-0.05883
148	-0.06102	0.00407	-0.00760	-0.01439	0.21028	-0.09591	-0.12901	-0.10138	-0.06217	0.17631
149	0.40061	-0.35306	0.23201	0.00012	-0.06673	0.02619	0.24017	-0.02842	0.30098	0.12140
150	0.50431	-0.25402	0.02507	0.00517	0.00580	0.00267	0.52988	-0.01168	0.37945	0.05624
151	0.57970	-0.22904	0.12265	-0.05271	0.09162	-0.08614	0.77463	0.12832	0.48916	0.23880
152	-0.08895	-0.15044	-0.13933	0.21463	-0.04981	0.22440	0.06219	-0.09464	-0.16749	-0.18603
153	0.30961	-0.13735	-0.13861	-0.06707	-0.13813	-0.01006	0.55776	0.05968	0.24245	0.07180
154	-0.11477	0.07766	0.02079	-0.23384	-0.16181	-0.16004	-0.03138	-0.12939	0.06961	-0.21936
155	0.18222	-0.14001	0.08311	0.22590	-0.14519	0.27243	0.21605	-0.11510	0.18400	0.03303
156	-0.00703	-0.03887	-0.09308	0.23886	0.17889	0.15816	-0.23748	-0.02045	-0.10925	0.14959
157	-0.23772	0.14324	0.10450	-0.08340	0.12623	-0.12896	-0.32949	0.07565	-0.21444	-0.05308
158	0.19637	-0.07316	-0.10400	-0.17776	-0.19887	-0.09202	0.44568	-0.01815	0.23723	-0.05525
159	0.10520	-0.11725	-0.02524	0.33253	0.05771	0.29495	-0.06225	-0.08677	0.02265	0.14238
160	0.23840	-0.02011	0.20218	-0.25240	0.23981	-0.33471	0.13261	0.15262	0.11037	0.32604
161	-0.26621	-0.05332	-0.07874	0.14799	-0.11385	0.18579	-0.10411	-0.09750	-0.02471	-0.22659
162	-0.07204	0.08979	-0.22384	0.22420	-0.24279	0.30894	-0.08875	-0.12682	-0.14252	-0.25662
163	0.44377	-0.36359	0.46471	-0.20359	-0.07405	-0.16546	0.29888	0.35344	0.36527	0.17661
164	-0.43004	0.34601	-0.38184	0.16124	0.15378	0.09386	-0.29472	-0.31776	-0.33926	-0.11264
165	-0.10648	0.09908	-0.23520	0.11303	-0.12941	0.15849	-0.06173	-0.12983	-0.11551	-0.15170
166	0.50903	-0.51658	0.50619	-0.10962	-0.19543	-0.01971	0.51795	0.19876	0.45501	0.17678
167	-0.50921	0.51680	-0.50640	0.10973	0.19542	0.01982	-0.51789	-0.19871	-0.45507	-0.17694
168	0.31994	-0.24261	0.39607	-0.16209	0.04111	-0.17083	0.28106	0.16560	0.22449	0.14091
169	-0.32003	0.24273	-0.39617	0.16213	-0.04111	0.17087	-0.16558	-0.28103	-0.22453	-0.14099
170	0.38753	-0.34736	0.44357	-0.18100	-0.07660	-0.14289	0.27161	0.33623	0.31345	0.11691
171	-0.38721	0.32762	-0.36810	0.16341	0.15066	0.09716	-0.26919	-0.29859	-0.29033	-0.06845
172	-0.08157	0.10920	-0.23121	0.06908	-0.11956	0.11268	-0.06312	-0.13931	-0.10776	-0.11303
173	0.49798	-0.47945	0.47960	-0.11162	-0.14970	-0.04808	0.51155	0.19046	0.47968	0.14634
174	-0.49816	0.47968	-0.47981	0.11173	0.14969	0.04819	-0.51148	-0.19040	-0.47974	-0.14650
175	0.28541	-0.19696	0.37358	-0.18469	0.02380	-0.18565	0.11024	0.28668	0.20803	0.13435
176	-0.28541	0.19696	-0.37358	0.18469	-0.02381	0.18565	-0.11024	-0.28668	-0.20803	-0.13435
177	0.34466	-0.29951	0.44171	-0.21128	-0.15317	-0.14189	0.15877	0.31133	0.26248	0.10113
178	-0.09819	-0.00273	-0.11255	0.22834	0.14279	0.16223	-0.13317	-0.22200	-0.20013	0.06369
179	-0.36229	0.41774	-0.47994	0.02578	0.04505	0.00701	-0.06443	-0.17133	-0.12935	-0.21458

180	0.32772	-0.31668	0.49453	-0.19339	-0.23632	-0.09231	0.29517	0.14983	0.28169	0.13935
181	-0.31714	0.31760	-0.48952	0.15200	0.19710	0.06812	-0.27125	-0.13390	-0.25882	-0.11538
182	0.43154	-0.24261	0.26915	-0.25020	-0.02750	-0.22815	0.17663	0.21025	0.27287	0.29076
183	0.38717	-0.40274	0.39359	-0.10831	-0.07889	-0.07259	0.31498	0.11247	0.29257	0.14129
184	0.35353	-0.36048	0.17626	0.00904	-0.05764	0.03115	0.23934	0.24423	0.12787	0.20544
185	0.42185	-0.43064	0.38577	-0.01673	-0.03337	-0.00294	0.27411	0.21132	0.21005	0.21485
186	0.36469	-0.24073	0.17311	-0.15117	-0.06391	-0.11937	0.37424	0.14893	0.30432	0.25165
187	0.21142	-0.32754	0.27072	-0.12948	0.06147	-0.14765	0.05868	-0.15444	0.03235	-0.01853
188	0.44039	-0.42038	0.20434	-0.19644	-0.13345	-0.13542	0.54096	0.07629	0.51482	0.11409
189	0.54906	-0.48184	0.33497	-0.22466	-0.15632	-0.15342	0.63467	0.18169	0.49635	0.13101
190	0.30448	-0.28595	0.11902	-0.22017	-0.14232	-0.15461	0.60344	0.13618	0.47393	-0.00391
191	-0.32077	0.22961	-0.26255	0.09016	0.13230	0.03439	-0.04803	-0.18840	-0.03203	-0.02113
192	-0.29556	0.23507	-0.30767	0.19472	0.03237	0.17327	-0.17011	-0.06943	-0.22720	-0.15555
193	-0.44184	0.45698	-0.25808	0.03061	0.07056	0.00166	-0.35626	-0.13876	-0.33926	-0.19811
194	0.23768	-0.26958	0.26136	0.00182	-0.11097	0.04509	-0.12181	0.19931	-0.04694	0.04567
195	0.53045	-0.32966	0.35268	-0.05985	-0.03877	-0.04199	0.36687	0.12362	0.50213	0.17122
196	0.53966	-0.47923	0.27558	-0.19148	-0.15006	-0.12419	0.63894	0.14920	0.47060	0.39612

	41	42	43	44	45	46	47	48	49	50
41	1.00000									
42	-0.06744	1.00000								
43	-0.03463	0.26066	1.00000							
44	0.13675	0.25239	0.10722	1.00000						
45	-0.09418	0.01904	-0.03078	0.00780	1.00000					
46	-0.13044	-0.01075	0.13522	-0.17268	-0.24203	1.00000				
47	-0.05618	0.12163	-0.09662	0.19297	0.20564	-0.81237	1.00000			
48	0.20587	-0.19869	-0.10878	0.02385	-0.11121	-0.51988	0.04807	1.00000		
49	0.05290	0.00637	-0.13558	0.17643	-0.04881	-0.94411	0.87344	0.52834	1.00000	
50	-0.01074	0.13175	0.04527	0.07500	0.30020	0.20971	-0.21894	-0.21276	-0.28953	1.00000
51	-0.13909	-0.29530	-0.00480	0.04949	-0.18110	-0.08651	0.18572	-0.00554	0.15522	-0.70278
52	0.26750	0.13193	-0.05493	-0.14639	-0.13919	-0.13484	-0.00271	0.31230	0.14917	-0.27647
53	-0.06849	0.79492	0.02859	0.17988	-0.03627	-0.07376	0.21499	-0.18303	0.09373	0.10496
54	-0.10203	-0.07292	-0.01406	-0.17816	0.00975	0.00678	-0.03504	0.05550	-0.00199	-0.20341
55	0.11208	-0.01026	-0.22798	-0.23034	-0.37691	0.00249	0.08242	0.05170	0.09467	-0.49880
56	-0.03475	-0.00276	-0.13145	0.27149	0.01837	-0.26606	0.26036	0.16194	0.30062	0.02954
57	-0.08273	0.01375	0.36008	-0.00283	0.37930	0.24578	-0.32232	-0.21843	-0.38017	0.49981
58	0.00955	0.07459	-0.03573	-0.14761	-0.13991	0.16361	-0.22177	0.10776	-0.13609	-0.16619
59	0.39020	0.19482	0.07834	0.32912	-0.00008	-0.34317	0.28299	0.17332	0.32464	-0.21402
60	-0.14007	-0.10497	0.06962	0.00659	0.00313	0.11446	-0.08333	-0.08322	-0.11120	0.24668
61	-0.31713	-0.15880	-0.13285	-0.30603	0.00144	0.20642	-0.13907	-0.17041	-0.20097	0.09409
62	-0.34972	-0.19906	-0.05944	-0.31082	0.07513	0.31469	-0.28767	-0.15601	-0.32061	0.33258
63	0.25845	0.31065	0.29097	0.35809	-0.28785	-0.09662	0.03774	0.28497	0.17056	-0.22738
64	0.13505	-0.04232	-0.16402	-0.04058	-0.06057	-0.13655	0.20791	-0.07625	0.13895	-0.26964
65	-0.01383	-0.09500	-0.12565	-0.00758	0.34655	-0.15103	0.11514	-0.08247	0.05813	0.14433
66	-0.02295	0.04636	-0.01519	0.04795	-0.02092	-0.05273	0.11375	-0.04759	0.07305	0.09302
67	0.27925	0.20359	0.08373	0.53175	0.12187	-0.13446	0.09896	-0.02815	0.07041	0.07190
68	0.24444	-0.10056	-0.06304	-0.08861	-0.12153	-0.00181	-0.17097	0.22130	-0.03753	-0.03574
69	-0.21519	-0.14387	-0.02391	-0.35808	-0.03724	0.13395	-0.11734	0.00142	-0.09917	-0.12124
70	0.22253	-0.14633	-0.25663	0.15398	0.25517	0.02716	-0.10860	-0.05704	-0.12015	0.16656
71	-0.14567	0.14312	0.19537	-0.03319	-0.16021	-0.10139	0.16268	0.04069	0.15858	-0.16113
72	-0.08994	-0.07932	0.03180	-0.06133	-0.16172	0.16467	-0.09836	-0.05583	-0.11121	0.06254
73	-0.06153	-0.03471	0.02170	0.22087	-0.15196	0.20117	-0.22968	0.07867	-0.15637	-0.01564
74	-0.13544	0.12605	0.17324	-0.25457	-0.10875	-0.05100	0.07617	0.07016	0.09846	-0.11551
75	0.19490	-0.00095	-0.31706	0.06888	0.05645	0.06099	-0.07002	-0.07829	-0.09712	-0.06922
76	-0.10723	0.04557	0.36142	0.04980	0.14990	0.01535	0.06353	-0.22338	-0.05413	0.26853
77	-0.04274	-0.02101	-0.02344	-0.06220	-0.08712	0.23258	-0.22119	-0.04891	-0.21211	0.35576
78	0.24894	0.03021	-0.17229	0.30661	-0.04444	-0.20320	0.15028	0.16207	0.20628	-0.19351
79	-0.20996	-0.13718	-0.04228	-0.26877	0.07647	0.21495	-0.11271	-0.27453	-0.22974	0.16960
80	-0.08193	0.04733	-0.09165	0.00053	0.05623	0.08637	-0.05799	-0.09982	-0.09660	0.09558

81	-0.00349	0.05055	0.23801	-0.03855	-0.16922	0.10465	-0.08766	-0.00286	-0.07596	-0.00411
82	-0.18906	0.00754	0.36969	-0.31411	0.03694	0.03224	-0.07517	0.07726	-0.02664	0.10744
83	-0.06462	-0.03174	0.32559	-0.15214	0.19459	0.26274	-0.25620	-0.21510	-0.32283	0.42330
84	0.10536	-0.11581	-0.05910	-0.05864	0.39741	0.13830	-0.29713	-0.07532	-0.28909	0.23597
85	-0.27373	-0.01847	-0.16837	-0.39063	-0.15807	0.30979	-0.16668	-0.19705	-0.23765	0.07519
86	0.14461	0.32336	0.18691	0.14331	-0.24172	0.03491	0.12378	-0.14749	0.03304	-0.40568
87	0.07134	-0.13066	-0.31131	0.34336	-0.12487	-0.57150	0.43779	0.49652	0.61449	-0.30034
88	-0.00526	-0.08263	0.25247	-0.15873	0.35728	0.29267	-0.36293	-0.22124	-0.41642	0.47718
89	-0.06321	0.23324	0.02362	-0.16656	-0.29572	0.24381	-0.02191	-0.25084	-0.14105	-0.25625
90	0.02121	0.09446	-0.20552	0.41273	-0.15031	-0.26697	0.31237	0.09838	0.31325	-0.33631
91	-0.15584	-0.07272	-0.00437	-0.13649	-0.07830	0.22447	-0.30307	0.12724	-0.19505	0.25533
92	0.10431	0.04958	0.38548	0.42636	0.07922	-0.07618	0.04984	-0.02506	0.02998	0.13552
93	0.22401	-0.07812	0.16630	-0.07605	-0.11932	0.12280	-0.14646	0.07168	-0.00019	-0.00605
94	0.01781	-0.03754	-0.00554	-0.29888	0.22220	0.21862	-0.18435	-0.26897	-0.28794	0.32566
95	-0.07275	-0.14602	-0.09885	-0.35383	0.20525	0.05293	-0.07777	-0.06836	-0.09705	0.02531
96	-0.02216	0.06302	0.16338	-0.30559	0.17779	0.18357	-0.28368	-0.07826	-0.27977	0.30051
97	0.04276	-0.08196	-0.06718	0.03524	-0.07515	0.06595	-0.08660	0.06943	-0.03931	0.04583
98	-0.12239	0.03579	0.34276	-0.14924	-0.10608	0.03867	-0.05058	0.10432	0.00768	0.03173
99	0.08437	0.07372	-0.10918	0.48386	-0.20803	-0.22758	0.25066	0.15380	0.28765	-0.30489
100	0.04619	0.05588	-0.20079	0.48384	-0.14207	-0.27120	0.32544	0.09307	0.32158	-0.27359
101	-0.00610	-0.09481	-0.02019	-0.14089	-0.03780	0.18497	-0.31887	0.15264	-0.19624	0.23725
102	-0.10609	0.02127	0.31858	0.40526	-0.07905	-0.02435	0.10708	-0.05727	0.06303	0.13787
103	0.17593	0.02536	0.06740	-0.16025	-0.19002	0.18987	-0.21159	0.06553	-0.14792	0.05166
104	-0.01895	-0.06004	-0.11249	-0.35011	0.21335	0.20989	-0.17248	-0.26380	-0.27505	0.28051
105	-0.11384	-0.13672	-0.12559	-0.45541	0.27719	0.06128	-0.09501	-0.09792	-0.12716	-0.01774
106	0.08599	0.00333	0.11188	-0.27580	0.18505	0.13893	-0.29330	-0.01977	-0.25939	0.24926
107	0.04276	-0.08196	-0.06718	0.03524	-0.07515	0.06595	-0.08660	0.06943	-0.03931	0.04583
108	-0.11322	0.07429	0.45279	-0.11234	-0.06467	0.01606	-0.04348	0.11008	0.01645	-0.02768
109	0.09117	0.05419	-0.14210	0.50369	-0.23727	-0.19592	0.23627	0.14007	0.26872	-0.21005
110	-0.02657	-0.10879	-0.07678	-0.48390	0.31049	0.24637	-0.26656	-0.24508	-0.34549	0.34257
111	-0.03743	-0.10969	-0.11265	-0.52295	0.31841	0.22071	-0.25115	-0.23262	-0.32625	0.26423
112	-0.09066	-0.14425	-0.27599	0.29435	-0.11553	-0.17164	0.21137	0.09223	0.22484	-0.23604
113	-0.11919	-0.08549	0.06200	-0.56252	0.13461	0.12773	-0.23764	0.01370	-0.19504	0.19360
114	0.09284	0.06411	-0.09707	0.54616	-0.14227	-0.13810	0.25500	-0.01032	0.21136	-0.20645
115	0.43586	-0.04751	-0.05203	0.28931	-0.10749	0.02625	-0.12835	0.10254	-0.05744	0.09478
116	-0.04141	0.17254	0.29917	-0.10283	0.13213	0.08311	-0.09988	-0.07514	-0.12160	0.07745
117	0.18505	0.19362	-0.03401	0.54874	-0.19844	-0.26923	0.30205	0.15992	0.32970	-0.32271
118	-0.18534	-0.21675	-0.09700	-0.55529	0.25121	0.25874	-0.27602	-0.20119	-0.33196	0.33460
119	-0.10986	0.00425	0.31608	-0.06018	-0.08215	-0.07298	0.04031	0.16224	0.11322	0.00246
120	0.11335	0.08381	0.31643	0.00246	-0.14782	0.21732	-0.26831	0.03366	-0.21207	-0.00397
121	0.19400	0.18916	-0.03614	0.56527	-0.20846	-0.26066	0.29651	0.14100	0.32017	-0.32100
122	-0.23866	-0.18060	-0.00521	-0.44481	0.29352	0.09134	-0.10069	-0.16724	-0.16697	0.28621
123	0.00859	-0.10459	0.01518	-0.42566	0.00480	0.23456	-0.28293	-0.02281	-0.25114	0.27935
124	-0.14747	-0.11526	0.07903	-0.37183	0.09526	0.29235	-0.32342	-0.09869	-0.31734	0.13245
125	-0.05729	0.20125	0.33437	-0.02239	0.02379	-0.00258	-0.05878	0.10256	-0.00022	0.07428
126	0.00921	0.16250	0.36000	-0.05844	0.13422	-0.10751	-0.00196	0.13104	0.06194	-0.01135
127	0.24712	0.01756	-0.03723	0.37837	0.16056	0.03638	-0.07923	-0.05466	-0.09403	0.31609
128	-0.23141	-0.11780	-0.18302	-0.31804	-0.22531	0.02642	0.07766	-0.02771	0.05271	-0.29147
129	0.11073	0.03417	-0.13175	0.34150	-0.20367	-0.27886	0.27092	0.22249	0.33898	-0.37755
130	-0.01587	0.01958	0.18012	-0.19353	0.23722	0.37237	-0.36219	-0.30163	-0.45533	0.36465
131	-0.20173	-0.10607	-0.04869	-0.36356	-0.00179	-0.08609	0.08503	0.07639	0.10978	0.13172
132	0.08609	-0.00390	-0.04007	0.24835	-0.08967	-0.43529	0.42424	0.23656	0.47516	-0.41048
133	0.03011	0.04878	-0.11712	0.00106	-0.22747	-0.13768	0.20659	0.05909	0.20432	-0.47893
134	-0.08519	-0.02471	0.09875	-0.19607	0.20144	0.42137	-0.45241	-0.21990	-0.49110	0.59720
135	0.15389	0.01544	-0.02327	0.67271	-0.03501	-0.21789	0.24434	0.01408	0.21448	-0.09111
136	-0.15389	-0.01544	0.02327	-0.67271	0.03501	0.21789	-0.24435	-0.01409	-0.21449	0.09111
137	-0.21654	-0.02910	0.17602	-0.54857	0.10441	0.26781	-0.28069	-0.10484	-0.29005	0.16017
138	-0.19533	0.05046	0.09941	-0.57758	0.14465	0.25626	-0.31448	-0.07549	-0.30417	0.14523
139	0.09227	-0.01771	-0.00466	0.34263	-0.26659	-0.00172	0.18366	-0.13333	0.09089	-0.10628
140	0.21514	-0.06229	-0.15130	0.56643	0.03536	-0.41463	0.31191	0.24820	0.38643	-0.12241

141	0.15828	0.16859	-0.01000	0.72140	-0.08975	-0.19284	0.24705	-0.00536	0.20715	-0.10233
142	-0.23010	-0.29040	-0.23679	-0.52412	0.03433	0.19279	-0.21092	-0.01562	-0.18590	0.01110
143	-0.12100	0.00894	0.06545	-0.47333	0.19351	-0.12473	0.05204	0.06945	0.07769	-0.03897
144	-0.12819	-0.06876	0.20124	-0.13433	-0.20138	0.08706	-0.12675	0.19273	-0.01450	0.12763
145	0.36158	-0.03065	0.29121	0.33739	-0.04562	-0.14948	0.11960	0.01761	0.10950	0.06847
146	0.23241	0.08881	0.10793	0.19558	-0.24836	0.10720	-0.01801	-0.00166	-0.01684	-0.02953
147	0.16538	0.14119	0.09256	-0.07359	0.15055	0.20300	-0.19326	-0.21667	-0.26947	0.10490
148	0.06501	-0.04542	-0.12737	-0.19943	0.09739	-0.00195	-0.00102	-0.03285	-0.01679	0.03449
149	-0.00485	0.01878	0.06165	-0.23352	0.17686	0.15546	-0.24261	-0.06947	-0.24076	0.24996
150	0.06514	0.12381	0.21941	0.10341	0.10952	0.02760	-0.07374	0.01293	-0.05620	0.22003
151	-0.03297	0.11061	0.35347	-0.19169	-0.09805	0.03589	-0.05078	0.06550	-0.01164	0.09738
152	-0.22075	-0.25705	-0.11553	-0.68091	0.04845	0.13929	-0.18236	0.04846	-0.13104	0.08729
153	-0.19533	0.02953	0.23670	-0.51690	0.03857	0.13430	-0.18633	0.03746	-0.14045	-0.06665
154	0.12264	0.14267	-0.12119	-0.20747	0.01316	0.09965	-0.16654	0.03203	-0.12541	0.01378
155	-0.11764	-0.14037	-0.05858	-0.32713	-0.06321	0.27949	-0.34238	0.02565	-0.27938	0.28897
156	0.01365	-0.06457	-0.15001	-0.16511	0.04569	0.04012	0.07894	-0.23345	-0.04681	0.18198
157	0.12404	0.01355	-0.00086	0.68157	-0.03187	-0.27779	0.30191	0.08219	0.29719	-0.18582
158	-0.09791	0.09897	0.13278	-0.53667	0.03892	0.16318	-0.24128	0.04786	-0.19186	-0.04850
159	-0.06049	-0.13819	-0.15813	-0.33374	-0.00121	0.29274	-0.14355	-0.17532	-0.20809	0.32455
160	0.15179	0.09863	0.18013	0.39689	0.05241	-0.16223	0.13767	0.04963	0.14015	0.09815
161	-0.12703	-0.05423	-0.12616	-0.31880	-0.04521	-0.03332	0.06743	0.00204	0.05888	-0.18975
162	-0.09288	-0.09162	-0.13741	-0.25758	-0.03050	0.28602	-0.28586	-0.07876	-0.28036	0.05995
163	0.29629	0.17331	0.44249	0.63751	0.09062	-0.08478	-0.01849	0.12416	0.04482	0.11015
164	-0.31795	-0.11315	-0.39530	-0.43880	-0.12025	-0.05770	0.16690	-0.07338	0.10591	-0.16988
165	-0.01617	-0.13951	-0.16615	-0.47439	0.03570	0.27124	-0.26257	-0.11391	-0.27842	0.08594
166	0.06677	0.20189	0.38660	0.15492	0.03074	-0.12349	-0.04173	0.27871	0.09957	-0.04921
167	-0.06673	-0.20187	-0.38657	-0.15486	-0.03117	0.12341	0.04187	-0.27853	-0.09936	0.04915
168	0.29963	0.17735	0.32087	0.73842	0.06589	-0.22541	0.18717	0.09209	0.20372	0.02420
169	-0.29960	-0.17735	-0.32086	-0.73837	-0.06608	0.22538	-0.18710	-0.09202	-0.20363	-0.02423
170	0.27393	0.15644	0.43401	0.65892	0.05455	-0.07622	-0.02755	0.14546	0.04753	0.04066
171	-0.30841	-0.09517	-0.38921	-0.48690	-0.12865	-0.01599	0.14014	-0.11149	0.06457	-0.11929
172	0.00609	-0.14460	-0.17284	-0.45302	0.12451	0.18488	-0.20048	-0.09283	-0.21535	0.13564
173	0.17248	0.19469	0.38320	0.21466	0.01271	-0.15793	-0.01060	0.29577	0.13439	-0.03911
174	-0.17242	-0.19467	-0.38316	-0.21459	-0.01314	0.15786	0.01074	-0.29559	-0.13417	0.03905
175	0.29248	0.23663	0.30654	0.75387	0.04121	-0.24179	0.20961	0.09191	0.22263	0.04565
176	-0.29248	-0.23663	-0.30654	-0.75387	-0.04121	0.24179	-0.20961	-0.09191	-0.22263	-0.04565
177	0.23727	0.31628	0.38658	0.76333	0.04694	-0.11903	0.04857	0.10581	0.09269	0.09319
178	-0.16178	-0.23991	-0.33658	-0.42388	0.03224	0.11829	-0.01635	-0.22964	-0.12514	0.05216
179	-0.13967	-0.15734	-0.14182	-0.56175	-0.10273	0.02638	-0.04784	0.12962	0.01812	-0.18981
180	0.09603	0.24622	0.26401	0.52171	0.05632	-0.31213	0.22181	0.22031	0.29552	-0.09475
181	-0.08116	-0.22762	-0.24379	-0.48172	-0.02462	0.20589	-0.13854	-0.16086	-0.19565	0.10559
182	0.19951	0.24534	0.24356	0.46861	0.05298	0.07963	-0.04899	-0.14749	-0.11483	0.32326
183	0.23818	0.12292	0.27318	0.52992	0.05277	-0.31301	0.21222	0.20842	0.28162	-0.02340
184	-0.25449	0.04877	0.33976	-0.08327	0.01857	0.07632	-0.13525	0.07961	-0.07638	0.11422
185	0.01977	0.08879	0.31734	0.33821	-0.04671	-0.14071	0.05229	0.19987	0.14145	0.05565
186	-0.10997	0.20151	0.25807	-0.10627	0.08672	-0.15492	0.06401	0.16518	0.13383	-0.10382
187	-0.02843	0.01920	-0.11341	0.01855	0.22449	-0.07635	0.04681	-0.03967	0.02085	0.07140
188	-0.02509	0.22309	0.35880	-0.04421	0.14735	-0.05415	-0.01135	-0.00326	-0.01124	-0.08663
189	0.08618	0.27926	0.47098	0.07194	0.14667	-0.20889	0.06680	0.18899	0.14889	0.00361
190	0.01391	0.20753	0.43340	-0.11742	0.04105	-0.12970	-0.02819	0.26207	0.10378	-0.04608
191	0.07962	-0.17571	-0.19512	-0.36293	-0.22070	-0.03080	-0.02427	0.21477	0.08384	-0.12868
192	-0.16437	-0.08890	-0.17314	-0.28944	0.00709	-0.09791	0.18823	-0.06243	0.13006	0.00718
193	-0.08371	-0.15706	-0.21285	0.00441	0.05941	-0.03533	-0.00416	0.06990	0.03038	-0.17756
194	-0.08176	0.31720	0.15060	0.34038	0.01584	0.16627	-0.03090	-0.27550	-0.16098	0.17761
195	0.15795	-0.02658	0.18580	0.06691	0.04678	0.01743	-0.18025	0.11992	-0.09477	0.19431
196	-0.04010	0.16127	0.39947	-0.03206	0.12783	-0.07978	0.01098	0.05904	0.03765	0.08019

	51	52	53	54	55	56	57	58	59	60
51	1.00000									

52	-0.44256	1.00000									
53	-0.26083	0.09235	1.00000								
54	-0.05630	0.02374	-0.07590	1.00000							
55	0.14271	0.39150	0.01151	0.24114	1.00000						
56	0.08045	-0.11814	0.03949	-0.13506	-0.49330	1.00000					
57	-0.22455	-0.29140	-0.04695	-0.14080	-0.59882	-0.40027	1.00000				
58	-0.29333	0.51417	0.08287	0.35423	0.22509	-0.18310	-0.07137	1.00000			
59	0.13653	0.11359	0.16098	-0.15161	0.27574	0.13941	-0.41683	-0.15094	1.00000		
60	-0.13316	-0.09580	-0.11491	-0.07585	-0.24951	-0.14831	0.40128	-0.08739	-0.51867	1.00000	
61	0.10232	-0.27990	-0.11563	0.07162	-0.19056	0.06147	0.14153	-0.21707	-0.58774	-0.27059	
62	-0.17913	-0.14916	-0.21548	0.00058	-0.36245	-0.18286	0.55030	-0.02859	-0.87416	0.63483	
63	0.15510	0.07564	0.15456	-0.06174	-0.02930	0.22349	-0.18023	0.09885	0.54728	-0.39250	
64	0.09248	0.22771	0.04637	-0.00628	0.51150	-0.09405	-0.44829	0.05411	0.43570	-0.16184	
65	-0.06453	-0.14027	0.03774	0.08867	-0.02573	0.05507	-0.02099	-0.15117	-0.01161	-0.16684	
66	-0.10129	0.05854	-0.01207	-0.10488	0.20402	0.00735	-0.21673	-0.12628	0.14528	0.45910	
67	-0.14535	0.13711	0.24369	-0.19463	-0.29413	0.10435	0.22007	-0.01402	0.05949	0.26653	
68	-0.11560	0.26027	-0.02659	-0.10533	0.02604	-0.06973	0.03924	0.05475	0.10291	0.03968	
69	0.20979	-0.19854	-0.14450	0.24077	0.00475	-0.05305	0.03318	0.10711	-0.18785	-0.57525	
70	-0.16562	0.02313	-0.09491	0.03025	0.14569	-0.06283	-0.09475	0.10392	0.20111	-0.06719	
71	0.16160	-0.03917	0.15847	-0.02520	-0.04986	-0.09657	0.13704	-0.08479	-0.07255	0.19988	
72	0.01041	-0.09455	-0.09291	0.03624	-0.14782	0.04815	0.11204	-0.06074	-0.25448	0.20373	
73	0.04481	-0.00604	-0.05480	-0.08164	-0.12482	0.06818	0.06848	0.03598	-0.09897	-0.05482	
74	0.05698	0.08123	0.01527	-0.02758	-0.08223	0.22504	-0.11753	-0.02809	-0.08667	-0.30352	
75	-0.03228	0.17075	-0.01046	-0.08120	0.27057	-0.01020	-0.27716	0.05923	0.16464	0.02031	
76	-0.18729	-0.18269	0.21968	0.14947	-0.21899	-0.17918	0.39433	-0.02491	-0.12246	0.06798	
77	-0.25300	-0.08811	-0.03142	-0.04681	-0.11795	-0.12841	0.24112	-0.13621	-0.03525	-0.06027	
78	0.09441	0.08936	0.04852	0.07275	0.33675	0.11430	-0.46204	-0.14822	0.61700	-0.24186	
79	-0.10577	-0.08867	-0.09831	0.08954	-0.11915	-0.02483	0.15120	0.03261	-0.45250	0.21047	
80	-0.11841	0.04223	0.00973	0.00143	-0.25533	0.19988	0.08973	0.18140	-0.55638	0.13019	
81	-0.01331	0.08067	-0.05978	-0.12966	0.02216	-0.44609	0.38845	0.15199	-0.18732	0.28471	
82	0.05970	-0.17537	0.02807	-0.17762	-0.28638	-0.19114	0.47297	-0.01306	-0.05524	-0.02880	
83	-0.23591	-0.23065	-0.09707	0.05570	-0.28901	-0.34002	0.61769	0.03332	-0.21766	0.33442	
84	-0.21659	0.03638	-0.06829	-0.07594	-0.31559	-0.17689	0.49564	0.05059	-0.14089	0.07165	
85	-0.14694	0.03038	0.03288	0.22285	0.13689	0.00504	-0.14546	-0.03003	-0.35323	-0.02836	
86	0.27029	0.13882	0.16768	-0.04594	0.36520	0.12314	-0.49455	-0.06647	0.38529	-0.41819	
87	0.25285	0.08543	-0.01258	-0.13136	0.09585	0.33878	-0.41817	0.00974	0.24946	-0.04264	
88	-0.30627	-0.18160	-0.11611	0.01146	-0.39973	-0.37751	0.76898	0.05231	-0.25478	0.32236	
89	0.10246	0.12710	0.15089	0.12256	0.37492	0.09753	-0.47966	-0.07265	0.04430	-0.33966	
90	0.34289	0.00463	0.09303	-0.19508	0.25425	0.29435	-0.53839	-0.20103	0.31250	-0.19235	
91	-0.19516	-0.01596	-0.08335	-0.08297	0.00536	-0.18612	0.16946	-0.05266	-0.08470	0.14041	
92	0.05274	-0.21422	-0.02761	-0.11960	-0.31975	0.01381	0.32409	-0.14596	0.00938	0.09973	
93	-0.23240	0.24435	-0.12508	0.36592	0.09923	-0.17170	0.04686	0.20368	0.03144	-0.07892	
94	-0.31845	-0.01690	-0.02736	0.13236	-0.12041	0.00081	0.13015	0.14673	-0.30796	0.25354	
95	-0.12967	0.01095	0.01803	0.40580	-0.01741	-0.13416	0.14660	0.14293	-0.25064	-0.01377	
96	-0.23077	0.00200	-0.07299	-0.16439	-0.27827	-0.32802	0.58702	-0.00744	-0.21578	0.19273	
97	-0.14387	0.17575	0.00695	-0.08350	-0.06233	0.10636	-0.03098	0.12955	0.10551	-0.02146	
98	0.08168	-0.10835	-0.02913	-0.14005	-0.20702	-0.21409	0.41209	0.06728	-0.00792	0.00271	
99	0.27863	0.04468	0.04142	-0.13465	0.26151	0.23983	-0.49727	-0.19410	0.34418	-0.13575	
100	0.28165	0.00275	0.05944	-0.16017	0.24110	0.27968	-0.51214	-0.20919	0.32027	-0.23335	
101	-0.19644	0.02184	-0.09864	-0.10710	0.03509	-0.20586	0.15687	-0.02761	-0.00584	0.10385	
102	0.05869	-0.22475	-0.01404	-0.13229	-0.28685	0.02199	0.28220	-0.11909	-0.08976	0.21145	
103	-0.23951	0.18387	-0.01055	0.28660	0.09232	-0.07633	-0.03071	0.20560	-0.01745	-0.03737	
104	-0.29933	0.00789	-0.02847	0.15778	-0.11207	-0.01111	0.13227	0.13678	-0.35635	0.29740	
105	-0.09222	0.03245	0.02266	0.35298	-0.01767	-0.17402	0.18392	0.15276	-0.29265	0.04365	
106	-0.19262	0.01219	-0.06317	-0.15921	-0.23599	-0.35573	0.56835	-0.00058	-0.15605	0.15815	
107	-0.14387	0.17575	0.00695	-0.08350	-0.06233	0.10636	-0.03098	0.12955	0.10551	-0.02146	
108	0.14871	-0.12480	-0.03097	-0.14201	-0.21850	-0.18377	0.39653	0.05104	0.06788	-0.04589	
109	0.19377	0.03265	0.03955	-0.11242	0.24766	0.24053	-0.48356	-0.17761	0.31955	-0.20809	
110	-0.37946	0.01179	-0.03179	0.24405	-0.18568	-0.15572	0.34198	0.18936	-0.40374	0.23146	
111	-0.31970	0.03829	-0.02664	0.22007	-0.15629	-0.16954	0.32391	0.17690	-0.41815	0.27361	

112	0.35275	-0.16666	-0.02235	-0.07278	0.10167	0.37859	-0.45540	-0.26220	0.14220	-0.21375
113	-0.27418	0.09172	-0.05574	0.16743	-0.09604	-0.25232	0.33237	0.17213	-0.39966	0.09863
114	0.29487	-0.09806	0.06421	-0.14869	0.10636	0.29301	-0.38077	-0.20249	0.39096	-0.07935
115	-0.07663	0.00158	-0.01418	-0.03964	-0.08428	-0.08153	0.16473	0.07348	0.08298	-0.13985
116	-0.08109	0.05880	-0.06496	-0.09678	-0.04990	-0.30025	0.32890	0.21455	-0.03474	-0.06444
117	0.17309	0.19659	0.11636	-0.09928	0.32978	0.18738	-0.51721	-0.15241	0.46088	-0.31091
118	-0.20458	-0.18113	-0.11024	0.13747	-0.29338	-0.10879	0.40578	0.10655	-0.49660	0.34691
119	0.17621	-0.20840	0.00729	-0.15432	-0.29665	-0.07466	0.37881	-0.06931	0.04789	-0.01437
120	-0.09918	0.15833	-0.07154	0.01556	0.12814	-0.38485	0.22336	0.39150	0.03942	-0.12618
121	0.18779	0.18142	0.11248	-0.11846	0.31647	0.18829	-0.50284	-0.16854	0.46281	-0.28522
122	-0.14962	-0.16690	-0.03120	0.01248	-0.35572	-0.11316	0.47882	-0.02421	-0.46876	0.28961
123	-0.19807	-0.09101	-0.05026	0.03456	-0.13394	-0.15513	0.27824	0.25454	-0.21934	0.17423
124	-0.06906	-0.12683	-0.10412	0.23752	-0.15515	-0.15869	0.30538	0.21167	-0.27620	0.13175
125	-0.06439	0.02458	-0.04461	-0.06646	-0.08219	-0.22387	0.29214	0.21215	-0.07690	0.16513
126	0.07115	-0.00653	0.01207	-0.24026	-0.37609	-0.01602	0.41058	0.09161	0.01060	0.02413
127	-0.13973	-0.13315	0.03008	-0.27871	-0.37553	0.22535	0.19189	-0.20324	0.15853	-0.12070
128	0.09362	0.12620	-0.03285	0.39679	0.56325	-0.18931	-0.42234	0.12677	-0.14939	0.09049
129	0.36978	0.01265	0.02737	-0.13294	0.20105	0.26168	-0.46061	-0.20926	0.30797	-0.29593
130	-0.33114	-0.04912	0.00897	0.10578	-0.19233	-0.27296	0.45290	0.21560	-0.15145	0.20862
131	-0.17539	0.06170	-0.07336	0.08628	-0.07270	-0.05639	0.12592	0.04916	-0.36905	0.22133
132	0.47194	-0.04756	-0.01559	-0.23715	0.14380	0.16688	-0.30181	-0.20261	0.45476	-0.29184
133	0.28729	0.19283	0.08861	0.05555	0.27698	0.12127	-0.40285	-0.16085	0.03212	-0.24616
134	-0.53625	-0.07320	-0.03832	0.15511	-0.27203	-0.20108	0.46875	0.25151	-0.37642	0.37075
135	0.22292	-0.10715	-0.06160	-0.24393	0.05300	0.17628	-0.21191	-0.27692	0.37515	-0.04746
136	-0.22292	0.10715	0.06160	0.24393	-0.05299	-0.17628	0.21191	0.27692	-0.37515	0.04746
137	-0.13447	-0.03994	-0.01338	0.06328	-0.15342	-0.23574	0.37125	0.25294	-0.31419	0.07817
138	-0.20747	0.02172	0.07625	0.20536	-0.10091	-0.24077	0.32027	0.31386	-0.30501	-0.04245
139	0.18808	-0.07490	-0.01311	-0.15632	0.14831	0.16725	-0.30442	-0.36437	0.13975	0.00823
140	0.14019	0.03925	-0.10654	-0.16823	0.01263	0.21171	-0.20186	-0.13322	0.34061	0.05782
141	0.17894	-0.05019	0.08504	-0.25721	0.08252	0.18579	-0.25070	-0.26645	0.43715	-0.04786
142	-0.06129	-0.03216	-0.09717	0.35920	0.02337	0.04845	-0.07904	0.30774	-0.39880	-0.00650
143	0.12455	-0.07624	-0.02982	-0.13326	-0.12988	-0.12059	0.24696	-0.18143	-0.21482	-0.01330
144	0.02756	-0.12855	-0.12012	-0.17895	-0.10880	-0.16652	0.26929	-0.11378	0.07088	-0.09767
145	-0.01164	-0.02949	-0.09764	-0.08072	-0.11934	0.12954	0.00888	-0.08876	0.12835	0.11115
146	-0.24664	0.33878	0.10953	0.12122	0.10559	-0.02255	-0.08540	0.05459	0.14501	-0.12765
147	-0.19430	0.00795	0.06290	0.35039	0.08615	-0.16255	0.06157	0.10552	-0.02750	0.08220
148	-0.25732	0.31036	-0.04468	0.12169	0.10132	-0.00899	-0.09411	0.07278	0.07659	-0.18290
149	-0.19824	0.01650	-0.03425	-0.16813	-0.21356	-0.16430	0.37625	0.05291	-0.09523	0.13958
150	-0.11363	-0.10482	0.04745	-0.10478	-0.11620	-0.33923	0.43355	0.08139	-0.12510	0.33026
151	-0.12275	0.08267	0.02224	-0.11188	-0.15005	-0.30065	0.43024	0.23778	-0.16799	0.23216
152	-0.04032	-0.01982	-0.10649	0.25756	-0.04664	-0.03620	0.07433	0.18095	-0.42923	-0.04409
153	0.09829	-0.03061	-0.01933	-0.05398	-0.06875	-0.21560	0.26321	0.15430	-0.10306	-0.09473
154	-0.20786	0.14547	0.17243	0.31633	0.25259	-0.14678	-0.13279	0.33099	0.06938	-0.23888
155	-0.22088	-0.00252	-0.12416	-0.12220	-0.06750	-0.20898	0.25858	0.01699	-0.25796	0.20976
156	-0.18283	-0.00511	0.01648	0.06498	-0.09695	0.07338	0.03714	-0.11609	-0.38197	0.24672
157	0.22042	-0.03840	-0.01869	-0.08544	0.02146	0.26003	-0.25522	-0.19229	0.36850	-0.05959
158	-0.02693	0.05072	0.07410	0.12019	0.07502	-0.25525	0.14862	0.30951	-0.04970	-0.20317
159	-0.28359	-0.00588	-0.06191	-0.02178	-0.12040	-0.06716	0.18776	-0.08479	-0.46994	0.32903
160	-0.06087	-0.04703	0.12358	-0.05916	-0.09312	-0.08045	0.16749	-0.19517	0.29760	-0.08114
161	0.10590	0.15056	-0.09543	-0.08401	0.06367	0.11355	-0.16760	0.05537	-0.26333	0.05309
162	-0.02381	-0.09389	-0.09446	0.18407	0.07268	-0.00178	-0.07217	0.23803	-0.15095	0.06592
163	0.00766	-0.06476	0.02522	-0.28914	-0.39530	0.09214	0.33368	-0.13274	0.33325	-0.01534
164	0.04289	0.08813	0.02557	0.21514	0.39925	-0.12680	-0.30281	0.07924	-0.22777	0.03470
165	-0.09233	-0.02956	-0.09625	0.18571	0.06628	0.04453	-0.11681	0.12056	-0.25046	-0.03236
166	0.07362	0.05013	0.09794	-0.30641	-0.43009	0.03610	0.41975	-0.02973	0.08176	0.05190
167	-0.07371	-0.04994	-0.08790	0.30643	0.43027	-0.03596	-0.42006	0.02986	-0.08171	-0.05193
168	0.11756	-0.11114	0.09207	-0.31934	-0.32049	0.19228	0.16466	-0.20745	0.43227	0.01173
169	-0.11760	0.11121	-0.09205	0.31935	0.32057	-0.19221	-0.16481	0.20751	-0.43224	-0.01166
170	0.09154	-0.09301	0.01504	-0.28405	-0.36912	0.06951	0.30872	-0.16277	0.34954	-0.07550
171	-0.04160	0.13917	0.03997	0.21842	0.37700	-0.11464	-0.29081	0.12596	-0.39529	0.10375

172	-0.11044	-0.06511	-0.10388	0.17924	0.06283	0.02719	-0.09731	0.10155	-0.15371	-0.03681
173	0.02588	0.10738	0.08433	-0.31200	-0.39233	0.00313	0.41972	-0.01092	0.11623	0.04821
174	-0.02697	-0.10719	-0.08429	0.31202	0.39251	-0.00299	-0.41103	0.01105	-0.11617	-0.04805
175	0.06848	-0.08673	0.16001	-0.30229	-0.28056	0.18925	0.12580	-0.19164	0.47027	-0.01194
176	-0.06848	0.08673	-0.16001	0.30229	0.28056	-0.18925	-0.12580	0.19164	-0.47027	0.01194
177	0.01723	-0.08800	0.15557	-0.26582	-0.38343	0.19842	0.22426	-0.17299	0.35010	-0.05069
178	-0.13253	0.15048	-0.04689	-0.05413	0.07650	-0.04643	-0.03316	0.07307	-0.39206	0.32755
179	0.13238	-0.05403	-0.16030	0.43113	0.44135	-0.22070	-0.27141	0.15332	-0.02690	-0.31270
180	0.17620	-0.04559	0.14722	-0.31783	-0.34972	0.20897	0.18084	-0.10517	0.36929	-0.08148
181	-0.14657	-0.02139	-0.13705	0.33931	0.36367	-0.23663	-0.17042	0.09733	-0.25140	0.09431
182	-0.10077	-0.22670	0.18081	-0.28124	-0.35232	-0.03366	0.40266	-0.12898	0.10845	0.14031
183	0.18441	-0.12644	0.01170	-0.31884	-0.42803	0.14175	0.32678	-0.17365	0.13202	0.00650
184	0.05465	-0.18928	0.05617	-0.15731	-0.39772	-0.11196	0.52009	-0.10791	-0.13129	0.07163
185	0.13193	-0.16269	0.06795	-0.31957	-0.48225	0.01505	0.49740	-0.19015	-0.03970	0.12908
186	0.00932	0.17446	0.12879	-0.20431	-0.13725	-0.13820	0.27396	0.19675	0.09637	-0.09502
187	0.03474	-0.10801	0.03234	-0.12759	-0.28415	-0.00108	0.29669	-0.15017	-0.24134	0.04782
188	0.21982	-0.14881	0.03025	-0.25167	-0.27631	-0.12384	0.40622	-0.04515	0.05906	0.05413
189	0.11647	-0.13889	0.15623	-0.18685	-0.39296	-0.02821	0.43574	0.02452	0.11523	-0.11194
190	0.04577	0.02965	0.07125	-0.13402	-0.16205	-0.08581	0.24613	0.08824	0.17804	-0.21995
191	-0.19613	0.33949	-0.16930	0.44051	0.29747	0.01607	-0.33484	0.33862	-0.06085	-0.22176
192	-0.13332	0.07592	-0.00605	0.31732	0.23662	0.11103	-0.34504	0.16848	-0.03310	0.21032
193	0.13860	0.08099	-0.11948	-0.06272	0.36016	-0.07015	-0.31579	-0.24544	0.04971	-0.10535
194	0.00191	-0.23573	0.26809	-0.16403	-0.33423	0.08592	0.27840	-0.23958	-0.08677	0.13025
195	-0.08807	-0.05226	0.01127	-0.24062	-0.28896	-0.21907	0.50259	0.08921	-0.04326	0.25741
196	0.14077	-0.24078	0.02965	-0.22689	-0.41954	-0.04894	0.48313	-0.10874	0.07652	-0.09474

	61	62	63	64	65	66	67	68	69	70
61	1.00000									
62	0.42572	1.00000								
63	-0.30790	-0.53514	1.00000							
64	-0.36844	-0.42058	-0.21791	1.00000						
65	0.23103	-0.19344	-0.36223	-0.23036	1.00000					
66	-0.51373	-0.09166	-0.15619	0.37798	-0.38058	1.00000				
67	-0.29747	-0.05754	0.05597	-0.07587	0.08729	-0.17859	1.00000			
68	-0.17612	-0.08752	0.07488	0.00475	0.01633	-0.14332	0.15281	1.00000		
69	0.67369	0.13720	0.08529	-0.28041	0.00476	-0.71642	-0.51467	-0.22094	1.00000	
70	-0.21399	-0.24177	-0.15976	0.18078	0.34565	0.24522	0.07025	-0.01429	-0.25130	1.00000
71	-0.05715	0.16508	0.06528	-0.02645	-0.28418	-0.12995	0.07767	0.02841	0.05208	-0.79124
72	0.13169	0.29992	-0.07869	-0.17290	-0.11534	-0.02975	0.01304	-0.07950	0.03839	-0.33111
73	0.14469	0.17067	0.16741	-0.10669	-0.33840	-0.23863	0.08437	0.03501	0.14542	-0.05579
74	0.38543	-0.02292	0.22967	-0.17231	-0.08627	-0.20773	-0.28439	0.03081	0.35398	-0.49357
75	-0.22966	-0.13986	-0.14325	0.48245	-0.14626	0.16527	0.10941	-0.06310	-0.19703	0.21774
76	0.08817	0.08994	-0.19229	0.02882	0.10243	-0.09851	0.16272	-0.02059	-0.01684	0.13435
77	0.15550	0.13463	-0.05956	-0.01318	-0.09025	-0.00084	-0.03892	-0.05751	0.11715	0.13775
78	-0.40678	-0.57050	0.28577	0.19654	0.18452	0.31517	-0.03552	0.09536	-0.26885	0.50996
79	0.30390	0.42761	-0.54224	0.05996	0.07133	-0.03662	-0.02135	-0.13878	0.07839	-0.15504
80	0.42313	0.39469	-0.22546	-0.15230	-0.07210	-0.21177	0.13930	-0.16916	0.13673	-0.33612
81	-0.11491	0.19774	0.07775	-0.05441	-0.31540	-0.05503	0.17904	0.05526	-0.08255	-0.34571
82	0.09391	0.15966	0.20960	-0.26816	-0.20387	-0.33824	-0.15329	0.13315	0.35473	-0.31456
83	-0.07009	0.33946	-0.05095	-0.43065	0.07532	-0.05421	-0.02525	-0.07648	0.07907	-0.04353
84	0.06997	0.28300	-0.17335	-0.04400	-0.10786	-0.20764	0.15745	0.22828	0.02305	0.19558
85	0.43467	0.24487	-0.40811	0.09856	0.10142	0.08655	-0.38525	-0.07234	0.18623	-0.08280
86	-0.02738	-0.51314	0.42864	0.14067	-0.02442	-0.07009	0.04408	-0.12550	0.06722	-0.15991
87	-0.24562	-0.27987	0.10853	0.27835	-0.06633	0.16035	0.16770	0.09292	-0.26701	0.11654
88	-0.02676	0.42749	-0.12676	-0.39165	0.01322	-0.14624	0.05420	0.04336	0.07890	0.05064
89	0.28627	-0.21801	0.03813	0.17698	0.05310	0.00757	-0.23796	-0.14727	0.18268	-0.13110
90	-0.08519	-0.40534	0.06862	0.38314	0.04273	0.22903	0.12048	-0.06628	-0.25649	0.32485
91	-0.00773	0.16191	-0.06168	-0.14198	0.01719	0.13614	-0.16327	0.04527	-0.02875	0.10580
92	-0.03176	0.05269	0.18393	-0.20400	-0.09386	-0.07805	0.18740	-0.03226	-0.04092	0.09000

93	-0.05915	0.00454	0.06790	0.02643	-0.12436	-0.09974	0.02146	-0.14550	0.10971	0.12281
94	0.05182	0.33664	-0.27003	-0.13213	0.04495	0.00648	-0.01033	0.05063	-0.00759	0.18202
95	0.22679	0.21347	-0.17244	-0.11860	0.06800	-0.15841	-0.22950	0.00325	0.27269	-0.13671
96	0.07197	0.31559	-0.19248	-0.15753	-0.00306	-0.24744	0.14369	0.31916	0.04387	-0.07604
97	-0.15934	-0.09089	0.09792	-0.01899	0.01562	-0.11914	0.12354	0.55212	-0.11522	-0.04079
98	-0.02490	0.08192	0.31466	-0.39600	-0.09790	-0.19364	-0.16777	-0.08134	0.29364	-0.26307
99	-0.12116	-0.41011	0.11836	0.37386	-0.00674	0.23644	0.14255	-0.11962	-0.26339	0.10472
100	-0.05357	-0.38368	0.06457	0.35564	0.04869	0.16327	0.12832	-0.08476	-0.20028	0.08734
101	-0.07464	0.06200	-0.02550	-0.08585	0.04428	0.13337	-0.06779	0.17071	-0.11667	0.16321
102	-0.03269	0.12621	0.15669	-0.31735	-0.03468	-0.15261	0.24966	-0.02513	-0.03292	-0.08352
103	-0.04287	0.00979	0.09149	0.10005	-0.24442	0.09418	-0.10504	-0.09463	0.00891	0.04949
104	0.07143	0.36809	-0.32872	-0.10906	0.05755	0.02433	-0.00115	0.04777	-0.02831	0.17094
105	0.21824	0.27624	-0.24393	-0.12311	0.08179	-0.19259	-0.19919	0.01116	0.27556	-0.15262
106	0.03263	0.25425	-0.14189	-0.14597	0.00068	-0.26437	0.16856	0.37978	0.02796	-0.06160
107	-0.15934	-0.09089	0.09792	-0.01899	0.01562	-0.11914	0.12354	0.55212	-0.11522	-0.04079
108	-0.05867	-0.00532	0.37252	-0.37882	-0.07007	-0.15178	-0.20783	-0.11739	0.29165	-0.28632
109	-0.09029	-0.37380	0.12162	0.34645	-0.03059	0.20519	0.13389	-0.09776	-0.23703	0.12512
110	0.15835	0.43700	-0.33035	-0.20492	0.06767	-0.16255	-0.06855	0.19009	0.13494	0.03447
111	0.14261	0.44505	-0.37358	-0.17308	0.07905	-0.14738	-0.02905	0.18708	0.09850	0.02918
112	0.15289	-0.20831	-0.02058	0.22195	0.06801	0.01162	0.05435	-0.24907	0.01764	0.02367
113	0.27932	0.39918	-0.26335	-0.24295	0.07229	-0.27965	-0.19027	0.29521	0.28312	-0.07398
114	-0.27264	-0.39516	0.22764	0.26208	-0.05127	0.30447	0.17982	-0.28447	-0.30675	0.08945
115	-0.01124	-0.12990	0.21137	-0.06277	-0.03397	-0.26440	0.28428	0.15759	0.00547	0.17403
116	-0.00317	0.09373	0.12330	-0.14732	-0.13027	-0.09351	-0.16649	-0.11890	0.21627	-0.06515
117	-0.16905	-0.50499	0.25941	0.24898	0.08666	0.14468	0.16446	-0.13652	-0.19510	0.00716
118	0.19744	0.52785	-0.38864	-0.12277	-0.06919	-0.06857	-0.13047	0.13532	0.10817	0.05232
119	-0.00886	-0.00655	0.29763	-0.36001	0.00647	-0.16429	-0.13903	-0.03599	0.23775	-0.27468
120	-0.11306	-0.00196	0.32709	-0.27862	-0.12780	-0.24028	-0.03936	0.08576	0.21249	0.03590
121	-0.18575	-0.50532	0.25843	0.25551	0.06658	0.16564	0.18160	-0.11953	-0.22808	0.00584
122	0.27751	0.50173	-0.39308	-0.28065	0.14463	-0.20969	0.04459	0.10905	0.12567	0.03459
123	-0.02890	0.24476	-0.08435	-0.02899	-0.18966	-0.03419	-0.19076	0.17010	0.10705	-0.05871
124	0.09354	0.30999	-0.00775	-0.20486	-0.18886	-0.08121	-0.32914	-0.01222	0.28198	-0.00874
125	-0.16039	0.10726	0.17365	-0.23255	-0.12320	0.03335	0.01615	-0.09165	-0.01845	-0.16998
126	-0.07608	0.10910	0.36470	-0.34910	-0.25392	-0.23058	-0.00536	0.06383	0.18604	-0.32151
127	0.02443	-0.07996	0.10897	-0.20668	0.19111	-0.17485	0.33682	-0.12000	-0.03578	0.10074
128	0.02789	0.00790	-0.31407	0.39916	-0.02944	0.28988	-0.31111	0.08024	-0.06986	0.09469
129	0.00753	-0.40931	0.17998	0.33583	-0.04781	0.19213	0.04818	-0.13338	-0.16378	0.04341
130	-0.11648	0.25695	-0.04793	-0.24538	-0.02200	-0.12347	-0.02033	-0.02848	0.12466	0.03093
131	0.19241	0.38704	-0.28870	-0.25833	0.13908	-0.17810	-0.06318	0.32851	0.11670	-0.09108
132	-0.15411	-0.41381	0.25293	0.38158	-0.19035	0.03776	0.09110	-0.11076	-0.06353	-0.06265
133	0.25809	-0.13623	0.07795	-0.00765	0.08953	-0.11892	0.00362	-0.19039	0.14986	-0.12774
134	-0.02643	0.40389	-0.24400	-0.29596	0.09869	0.03852	-0.07405	0.19637	-0.03582	0.12224
135	-0.25006	-0.36581	0.01099	0.34060	0.11765	0.32173	0.25927	-0.10989	-0.41315	0.20948
136	0.25006	0.36581	-0.01099	-0.34060	-0.11265	-0.32172	-0.25927	0.10989	0.41315	-0.20947
137	0.16523	0.35119	-0.00454	-0.33777	-0.10492	-0.30058	-0.25365	-0.09092	0.44099	-0.17146
138	0.23433	0.31575	0.02964	-0.32493	-0.11573	-0.36187	-0.29479	-0.00576	0.49798	-0.18950
139	0.00618	-0.23717	-0.04678	0.19840	0.16892	0.25314	0.14642	0.06242	-0.32474	0.05403
140	-0.37196	-0.26106	-0.00100	0.31344	0.01601	0.31703	0.31692	-0.05248	-0.45932	0.24362
141	-0.32375	-0.42087	0.10863	0.34061	0.05729	0.36238	0.30234	-0.11925	-0.47359	0.15972
142	0.31043	0.27332	-0.17197	-0.11891	-0.01420	-0.23690	-0.27996	0.06126	0.36465	0.01547
143	0.33618	0.30068	-0.09967	-0.26264	0.00883	-0.30834	-0.17054	-0.02736	0.38123	-0.34583
144	0.06033	0.01554	0.25484	-0.32007	-0.01471	-0.19584	-0.14669	-0.03162	0.27196	-0.22555
145	-0.20231	-0.10542	0.20286	-0.14615	0.03476	0.03437	0.18486	0.16351	-0.18439	0.16774
146	-0.07803	-0.09975	0.13508	0.07236	-0.12272	-0.01881	0.17661	-0.14043	-0.06059	0.06044
147	-0.09060	-0.00406	0.03185	-0.09275	0.06652	0.05629	0.06872	0.09544	-0.11317	0.02320
148	0.04340	-0.08394	-0.17221	0.09789	0.23789	-0.09472	-0.11577	0.34536	0.06652	0.03770
149	-0.04178	0.22644	-0.13778	-0.12139	0.00387	-0.10348	0.05296	0.32231	-0.02077	0.09052
150	-0.19274	0.17163	0.09077	-0.25967	-0.07056	0.11852	0.01460	-0.03352	-0.11410	-0.07985
151	-0.12929	0.22195	0.15441	-0.21763	-0.27642	0.01838	-0.09303	-0.03572	0.05210	-0.22569
152	0.43657	0.38043	-0.13237	-0.28335	-0.03356	-0.40466	-0.31709	0.02045	0.54394	-0.16983

153	0.12884	0.15033	0.18634	-0.23473	-0.19708	-0.23843	-0.36878	-0.15516	0.47807	-0.31317
154	-0.01573	-0.04719	0.09557	0.12743	-0.20145	-0.17588	-0.24808	0.13528	0.26853	-0.12071
155	0.09398	0.34667	-0.15854	-0.04080	-0.21778	-0.00473	-0.06625	0.09148	0.02615	0.13913
156	0.26122	0.28679	-0.24302	-0.22558	0.17728	0.14289	0.01054	-0.12570	-0.09709	-0.08636
157	-0.27066	-0.39375	0.03467	0.25279	0.21620	0.16314	0.38526	0.08112	-0.40427	0.26032
158	0.09806	0.09996	0.20438	-0.12785	-0.26875	-0.28940	-0.43495	-0.05782	0.53621	-0.32257
159	0.27090	0.44495	-0.29501	-0.20914	0.01225	0.11328	-0.03156	-0.04688	-0.06305	0.01337
160	-0.15917	-0.21350	0.25365	-0.22021	0.19433	-0.10492	0.25677	0.03592	-0.08263	0.07102
161	0.22250	0.22081	-0.21728	0.19731	-0.22863	-0.09092	-0.11874	0.03620	0.14655	-0.29898
162	-0.00122	0.08405	-0.14970	0.12027	-0.04581	0.26165	-0.26355	-0.09540	-0.03477	0.21269
163	-0.29855	-0.20551	0.42854	-0.22717	-0.04093	-0.12353	0.48557	-0.08255	-0.18141	-0.01181
164	0.18791	0.13479	-0.43271	0.23791	0.13115	0.04649	-0.29333	0.19659	0.09714	-0.01782
165	0.25367	0.16473	-0.07113	0.02251	-0.15466	0.16101	-0.43554	-0.18879	0.18519	0.05482
166	-0.12419	0.02589	0.41012	-0.31174	-0.24089	-0.23115	0.32282	0.11926	-0.03565	-0.29731
167	0.12393	-0.02603	-0.40994	0.31172	0.24087	0.23133	-0.32277	-0.11919	0.03544	0.29715
168	-0.39842	-0.39130	0.39108	-0.06026	-0.04341	0.03303	0.50996	-0.15495	-0.31354	0.07881
169	0.39829	0.39122	-0.39100	0.06026	0.04341	-0.03294	-0.50993	0.15497	0.31343	-0.07886
170	-0.24920	-0.24553	0.45931	-0.21425	-0.04159	-0.18367	0.50493	-0.09092	-0.14264	-0.02465
171	0.19156	0.20564	-0.47099	0.20531	0.12116	0.10835	-0.33408	0.18932	0.07119	-0.04780
172	0.15792	0.12396	-0.07447	0.06136	-0.13688	0.17626	-0.41933	-0.18155	0.16005	0.13789
173	-0.16806	-0.00059	0.43220	-0.26901	-0.28088	-0.23112	0.37055	0.12313	-0.06683	-0.26289
174	0.16779	0.00045	-0.43202	0.26899	0.28086	0.23131	-0.37049	-0.12307	0.06661	0.26273
175	-0.42706	-0.34730	0.39273	0.02209	-0.07289	0.05649	0.51430	-0.14998	-0.33755	0.08276
176	0.42706	0.34730	-0.39273	-0.02209	0.07289	-0.05649	-0.51430	0.14998	0.33755	-0.08275
177	-0.26685	-0.26163	0.48960	-0.23655	-0.03545	-0.11601	0.55095	-0.12233	-0.21814	0.00059
178	0.11340	0.35131	-0.53481	0.28465	-0.08017	0.20140	-0.10035	0.19037	-0.16014	-0.05393
179	0.23719	-0.04818	-0.05321	-0.00494	0.14285	-0.07486	-0.64572	-0.05312	0.48939	0.06184
180	-0.29208	-0.27053	0.50737	-0.09797	-0.20019	-0.12795	0.44281	-0.03872	-0.16036	-0.16021
181	0.15550	0.20870	-0.47579	0.15959	0.17455	0.11595	-0.41164	0.06040	0.14536	0.20282
182	-0.18627	0.00727	0.22218	-0.21829	-0.06788	0.02449	0.30018	-0.16277	-0.17224	0.14020
183	-0.07353	-0.02473	0.38994	-0.34983	-0.10401	-0.19135	0.27667	-0.00520	-0.00932	-0.16250
184	0.13323	0.17395	0.18655	-0.36443	-0.08758	-0.24284	0.00435	0.10590	0.17719	-0.35291
185	0.01715	0.14368	0.32947	-0.43087	-0.16372	-0.26878	0.29766	0.08410	0.02061	-0.32171
186	-0.28313	-0.07906	0.26733	-0.14650	-0.08726	-0.00169	0.08608	0.28307	-0.12183	-0.23311
187	0.29716	0.29944	-0.09317	-0.03816	-0.24453	-0.22912	0.09746	-0.01204	0.13467	-0.39434
188	-0.09360	0.01477	0.23757	-0.04187	-0.29202	-0.15770	0.12611	0.07932	0.03549	-0.42595
189	-0.04062	-0.10590	0.47596	-0.34874	-0.10755	-0.25266	0.05702	0.05166	0.14613	-0.24467
190	-0.04380	-0.17252	0.43260	-0.17130	-0.15222	-0.21581	-0.17050	0.17229	0.24780	-0.36894
191	0.10895	-0.05755	-0.10770	0.04202	0.17725	-0.16385	-0.29870	0.31981	0.25509	0.09920
192	-0.22854	-0.04906	-0.26754	0.22525	0.17751	0.37608	-0.10254	-0.02944	-0.25032	0.22650
193	0.15261	-0.04872	-0.21112	0.24395	0.08079	0.28323	-0.27518	-0.16711	-0.03035	0.15409
194	0.09198	0.18356	0.04191	-0.14237	-0.15204	-0.09179	0.31290	-0.26971	-0.05423	-0.19971
195	-0.22231	0.13630	0.04835	-0.05515	-0.19033	-0.10323	0.41251	0.31221	-0.25002	-0.01912
196	0.04890	0.01037	0.38674	-0.35489	-0.14127	-0.31780	-0.08210	0.09916	0.30082	-0.40263

	71	72	73	74	75	76	77	78	79	80
71	1.00000									
72	0.01047	1.00000								
73	-0.09126	0.09520	1.00000							
74	0.01193	-0.07044	-0.02548	1.00000						
75	-0.17455	0.11450	0.15870	-0.26724	1.00000					
76	-0.04279	-0.08690	-0.08883	-0.11850	-0.37629	1.00000				
77	-0.10188	-0.05798	-0.03420	-0.06497	-0.14070	0.17210	1.00000			
78	-0.27360	-0.38215	0.01594	-0.31672	0.06061	-0.07772	-0.01600	1.00000		
79	-0.02809	0.51459	-0.20148	0.03852	0.11594	0.04261	-0.02660	-0.64560	1.00000	
80	0.12356	0.18427	0.15369	0.30792	0.18768	-0.07271	-0.07211	-0.61154	0.23238	1.00000
81	0.47449	-0.00209	0.07426	-0.07267	-0.01928	-0.05851	-0.06994	-0.36271	-0.04948	0.05314
82	0.19792	0.02061	-0.02552	0.30027	-0.44529	0.22369	0.17562	-0.47204	0.00712	-0.13958
83	0.10348	0.04149	-0.08506	-0.08523	-0.25786	0.07805	0.23471	-0.25604	0.07957	-0.16053

84	-0.08903	-0.02796	0.10954	-0.22920	-0.00788	0.36823	0.19456	-0.15136	0.02687	0.08337
85	-0.16099	0.15792	-0.11802	0.32692	-0.06752	0.06647	0.11107	-0.24368	0.37240	0.24054
86	0.06624	0.04273	-0.01990	0.18511	0.21048	-0.31644	-0.32219	0.16105	-0.06932	-0.06824
87	0.00519	-0.16664	0.11949	-0.14908	0.14930	-0.09054	-0.17700	0.38494	-0.29460	-0.01519
88	0.04683	0.02327	-0.02083	-0.18287	-0.22554	0.24322	0.29516	-0.29360	0.07924	-0.09946
89	-0.06170	0.14518	-0.09809	0.37123	0.11275	-0.19432	-0.16719	-0.04969	0.21072	0.13296
90	-0.04337	0.01485	0.00896	0.00632	0.29792	-0.16359	-0.32478	0.35305	-0.07859	0.04057
91	0.04927	-0.12033	-0.06154	-0.18807	-0.19839	0.00951	0.49803	-0.01390	-0.13665	-0.06621
92	0.02879	-0.16256	0.15527	-0.14247	-0.23983	0.18224	-0.07128	-0.02007	-0.18392	0.01027
93	-0.15203	0.13279	-0.04166	-0.08645	-0.08774	0.12460	0.22834	0.10654	0.05374	-0.27348
94	-0.18843	-0.02550	0.05421	-0.05830	0.20493	-0.03252	0.05453	-0.19933	0.21750	0.18884
95	0.05763	-0.03963	0.05200	0.19430	-0.16460	0.23660	-0.13316	-0.21404	0.10069	0.12209
96	0.17574	0.13426	-0.19135	-0.17448	-0.15381	0.17001	0.33736	-0.38982	0.19650	-0.06660
97	-0.12669	0.18253	-0.06101	0.16434	0.04039	-0.04888	-0.03498	-0.06335	0.14611	-0.08552
98	0.27853	-0.05426	-0.02804	0.12639	-0.47856	-0.02444	0.28604	-0.20706	-0.21667	-0.17429
99	-0.08461	0.00899	0.01184	-0.08260	0.22443	-0.10832	-0.20365	0.42322	-0.12863	-0.05490
100	-0.11483	0.05499	0.09894	-0.05162	0.27539	-0.09031	-0.28948	0.37022	-0.05071	-0.02653
101	0.01695	-0.16289	-0.07913	-0.21759	-0.13184	-0.02220	0.45892	0.00554	-0.14222	-0.08108
102	0.25741	-0.16305	0.12047	-0.14923	-0.26244	0.05899	-0.07437	-0.09277	-0.12082	0.02514
103	-0.12088	0.12624	-0.09329	0.02344	-0.04415	0.04426	0.15279	0.08706	0.00594	-0.17885
104	-0.17894	0.01343	0.01725	-0.07003	0.21160	-0.00322	0.08292	-0.23946	0.25062	0.21801
105	0.16862	-0.12426	-0.08157	0.17080	-0.18038	0.14982	-0.06183	-0.26570	0.12927	0.15730
106	0.19537	0.02529	-0.17685	-0.16191	-0.14482	0.12785	0.33048	-0.31053	0.07795	-0.06277
107	-0.12669	0.18253	-0.06101	0.16434	0.04039	-0.04988	-0.03498	-0.06335	0.14611	-0.08552
108	0.25118	-0.05472	-0.03158	0.21522	-0.46621	-0.00649	0.17046	-0.17143	-0.25484	-0.18422
109	-0.11905	0.04765	0.08082	-0.11009	0.21238	-0.07541	-0.18827	0.41086	-0.09661	-0.07553
110	-0.06630	0.02034	0.00176	0.02106	0.02158	0.14329	0.06949	-0.37634	0.28201	0.16950
111	-0.01399	-0.02272	-0.07546	-0.00391	0.03830	0.09328	0.11685	-0.37721	0.27080	0.22258
112	-0.06674	0.09899	0.11531	-0.03490	0.25222	-0.03600	-0.17265	0.21948	-0.00370	0.14815
113	0.01422	-0.08802	-0.09004	0.20197	-0.10524	0.17958	0.11015	-0.32464	0.13980	0.12527
114	-0.01254	0.09870	0.05732	-0.19609	0.10871	-0.17362	-0.12876	0.33942	-0.10663	-0.13729
115	-0.11402	-0.07388	0.19704	-0.15507	0.01770	0.16842	0.38446	0.05581	-0.13910	0.07490
116	0.04740	-0.05603	0.13545	0.06368	-0.04949	-0.10530	-0.04054	-0.18680	-0.15931	0.07177
117	-0.03355	-0.02847	0.07314	0.04168	0.17186	-0.23337	-0.17423	0.45560	-0.22525	-0.10878
118	-0.02612	0.05540	-0.09466	-0.07948	-0.00797	0.24173	0.11367	-0.43063	0.32120	0.19047
119	0.26599	-0.07597	-0.11276	0.20113	-0.52000	0.01174	0.24410	-0.15939	-0.22908	-0.19619
120	-0.01772	-0.04282	0.26366	-0.06914	-0.25712	-0.01603	0.05008	-0.01972	-0.18581	-0.17216
121	-0.02331	-0.04061	0.09978	0.03107	0.17778	-0.24352	-0.17996	0.47026	-0.24119	-0.11451
122	-0.02567	0.13413	-0.10285	-0.07851	-0.22029	0.28510	0.16683	-0.48964	0.36707	0.15806
123	-0.06039	0.04215	-0.00636	0.18100	-0.02976	0.23593	-0.03899	-0.31871	0.14624	0.08496
124	0.14476	-0.12462	0.03002	-0.12816	-0.09957	-0.01640	0.23968	-0.17606	-0.05398	0.00222
125	0.19066	-0.08232	-0.04856	0.10372	-0.36399	-0.07231	-0.02744	-0.24998	-0.08063	-0.05824
126	0.37199	-0.09904	-0.01673	0.11741	-0.42114	-0.06400	-0.04712	-0.26962	-0.15945	-0.07279
127	-0.17157	0.19657	0.24051	-0.11629	0.27175	-0.10545	0.06253	0.06628	0.04374	0.03921
128	-0.05791	-0.12912	-0.21187	0.03715	0.00119	0.13786	-0.03033	0.10190	0.05222	0.00720
129	-0.10958	-0.00130	0.07060	0.07052	0.19960	-0.12794	-0.05119	0.29179	-0.10450	0.04552
130	0.08019	-0.06121	-0.03771	-0.07614	-0.05802	0.07564	0.08753	-0.19009	0.03851	-0.11036
131	0.08409	0.11145	-0.07993	-0.01097	-0.31025	0.13022	-0.05024	-0.26620	0.14856	0.10244
132	-0.01200	0.09725	0.13588	0.04587	0.18482	-0.25029	-0.04381	0.08279	-0.08849	-0.08869
133	0.06789	0.02286	-0.02933	0.13539	-0.02007	-0.22923	-0.05666	0.19590	0.05895	-0.08586
134	-0.02930	-0.08942	-0.09008	-0.11358	-0.13428	0.32850	0.06698	-0.17751	0.03017	0.11911
135	-0.02850	-0.17302	0.01187	-0.25022	0.08997	-0.02805	-0.03066	0.44220	-0.19699	-0.10983
136	0.02850	0.17302	-0.01187	0.25022	-0.08997	0.02805	0.03067	-0.44220	0.19700	0.10983
137	0.08536	0.09443	0.00439	0.13835	-0.10393	0.01541	0.08868	-0.41148	0.13601	-0.02680
138	0.02243	0.13519	-0.00412	0.24463	-0.13356	0.09219	0.06544	-0.41699	0.16473	0.03474
139	-0.02187	-0.07894	-0.11148	0.00543	0.05173	-0.08035	-0.06939	0.18275	0.02672	0.04691
140	-0.01400	-0.13370	0.11516	-0.38790	0.15794	-0.06499	-0.03418	0.47235	-0.28334	-0.10821
141	0.00864	-0.12947	0.01757	-0.24133	0.09604	-0.06752	-0.05697	0.45840	-0.19584	-0.15343
142	-0.14459	0.02967	0.11066	0.15011	0.13687	0.07749	-0.10069	-0.24251	0.18796	0.23357
143	0.21656	0.24336	-0.13855	0.20434	-0.12610	-0.03632	0.00117	-0.40761	0.10341	0.18080

144	0.11141	0.14552	-0.03514	0.17602	-0.27266	-0.10933	0.31532	-0.27505	0.09521	-0.22192
145	-0.06594	-0.07395	-0.10629	-0.15311	-0.14630	0.05920	-0.06094	0.20999	-0.14355	-0.09884
146	-0.13848	0.11939	0.06315	0.00153	-0.03057	0.09239	0.17748	0.18979	-0.05259	-0.13548
147	-0.15095	-0.07755	0.04877	-0.16026	0.14925	-0.03906	0.05793	0.08389	0.05299	-0.05734
148	-0.11169	-0.13091	-0.12257	0.27284	-0.13031	0.04745	-0.07027	0.05826	0.04897	-0.07361
149	-0.12780	0.07251	-0.12285	-0.00266	-0.11732	0.06739	0.12831	-0.19317	0.18410	-0.18923
150	0.14442	-0.05436	-0.07655	-0.01410	-0.14804	-0.03554	-0.04389	-0.15480	-0.14743	-0.06187
151	0.30437	-0.04092	-0.06414	0.01184	-0.32630	0.03134	0.21442	-0.30287	-0.11695	-0.03852
152	-0.04045	0.19198	0.03312	0.25700	0.00940	0.05984	-0.01490	-0.41776	0.21987	0.24214
153	0.15000	0.11289	0.07271	0.28803	-0.12710	-0.11804	-0.01045	-0.35798	-0.02601	-0.00939
154	0.08573	0.04695	0.04759	0.06146	0.23285	-0.05142	-0.00077	-0.09143	0.07131	0.05780
155	-0.08830	-0.06980	-0.01769	-0.08402	0.09420	-0.02692	0.52014	-0.27030	0.15489	0.00739
156	0.04089	0.04867	-0.26740	0.12901	-0.17022	-0.00835	-0.05935	-0.12901	0.24522	0.24088
157	-0.12756	-0.09665	0.08838	-0.26465	0.04309	0.12047	-0.17915	0.47222	-0.21964	-0.15936
158	0.16907	0.11800	0.08512	0.27086	0.01631	-0.12462	-0.00905	-0.33915	0.01558	0.02761
159	-0.01963	-0.00276	-0.22992	0.05460	-0.08156	-0.02320	0.26774	-0.27028	0.29464	0.20161
160	-0.00343	-0.01260	0.12098	-0.15058	-0.30654	0.17181	0.07712	0.30393	-0.26828	-0.30053
161	0.22874	-0.06728	-0.10387	0.28285	0.26250	-0.12798	-0.05955	-0.43492	0.23309	0.50086
162	-0.24795	0.09422	-0.07111	-0.08136	0.18088	-0.12250	-0.05271	0.01382	0.15467	0.04639
163	0.08625	-0.04460	0.10242	-0.10162	-0.20959	0.14290	0.17156	0.09864	-0.28396	-0.09792
164	-0.00376	0.09859	-0.07163	-0.01138	0.18525	-0.12397	-0.16279	-0.08516	0.26408	0.03982
165	-0.16360	-0.08808	-0.07414	0.22166	0.08223	-0.06114	-0.04629	-0.04236	0.08768	0.12194
166	0.22667	-0.00077	0.14696	0.20003	-0.38824	0.00683	0.11884	-0.13884	-0.23482	-0.12379
167	-0.22655	0.00082	-0.14691	-0.19995	0.38828	-0.00710	-0.11880	0.13896	0.23465	0.12380
168	0.04261	-0.11422	0.10071	-0.16351	-0.15513	0.08165	0.06822	0.22530	-0.28575	-0.17907
169	-0.04257	0.11424	-0.10069	0.16354	0.15517	-0.08175	-0.06821	-0.22523	0.28567	0.17907
170	0.08749	-0.04391	0.11744	-0.08223	-0.21510	0.13222	0.19383	0.10337	-0.31462	-0.09861
171	0.00045	0.09810	-0.08607	0.04420	0.16701	-0.12757	-0.18821	-0.12348	0.33236	0.08025
172	-0.17921	-0.09104	-0.08199	0.08706	0.13296	-0.03608	-0.05085	0.01593	0.03248	-0.05401
173	0.19819	-0.04092	0.20036	0.19288	-0.32844	0.01138	0.07691	-0.11734	-0.28587	-0.10436
174	-0.19807	0.04097	-0.20031	-0.19280	0.32849	-0.01165	-0.07688	0.11747	0.28569	0.10438
175	0.04584	-0.11977	0.11867	-0.17624	-0.09633	0.06723	0.12091	0.25362	-0.29009	-0.19257
176	-0.04584	0.11977	-0.11867	0.17624	0.09633	-0.06723	-0.12091	-0.25362	0.29009	0.19257
177	0.06201	-0.08924	0.16799	-0.07181	-0.16441	0.05486	0.12348	0.16801	-0.31745	-0.11110
178	-0.01094	0.14059	-0.07199	0.04179	0.17591	0.07882	-0.12283	-0.32094	0.42094	0.22603
179	-0.07271	-0.04082	-0.14874	0.05086	0.02200	-0.16772	-0.02741	0.11445	-0.05218	-0.11008
180	0.19274	-0.07092	0.12573	0.03670	-0.13933	-0.00462	0.02150	0.04937	-0.31870	-0.09750
181	-0.15692	0.09309	-0.11431	-0.19295	0.23563	0.08412	-0.01445	0.00301	0.23676	0.03280
182	-0.06915	0.03397	0.11710	-0.21499	-0.08884	0.20782	0.03837	0.09222	-0.09783	-0.16662
183	0.15887	-0.06490	0.11675	0.09152	-0.29985	-0.04742	-0.14224	-0.01668	-0.20121	-0.04068
184	0.24101	0.23651	0.04979	0.14516	-0.42127	0.23123	0.29358	-0.29780	-0.04879	-0.08944
185	0.29289	0.20007	0.14332	0.00916	-0.43361	0.17556	0.16679	-0.13126	-0.18997	-0.08465
186	0.18192	-0.01519	-0.16713	0.21983	-0.31022	-0.03125	-0.09582	-0.10437	-0.17320	-0.19585
187	0.33398	0.11831	0.13496	0.14519	0.04554	0.03331	-0.07093	-0.40134	0.07677	0.49931
188	0.43307	0.00826	0.01307	0.15429	-0.16625	-0.03114	-0.12227	-0.43206	0.02931	-0.00300
189	0.21316	-0.12405	0.05177	0.22229	-0.35234	0.04350	-0.10895	-0.24651	-0.18791	-0.09586
190	0.18631	-0.11334	0.08462	0.49254	-0.24617	-0.03377	-0.08675	-0.31386	-0.21429	-0.01541
191	-0.15613	-0.06831	-0.10940	0.11732	0.05340	-0.09390	-0.03746	0.04805	0.09199	-0.02176
192	-0.23200	0.00777	-0.25100	-0.03608	0.19740	-0.08661	-0.18060	0.08286	0.06076	0.03762
193	-0.14743	-0.25687	0.13378	0.07372	0.09239	-0.04597	-0.07339	0.28900	-0.07657	-0.07860
194	0.21898	0.31253	-0.01310	-0.15882	-0.01423	0.11893	0.17468	-0.12571	0.14262	0.11803
195	0.16258	0.01102	0.25359	-0.27517	-0.12845	0.17413	0.20289	-0.12531	-0.06383	-0.12557
196	0.29953	0.01607	-0.00991	0.31493	-0.36430	-0.00724	-0.04169	-0.32833	-0.14572	-0.06977

	81	82	83	84	85	86	87	88	89	90
81	1.00000									
82	0.20293	1.00000								
83	0.30276	0.45197	1.00000							
84	0.06190	0.16087	0.03659	1.00000						

85	-0.26549	-0.05065	-0.24516	-0.15177	1.00000					
86	0.00724	-0.18147	-0.29639	-0.46445	-0.07421	1.00000				
87	-0.15791	-0.36664	-0.62228	-0.13807	-0.30216	-0.13976	1.00000			
88	0.29281	0.46667	0.87883	0.50996	-0.28364	-0.47662	-0.60225	1.00000		
89	-0.18160	-0.17427	-0.39947	-0.46162	0.64947	0.71009	-0.31936	-0.56416	1.00000	
90	-0.17169	-0.58778	-0.78237	-0.22217	-0.01721	0.35778	0.44306	-0.78006	0.26081	1.00000
91	0.11239	0.18935	0.26893	-0.02171	0.17033	-0.20535	-0.21988	0.22166	-0.03581	-0.42028
92	0.11614	0.16576	0.11490	0.16170	-0.22701	-0.08234	0.01438	0.17621	-0.22341	-0.08623
93	0.01676	0.01853	0.16347	-0.14226	0.13673	0.06743	-0.22653	0.07313	0.14797	-0.25789
94	-0.21098	0.07383	0.43453	0.11834	-0.01426	-0.21928	-0.32268	0.43028	-0.17777	-0.54263
95	-0.01717	0.25281	0.21753	0.15062	0.30823	-0.23228	-0.33687	0.25929	0.04041	-0.47778
96	0.46259	0.40393	0.38109	0.47477	-0.13222	-0.27430	-0.34494	0.55565	-0.30241	-0.40686
97	-0.08414	0.11092	-0.05570	0.15227	-0.05747	0.00131	0.01006	0.02489	-0.04025	0.01788
98	0.33725	0.66862	0.59092	0.00098	-0.29656	-0.13050	-0.34741	0.50960	-0.24503	-0.58433
99	-0.14492	-0.58533	-0.74932	-0.27069	0.01987	0.36787	0.46423	-0.77460	0.29474	0.93355
100	-0.17176	-0.57903	-0.74488	-0.12767	-0.05351	0.34868	0.58265	-0.70023	0.22838	0.93967
101	0.09801	0.18021	0.27734	-0.02757	0.08925	-0.16358	-0.20045	0.22602	-0.06117	-0.40429
102	0.34651	0.10753	0.15673	-0.04100	-0.22512	-0.06155	0.06717	0.11557	-0.20610	-0.02896
103	-0.00195	-0.00264	-0.03391	-0.24401	0.30333	0.03796	-0.06740	-0.14555	0.24297	-0.09346
104	-0.20887	0.08650	0.41740	0.11759	0.04363	-0.23745	-0.33167	0.41535	-0.15053	-0.55691
105	-0.03464	0.24749	0.28119	0.13787	0.28935	-0.28459	-0.34119	0.30785	-0.01205	-0.55016
106	0.47945	0.36233	0.36074	0.49011	-0.19958	-0.27418	-0.28727	0.54538	-0.35008	-0.37863
107	-0.08414	0.11092	-0.05570	0.15227	-0.05747	0.00131	0.01006	0.02489	-0.04025	0.01788
108	0.28319	0.67703	0.56161	-0.03322	-0.21440	-0.06320	-0.34332	0.46793	-0.19955	-0.50369
109	-0.10875	-0.59102	-0.73324	-0.22755	0.02647	0.34645	0.57569	-0.74014	0.29317	0.89603
110	-0.02998	0.29080	0.53290	0.32028	0.10107	-0.35868	-0.50680	0.61176	-0.20258	-0.75484
111	-0.04643	0.27666	0.51539	0.28808	0.10130	-0.36893	-0.46451	0.58135	-0.21018	-0.74246
112	-0.29328	-0.45302	-0.65482	-0.12663	0.08725	0.23682	0.49219	-0.62447	0.24267	0.78472
113	-0.03447	0.38835	0.21165	0.25506	0.26390	-0.29258	-0.31275	0.30359	-0.03658	-0.47194
114	-0.02551	-0.40926	-0.23937	-0.26811	-0.24138	0.28789	0.33534	-0.33363	0.04887	0.50201
115	0.05567	-0.07705	-0.01191	0.15660	-0.20584	-0.04944	0.10335	0.06408	-0.18314	-0.03636
116	0.41789	0.25250	0.24475	0.05521	-0.02609	0.01773	-0.26731	0.23687	-0.00454	-0.27648
117	-0.05752	-0.53388	-0.48266	-0.30494	-0.14553	0.47759	0.39159	-0.56135	0.26124	0.73250
118	-0.05122	0.34705	0.30348	0.32825	0.23718	-0.47692	-0.29037	0.41807	-0.19605	-0.56554
119	0.16942	0.69807	0.50758	-0.06467	-0.15449	-0.14383	-0.25427	0.40662	-0.21869	-0.48802
120	0.39862	0.21938	0.42606	0.02115	-0.27979	0.09182	-0.30983	0.37708	-0.12736	-0.43747
121	-0.03802	-0.55064	-0.48954	-0.30704	-0.16123	0.46914	0.41660	-0.56830	0.24368	0.74953
122	-0.06686	0.46187	0.28383	0.35090	0.25458	-0.43070	-0.32981	0.41196	-0.14771	-0.50752
123	0.02758	0.40619	0.25217	0.11699	0.17995	-0.31991	-0.20043	0.27327	-0.11760	-0.43450
124	0.15745	0.33025	0.56376	0.15359	-0.12093	-0.25401	-0.37120	0.55892	-0.27923	-0.72173
125	0.52875	0.39283	0.37725	-0.05114	-0.18282	-0.02943	-0.19902	0.30663	-0.15158	-0.28044
126	0.38187	0.59752	0.36931	0.18933	-0.36785	-0.05565	-0.17674	0.40953	-0.30204	-0.42615
127	-0.07751	-0.18439	0.04785	-0.04932	-0.18111	0.00515	0.09988	0.01783	-0.12416	0.11867
128	-0.16829	-0.18244	-0.26988	-0.05700	0.38312	0.02738	0.01607	-0.25985	0.29152	0.14187
129	-0.23177	-0.40958	-0.75303	-0.23377	0.05415	0.25117	0.65030	-0.76023	0.23036	0.74324
130	0.29529	0.31044	0.81161	0.20130	-0.20246	-0.15860	-0.65665	0.79512	-0.26521	-0.64421
131	-0.04651	0.29353	0.11242	0.12564	0.24935	-0.23783	-0.17621	0.15694	-0.00419	-0.35783
132	0.04320	0.00084	-0.41381	-0.17081	-0.19725	0.19965	0.48963	-0.43788	0.01364	0.46594
133	-0.20359	-0.27036	-0.31210	-0.36681	0.08946	0.40123	0.15294	-0.44380	0.36916	0.34060
134	0.08223	0.15443	0.50472	0.34464	0.10417	-0.38683	-0.47314	0.59912	-0.22233	-0.56209
135	-0.11454	-0.50576	-0.42771	-0.09686	-0.20674	0.09867	0.54468	-0.41478	-0.07060	0.71719
136	0.11454	0.50576	0.42771	0.09686	0.20674	-0.09868	-0.54468	0.41478	0.07060	-0.71719
137	0.28574	0.56911	0.69332	0.05781	-0.03239	-0.11629	-0.60640	0.62234	-0.11184	-0.75039
138	0.16437	0.54611	0.54905	0.15050	0.11136	-0.11394	-0.61715	0.54480	-0.00677	-0.70622
139	-0.15041	-0.37271	-0.46602	-0.22664	0.18031	0.30639	0.23594	-0.50933	0.36086	0.56530
140	-0.10965	-0.48801	-0.40144	-0.01281	-0.35040	-0.12262	0.73328	-0.35221	-0.34003	0.54971
141	-0.06348	-0.51842	-0.40573	-0.14179	-0.22730	0.20920	0.48000	-0.41717	-0.00093	0.71918
142	-0.13573	0.10424	-0.00667	0.06369	0.25681	-0.14435	-0.09691	0.02438	0.07091	-0.23706
143	0.10690	0.46165	0.23592	0.18471	0.07547	-0.07124	-0.33495	0.29175	-0.00023	-0.37061
144	0.21471	0.58885	0.38742	-0.11379	-0.03386	-0.01133	-0.28973	0.28012	-0.03201	-0.35476

145	-0.11246	-0.10603	0.06156	-0.05376	-0.27416	0.07898	0.09851	0.02653	-0.13366	0.03389
146	-0.07507	-0.14047	-0.07280	-0.15261	0.22377	0.18512	-0.13353	-0.13540	0.29933	0.00993
147	-0.20660	-0.05420	0.32893	-0.01221	-0.09688	0.02761	-0.27212	0.27707	-0.04764	-0.38270
148	-0.16445	-0.00100	-0.06967	-0.00028	0.44708	-0.07879	-0.17868	-0.05931	0.25496	-0.17899
149	0.15379	0.32183	0.30568	0.37559	-0.11927	-0.26799	-0.22888	0.44289	-0.23874	-0.33492
150	0.44907	0.30570	0.59528	-0.08757	-0.25648	-0.16321	-0.24480	0.47066	-0.30609	-0.34640
151	0.51964	0.50928	0.52133	0.04519	-0.21101	-0.17059	-0.27052	0.47096	-0.27895	-0.58000
152	-0.06298	0.37833	0.15808	0.10223	0.29727	-0.12785	-0.32145	0.18497	0.11259	-0.45372
153	0.25255	0.63332	0.36484	-0.04702	0.07736	0.03858	-0.43606	0.30916	0.08419	-0.50770
154	-0.10398	0.08033	0.11360	-0.02571	0.06767	0.01557	-0.15540	0.08522	0.05864	-0.24011
155	0.20530	0.26492	0.23093	0.21476	0.06800	-0.25090	-0.20789	0.30165	-0.14309	-0.38148
156	-0.08624	-0.22291	-0.02886	-0.05945	0.26709	-0.00193	-0.12009	-0.05361	0.18737	0.04802
157	-0.16810	-0.45965	-0.39791	-0.01344	-0.26383	0.07355	0.52686	-0.34897	-0.13011	0.59115
158	0.15494	0.56680	0.37782	-0.05207	0.09955	0.04026	-0.44247	0.30050	0.10059	-0.54587
159	0.05500	-0.02079	0.11679	0.08198	0.25949	-0.15381	-0.22464	0.13955	0.06628	-0.19252
160	0.13524	0.02941	0.17046	0.17418	-0.34229	0.03106	-0.05305	0.22991	-0.21787	0.05701
161	-0.03547	0.09933	-0.16188	-0.08560	0.21764	0.03366	0.03314	-0.18022	0.17925	-0.05562
162	-0.15874	-0.15512	-0.08292	-0.17314	0.28557	-0.08494	0.04475	-0.15408	0.13676	-0.02620
163	0.11955	0.14963	0.17305	0.10178	-0.48995	0.02956	0.08557	0.19797	-0.32347	-0.00361
164	-0.03289	-0.13777	-0.20394	-0.09352	0.36865	0.01333	-0.00846	-0.22033	0.27089	0.08916
165	-0.17671	-0.04857	0.02394	-0.03433	0.30809	-0.08238	-0.15388	0.00362	0.15407	-0.15316
166	0.33946	0.49275	0.18666	0.06827	-0.32801	-0.01336	0.01168	0.19368	-0.24171	-0.17541
167	-0.33736	-0.49288	-0.18661	-0.06884	0.32806	0.01349	-0.01156	-0.19390	0.24184	0.17539
168	0.05837	0.01605	0.07414	-0.01344	-0.52336	0.05422	0.25136	0.05764	-0.32834	0.16776
169	-0.05534	-0.01613	-0.07412	0.01318	0.52338	-0.05416	-0.25130	-0.05774	0.32840	-0.16776
170	0.14256	0.16162	0.13033	0.09550	-0.48374	0.06876	0.09810	0.15833	-0.28918	0.03670
171	-0.05336	-0.16691	-0.18524	-0.12296	0.43429	0.00122	-0.04682	-0.21839	0.30736	0.05573
172	-0.19314	-0.02442	0.07311	0.03050	0.19172	-0.14282	-0.11414	0.07679	0.02606	-0.17660
173	0.40402	0.44793	0.16514	0.11518	-0.38161	-0.02572	0.05314	0.19748	-0.28914	-0.14620
174	-0.40391	-0.44806	-0.16508	-0.11575	0.38166	0.02585	-0.05301	-0.19771	0.28927	0.14618
175	0.04526	-0.01530	0.07573	-0.05052	-0.53677	0.08623	0.25573	0.04133	-0.31341	0.19497
176	-0.04526	0.01530	-0.07573	0.05052	0.53677	-0.08623	-0.25573	-0.04133	0.31340	-0.19497
177	0.08250	0.03818	0.12600	-0.03957	-0.51269	0.14787	0.13835	0.08989	-0.24950	0.13059
178	0.07350	-0.08841	-0.12100	0.15273	0.37005	-0.18280	-0.08267	-0.03103	0.12202	-0.04641
179	-0.19999	0.05050	-0.03322	-0.12350	0.27742	0.00838	-0.09453	-0.08824	0.20249	-0.12625
180	0.21436	0.23714	-0.04739	-0.04952	-0.42752	0.10813	0.28559	-0.06421	-0.21912	0.13615
181	-0.19058	-0.19752	0.08067	0.09896	0.26729	-0.11438	-0.23211	0.11645	0.10168	-0.16079
182	0.21941	-0.01484	0.20889	0.19110	-0.33661	-0.03423	-0.05512	0.27079	-0.26440	0.10312
183	0.16373	0.20878	0.04544	0.01544	-0.41106	-0.01969	0.24245	0.04634	-0.30523	0.07872
184	0.25428	0.62213	0.40637	0.25130	-0.16228	-0.19629	-0.28374	0.47064	-0.26398	-0.36908
185	0.29690	0.44723	0.22358	0.20819	-0.41723	-0.15717	0.06574	0.29236	-0.41410	-0.11837
186	0.22758	0.40660	0.24457	-0.01178	-0.21206	-0.06479	-0.04247	0.20521	-0.19952	-0.25426
187	0.18820	0.03157	-0.17841	0.27856	0.03318	-0.12031	0.08919	-0.02091	-0.06756	0.18152
188	0.52101	0.57110	0.21583	0.09365	-0.25035	0.10136	-0.16923	0.23129	-0.09918	-0.16009
189	0.30779	0.64672	0.30943	0.03848	-0.38761	0.08052	-0.12120	0.28497	-0.21223	-0.28069
190	0.29607	0.72944	0.29852	-0.00094	-0.16985	0.08434	-0.24106	0.25699	-0.05517	-0.32622
191	-0.15444	-0.03099	-0.04795	-0.11261	0.31301	-0.03220	-0.08048	-0.09512	0.16611	-0.23204
192	-0.20152	-0.16965	-0.03877	-0.33241	0.29300	-0.01013	0.02740	-0.19246	0.19975	-0.09565
193	-0.29351	-0.26209	-0.27814	0.03467	0.14255	0.04135	0.12871	-0.22290	0.13153	0.29992
194	0.16570	-0.11633	0.01555	0.11255	-0.06701	0.01551	-0.04273	0.06717	-0.03513	0.14548
195	0.39203	0.25365	0.30045	0.21896	-0.48398	-0.30456	0.13751	0.36388	-0.57367	-0.18103
196	0.33699	0.72412	0.32903	0.08239	-0.16574	0.02123	-0.27326	0.32315	-0.10071	-0.34287

	91	92	93	94	95	96	97	98	99	100
91	1.00000									
92	0.01165	1.00000								
93	-0.01269	-0.11199	1.00000							
94	-0.00851	-0.07054	-0.06297	1.00000						
95	0.05492	-0.20537	0.02795	0.20850	1.00000					

96	0.22189	0.10161	0.03259	-0.00977	-0.09542	1.00000					
97	-0.11190	-0.12715	-0.06356	-0.00294	-0.08936	0.18255	1.00000				
98	0.41865	0.14465	0.03098	-0.10560	0.05078	0.31685	-0.09509	1.00000			
99	-0.27761	0.04303	0.00730	-0.64128	-0.55013	-0.38347	-0.10476	-0.53716	1.00000		
100	-0.43650	0.01030	-0.19785	-0.52105	-0.45597	-0.37695	0.07402	-0.59278	0.99263	1.00000	
101	0.92864	0.02034	-0.03123	0.09114	0.00794	0.21351	-0.12721	0.34744	-0.27864	-0.44322	
102	0.09213	0.70885	-0.15969	-0.18573	-0.18850	0.11716	-0.11120	0.23348	0.05626	-0.02997	
103	0.06946	-0.18170	0.76857	-0.18763	0.10674	-0.02742	-0.09853	-0.09260	0.13030	-0.17759	
104	0.03583	-0.13879	-0.03289	0.97862	0.21735	0.02340	-0.01609	-0.08897	-0.65032	-0.56094	
105	0.10647	-0.23329	-0.01542	0.32478	0.91474	-0.02354	-0.12032	0.13107	-0.64018	-0.60693	
106	0.23481	0.12072	-0.01706	-0.03140	-0.08585	0.97126	0.14164	0.31494	-0.36263	-0.35972	
107	-0.11190	-0.12715	-0.06356	-0.00294	-0.08936	0.18255	1.00000	-0.09509	-0.04476	0.07402	
108	0.30022	0.16221	0.02222	-0.14884	0.05752	0.22503	-0.10484	0.96109	-0.46984	-0.52838	
109	-0.26390	0.06916	0.02282	-0.63662	-0.48003	-0.35535	0.00429	-0.56621	0.97026	0.92417	
110	0.07731	-0.13767	-0.02775	0.82325	0.62166	0.26388	0.10855	0.03556	-0.86204	-0.71350	
111	0.12515	-0.18188	-0.04047	0.84019	0.62941	0.27876	0.05862	0.07225	-0.85062	-0.76056	
112	-0.27592	-0.16088	-0.21781	-0.40781	-0.21934	-0.44911	-0.17730	-0.50077	0.72546	0.71802	
113	0.08197	-0.07703	0.01387	0.38303	0.30701	0.30704	0.13574	0.12926	-0.51986	-0.52398	
114	-0.11241	0.04427	-0.03706	-0.35506	-0.29005	-0.33664	-0.13717	-0.19086	0.53445	0.54735	
115	0.10644	0.10550	0.03334	-0.07458	-0.02677	0.10439	0.20058	0.00772	0.00897	0.00481	
116	0.18671	0.18502	0.15890	-0.11731	-0.07014	0.21291	-0.07232	0.47815	-0.18983	-0.25363	
117	-0.30085	0.04777	0.04819	-0.51887	-0.44971	-0.40301	0.05163	-0.35012	0.78407	0.81195	
118	0.18436	-0.12665	-0.08691	0.57389	0.43215	0.33052	-0.02595	0.05931	-0.54614	-0.65774	
119	0.30396	0.18795	0.00577	-0.12207	0.06461	0.20957	-0.09205	0.89439	-0.45242	-0.52167	
120	0.31247	0.17605	0.20161	-0.03622	0.10861	0.20947	-0.03001	0.50607	-0.33277	-0.33597	
121	-0.29636	0.07568	0.01920	-0.52755	-0.45157	-0.41070	0.03908	-0.36214	0.79937	0.81648	
122	0.17040	0.01834	-0.09815	0.38963	0.28619	0.44353	0.00856	0.17561	-0.56231	-0.55076	
123	0.09600	-0.14561	-0.02001	0.31711	0.40168	0.14053	0.12820	0.17368	-0.49901	-0.48850	
124	0.39463	-0.07759	0.10544	0.45372	0.33716	0.25484	-0.22097	0.47909	-0.70908	-0.77592	
125	0.20267	0.17339	0.12125	-0.13671	-0.04152	0.27939	-0.04966	0.47192	-0.20468	-0.25692	
126	0.08400	0.28860	-0.06090	-0.03587	0.00021	0.37652	-0.03571	0.70855	-0.43307	-0.45112	
127	-0.08020	0.08389	0.04689	-0.00611	-0.11367	-0.08581	0.00107	-0.14311	0.14676	0.14139	
128	0.01725	-0.24755	-0.01596	0.03277	0.10784	-0.14466	0.02116	-0.28668	0.11406	0.13340	
129	-0.20320	-0.02634	-0.11599	-0.47787	-0.29487	-0.48191	-0.08235	-0.39778	0.74872	0.66585	
130	0.10117	0.03179	0.16839	0.40744	0.25685	0.38877	0.00590	0.36473	-0.64211	-0.57958	
131	0.24096	-0.00215	-0.06118	0.26461	0.15225	0.30615	0.16023	0.17377	-0.40686	-0.33618	
132	-0.24157	0.04434	-0.08852	-0.30366	-0.34187	-0.23606	-0.02523	-0.11709	0.45259	0.46344	
133	-0.24271	-0.11729	0.12512	-0.27683	-0.12905	-0.29053	-0.19363	-0.07935	0.35456	0.28350	
134	0.32938	0.03241	-0.00179	0.39755	0.34333	0.35234	0.13075	0.13761	-0.55948	-0.52741	
135	-0.16393	0.30741	-0.19655	-0.48234	-0.51884	-0.27053	-0.11891	-0.32127	0.75856	0.72258	
136	0.16393	-0.30741	0.19655	0.48234	0.51884	0.27053	0.11890	0.32127	-0.75856	-0.72258	
137	0.18374	-0.14189	0.16428	0.40340	0.33590	0.37994	-0.03257	0.57078	-0.77296	-0.72250	
138	0.08668	-0.22838	0.19460	0.38242	0.48917	0.33997	0.09238	0.41610	-0.74847	-0.67432	
139	-0.02973	0.14567	-0.16076	-0.27046	-0.41276	-0.26801	0.00808	-0.37353	0.59891	0.51280	
140	-0.10671	0.21417	-0.14635	-0.33278	-0.36007	-0.26846	-0.15294	-0.28391	0.58279	0.55140	
141	-0.14795	0.27114	-0.18827	-0.47259	-0.54674	-0.29111	-0.07869	-0.30914	0.76020	0.72631	
142	-0.10627	-0.39594	0.00826	0.36691	0.45112	-0.03116	0.11475	-0.13448	-0.35062	-0.30358	
143	0.15252	-0.04898	-0.10292	0.13357	0.22681	0.32636	-0.15802	0.35171	-0.42707	-0.35360	
144	0.45605	-0.04962	0.02863	-0.11143	-0.03877	0.21797	-0.01865	0.66617	-0.30763	-0.37862	
145	-0.04837	0.56941	-0.05988	0.04929	-0.18960	-0.05930	0.00594	-0.08157	0.10746	0.09770	
146	-0.00122	-0.10079	0.77490	-0.23026	0.02376	-0.20555	-0.08005	-0.11801	0.24809	0.07489	
147	0.03279	0.00511	0.05622	0.68627	0.17834	-0.16374	-0.05465	-0.08530	-0.40287	-0.39133	
148	0.03451	-0.13545	0.11859	-0.00668	0.47218	0.01470	0.29909	-0.11515	-0.16916	-0.11804	
149	-0.06699	0.01960	0.09703	0.19219	-0.08461	0.64565	0.44493	0.13685	-0.35231	-0.28865	
150	0.11952	0.18264	0.09956	0.01777	0.10848	0.14584	0.01319	0.39138	-0.29359	-0.30020	
151	0.35372	0.27087	0.15360	0.03451	-0.05874	0.46247	-0.07476	0.74141	-0.48285	-0.54662	
152	0.04058	-0.38072	0.11290	0.34726	0.51778	0.12294	0.00755	0.11960	-0.52666	-0.49174	
153	0.23424	-0.06769	0.07044	0.04191	0.24999	0.21983	-0.11415	0.65291	-0.51052	-0.56186	
154	-0.09671	-0.18461	0.08526	0.36888	0.39531	-0.13688	0.08975	-0.14790	-0.29232	-0.29779	
155	0.46739	0.03553	0.08581	0.32478	-0.20538	0.42567	0.06855	0.15329	-0.30082	-0.38765	

156	-0.11384	-0.13517	0.04466	0.09524	0.01617	-0.01711	-0.12792	-0.14570	0.02492	-0.03539
157	-0.25333	0.18981	-0.15018	-0.38226	-0.26791	-0.24363	0.08269	-0.36991	0.59486	0.66458
158	0.14358	-0.15242	0.10266	0.22716	0.41353	0.11067	-0.04765	0.46373	-0.57552	-0.57393
159	0.19199	-0.08885	0.09194	0.27510	-0.11198	0.24508	-0.06274	-0.02585	-0.16236	-0.26429
160	-0.17650	0.24468	0.11089	-0.29131	-0.18491	0.18078	0.05305	0.19390	0.19790	0.24465
161	0.06238	-0.18213	-0.24002	0.36294	0.19962	-0.11095	-0.08253	-0.14233	-0.16041	-0.18087
162	0.20192	-0.17475	0.09554	0.04623	0.16311	-0.15498	0.00978	-0.14067	0.01156	-0.17606
163	0.11598	0.45344	0.11252	-0.25571	-0.33332	0.09283	0.04057	0.27545	0.13399	0.07696
164	-0.12992	-0.42020	-0.14787	0.13366	0.29187	0.01285	0.04451	-0.25196	-0.04705	0.03028
165	0.00419	-0.14409	0.04343	0.26545	0.29703	-0.18612	-0.15998	-0.09221	-0.18085	-0.20693
166	0.08905	0.27260	0.10453	-0.20882	-0.21371	0.27628	0.11504	0.46422	-0.09706	-0.16704
167	-0.08896	-0.27282	-0.10440	0.20885	0.21369	-0.27658	-0.11499	-0.46409	0.09705	0.16695
168	-0.03729	0.46931	0.05441	-0.28252	-0.36550	-0.06943	-0.04510	0.13274	0.26279	0.24704
169	0.03733	-0.46940	-0.05435	0.28253	0.36549	0.06928	0.04512	-0.13270	-0.26278	-0.24706
170	0.09804	0.44275	0.11926	-0.31358	-0.33893	0.07945	0.03244	0.26968	0.17602	0.11028
171	-0.11972	-0.43790	-0.13537	0.17288	0.23296	-0.00724	0.05603	-0.24882	-0.08154	-0.00631
172	0.01893	-0.10174	0.00446	0.32286	0.26502	-0.14895	-0.16927	-0.09456	-0.20957	-0.21323
173	0.01978	0.31794	0.12570	-0.22586	-0.17500	0.24762	0.11095	0.39979	-0.06302	-0.11967
174	-0.01969	-0.31816	-0.12557	0.22588	0.17499	-0.24792	-0.11091	-0.39967	0.06302	0.11967
175	-0.05687	0.45382	0.06052	-0.26348	-0.39581	-0.08895	-0.07209	0.10608	0.30507	0.26567
176	0.05687	-0.45382	-0.06052	0.26348	0.39581	0.08895	0.07209	-0.10608	-0.30507	-0.26567
177	-0.02827	0.48822	0.06609	-0.25207	-0.35512	-0.04056	-0.03783	0.14269	0.24669	0.19574
178	-0.06019	-0.42225	-0.09621	0.24478	0.20816	0.11794	0.17469	-0.22628	-0.16798	-0.09513
179	0.10894	-0.13261	0.02278	0.06272	0.24819	-0.08154	-0.15197	0.06694	-0.14506	-0.15970
180	0.00130	0.45447	-0.08143	-0.30114	-0.31040	-0.00539	0.02811	0.21791	0.20459	0.14047
181	0.03108	-0.43257	0.04678	0.35311	0.24221	0.04607	-0.01544	-0.18812	-0.23342	-0.15362
182	-0.17174	0.33308	0.14504	-0.12897	-0.39318	0.14512	-0.11936	0.06894	0.18663	0.19081
183	-0.15044	0.56430	-0.03007	-0.26489	-0.22750	-0.04208	-0.02383	0.24556	0.14711	0.11982
184	0.08592	-0.04916	-0.03965	-0.09399	0.13752	0.44262	0.06183	0.58708	-0.41755	-0.38502
185	-0.03600	0.27907	-0.00549	-0.25465	-0.10204	0.27426	0.01943	0.43412	-0.09285	-0.07809
186	0.01850	0.01904	-0.00804	0.03011	-0.08853	0.21720	0.24987	0.44173	-0.28107	-0.31363
187	-0.20114	0.02572	-0.16639	-0.12911	0.01018	0.18367	-0.05466	-0.16285	0.11458	0.13872
188	-0.08716	0.11142	-0.12461	-0.11659	-0.03050	0.41718	-0.10609	0.40285	-0.21737	-0.21754
189	-0.03165	0.39307	-0.07882	-0.10594	-0.03622	0.26451	-0.04667	0.58014	-0.27772	-0.27820
190	0.07513	0.12730	-0.13118	-0.08891	0.18256	0.17674	0.07390	0.58188	-0.37142	-0.33355
191	0.13239	-0.13797	0.21192	0.20155	0.24526	0.00461	0.10900	-0.09819	-0.18894	-0.13974
192	0.09239	-0.32755	0.02639	0.24292	0.12540	-0.23870	0.02974	-0.21230	-0.03569	-0.13236
193	-0.11534	-0.04511	-0.15736	-0.10476	0.08102	-0.37516	-0.23259	-0.21508	0.25346	0.33119
194	-0.09727	0.11096	0.07361	-0.10895	-0.19976	0.10731	-0.07119	-0.10767	0.18637	0.13149
195	0.02683	0.18363	0.04007	0.01166	-0.24800	0.51729	0.04844	0.22904	-0.15261	-0.20034
196	0.12407	0.32367	-0.10094	-0.14796	0.02088	0.34380	0.02643	0.64542	-0.33636	-0.32892

	101	102	103	104	105	106	107	108	109	110
101	1.00000									
102	0.03219	1.00000								
103	0.04605	-0.16988	1.00000							
104	0.12294	-0.23691	-0.14891	1.00000						
105	0.07064	-0.12433	0.07122	0.34675	1.00000					
106	0.25486	0.10796	-0.06348	-0.01053	-0.01224	1.00000				
107	-0.12721	-0.11120	-0.09853	-0.01609	-0.12332	0.14164	1.00000			
108	0.24100	0.18137	-0.09630	-0.13557	0.10788	0.22800	-0.10484	1.00000		
109	-0.27539	0.08093	0.13688	-0.66855	-0.63195	-0.34373	0.00429	-0.52612	1.00000	
110	0.12109	-0.20576	-0.09902	0.82102	0.68053	0.24038	0.10855	-0.02079	-0.80956	1.00000
111	0.17618	-0.20662	-0.10122	0.86967	0.67707	0.26336	0.05862	0.00102	-0.85094	0.96465
112	-0.30025	-0.00433	-0.05732	-0.39188	-0.28827	-0.44647	-0.17730	-0.44320	0.60488	-0.55859
113	0.11787	-0.14541	0.06951	0.42784	0.38487	0.28119	0.13574	0.11232	-0.53897	0.53841
114	-0.14598	0.12345	-0.07643	-0.39770	-0.36345	-0.31624	-0.13717	-0.17429	0.55295	-0.51868
115	0.15063	0.00698	-0.00101	-0.07316	-0.06589	0.17317	0.20058	-0.03080	0.03222	-0.01563
116	0.15169	0.14367	0.06189	-0.12785	-0.07255	0.21516	-0.07232	0.49810	-0.19961	-0.06344

117	-0.31136	0.00208	-0.09137	-0.56367	-0.58186	-0.35254	0.05163	-0.26989	0.79096	-0.71885
118	0.21119	-0.07662	0.10775	0.62253	0.56132	0.27103	-0.02595	-0.03306	-0.64047	0.73032
119	0.24777	0.18283	-0.08681	-0.09950	0.14353	0.21757	-0.09205	0.91254	-0.51404	-0.03126
120	0.29868	0.18213	0.04441	-0.07941	0.04544	0.23945	-0.03001	0.45897	-0.26152	0.08924
121	-0.29812	0.03652	-0.08819	-0.57601	-0.58332	-0.35281	0.03908	-0.27968	0.79518	-0.72964
122	0.17585	0.03509	-0.05384	0.44394	0.43367	0.36194	0.00856	0.09298	-0.56946	0.56678
123	0.11075	-0.12192	0.17370	0.30703	0.41517	0.12359	0.12820	0.15501	-0.46270	0.48826
124	0.37866	-0.02777	0.13094	0.49700	0.44056	0.24274	-0.22097	0.40806	-0.72209	0.55287
125	0.17455	0.21993	0.05234	-0.13911	-0.06676	0.27641	-0.04966	0.45913	-0.18968	-0.04054
126	0.04977	0.34314	-0.12347	-0.04049	0.12609	0.36995	-0.03571	0.67862	-0.45964	0.08400
127	-0.03514	0.15934	0.01627	-0.08133	-0.15916	-0.06673	0.00107	-0.10011	0.17725	-0.08801
128	-0.00404	-0.35566	0.05100	0.10539	0.08124	-0.15956	0.02116	-0.30922	0.10137	0.03711
129	-0.16601	-0.05668	0.08979	-0.47130	-0.34976	-0.45541	-0.08235	-0.32400	0.69891	-0.64778
130	0.09462	0.06723	-0.03324	0.37283	0.28180	0.39120	0.00590	0.24513	-0.60359	0.54191
131	0.17577	-0.00183	-0.12791	0.31288	0.22218	0.24672	0.16023	0.05542	-0.37245	0.37651
132	-0.17789	-0.02108	-0.13111	-0.32159	-0.35817	-0.21985	-0.02523	-0.06248	0.41522	-0.46644
133	-0.25362	-0.01646	0.10324	-0.22515	-0.05825	-0.29810	-0.19353	-0.09515	0.29150	-0.37217
134	0.28552	0.02585	0.04429	0.38203	0.31555	0.34397	0.13075	0.10381	-0.49397	0.58050
135	-0.14387	0.23968	-0.14370	-0.52644	-0.57452	-0.22221	-0.11891	-0.26600	0.73654	-0.70512
136	0.14387	-0.23968	0.14370	0.52644	0.57452	0.22221	0.11890	0.26599	-0.73654	0.70512
137	0.14841	-0.10291	0.01122	0.42090	0.39813	0.33463	-0.03257	0.53135	-0.75919	0.57271
138	0.05579	-0.26011	0.08956	0.39507	0.52018	0.30161	0.09238	0.40210	-0.72306	0.63626
139	-0.02153	0.29665	-0.06486	-0.26141	-0.41299	-0.26716	0.00808	-0.37410	0.57107	-0.48487
140	-0.06636	0.11576	-0.07669	-0.36146	-0.40819	-0.20932	-0.15294	-0.26151	0.57033	-0.51936
141	-0.14228	0.23228	-0.15389	-0.51534	-0.60077	-0.24367	-0.07869	-0.25530	0.73585	-0.71444
142	-0.10400	-0.20782	0.12901	0.41182	0.46388	-0.06748	0.11475	-0.16737	-0.33139	0.49625
143	0.12612	-0.19406	-0.17642	0.16158	0.29896	0.30727	-0.15802	0.34255	-0.44897	0.29396
144	0.42220	0.17490	-0.06466	-0.09175	-0.00054	0.18961	-0.01865	0.64572	-0.32363	-0.03628
145	0.01951	0.36858	-0.09723	-0.03648	-0.22256	-0.01507	0.00594	-0.05131	0.13523	-0.07330
146	-0.03135	-0.11373	0.05935	-0.21644	-0.08562	-0.24523	-0.08005	-0.11048	0.28393	-0.22374
147	0.18130	-0.12247	-0.02970	0.65857	0.25494	-0.16035	-0.05465	-0.10001	-0.40685	0.52582
148	0.02931	-0.12841	0.10553	-0.04252	0.44144	0.02201	0.28909	-0.11365	-0.10639	0.26933
149	-0.07971	-0.11657	0.00616	0.20502	-0.04177	0.60589	0.44493	0.11473	-0.33950	0.33475
150	0.13471	0.16106	0.05508	-0.02174	0.06518	0.15115	0.01319	0.39245	-0.25214	0.11328
151	0.31859	0.18932	0.03177	0.05464	-0.00069	0.46571	-0.07476	0.67341	-0.48621	0.12660
152	0.02298	-0.26480	0.14777	0.40295	0.54722	0.07048	0.00755	0.08514	-0.51317	0.55158
153	0.18474	-0.07891	0.06462	0.07250	0.29301	0.20845	-0.11415	0.69270	-0.55861	0.21211
154	0.01513	-0.27597	0.09037	0.30498	0.38920	-0.11920	0.08975	-0.14815	-0.23470	0.43490
155	0.51776	0.02800	0.04501	0.36064	-0.11724	0.41241	0.06855	0.05304	-0.30245	0.26444
156	-0.16478	0.03710	0.16938	0.15609	0.09999	-0.04326	-0.12792	-0.21437	-0.00135	0.05874
157	-0.26035	0.14219	-0.19950	-0.42551	-0.38362	-0.24294	0.08359	-0.31545	0.61877	-0.49267
158	0.16101	-0.20944	0.10057	0.21921	0.45019	0.11047	-0.04765	0.49654	-0.58532	0.40270
159	0.17998	0.04775	0.16535	0.34657	0.01006	0.21567	-0.06274	-0.14292	-0.18476	0.20856
160	-0.22695	0.21803	-0.26279	-0.34068	-0.29729	0.20988	0.05305	0.10634	0.16619	-0.24421
161	0.14605	-0.13344	-0.12579	0.41027	0.25771	-0.12658	-0.08253	-0.15310	-0.23318	0.27550
162	0.18672	-0.18765	0.54356	0.06989	0.17199	-0.18257	0.00978	-0.13252	0.00244	0.07070
163	0.09642	0.35739	-0.08669	-0.29708	-0.36253	0.11287	0.04057	0.30744	0.12803	-0.32489
164	-0.12897	-0.22516	-0.08029	0.18099	0.23706	-0.00904	0.04451	-0.27777	-0.05497	0.20745
165	0.04115	-0.30327	0.31641	0.26244	0.29168	-0.25633	-0.15998	-0.10898	-0.15436	0.27024
166	0.07867	0.23471	-0.00295	-0.23168	-0.15964	0.30626	0.11504	0.47845	-0.12686	-0.16443
167	-0.07857	-0.23462	0.00308	0.23171	0.15965	-0.30655	-0.11499	-0.47833	0.12683	0.16436
168	-0.03721	0.39447	-0.12941	-0.34410	-0.40368	-0.02609	-0.04510	0.17831	0.27780	-0.41510
169	0.03725	-0.39442	0.12946	0.34411	0.40368	0.02594	0.04512	-0.17827	-0.27779	0.41505
170	0.07729	0.34940	-0.07640	-0.35222	-0.36677	0.11291	0.03244	0.31039	0.16267	-0.37128
171	-0.12650	-0.22435	-0.05492	0.22291	0.26613	-0.03120	0.05603	-0.28273	-0.08478	0.24665
172	0.07377	-0.30242	0.25666	0.30990	0.26105	-0.17323	-0.16927	-0.11471	-0.17645	0.30554
173	0.00690	0.27227	0.02029	-0.26357	-0.16028	0.29209	0.11095	0.42344	-0.07461	-0.16603
174	-0.00680	-0.27218	-0.02016	0.26360	0.16029	-0.29238	-0.11091	-0.42333	0.07459	0.16596
175	-0.03789	0.35739	-0.11248	-0.32884	-0.43174	-0.04011	-0.07209	0.15379	0.29714	-0.42543
176	0.03789	-0.35739	0.11248	0.32884	0.43174	0.04011	0.07209	-0.15379	-0.29714	0.42543

177	-0.00649	0.39593	-0.07640	-0.32025	-0.40771	-0.00075	-0.03783	0.29021	0.24694	-0.37845
178	-0.08252	-0.25555	-0.04520	0.32249	0.26612	0.07739	0.17469	-0.29236	-0.17373	0.33551
179	0.10548	-0.24928	0.15907	0.06628	0.25344	-0.08929	-0.15197	0.06459	-0.13878	0.13164
180	0.02780	0.39595	-0.11399	-0.35546	-0.29704	0.04035	0.02811	0.26070	0.18111	-0.37376
181	0.00699	-0.37233	0.03449	0.40476	0.23696	-0.00321	-0.01544	-0.23515	-0.21265	0.39000
182	-0.16900	0.32349	-0.07194	-0.18797	-0.45583	0.15871	-0.11936	0.10904	0.20229	-0.26152
183	-0.18156	0.46322	-0.12195	-0.32706	-0.23733	0.00454	-0.02383	0.30377	0.13058	-0.32174
184	0.02705	0.00467	-0.10302	-0.05979	0.16168	0.40853	0.06183	0.61285	-0.44168	0.14183
185	-0.09963	0.25895	-0.12199	-0.26834	-0.11006	0.28599	0.01943	0.45852	-0.10025	-0.15087
186	0.04931	-0.02343	-0.08475	0.02029	0.04426	0.23295	0.24987	0.49551	-0.36043	0.06729
187	-0.18385	0.04934	-0.01727	-0.12453	0.03710	0.18681	-0.05466	-0.17990	0.11855	-0.03906
188	-0.06214	0.13119	-0.11818	-0.10303	0.03788	0.41566	-0.10609	0.43045	-0.26290	0.01534
189	0.01006	0.23764	-0.12466	-0.13341	-0.03820	0.28541	-0.04667	0.63989	-0.30048	-0.01985
190	0.11527	0.01429	-0.14574	-0.10561	0.11264	0.20510	0.07390	0.67672	-0.38471	0.08961
191	0.15362	-0.22257	0.10075	0.20319	0.17433	0.01238	0.10900	-0.14542	-0.12486	0.28250
192	0.11005	-0.15555	0.24237	0.31043	0.15103	-0.28782	0.02974	-0.23201	-0.06290	0.16999
193	-0.10559	-0.16415	-0.20008	-0.11778	0.03657	-0.34481	-0.23259	-0.16228	0.23867	-0.17068
194	-0.18395	0.21459	0.08746	-0.12402	-0.15181	0.06211	-0.07119	-0.09352	0.17410	-0.15511
195	0.13881	0.18590	0.03121	0.01051	-0.18085	0.55318	0.04844	0.15538	-0.14793	0.04273
196	0.08772	0.27151	-0.15170	-0.17320	0.02612	0.36310	0.02643	0.67870	-0.34401	0.01022

	111	112	113	114	115	116	117	118	119	120
111	1.00000									
112	-0.54275	1.00000								
113	0.56401	-0.30829	1.00000							
114	-0.54222	0.36217	-0.98975	1.00000						
115	-0.01882	-0.01497	0.03130	-0.08550	1.00000					
116	-0.07352	-0.44180	0.05102	-0.17629	-0.09676	1.00000				
117	-0.75151	0.43981	-0.64186	0.63231	0.04934	-0.04536	1.00000			
118	0.76557	-0.27761	0.63334	-0.60176	-0.08627	-0.10286	-0.94855	1.00000		
119	0.04108	-0.38102	0.15134	-0.18132	-0.00124	0.24854	-0.31243	0.04294	1.00000	
120	0.02345	-0.49334	-0.02292	-0.05975	0.20554	0.51338	-0.07732	-0.15062	0.23066	1.00000
121	-0.76220	0.45026	-0.64702	0.63815	0.07293	-0.06318	0.99410	-0.94024	-0.31829	-0.08170
122	0.61186	-0.20657	0.61121	-0.58837	-0.06041	-0.05333	-0.79397	0.79848	0.21184	-0.14904
123	0.44796	-0.32269	0.43666	-0.42480	-0.04637	-0.00337	-0.69162	0.67026	0.13253	0.08768
124	0.59764	-0.51289	0.33122	-0.35172	-0.05029	0.22760	-0.68889	0.57196	0.35875	0.32219
125	-0.06096	-0.47489	-0.03814	-0.02336	-0.06644	0.49076	-0.02048	-0.14126	0.29658	0.51806
126	0.12103	-0.47819	0.17361	-0.22103	-0.05550	0.41027	-0.33966	0.13428	0.62299	0.38722
127	-0.14630	0.19458	-0.26340	0.24143	0.21326	0.01985	0.19489	-0.16466	-0.07591	-0.10868
128	0.07171	0.11034	0.15002	-0.09993	-0.16409	-0.27280	0.00927	0.08559	-0.29227	-0.14196
129	-0.62132	0.59220	-0.41137	0.41810	0.13801	-0.17971	0.54708	-0.43544	-0.29416	-0.34709
130	0.49685	-0.51529	0.20736	-0.22459	-0.08168	0.20036	-0.37218	0.26002	0.25806	0.36278
131	0.40243	-0.30869	0.48420	-0.46723	-0.14096	0.01424	-0.47136	0.44022	0.14934	0.07157
132	-0.44994	0.32742	-0.43835	0.42320	0.05689	0.02154	0.44371	-0.42252	-0.04666	-0.15835
133	-0.28337	0.33128	-0.10512	0.13641	0.00427	-0.25237	0.37912	-0.35257	-0.09482	-0.16969
134	0.51659	-0.44786	0.40516	-0.41121	-0.04744	0.12800	-0.56643	0.53451	0.06782	0.22234
135	-0.70164	0.50022	-0.55804	0.56668	0.10151	-0.19611	0.65964	-0.59014	-0.19571	-0.26263
136	0.70164	-0.50022	0.55804	-0.56668	-0.10151	0.19611	-0.65964	0.59014	0.19970	0.26262
137	0.56452	-0.55569	0.39641	-0.42870	-0.12941	0.36498	-0.58948	0.43492	0.41298	0.43992
138	0.60167	-0.52601	0.47601	-0.50568	-0.05150	0.31698	-0.57099	0.45627	0.29841	0.36619
139	-0.44034	0.45702	-0.33123	0.37512	-0.03974	-0.35666	0.41547	-0.29872	-0.26971	-0.36574
140	-0.50891	0.37431	-0.41947	0.42275	0.11925	-0.14525	0.48504	-0.42026	-0.20176	-0.19411
141	-0.70742	0.47243	-0.66606	0.67440	0.11382	-0.21576	0.72635	-0.66627	-0.20185	-0.22926
142	0.49335	0.06533	0.55567	-0.53002	-0.03472	-0.09571	-0.52698	0.61507	-0.19848	-0.11593
143	0.31585	-0.24060	0.24876	-0.25887	-0.23168	0.22924	-0.33170	0.24298	0.31956	0.13683
144	-0.01790	-0.14656	0.08665	-0.11030	-0.01384	0.19786	-0.22940	0.03764	0.65496	0.24478
145	-0.12784	-0.02205	-0.03403	0.03248	0.25853	-0.12599	0.12091	-0.14561	-0.01592	0.13587
146	-0.26544	0.06641	-0.18168	0.18347	-0.00913	-0.03557	0.29364	-0.29804	-0.08493	0.07844
147	0.54013	-0.38176	0.13546	-0.13064	0.06255	-0.04854	-0.25378	0.27781	-0.12505	0.09215

148	0.19446	-0.27201	0.13655	-0.12678	-0.05751	-0.02498	-0.05668	0.06845	-0.06846	0.03986
149	0.32768	-0.50580	0.33611	-0.35929	0.00002	0.22252	-0.27873	0.23234	0.09684	0.18772
150	0.05411	-0.50880	-0.04918	0.00218	-0.01644	0.35438	-0.08047	-0.05619	0.30230	0.37995
151	0.15571	-0.73597	0.14541	-0.21577	0.01696	0.54168	-0.30447	0.08514	0.59508	0.49645
152	0.55092	-0.07489	0.61199	-0.59656	-0.13566	0.04105	-0.61965	0.62623	0.05324	0.02246
153	0.22986	-0.35789	0.30788	-0.36864	-0.13216	0.56824	-0.43301	0.25465	0.53533	0.37438
154	0.36760	-0.23669	0.19659	-0.19027	0.06631	-0.05359	-0.12799	0.16001	-0.19357	0.11234
155	0.32322	-0.28166	0.35941	-0.38031	0.09948	0.15835	-0.38885	0.38024	0.03898	0.07773
156	0.13420	0.12927	0.17754	-0.13570	-0.06376	-0.25689	-0.13254	0.21702	-0.12190	-0.28835
157	-0.53284	0.39694	-0.55289	0.57726	0.05476	-0.29112	0.59640	-0.53126	-0.23338	-0.17774
158	0.39151	-0.41982	0.35797	-0.40600	-0.07481	0.44278	-0.42566	0.29463	0.34239	0.36923
159	0.36592	-0.06533	0.36368	-0.34225	0.00843	-0.11331	-0.34442	0.40820	-0.07598	-0.18926
160	-0.31663	-0.03226	-0.29746	0.27635	0.16856	0.03021	0.40698	-0.50909	0.20029	0.21877
161	0.36885	0.12410	0.29469	-0.26587	-0.14214	-0.10190	-0.27714	0.36758	-0.13891	-0.26406
162	0.07878	0.02302	0.13133	-0.13076	-0.10193	0.06636	-0.31900	0.37594	-0.15431	-0.04418
163	-0.34064	-0.11269	-0.36786	0.32354	0.31255	0.12212	0.29980	-0.42431	0.27891	0.26155
164	0.23638	0.17974	0.29588	-0.25762	-0.22627	-0.13072	-0.15690	0.25562	-0.20961	-0.23948
165	0.24952	-0.10029	0.19690	-0.17807	-0.21205	-0.00565	-0.31148	0.38038	-0.17512	-0.08690
166	-0.14661	-0.30958	-0.03941	-0.00325	0.15567	0.23587	0.00396	-0.16165	0.50001	0.21122
167	0.14656	0.30051	0.03928	0.00337	-0.15561	-0.23580	-0.00391	0.16146	-0.49990	-0.21111
168	-0.43674	0.01079	-0.58782	0.55910	0.22753	0.01627	0.44720	-0.53397	0.19580	0.12566
169	0.43671	-0.31081	0.58774	-0.55903	-0.22751	-0.01625	-0.44712	0.53387	-0.19577	-0.12862
170	-0.38295	-0.04357	-0.39662	0.35392	0.32894	0.09760	0.33244	-0.46071	0.30751	0.23703
171	0.27455	0.10746	0.33971	-0.29378	-0.24400	-0.10682	-0.18271	0.28672	-0.24285	-0.21859
172	0.27819	-0.10796	0.20353	-0.18413	-0.22444	-0.00273	-0.34350	0.41472	-0.18275	-0.08313
173	-0.17398	-0.27400	-0.07832	0.03248	0.19685	0.23323	0.06391	-0.21113	0.43365	0.22976
174	0.17394	0.27393	0.07818	-0.03236	-0.19679	-0.23316	-0.06376	0.21093	-0.43355	-0.22965
175	-0.44412	0.04272	-0.61591	0.59186	0.23948	-0.02899	0.47935	-0.56081	0.19329	0.09545
176	0.44413	-0.04272	0.61591	-0.59186	-0.23948	0.02899	-0.47935	0.56091	-0.19329	-0.09545
177	-0.41400	0.02419	-0.44418	0.41738	0.28211	-0.00477	0.42734	-0.52457	0.21925	0.16106
178	0.38522	-0.01156	0.20073	-0.18008	-0.16722	-0.04257	-0.31243	0.43530	-0.27638	-0.25324
179	0.12283	-0.01988	0.38045	-0.36746	-0.19559	0.05649	-0.22662	0.21769	0.01950	0.07262
180	-0.37426	0.00106	-0.29454	0.26271	0.19912	0.09676	0.26060	-0.35485	0.31886	0.04307
181	0.39553	-0.00394	0.30642	-0.27725	-0.18376	-0.09270	-0.30004	0.38484	-0.29807	-0.00931
182	-0.39469	0.01762	-0.30674	0.26727	0.21750	0.14213	0.25300	-0.30294	0.05627	0.15144
183	-0.34124	-0.05037	-0.19059	0.15004	0.18432	0.18516	0.23294	-0.35116	0.37889	0.10279
184	0.14136	-0.20502	0.20014	-0.21023	0.09533	0.05577	-0.34577	0.17388	0.68270	0.11774
185	-0.16476	-0.08846	-0.06838	0.04327	0.25549	0.04904	0.00586	-0.16636	0.56386	0.14049
186	0.11712	-0.30678	0.12688	-0.15457	-0.09956	0.27662	-0.16633	0.01922	0.53025	0.14574
187	-0.02879	0.20837	0.02061	-0.02496	0.00346	0.03456	-0.05752	0.14898	-0.14804	-0.30555
188	0.04311	-0.24031	0.08933	-0.11797	-0.01058	0.24125	-0.23182	0.11296	0.44055	0.12051
189	-0.04163	-0.17072	0.16054	-0.21002	0.11220	0.33879	-0.18525	-0.00889	0.64464	0.26016
190	0.03401	-0.36118	0.21534	-0.25731	-0.05592	0.37525	-0.17116	-0.02023	0.60267	0.30050
191	0.23595	-0.24565	0.25779	-0.23887	-0.09720	-0.06101	-0.07935	0.08420	-0.13578	0.17597
192	0.21689	0.09525	0.25571	-0.21136	-0.33434	-0.12750	-0.23086	0.33304	-0.21634	-0.23716
193	-0.17986	0.29441	-0.15882	0.19288	-0.26217	-0.15882	0.31267	-0.24510	-0.17593	-0.20914
194	-0.14602	0.18549	-0.30555	0.29148	0.09800	0.01167	0.15240	-0.11709	-0.09729	-0.11412
195	0.07819	-0.29090	0.03230	-0.05961	0.32414	0.04534	-0.22178	0.14165	0.18200	0.25249
196	-0.01519	-0.38283	0.14369	-0.19534	-0.05286	0.43677	-0.24882	0.05434	0.67172	0.23746

	121	122	123	124	125	126	127	128	129	130
121	1.00000									
122	-0.80860	1.00000								
123	-0.68476	0.32870	1.00000							
124	-0.68893	0.28289	0.30559	1.00000						
125	-0.02553	-0.12191	0.03330	0.19803	1.00000					
126	-0.34272	0.18004	0.17780	0.41990	0.51975	1.00000				
127	0.22001	-0.13606	-0.08029	-0.27189	-0.30050	-0.17314	1.00000			
128	-0.01209	0.03238	-0.02620	0.00837	-0.06277	-0.42409	-0.81750	1.00000		

129	0.57529	-0.42267	-0.35527	-0.48873	-0.25194	-0.34403	0.20504	0.01441	1.00000	
130	-0.38383	0.16130	0.26569	0.46441	0.24925	0.28052	0.07949	-0.17816	-0.87674	1.00000
131	-0.51048	0.59009	0.26308	0.18478	0.07755	0.21279	-0.44324	0.28911	-0.59804	0.03219
132	0.45845	-0.27145	-0.35715	-0.41223	0.01686	-0.02567	0.17708	-0.15140	0.65270	-0.55828
133	0.37717	-0.22064	-0.43894	-0.21355	-0.21593	-0.06256	-0.02038	0.06483	0.33376	-0.29976
134	-0.57691	0.33995	0.53258	0.44692	0.11053	0.05600	-0.12757	0.08192	-0.70490	0.61122
135	0.69054	-0.49607	-0.47895	-0.55543	-0.12683	-0.26629	0.24539	-0.07264	0.60203	-0.45223
136	-0.69054	0.49607	0.47895	0.55543	0.12683	0.26629	-0.24539	0.07264	-0.60203	0.45222
137	-0.61919	0.37474	0.41592	0.60463	0.28611	0.41041	-0.15211	-0.10258	-0.74078	0.71149
138	-0.60786	0.40108	0.43986	0.52099	0.16566	0.31371	-0.18045	-0.01612	-0.67743	0.63046
139	0.43947	-0.22863	-0.31995	-0.45923	-0.13832	-0.32487	0.01263	0.17683	0.48444	-0.51315
140	0.51907	-0.40216	-0.37370	-0.36462	-0.12389	-0.17195	0.27007	-0.14844	0.58392	-0.48242
141	0.75776	-0.57329	-0.51983	-0.57505	-0.07795	-0.24390	0.23742	-0.08046	0.58322	-0.41340
142	-0.54227	0.39961	0.45921	0.34863	-0.25011	-0.09650	-0.17441	0.22878	-0.24186	0.15492
143	-0.36241	0.40290	0.10760	0.22437	0.15708	0.26695	-0.17657	-0.00421	-0.32631	0.13008
144	-0.23277	0.18572	0.10338	0.21392	0.22169	0.33287	0.17880	-0.36362	-0.14974	0.15622
145	0.15027	-0.02144	-0.17026	-0.18031	-0.08652	0.00889	0.15447	-0.14385	0.01543	-0.00319
146	0.28124	-0.21919	-0.20539	-0.19452	-0.02434	-0.23789	0.17365	-0.02751	0.10433	-0.02283
147	-0.24743	0.13937	0.03539	0.37521	-0.10068	-0.13347	0.05407	0.02955	-0.16447	0.19759
148	-0.06170	0.01941	0.30010	-0.14560	-0.09977	-0.11171	0.03468	0.03545	-0.17187	0.04188
149	-0.29620	0.29964	0.13926	0.17808	0.23020	0.30115	-0.13725	-0.05250	-0.35037	0.28968
150	-0.08213	-0.10003	0.15641	0.19408	0.61542	0.31820	-0.04337	-0.16904	-0.35704	0.45960
151	-0.31351	0.08526	0.18746	0.47021	0.60803	0.67856	-0.28217	-0.14767	-0.43608	0.37607
152	-0.65039	0.55369	0.43983	0.41488	-0.13008	0.05617	-0.17919	0.14175	-0.38767	0.23093
153	-0.44240	0.25526	0.34031	0.41222	0.31876	0.44427	-0.09809	-0.17344	-0.34842	0.34197
154	-0.14263	-0.10455	0.30802	0.21195	-0.08225	-0.05279	0.00532	0.02867	-0.17180	0.24256
155	-0.37836	0.33155	0.12582	0.34519	0.11680	0.02447	-0.08352	0.05785	-0.16171	0.15058
156	-0.13476	0.28580	-0.03948	-0.03265	-0.09038	-0.03619	-0.17368	0.18615	-0.12060	-0.00364
157	0.60616	-0.43479	-0.40125	-0.50594	-0.18333	-0.27476	0.20019	-0.02295	0.45416	-0.40505
158	-0.44110	0.15716	0.44278	0.45204	0.22111	0.34063	-0.07901	-0.12831	-0.37826	0.40972
159	-0.33987	0.43491	0.04423	0.18278	-0.00288	-0.01458	-0.19234	0.18688	-0.19714	0.08394
160	0.38828	-0.18238	-0.38750	-0.34086	0.10950	0.14254	0.13566	-0.21133	-0.18229	0.23438
161	-0.27343	0.14720	0.23959	0.24461	-0.08455	0.03082	-0.20708	0.17971	0.08094	-0.16623
162	-0.29441	0.11762	0.33942	0.25347	-0.07484	-0.25316	0.02041	0.12615	0.19047	-0.17424
163	0.30684	-0.28226	-0.20222	-0.17254	0.35827	0.33949	0.36481	-0.54763	0.09113	0.04226
164	-0.16651	0.26014	0.03277	0.01633	-0.36438	-0.29238	-0.29369	0.45498	-0.06472	-0.10544
165	-0.30916	0.09105	0.34088	0.31291	-0.07429	-0.14673	-0.19457	0.26668	-0.06390	0.10710
166	0.01832	-0.00325	0.02976	-0.06645	0.46860	0.59880	0.16310	-0.51026	-0.04535	0.05787
167	-0.01817	0.00299	-0.02978	0.06645	-0.46853	-0.59887	-0.16304	0.51024	0.04545	-0.05794
168	0.46505	-0.37576	-0.33665	-0.30516	0.26806	0.21677	0.40080	-0.50739	0.22350	-0.03528
169	-0.46497	0.37563	0.33663	0.30515	-0.26803	-0.21682	-0.40077	0.50739	-0.22344	0.03525
170	0.33835	-0.27751	-0.26317	-0.20028	0.31945	0.30388	0.37280	-0.53264	0.15312	-0.01136
171	-0.19009	0.23617	0.10799	0.03874	-0.31178	-0.26689	-0.32038	0.46282	-0.10500	-0.00603
172	-0.34201	0.13306	0.33919	0.33800	-0.08090	-0.13123	-0.17368	0.23897	-0.11983	0.14771
173	0.08366	-0.06799	0.01002	-0.11760	0.47182	0.55195	0.21071	-0.52851	-0.01987	0.06527
174	-0.08350	0.06772	-0.01004	0.11759	-0.47175	-0.55203	-0.21064	0.52849	0.01998	-0.06534
175	0.50001	-0.40986	-0.37778	-0.30572	0.20763	0.14640	0.40823	-0.47191	0.22850	-0.01379
176	-0.50001	0.40986	0.37778	0.30572	-0.20763	-0.14640	-0.40823	0.47190	-0.22850	0.01379
177	0.44724	-0.36398	-0.35554	-0.26121	0.25938	0.20278	0.46100	-0.55516	0.18901	0.01729
178	-0.32003	0.31014	0.31336	0.06597	-0.26301	-0.11957	-0.23597	0.29963	-0.16561	0.03967
179	-0.24527	0.14138	0.12644	0.28450	-0.05175	-0.14093	-0.36243	0.41836	-0.06783	-0.06984
180	0.29663	-0.19694	-0.19038	-0.27419	0.29175	0.37496	0.36821	-0.56683	0.28281	-0.16895
181	-0.33566	0.20484	0.21019	0.33975	-0.28432	-0.32696	-0.39402	0.56361	-0.31792	0.18431
182	0.27021	-0.20519	-0.17345	-0.21572	0.18689	0.17339	0.36686	-0.44758	-0.07347	0.27508
183	0.25539	-0.14485	-0.23742	-0.20429	0.23030	0.47508	0.37278	-0.62369	0.17467	-0.11218
184	-0.35573	0.35910	0.10195	0.27393	0.11003	0.46453	-0.03548	-0.23192	-0.27358	0.24158
185	0.01542	0.08960	-0.16062	-0.01627	0.15587	0.49108	0.22767	-0.49381	-0.01738	0.03344
186	-0.16243	0.11210	0.18551	0.07255	0.31799	0.50703	-0.09502	-0.21108	-0.20104	0.12741
187	-0.05419	0.18710	-0.01572	-0.11268	-0.03803	0.10367	0.06775	-0.11894	0.06072	-0.07750
188	-0.22788	0.17996	0.16060	0.15850	0.45040	0.68295	-0.10814	-0.30401	-0.20184	0.18426

189	-0.18163	0.12162	0.11703	0.16627	0.43189	0.73126	0.04099	-0.46859	-0.18987	0.19285
190	-0.18246	0.00031	0.27433	0.18975	0.46386	0.55744	-0.08937	-0.25198	-0.20700	0.23194
191	-0.10697	-0.04154	0.18278	0.15222	-0.06557	-0.21375	-0.22567	0.33263	-0.23271	0.04932
192	-0.23006	0.20496	0.21545	0.08051	-0.05475	-0.27782	-0.26732	0.40630	-0.09608	-0.01403
193	0.30248	-0.28528	-0.17529	-0.18045	-0.28669	-0.29129	-0.12680	0.29574	0.27823	-0.19536
194	0.16846	0.01259	-0.32201	-0.13579	-0.06784	-0.01536	0.38592	-0.34691	0.21878	-0.06230
195	-0.19576	0.13539	0.17746	0.12665	0.26492	0.33396	0.07971	-0.27409	-0.20101	0.20206
196	-0.24808	0.16482	0.21960	0.17537	0.46532	0.71197	0.04534	-0.46372	-0.28199	0.23131

	131	132	133	134	135	136	137	138	139	140
131	1.00000									
132	-0.35749	1.00000								
133	-0.15677	0.05744	1.00000							
134	0.37098	-0.81687	-0.61369	1.00000						
135	-0.44127	0.37468	0.15237	-0.38537	1.00000					
136	0.44127	-0.37468	-0.15237	0.38537	-1.00000	1.00000				
137	0.26570	-0.38016	-0.17217	0.40484	-0.82287	0.82287	1.00000			
138	0.27865	-0.40356	-0.18234	0.42066	-0.89845	0.89845	0.91464	1.00000		
139	-0.08716	0.21155	0.20089	-0.28186	0.57667	-0.57667	-0.71824	-0.78427	1.00000	
140	-0.34998	0.42052	0.08790	-0.38130	0.83894	-0.83894	-0.72528	-0.79403	0.24560	1.00000
141	-0.47177	0.40361	0.16243	-0.41075	0.95469	-0.95469	-0.79160	-0.86228	0.60737	0.75206
142	0.22535	-0.34636	-0.03323	0.29143	-0.63303	0.63304	0.39522	0.51943	-0.33004	-0.48668
143	0.42859	-0.00752	-0.05974	0.04025	-0.51945	0.51945	0.53461	0.51615	-0.39586	-0.41921
144	0.03211	0.06491	-0.03479	-0.03121	-0.24101	0.24101	0.34088	0.23841	-0.08229	-0.29167
145	-0.02636	0.03225	-0.04719	0.00154	0.29164	-0.29164	-0.20951	-0.26465	0.14343	0.27304
146	-0.17683	0.02716	0.18485	-0.12717	0.06165	-0.06165	-0.15268	-0.11355	0.15290	0.02771
147	-0.01104	-0.18200	-0.01360	0.15108	-0.25158	0.25158	0.14632	0.16844	-0.11113	-0.15498
148	0.28181	-0.20258	-0.14312	0.24174	-0.14811	0.14810	-0.01492	0.11761	-0.02208	-0.16196
149	0.20937	-0.13572	-0.31889	0.28976	-0.28192	0.28192	0.31514	0.36567	-0.36978	-0.20911
150	-0.08106	-0.13912	-0.25462	0.25100	-0.11754	0.11754	0.34679	0.23540	-0.27117	-0.10232
151	0.23301	-0.15436	-0.20367	0.23832	-0.33427	0.33427	0.52500	0.38545	-0.36783	-0.24171
152	0.39189	-0.30016	-0.03152	0.25889	-0.85023	0.85024	0.63976	0.73382	-0.47713	-0.47895
153	0.11147	-0.04924	-0.13308	0.11518	-0.64115	0.64115	0.76487	0.71472	-0.56133	-0.56646
154	-0.07747	-0.10403	-0.03650	0.10307	-0.36804	0.36804	0.24298	0.40216	-0.40229	-0.23451
155	0.06721	-0.02868	-0.31424	0.20264	-0.33542	0.33542	0.30368	0.23475	-0.08810	-0.28058
156	0.25741	-0.38280	0.30337	0.12713	-0.08364	0.08365	-0.07432	-0.07581	0.35943	-0.23334
157	-0.21873	0.30964	0.06866	-0.28310	0.79540	-0.79541	-0.72314	-0.72765	0.39733	0.74740
158	0.05211	-0.09499	-0.12922	0.14909	-0.72357	0.72357	0.76058	0.80225	-0.67505	-0.59199
159	0.25108	-0.33005	0.05668	0.22703	-0.27238	0.27239	0.12418	0.08093	0.24029	-0.36165
160	-0.04133	0.04362	0.04383	-0.05942	0.24833	-0.24833	-0.06792	-0.07630	0.01434	0.10594
161	0.13020	0.06559	0.02714	-0.06965	-0.26143	0.26143	0.09164	0.08104	0.04234	-0.16849
162	-0.08032	-0.14309	-0.09697	0.16828	-0.09274	0.09274	0.00329	0.02789	-0.06915	0.02356
163	-0.26540	0.21218	-0.12699	-0.09417	0.40113	-0.40113	-0.19020	-0.31357	0.14289	0.34976
164	0.32552	-0.04516	0.07010	-0.00456	-0.26680	0.26680	0.05172	0.17559	-0.03954	-0.23524
165	-0.05910	-0.33832	0.12537	0.19420	-0.31532	0.31533	0.28381	0.30501	-0.21232	-0.27038
166	-0.00987	0.26769	-0.07887	-0.16536	-0.01353	0.01353	0.14491	0.06144	-0.11844	0.01961
167	0.00980	-0.26763	0.07896	0.16526	0.01346	-0.01346	-0.14487	-0.06146	0.11845	-0.01959
168	-0.40157	0.38076	-0.05901	-0.26577	0.57298	-0.57298	-0.34341	-0.46639	0.21935	0.51380
169	0.40152	-0.38073	0.05935	0.26572	-0.57298	0.57299	0.34341	0.46636	-0.21933	-0.51377
170	-0.29825	0.28951	-0.10389	-0.16826	0.42191	-0.42192	-0.21554	-0.32024	0.14969	0.35350
171	0.34049	-0.16439	0.09961	0.07236	-0.30911	0.30911	0.08199	0.19539	-0.01809	-0.28717
172	-0.01557	-0.28972	0.02932	0.21097	-0.29453	0.29454	0.28965	0.29571	-0.27249	-0.19515
173	-0.07605	0.31454	-0.12700	-0.17468	0.02715	-0.02715	0.09061	0.01714	-0.10134	0.07207
174	0.07597	-0.31447	0.12709	0.17457	-0.02721	0.02722	-0.09058	-0.01717	0.10135	-0.07203
175	-0.45040	0.39169	-0.03313	-0.28917	0.59516	-0.59516	-0.34703	-0.46651	0.21152	0.52158
176	0.45040	-0.39169	0.03313	0.28917	-0.59516	0.59516	0.34703	0.46651	-0.21152	-0.52158
177	-0.42395	0.25920	0.00850	-0.20880	0.50390	-0.50391	-0.27645	-0.37226	0.15699	0.42728
178	0.27426	-0.18056	-0.11389	0.20741	-0.31322	0.31322	0.14101	0.20443	-0.03946	-0.28016
179	0.26619	-0.14789	0.12138	0.04669	-0.33143	0.33143	0.21786	0.27633	-0.17105	-0.26410

180	-0.28549	0.54049	-0.07093	-0.38472	0.35814	-0.35814	-0.21785	-0.30544	0.09629	0.38250
181	0.33097	-0.44863	-0.07454	0.39586	-0.36582	0.36583	0.23776	0.29665	-0.13895	-0.32762
182	-0.34785	0.06925	-0.14117	0.02642	0.24640	-0.24640	-0.04591	-0.11313	0.08139	-0.09776
183	-0.16264	0.31783	0.05678	-0.28254	0.34694	-0.34695	-0.20603	-0.27036	0.07578	0.34834
184	0.13586	-0.04474	-0.14544	0.11379	-0.29912	0.29912	0.39661	0.41992	-0.36871	-0.29484
185	-0.02428	0.18376	-0.02515	-0.13002	0.08378	-0.08378	0.05997	0.03636	-0.19939	0.13866
186	0.18099	0.12297	-0.21982	0.02950	-0.24116	0.24115	0.29659	0.28940	-0.27594	-0.16168
187	0.01233	0.12040	-0.09213	-0.04162	0.04772	-0.04772	-0.14504	-0.06237	0.10281	-0.00287
188	0.00001	0.18891	-0.11717	-0.08160	-0.11663	0.11663	0.25377	0.19994	-0.16230	-0.15360
189	0.05275	0.11209	-0.06736	-0.04954	-0.14457	0.14456	0.29777	0.24877	-0.25672	-0.13733
190	0.01462	0.12527	-0.24043	0.04406	-0.29252	0.29252	0.37518	0.36678	-0.30518	-0.27449
191	0.39522	-0.27973	0.01299	0.21261	-0.32173	0.32173	0.17252	0.21058	-0.09671	-0.23429
192	0.22500	-0.11578	-0.09309	0.14429	-0.17940	0.17941	0.00580	-0.01471	0.07843	-0.05440
193	-0.22821	-0.03166	0.33636	-0.16764	0.29670	-0.29670	-0.28782	-0.23137	0.14871	0.21606
194	-0.24367	0.23955	-0.04200	-0.16421	0.17763	-0.17763	-0.11964	-0.10567	0.05843	0.10761
195	0.05638	-0.03471	-0.15683	0.09357	0.03724	-0.03724	0.12951	0.02562	-0.17550	0.13189
196	0.17176	0.09278	-0.26028	0.07629	-0.22508	0.22507	0.37261	0.29172	-0.16920	-0.28985

	141	142	143	144	145	146	147	148	149	150
141	1.00000									
142	-0.71044	1.00000								
143	-0.52795	-0.01949	1.00000							
144	-0.19741	-0.08963	0.21954	1.00000						
145	0.24488	-0.29503	-0.11175	-0.17266	1.00000					
146	0.10410	-0.23053	-0.14386	-0.01321	0.00178	1.00000				
147	-0.22005	0.08950	-0.00198	-0.05179	0.15763	-0.05780	1.00000			
148	-0.16971	0.00677	0.05701	-0.12025	0.01392	0.18858	-0.06658	1.00000		
149	-0.28025	0.07029	0.11040	0.04427	-0.13627	-0.16735	-0.00085	0.03704	1.00000	
150	-0.11476	-0.23477	0.16923	0.06591	0.09449	0.05439	0.10777	-0.05865	0.07753	1.00000
151	-0.30852	-0.14960	0.25797	0.29635	-0.04603	-0.10400	-0.08289	-0.13038	0.32672	0.46900
152	-0.91427	0.83383	0.48306	0.15599	-0.28720	-0.08726	0.07350	0.05681	0.08460	-0.10402
153	-0.61209	0.25178	0.53792	0.49144	-0.21308	-0.16327	-0.06258	-0.01810	0.14978	0.18029
154	-0.36443	0.30623	0.09794	-0.15145	-0.05309	-0.01895	0.42423	0.20199	-0.11564	0.20279
155	-0.32419	0.20040	0.06270	0.32629	-0.08713	-0.09961	0.09232	-0.24689	0.40133	-0.04797
156	-0.06876	0.20151	-0.08612	-0.12495	-0.05210	0.08138	-0.03561	-0.07815	-0.06352	-0.15229
157	0.76035	-0.50837	-0.39342	-0.34174	0.23783	0.11724	-0.16038	0.07382	-0.18742	-0.10574
158	-0.69759	0.36875	0.49710	0.32791	-0.20424	-0.14530	0.16938	0.09032	0.06364	0.25504
159	-0.25341	0.28667	-0.03210	0.09649	-0.09555	0.00600	0.02638	-0.21399	0.19194	-0.15427
160	0.30239	-0.38178	-0.11904	0.08990	0.18327	0.15277	-0.18748	-0.02858	0.12859	0.13181
161	-0.28973	0.28393	0.27051	-0.05083	-0.14660	-0.21425	0.10191	0.03154	-0.15572	-0.13331
162	-0.14453	0.27296	-0.11611	-0.09223	-0.11962	0.00253	0.17519	0.00914	-0.02414	-0.05517
163	0.44020	-0.63421	-0.11544	0.19416	0.28947	0.23151	-0.08752	-0.13379	0.00902	0.30478
164	-0.27717	0.48695	0.04579	-0.09664	-0.23666	-0.23037	-0.07397	0.15215	0.05766	-0.39771
165	-0.37405	0.38094	0.14645	-0.20988	-0.14856	-0.04445	0.30543	-0.00786	-0.12971	0.11089
166	0.06227	-0.38861	0.16374	0.33168	0.06311	0.07667	-0.17218	-0.05583	0.19050	0.29192
167	-0.06230	0.38868	-0.16396	-0.33157	-0.06305	-0.07597	0.17223	0.05589	-0.18969	-0.29185
168	0.61933	-0.71136	-0.23742	0.07621	0.34904	0.23253	-0.10379	-0.15993	-0.05679	0.24075
169	-0.61932	0.71138	0.23731	-0.07618	-0.34901	-0.23248	0.10382	0.15995	0.05669	-0.24072
170	0.46146	-0.64551	-0.09319	0.22682	0.27150	0.25255	-0.11545	-0.15521	0.00052	0.25680
171	-0.31391	0.53018	-0.00634	-0.12594	-0.24926	-0.23074	-0.06425	0.19876	0.05899	-0.36555
172	-0.36655	0.34597	0.20193	-0.22033	-0.09775	-0.09277	0.35301	-0.04685	-0.10914	0.14559
173	0.10155	-0.41051	0.11951	0.27884	0.13241	0.14233	-0.18820	-0.02840	0.15853	0.32283
174	-0.10157	0.41058	-0.11974	-0.27874	-0.13234	-0.14222	0.18826	0.02847	-0.15973	-0.32276
175	0.65779	-0.73667	-0.25787	0.08058	0.34438	0.25488	-0.05240	-0.20031	-0.10526	0.23785
176	-0.65779	0.73667	0.25787	-0.08058	-0.34438	-0.25488	0.05240	0.20030	0.10526	-0.23785
177	0.56069	-0.66229	-0.21430	0.13215	0.36387	0.26422	-0.01339	-0.21105	-0.07576	0.27536
178	-0.30020	0.47366	-0.03214	-0.17920	-0.32615	-0.19524	-0.13734	0.19367	0.20433	-0.25763
179	-0.42533	0.36334	0.33435	0.02647	-0.12317	-0.13782	0.17878	0.06578	-0.13396	-0.08014
180	0.42113	-0.54559	-0.06211	0.21988	0.24738	0.05609	-0.16339	-0.12602	-0.07114	0.14928

181	-0.42237	0.52114	0.12327	-0.19429	-0.22727	-0.12234	0.19127	0.03763	0.09792	-0.13450
182	0.35588	-0.37673	-0.19501	0.07867	0.19514	0.19241	-0.14091	-0.31623	0.11545	0.26477
183	0.34879	-0.51654	-0.01888	0.20483	0.40848	0.06261	-0.14975	-0.12764	0.01660	0.24328
184	-0.26974	0.00852	0.32817	0.49336	-0.15584	-0.11317	-0.16333	-0.15956	0.39712	0.10268
185	0.11128	-0.35480	0.19208	0.33821	0.20942	0.03209	-0.23257	-0.23614	0.19165	0.19620
186	-0.15973	-0.20341	0.25113	0.27667	-0.04969	-0.14238	-0.01107	0.14237	0.32184	0.21940
187	0.00541	0.03670	0.18181	-0.13799	-0.22329	-0.01219	-0.21637	-0.14396	-0.04455	0.09420
188	-0.09460	-0.14728	0.27259	0.30902	-0.16109	-0.25035	-0.13949	-0.16058	0.20885	0.24897
189	-0.13702	-0.17842	0.24897	0.38083	0.12633	-0.19430	-0.00733	-0.18649	0.13391	0.39659
190	-0.27566	-0.04581	0.31167	0.47265	-0.04694	-0.16718	-0.06340	0.05341	0.09829	0.40614
191	-0.34192	0.22954	0.16623	-0.07997	0.02486	0.09360	0.15676	0.51514	-0.05141	-0.10200
192	-0.21154	0.41769	-0.15102	-0.14797	-0.09230	0.00813	0.10995	0.07275	-0.11161	-0.09165
193	0.23179	-0.00494	-0.15153	-0.17560	-0.18069	-0.04027	-0.05172	0.01686	-0.22158	-0.16562
194	0.28352	-0.33533	0.02915	0.01070	0.10148	0.20244	-0.04216	-0.26309	0.09620	-0.02630
195	0.02234	-0.12602	-0.06008	0.08057	-0.02887	-0.14758	0.00809	-0.29971	0.32856	0.23713
196	-0.19570	-0.20039	0.38905	0.50555	0.04030	-0.18706	-0.17373	0.04278	0.16524	0.32947

	151	152	153	154	155	156	157	158	159	160
151	1.00000									
152	0.01079	1.00000								
153	0.49136	0.52804	1.00000							
154	-0.05631	0.30353	0.04706	1.00000						
155	0.33105	0.23734	0.25769	-0.08367	1.00000					
156	-0.06122	0.13721	-0.17962	-0.33147	-0.03793	1.00000				
157	-0.42145	-0.67783	-0.72077	-0.24479	-0.54498	-0.28453	1.00000			
158	0.37765	0.59630	0.85330	0.56100	0.17005	-0.32176	-0.72525	1.00000		
159	0.15132	0.25669	0.01008	-0.32153	0.57730	0.79404	-0.56418	-0.15927	1.00000	
160	0.11081	-0.35695	-0.15645	-0.26496	-0.24945	0.03654	0.30894	-0.26805	-0.12135	1.00000
161	-0.02443	0.33898	0.09267	0.31954	0.25467	-0.04927	-0.28416	0.24387	0.11484	-0.74058
162	-0.14336	0.17411	0.13907	0.05383	0.10136	-0.00136	-0.16065	0.14236	0.05952	-0.69578
163	0.24054	-0.54985	-0.12597	-0.23587	-0.10741	-0.22151	0.36198	-0.22778	-0.24620	0.43342
164	-0.24647	0.29621	0.03586	0.09758	0.08177	0.11793	-0.16891	0.08096	0.14555	-0.21056
165	-0.03280	0.37711	0.18562	0.29210	0.06625	0.22742	-0.41354	0.30628	0.22552	-0.48002
166	0.46449	-0.20661	0.28182	-0.20402	0.08163	-0.19817	-0.02811	0.12690	-0.11212	0.27463
167	-0.46438	0.20360	-0.28174	0.20411	-0.08165	0.19810	0.02807	-0.12680	0.11204	-0.27468
168	0.11956	-0.69576	-0.26549	-0.27760	-0.20532	-0.24792	0.53355	-0.36522	-0.32739	0.48058
169	-0.11953	0.69574	0.26550	0.27764	0.20530	0.24789	-0.53355	0.36525	0.32735	-0.48060
170	0.18290	-0.54212	-0.12361	-0.26864	-0.11015	-0.27519	0.40637	-0.24289	-0.29174	0.44168
171	-0.17874	0.40455	0.04891	0.11365	0.09074	0.23496	-0.25594	0.10013	0.24740	-0.24365
172	-0.04588	0.36510	0.16287	0.34030	0.05817	0.13082	-0.36034	0.31256	0.14164	-0.45512
173	0.42187	-0.24083	0.23571	-0.20379	0.05694	-0.22111	0.02724	0.08882	-0.14582	0.31351
174	-0.42177	0.24082	-0.23563	0.20388	-0.05697	0.22103	-0.02728	-0.08872	0.14574	-0.31356
175	0.08608	-0.72460	-0.28783	-0.22596	-0.20444	-0.27485	0.54190	-0.35731	-0.34887	0.48259
176	-0.08608	0.72460	0.28783	0.22696	0.20444	0.27485	-0.54191	0.35731	0.34887	-0.48259
177	0.07014	-0.62325	-0.23201	-0.19062	-0.17370	-0.26796	0.47030	-0.29205	-0.32456	0.44264
178	-0.03542	0.33434	0.04554	-0.05070	0.20837	0.33459	-0.28849	0.01115	0.46052	-0.25138
179	-0.05559	0.47209	0.26853	0.32329	-0.00313	-0.01991	-0.31403	0.39132	-0.01868	-0.31938
180	0.19020	-0.47599	0.02979	-0.18964	-0.04249	-0.34176	0.27439	-0.07399	-0.30504	0.21921
181	-0.16889	0.47607	-0.02243	0.22906	0.08801	0.19370	-0.23214	0.10112	0.21131	-0.20920
182	0.14757	-0.39324	-0.17606	-0.20832	0.03678	0.04672	0.13599	-0.21341	0.06127	0.59662
183	0.19249	-0.41778	-0.03736	-0.24920	-0.21382	-0.08494	0.27410	-0.16139	-0.19918	0.33334
184	0.35587	0.21095	0.39498	-0.14797	0.07529	-0.09826	-0.18560	0.25012	-0.03390	0.29861
185	0.30755	-0.16657	0.10984	-0.25603	-0.09124	-0.13610	0.14776	-0.04274	-0.16044	0.45482
186	0.49602	-0.05335	0.38903	-0.06141	0.04577	-0.17481	-0.16937	0.29851	-0.11516	0.09626
187	-0.07677	0.08965	-0.08544	0.01630	-0.05577	0.25398	-0.06910	-0.06225	0.17419	-0.02753
188	0.40753	-0.01496	0.34560	-0.05393	-0.05290	-0.05100	-0.16506	0.25821	-0.07339	0.11406
189	0.52820	-0.01537	0.41240	-0.02614	-0.06417	-0.14548	-0.16438	0.32791	-0.15764	0.23672
190	0.42736	0.14588	0.56395	0.15966	-0.00488	-0.37547	-0.24492	0.55063	-0.30942	0.06177
191	0.00609	0.29657	-0.01763	0.37265	0.01990	-0.09676	-0.10379	0.17974	-0.06696	-0.19321

192	-0.19484	0.28312	-0.02367	0.00711	0.04878	0.19981	-0.12168	-0.01531	0.19243	-0.42851
193	-0.28121	-0.12693	-0.22641	0.01924	-0.16967	-0.00507	0.22347	-0.17723	-0.10732	0.06015
194	-0.13556	-0.23552	-0.09959	-0.16780	0.07815	-0.02034	0.11467	-0.16277	0.03099	0.09696
195	0.40586	-0.16656	-0.01304	-0.07803	0.17899	-0.04597	-0.00695	-0.05166	0.07142	0.23384
196	0.53253	0.04885	0.57275	-0.10858	0.03141	-0.13350	-0.28689	0.41772	-0.08961	0.19402

	161	162	163	164	165	166	167	168	169	170
161	1.00000									
162	0.06238	1.00000								
163	-0.25949	-0.34624	1.00000							
164	0.20551	0.09657	-0.86365	1.00000						
165	0.20422	0.51199	-0.42952	-0.08427	1.00000					
166	-0.13955	-0.26801	0.63565	-0.51453	-0.33458	1.00000				
167	0.13960	0.26804	-0.63574	0.51471	0.33443	-1.00000	1.00000			
168	-0.33835	-0.76472	0.91144	-0.74811	-0.46166	0.53509	-0.53512	1.00000		
169	0.33836	0.76473	-0.91147	0.74818	0.46159	-0.53511	0.53515	-1.00000	1.00000	
170	-0.30312	-0.74387	0.97973	-0.81780	-0.47157	0.65019	-0.65027	0.90409	-0.90412	1.00000
171	0.23657	0.11307	-0.87587	0.96685	-0.00069	-0.53067	0.53088	-0.77720	0.77729	-0.87222
172	0.19521	0.49477	-0.39529	-0.10205	0.96410	-0.35509	0.35487	-0.42161	0.42151	-0.44335
173	-0.17341	-0.29029	0.65955	-0.52653	-0.36036	0.96969	-0.96969	0.58585	-0.58587	0.68021
174	0.17345	0.29032	-0.65964	0.52671	0.36020	-0.96969	0.96970	-0.58588	0.58590	-0.68029
175	-0.34518	-0.76022	0.85390	-0.68257	-0.46526	0.50588	-0.50586	0.97354	-0.97352	0.85703
176	0.34518	0.76022	-0.85390	0.68257	0.46526	-0.50587	0.50586	-0.97354	0.97351	-0.85703
177	-0.32019	-0.82643	0.89975	-0.75689	-0.42063	0.58541	-0.58543	0.91635	-0.91635	0.91505
178	0.30523	0.64896	-0.60172	0.60730	0.10099	-0.31978	0.31987	-0.56005	0.56008	-0.62955
179	0.08694	0.39484	-0.54133	0.33832	0.46452	-0.43682	0.43674	-0.61440	0.61435	-0.53144
180	-0.10783	-0.21647	0.72127	-0.55397	-0.43341	0.78751	-0.78749	0.74363	-0.74363	0.75123
181	0.13395	0.17701	-0.66699	0.56936	0.29846	-0.77452	0.77449	-0.70047	0.70047	-0.69832
182	-0.43774	-0.43303	0.54316	-0.41186	-0.32991	0.34880	-0.34893	0.58382	-0.58387	0.50628
183	-0.20430	-0.28647	0.66769	-0.52482	-0.37958	0.63117	-0.63129	0.69814	-0.69819	0.67372
184	-0.19311	-0.24532	0.12985	0.02140	-0.29430	0.45804	-0.45803	0.01853	-0.01854	0.20406
185	-0.29103	-0.37717	0.51364	-0.29794	-0.48112	0.67473	-0.67472	0.47335	-0.47336	0.57751
186	-0.01374	-0.13304	0.17925	-0.06439	-0.23842	0.64650	-0.64635	0.12647	-0.12642	0.18799
187	0.20776	-0.18743	0.06332	-0.09603	0.04657	0.13925	-0.13967	0.03399	-0.03418	0.06576
188	0.06791	-0.25051	0.25422	-0.15330	-0.22777	0.56515	-0.56534	0.18737	-0.18748	0.27112
189	-0.11923	-0.23214	0.41406	-0.37683	-0.14320	0.65939	-0.65958	0.33287	-0.33297	0.40689
190	0.09156	-0.19628	0.23379	-0.20855	-0.08789	0.47922	-0.47923	0.11371	-0.11374	0.24018
191	0.20644	0.06886	-0.34121	0.25357	0.22057	-0.32565	0.32573	-0.41482	0.41486	-0.37509
192	0.19756	0.44052	-0.45980	0.39457	0.20140	-0.40196	0.40223	-0.41737	0.41749	-0.49819
193	0.01772	-0.11227	-0.26327	0.18693	0.18519	-0.40786	0.40778	-0.12641	0.12639	-0.24937
194	-0.10654	-0.03108	0.29808	-0.19436	-0.24075	0.22952	-0.22956	0.33211	-0.33213	0.36096
195	-0.23045	-0.10469	0.32342	-0.25524	-0.18186	0.48619	-0.48626	0.27823	-0.27827	0.30401
196	-0.06155	-0.23028	0.39603	-0.33432	-0.18349	0.67763	-0.67778	0.25281	-0.25290	0.38626

	171	172	173	174	175	176	177	178	179	180
171	1.00000									
172	-0.05173	1.00000								
173	-0.55469	-0.37232	1.00000							
174	0.55491	0.37208	-1.00000	1.00000						
175	-0.72517	-0.42084	0.55770	-0.55768	1.00000					
176	0.72516	0.42084	-0.55770	0.55768	-1.00000	1.00000				
177	-0.80314	-0.39647	0.62443	-0.62444	0.92003	-0.92003	1.00000			
178	0.68849	0.02341	-0.33953	0.33962	-0.56954	0.56954	-0.70547	1.00000		
179	0.30756	0.52169	-0.46778	0.46769	-0.60829	0.60829	-0.56030	-0.19177	1.00000	
180	-0.61984	-0.39976	0.80310	-0.80307	0.73442	-0.73442	0.77496	-0.52459	-0.45998	1.00000
181	0.59515	0.33509	-0.78875	0.78873	-0.67924	0.67924	-0.74855	0.45563	0.50401	-0.93216
182	-0.39260	-0.31376	0.38588	-0.38601	0.58736	-0.58736	0.55585	-0.21342	-0.51967	0.34302
183	-0.54627	-0.37428	0.67942	-0.67953	0.64677	-0.64677	0.68982	-0.44894	-0.43042	0.71567

184	-0.05740	-0.31128	0.40592	-0.40581	0.04899	-0.04899	0.12743	-0.02417	-0.14837	0.18274
185	-0.37810	-0.48665	0.68266	-0.68266	0.47103	-0.47104	0.54452	-0.26962	-0.43879	0.55942
186	-0.07553	-0.24480	0.58739	-0.58724	0.13171	-0.13171	0.12139	0.01077	-0.18036	0.44056
187	-0.10397	0.05653	0.15465	-0.15503	0.01705	-0.01705	0.03196	0.10823	-0.17032	0.10569
188	-0.18579	-0.21314	0.52942	-0.52961	0.17146	-0.17146	0.19645	-0.04297	-0.22177	0.40641
189	-0.39178	-0.11282	0.63615	-0.63634	0.31064	-0.31064	0.39623	-0.38781	-0.09539	0.52319
190	-0.22661	-0.07503	0.48809	-0.48810	0.10095	-0.10095	0.18924	-0.24579	0.02521	0.32654
191	0.29494	0.22554	-0.32771	0.32779	-0.41696	0.41696	-0.39569	0.03276	0.50955	-0.40323
192	0.41542	0.25328	-0.41848	0.41875	-0.40636	0.40636	-0.45666	0.27904	0.30597	-0.31524
193	0.20383	0.13374	-0.39320	0.39312	-0.11112	0.11112	-0.17553	0.12432	0.00787	-0.35925
194	-0.26217	-0.25620	0.24982	-0.24986	0.34767	-0.34767	0.39783	-0.10754	-0.42494	0.33550
195	-0.26208	-0.14049	0.46459	-0.46466	0.31129	-0.31128	0.27794	-0.05760	-0.31714	0.28593
196	-0.33424	-0.17591	0.64185	-0.64200	0.20102	-0.20102	0.27588	-0.24549	-0.09501	0.52564

	181	182	183	184	185	186	187	188	189	190
181	1.00000									
182	-0.30060	1.00000								
183	-0.71065	0.47915	1.00000							
184	-0.15900	0.13718	0.17158	1.00000						
185	-0.53536	0.41279	0.69160	0.75418	1.00000					
186	-0.40944	0.07452	0.30803	0.48904	0.44972	1.00000				
187	-0.11771	0.15244	0.19348	0.06978	0.14112	-0.09620	1.00000			
188	-0.36515	0.18871	0.37706	0.48520	0.44047	0.45386	0.34553	1.00000		
189	-0.48802	0.28028	0.61858	0.45968	0.52984	0.49840	0.16413	0.74071	1.00000	
190	-0.29765	-0.02878	0.30163	0.44553	0.30051	0.43729	0.06979	0.60360	0.76395	1.00000
191	0.39801	-0.40961	-0.34280	-0.34511	-0.46331	-0.12878	-0.31818	-0.32037	-0.19593	0.00944
192	0.38684	-0.42683	-0.50862	-0.34326	-0.58180	-0.12959	-0.22335	-0.27157	-0.34435	-0.16382
193	0.23984	-0.16904	-0.21059	-0.18876	-0.25352	-0.32777	-0.08378	-0.31567	-0.31311	-0.14065
194	-0.31323	0.43682	0.30658	0.22503	0.45727	0.00051	0.23077	0.04111	-0.09029	-0.27673
195	-0.23875	0.32602	0.19661	0.33422	0.39261	0.29303	0.19214	0.45612	0.38412	0.11645
196	-0.48704	0.20645	0.54056	0.48385	0.49691	0.55708	0.19963	0.69242	0.79419	0.73560

	191	192	193	194	195	196
191	1.00000					
192	0.20112	1.00000				
193	-0.03759	-0.13759	1.00000			
194	-0.53138	-0.33778	-0.30763	1.00000		
195	-0.25937	-0.27761	-0.29116	-0.00439	1.00000	
196	-0.15098	-0.31833	-0.43120	0.01470	0.20280	1.00000

APPENDIX VI
UNROTATED FACTOR MATRIX

Variables	Factors							Communalities
	1	2	3	4	5	6	7	
1	-0.42299	-0.61816	-0.28895	0.32516	-0.12223	-C.19518	0.05260	0.806064
2	0.34225	0.38074	-0.44939	0.34335	-0.42389	-0.13780	-0.07440	C.786143
3	0.76038	0.15053	-0.36655	0.39220	-0.12959	-0.07389	-0.14727	C.932967
4	-0.01992	0.79199	0.14345	0.34551	0.05936	C.10685	-0.18433	0.816521
5	-0.56479	0.73796	-0.16770	0.00604	0.02230	-C.12135	-0.18855	0.942504
6	-0.55721	0.56308	0.30687	-0.08567	-0.13670	C.01723	-0.09516	0.757082
7	-0.07710	0.74516	0.35108	-0.15505	0.02056	0.06117	-0.18090	0.745398
8	-0.60657	0.46522	-C.36299	0.06175	C.10044	-0.24154	0.01950	C.788744
9	0.82911	0.28730	0.22869	0.14415	-0.15405	-0.08337	0.05926	C.877237
10	0.64925	0.27444	0.37458	0.16054	-0.18433	0.03229	0.00907	C.698021
11	-0.55299	0.66889	-0.25495	0.13085	0.02831	0.02427	-0.02147	0.837179
12	-0.52789	0.53039	0.07178	0.15408	-0.05073	0.05131	-0.06118	C.597829
13	-0.26567	-0.02013	0.40581	-0.44165	0.08092	0.08533	0.31736	0.545271
14	0.16163	0.19574	-0.38113	0.31185	-0.22205	-C.17576	0.23016	0.440123
15	-0.24785	0.03482	0.10948	0.73931	0.12602	0.22847	0.01731	C.689584
16	-0.61972	0.42983	0.49023	0.01855	0.04753	-0.03476	-0.09436	0.821851
17	0.53058	-0.26762	-0.35804	-0.56456	-0.12287	-C.15584	0.04003	C.841042
18	-0.15196	0.36793	0.33008	0.45187	0.05756	C.26011	-0.26549	C.613056
19	-0.55562	0.55671	-0.17445	-0.19279	0.06592	-C.35107	-0.21459	0.859884
20	-0.38369	0.46113	0.08148	-0.18568	-0.06694	-0.19806	-0.41297	0.615235
21	-0.29013	0.44291	0.06888	-0.15749	0.09613	-0.05375	-0.04957	C.324485
22	0.50106	0.52914	0.41207	0.04304	0.12603	C.16695	0.03153	0.747455
23	-0.28287	-0.31554	0.27963	-0.37798	0.44722	C.00130	-0.02720	0.601395
24	0.34548	0.30708	-C.38264	0.36490	-0.45684	-0.06589	0.12232	0.721221
25	-0.31136	-0.08050	0.56119	-0.02685	0.06775	C.11510	0.01930	0.437286
26	0.37189	-0.25593	-0.48825	-0.44063	-0.14548	-0.14813	-0.22329	C.729309
27	-0.66390	0.24377	C.54536	0.09008	0.12631	-C.09774	0.03655	C.832567
28	0.40968	0.43988	-0.28972	-0.24131	-0.17807	0.51167	-0.13344	0.814822
29	-0.18836	-0.12040	0.57085	-0.00215	-0.41464	-0.45502	0.10626	C.766118
30	-0.19851	-0.33539	-C.12011	0.35134	0.57698	-0.12598	0.19751	0.677554
31	-0.47787	-0.35072	0.39415	0.21008	0.09686	-0.44888	0.16178	C.787897
32	0.02807	0.59206	-C.35009	-0.11563	0.06990	0.33929	-0.09203	C.615727
33	0.32019	-0.07659	C.18689	-0.38333	-C.44864	-0.22231	0.15787	0.565891
34	0.16080	0.30803	0.50813	C.29039	-0.09006	0.04499	-0.30154	C.564323
35	-0.35664	-0.14332	-0.50765	0.12519	0.55087	0.13645	0.15310	C.766633
36	0.58699	0.10757	-0.06323	-0.37160	-0.26481	C.45966	0.01744	0.779930
37	-0.15416	-0.40265	0.19715	0.22152	0.20891	-0.26254	0.04097	C.388080
38	-0.09369	-0.23820	0.03431	0.35733	0.26863	-0.34198	-0.05892	0.394675
39	-0.30817	0.35725	0.04053	-0.17855	0.01698	-C.50837	-0.18579	0.549367
40	-0.75528	0.30436	-0.22733	0.17559	-0.05070	0.10403	0.09703	C.768397
41	0.63624	0.18382	-0.13079	0.37103	-0.33205	-C.06826	-0.02098	C.708721
42	-0.73274	0.06153	0.41812	-0.25241	-0.03214	C.14348	0.09641	0.910148
43	-0.64022	0.46617	-0.21272	-0.19707	-0.06428	-0.01713	0.39424	0.872711
44	0.88157	0.17898	-0.05901	0.09198	0.17249	-C.18371	-0.06660	0.887944
45	-0.59958	0.52806	-0.26086	-0.22127	-C.01991	0.02497	0.41345	0.927241
46	0.87175	0.15973	-0.01186	0.07538	0.21219	-0.16141	-0.11227	0.874962
47	-0.65706	-0.48990	0.19636	0.00912	-0.16223	C.21759	-0.15429	C.807544
48	-0.65375	-0.51088	0.17248	0.04619	-0.23313	C.17088	-0.11366	C.816737
49	0.69327	-0.16330	-C.12602	0.33704	0.23964	0.00917	0.16104	C.720208
50	-0.59276	-0.34149	-0.06613	0.22605	-0.12222	0.03650	-0.22076	C.588460
51	0.63189	0.27716	0.07314	-0.18934	0.08495	-0.00970	0.24846	0.586351
52	-0.39577	0.34061	-0.14187	-0.27637	0.20131	-C.27723	-0.11860	0.500607
53	0.79430	0.35932	-0.10423	-C.16045	0.24965	-0.07416	-0.08829	0.872247
54	-0.62803	-0.54700	0.16940	0.26098	-0.24988	0.05871	0.00394	C.856337
55	-0.54239	0.49419	-0.19743	-0.02520	-0.12465	C.11285	0.53103	0.884446
56	-0.36392	0.31038	-0.09212	-0.47698	0.11350	-0.04547	-0.19277	0.516875
57	0.81046	0.37499	-0.09050	-0.16603	0.24106	-0.08415	-0.09324	C.905393
58	-0.58846	-0.34845	0.13537	0.41699	-0.17768	0.02306	0.09039	0.716214
59	-0.53657	-0.24324	-0.01933	0.06795	-0.19194	0.08197	-0.09698	0.405033
60	-0.63882	-0.18979	-0.04769	-0.24169	-0.11440	0.07385	0.16988	0.552206
61	-0.59235	0.54266	-0.11515	0.06280	-0.11211	-0.04318	0.09639	0.686289
62	0.20191	-0.51330	-0.21064	-0.16720	-0.25392	-C.19982	-0.06966	0.485821
63	0.71963	0.15121	-0.20736	0.25487	0.10741	-0.08501	0.02486	0.668067
64	-0.39652	-0.23818	-0.00637	0.22118	-0.32614	-0.11458	-0.00349	0.382424
65	-0.52875	-0.29077	0.43498	-0.26091	-0.10749	C.10386	-0.08130	C.650358
66	0.77470	0.37081	0.29726	-0.00480	0.02576	-0.07183	0.14077	0.851693
67	-0.80106	-0.22641	-0.25172	-0.12103	C.12132	C.12935	-0.09939	0.812291
68	0.78664	0.42671	0.30156	-0.08372	0.02956	-0.05181	0.12447	0.917888
69	-0.33179	-0.65056	-0.26497	0.20404	0.02668	C.10299	-0.16002	0.682084
70	-0.61605	0.40818	-0.04469	-0.27410	-0.18485	-0.31821	0.05514	C.761722
71	-0.56738	-0.55695	-0.39795	0.25300	0.08205	0.06201	-0.05874	0.868428
72	0.71309	0.30645	0.27689	0.09150	-0.09448	0.11537	0.05561	0.712774
73	-0.66309	-0.05508	-0.51565	-0.17887	0.12943	0.06867	-0.10879	0.773908
74	-0.00045	0.76545	0.15700	0.29214	0.10197	-0.00615	0.12307	0.721500
75	-0.21405	0.62879	0.17401	0.26831	0.03969	0.02769	0.23641	0.601686
76	-0.38840	0.44385	-0.11377	0.00155	-0.31573	0.00830	-0.01275	C.460725
77	-0.44856	0.50677	-0.07428	0.18015	-0.01805	-C.16019	-0.07448	0.527525
78	-0.50306	0.70663	-0.15322	0.18061	-0.00173	0.05119	-0.02449	0.811720
79	-0.52599	0.52765	-0.38412	0.02832	0.00646	0.05066	-0.06872	0.710757
80	-0.58038	0.60971	-0.15502	0.12569	0.09245	0.01733	0.08172	0.763950

APPENDIX VII

ROTATED FACTOR MATRIX

Variables	Factors 1	2	3	4	5	6	7	Communalities
1	-0.72871	-0.15717	-0.20443	-0.17002	0.13873	-0.39671	0.05496	0.806064
2	0.17011	0.16282	-0.82937	-0.00774	-0.10794	0.17073	-0.04440	0.786143
3	0.44181	-0.27114	-0.77579	-0.01243	0.06922	0.09479	-0.22018	0.932967
4	0.33510	0.48929	-0.19571	0.62761	-0.00287	0.13417	-0.12089	0.816521
5	-0.05513	0.93757	-0.04528	0.20834	0.07658	0.07529	-0.05863	0.942504
6	-0.10874	0.67847	0.26079	0.36169	-0.27123	0.10715	0.03237	0.757082
7	0.38550	0.54209	0.21494	0.36855	-0.23005	0.23421	-0.11452	0.745398
8	-0.19383	0.80523	-0.11913	0.00949	0.24184	-0.13305	0.11094	0.788744
9	0.72405	-0.30402	-0.34889	0.13862	-0.33590	0.07149	-0.04086	0.877237
10	0.57443	-0.27280	-0.20752	0.29031	-0.38855	0.11100	-0.05473	0.698021
11	-0.11841	0.81578	-0.13018	0.27456	0.19768	0.11224	0.11685	0.837179
12	-0.15660	0.63095	0.02622	0.40882	-0.02817	0.05473	0.05996	0.557829
13	-0.00169	0.06799	0.62829	-0.03490	-0.18045	0.01836	0.33433	0.545271
14	0.07831	0.10051	-0.60441	-0.04443	0.02071	-0.05525	0.23047	0.440123
15	-0.25940	-0.04755	-0.19942	0.69600	0.23148	-0.19989	0.04803	0.689584
16	-0.13555	0.58074	0.41310	0.48182	-0.22214	-0.11835	-0.00804	0.821851
17	0.26813	-0.28744	-0.08329	-0.79404	-0.05059	0.21340	-0.03138	0.841042
18	0.00126	0.16581	-0.01582	0.73470	-0.01144	0.05499	-0.20585	0.613056
19	-0.05892	0.90638	0.06887	-0.07793	0.02552	-0.08007	-0.13044	0.855884
20	-0.03844	0.66645	0.13925	0.05935	-0.18395	0.05683	-0.33109	0.615235
21	0.09233	0.51685	0.18547	0.10779	-0.00948	0.05148	0.00816	0.324485
22	0.71381	-0.03522	0.04519	0.41944	-0.15779	0.18366	-0.00925	0.747455
23	-0.09968	-0.05864	0.70825	-0.13486	0.16488	-0.19048	-0.06892	0.601395
24	0.14437	0.04837	-0.79300	0.03092	-0.13859	0.16302	0.14986	0.721221
25	-0.15750	-0.02412	0.49652	0.33065	-0.20299	-0.11652	0.03537	0.437286
26	0.07396	-0.15935	-0.18944	-0.73568	0.03590	0.23233	-0.25702	0.729309
27	-0.21077	0.45320	0.46891	0.47515	-0.18447	-0.30855	0.08871	0.832567
28	0.34884	0.04626	-0.20868	-0.01364	0.07876	0.79954	-0.04239	0.814822
29	-0.15669	0.03132	0.14830	0.03850	-0.74100	-0.40254	0.07736	0.766118
30	-0.14750	-0.14824	0.06568	0.07961	0.55727	-0.54856	0.10816	0.677554
31	-0.36415	0.01930	0.27152	0.10113	-0.18388	-0.72615	0.09934	0.787897
32	0.24034	0.40826	-0.14288	0.09364	0.29116	0.52651	0.01072	0.615727
33	0.18814	-0.16000	0.00943	-0.37233	-0.58561	0.08874	0.12390	0.565881
34	0.23222	0.00762	-0.01449	0.55253	-0.33400	-0.00014	-0.30541	0.564323
35	-0.24759	0.11681	0.03571	-0.06949	0.79997	-0.13705	0.16385	0.766633
36	0.36481	-0.31681	-0.05461	-0.16047	-0.14123	0.70389	0.04828	0.779930
37	-0.20005	-0.20499	0.13646	0.04117	0.04094	-0.53111	-0.04436	0.388090
38	-0.09236	-0.08722	-0.03652	0.10478	0.12379	-0.57257	-0.15187	0.394675
39	0.06131	0.62387	0.08432	-0.13327	-0.18495	-0.25548	-0.17830	0.549367
40	-0.47834	0.61507	-0.03526	0.24356	0.19514	0.03348	0.24801	0.768397
41	0.35781	-0.23572	-0.67814	0.09655	-0.20625	0.09534	-0.06554	0.708721
42	-0.40310	0.36084	0.62533	0.21445	-0.19424	0.01786	0.20585	0.810148
43	-0.19355	0.72949	0.10172	-0.02512	0.06910	0.09176	0.52812	0.872711
44	0.78018	-0.30420	-0.36252	-0.08640	0.03465	-0.03281	-0.21344	0.887944
45	-0.12596	0.75051	0.09205	-0.02969	0.13107	0.14717	0.54764	0.927241
46	0.77911	-0.31958	-0.30010	-0.06502	0.04241	-0.03464	-0.26177	0.874952
47	-0.80223	-0.07606	0.36684	0.11416	-0.08152	-0.02209	-0.06113	0.807844
48	-0.83295	-0.08530	0.29557	0.09160	-0.12775	-0.05365	-0.02163	0.816737
49	0.43835	-0.55520	-0.36379	0.02687	0.25666	-0.14279	0.02192	0.720208
50	-0.72710	0.07197	0.03105	0.10091	0.05995	-0.13905	-0.14325	0.598460
51	0.70345	-0.15886	-0.06165	-0.09389	-0.07738	0.14135	0.16642	0.586351
52	0.01297	0.63606	0.18916	-0.17412	0.11878	-0.09510	-0.08136	0.500607
53	0.85204	-0.10416	-0.18944	-0.15197	0.10714	0.16389	-0.19519	0.872247
54	-0.84267	-0.13963	0.13979	0.16321	-0.13733	-0.23808	0.06850	0.856337
55	-0.15910	0.60370	-0.02119	0.13808	0.06561	0.14077	0.66707	0.884446
56	-0.01452	0.55818	0.33331	-0.20605	0.06082	0.18474	-0.11714	0.516875
57	0.87464	-0.10198	-0.18595	-0.14549	0.08111	0.16346	-0.20237	0.905393
58	-0.69505	-0.04492	0.03817	0.32310	-0.09360	-0.30875	0.14546	0.716214
59	-0.61744	0.10127	0.09575	0.05010	-0.03835	-0.01814	-0.00794	0.405033
60	-0.55256	0.22657	0.31800	-0.14763	-0.00398	0.02606	0.26737	0.552206
61	-0.19875	0.73736	-0.04915	0.21554	-0.00340	0.04639	0.22814	0.686289
62	-0.18917	-0.35045	-0.14980	-0.51751	-0.14246	-0.04926	-0.11931	0.485821
63	0.56994	-0.27068	-0.49373	-0.01026	0.13929	-0.01238	-0.08085	0.668067
64	-0.54124	0.04730	-0.12398	0.04254	-0.19200	-0.17548	0.04908	0.382424
65	-0.47460	0.02093	0.58900	0.05699	-0.27155	-0.01953	-0.01947	0.650358
66	0.83606	-0.21375	-0.14054	0.12637	-0.25810	0.05975	0.03318	0.851693
67	-0.70469	0.32367	0.29797	-0.10029	0.33453	-0.00239	0.01340	0.812291
68	0.88343	-0.17208	-0.09968	0.10259	-0.26848	0.12128	0.02389	0.917888
69	-0.67849	-0.28163	-0.02958	-0.11483	0.29725	-0.14098	-0.14188	0.682084
70	-0.20966	0.78079	0.13530	-0.13211	-0.21971	-0.05853	0.15607	0.761722
71	-0.79206	-0.06347	-0.05496	-0.10138	0.42501	-0.29734	-0.01044	0.868428
72	0.65568	-0.28476	-0.19516	0.23754	-0.25903	0.20020	-0.00851	0.712774
73	-0.54149	0.45000	0.10283	-0.25574	0.43980	0.09364	0.00422	0.773998
74	0.41943	0.46568	-0.15951	0.52873	-0.01536	-0.00428	0.15317	0.721500
75	0.19033	0.46384	-0.06424	0.50770	-0.03655	-0.03720	0.29277	0.601686
76	-0.18526	0.55754	-0.14035	0.12226	-0.16411	0.20014	0.11799	0.460725
77	-0.09684	0.65800	-0.11842	0.25124	0.01464	-0.08795	0.00903	0.527525
78	-0.06974	0.77982	-0.13158	0.37240	0.12661	0.11998	0.11099	0.811720
79	-0.19344	0.73712	-0.13471	0.10244	0.25202	0.18114	-0.07083	0.710757
80	-0.11377	0.76092	-0.02599	0.30255	0.19428	0.02878	0.20301	0.763950

APPENDIX VIII

ROTATED FACTOR SCORES

Cases	Factors						
	1	2	3	4	5	6	7
1	-0.89504	1.71319	-1.88578	0.88727	2.71089	1.50024	3.48528
2	-1.00478	-0.17251	0.00584	-0.38187	-0.63599	0.93340	0.57297
3	1.73225	-0.01870	0.32829	-0.55771	0.55366	-1.64625	-0.13628
4	1.50973	-0.61137	-0.46268	-1.47883	-0.90648	1.20941	1.06887
5	1.13925	-0.11093	0.41355	0.92056	-0.90706	-1.48171	1.08131
6	0.85239	0.19785	-1.22129	-0.10829	-1.25796	-0.27736	-0.59350
7	1.08183	0.60690	0.59546	0.62451	0.24761	-1.11568	0.04451
8	0.40766	0.96196	-0.85923	0.33594	-0.88197	1.19860	-2.14610
9	1.27889	-0.01769	-1.00047	1.41635	-0.48547	-0.09087	1.60333
10	1.12424	0.11662	1.50198	0.69214	-0.39536	0.41045	-0.47772
11	1.45271	0.17701	0.00106	0.87010	-0.43632	-0.06256	-0.37475
12	1.65154	-0.02385	0.36341	1.14487	0.90247	-0.01299	1.32259
13	0.46748	-0.63553	-1.23951	1.23691	-0.31712	0.02134	-0.02258
14	1.22209	-0.21010	-0.77435	0.29163	-0.96236	1.26366	-0.49002
15	0.46591	-0.24719	0.16011	1.58680	1.09754	1.90197	-0.61148
16	0.97835	0.39507	-0.56750	-1.93032	-0.88994	0.62281	-0.57268
17	1.10798	0.56743	-0.03567	0.57196	0.49992	1.63851	-2.14439
18	1.47635	-0.64957	-0.40270	0.01025	-1.10624	-0.51153	0.26793
19	1.18965	-0.01546	0.29030	-1.25299	-0.06699	0.45075	1.05994
20	1.15160	-0.30815	-0.30603	-0.26711	-0.05928	0.90614	-0.68389
21	-0.72455	-0.35819	-0.25954	1.18183	-0.75142	1.96100	-1.05296
22	-0.17003	-0.26499	0.58117	0.88331	0.51084	-0.17909	-0.29621
23	-0.16323	0.04358	0.42159	1.53972	0.83037	-0.45513	-0.20977
24	-0.58667	-0.43277	0.31940	0.34957	-1.31546	0.65292	-1.02816
25	0.87438	-0.67386	-0.66683	-1.97782	0.41419	0.16527	-0.03993
26	0.67451	-1.15590	1.43474	0.36000	1.83144	-1.68382	1.13032
27	0.39150	-0.26997	-0.53319	-2.00568	0.32460	-2.58018	-0.47033
28	-0.32771	-0.85003	2.31347	-1.72536	2.03937	0.87970	-0.76929
29	-0.08787	0.02551	1.41960	-0.17252	0.41520	0.02020	-0.23280
30	-0.84625	-0.20329	-0.47857	-0.31941	0.03660	-0.18342	1.23498
31	-1.59003	0.09383	-1.55857	0.44577	1.03515	-0.22355	-0.57111
32	-0.36164	-0.06730	-1.19555	-0.59052	0.56382	-1.85515	-0.84984
33	-0.84311	0.13199	-0.01129	0.92515	-0.37727	-0.93424	-0.49702
34	-0.36500	-0.33195	-0.81177	-0.84971	-1.18963	-0.95997	-0.46896
35	-0.83678	-0.50471	0.67194	-0.57954	-0.69875	-0.47506	-1.03786
36	-1.24284	0.65026	-0.93779	1.40672	-1.06613	0.16225	1.87873
37	-1.51626	-0.33447	1.64834	-0.46132	-0.43694	-0.69555	-0.67950
38	-0.20899	0.36282	0.91217	2.27302	1.03800	-0.77942	-0.97748
39	-0.36907	5.84158	0.76848	-1.48205	-1.18843	-0.62229	-0.17655
40	-0.26617	-0.00031	2.04788	0.64236	0.02948	0.23043	1.16093
41	-0.99270	-0.66609	1.94138	0.07115	-1.00074	1.32014	1.07218
42	-0.64428	0.41017	2.16045	-0.74061	-1.22889	0.89558	1.26587
43	-1.42061	0.16930	-0.39898	0.47693	-0.48087	0.21910	0.07718
44	-1.86733	-0.97552	-0.34113	0.02472	-1.04122	-0.87291	0.45747
45	-0.41459	-1.12135	-0.41766	-0.43200	-0.24415	-0.26609	1.17158
46	-1.09533	0.04152	-0.20678	-0.93566	-0.38727	0.22053	-1.84371
47	-1.18133	-0.34975	-0.32647	0.84975	0.29246	-2.39347	0.44643
48	-0.31916	-0.80780	-0.62300	-0.33520	-0.06048	-0.77871	0.63540
49	-0.80501	-0.58837	-1.02543	-0.37326	0.34009	-0.21879	-0.56336
50	0.19183	1.37408	0.03600	-0.70607	2.75086	-0.31145	-1.57011
51	-0.49894	-0.08093	-1.25283	-1.62168	0.92028	0.09597	-0.38325
52	-0.77831	-0.81914	-0.53753	-0.73734	1.38730	2.79860	0.92781

APPENDIX IX

ROTATED CONTROLLED FACTOR SCORES

Cases	Factors						
	1	2	3	4	5	6	7
1	-0.8056	2.3887	-0.8493	0.8980	2.4453	1.3526	4.0336
2	-0.8224	-0.0085	0.1758	-1.2378	0.7115	-0.1088	0.6115
3	1.2712	-0.3888	-0.3319	-0.1280	0.0756	-0.6791	-0.5486
4	1.7711	-1.0443	-0.8715	-1.8181	-1.8837	0.7626	-0.5486
5	0.9430	-0.0159	0.4374	1.1285	-1.3329	-0.6512	0.6106
6	1.2647	-0.2805	-1.0197	1.0816	-0.9889	-0.1315	-0.5486
7	0.8144	0.5404	0.2650	0.7271	-0.3228	-0.0099	-0.3492
8	0.7968	0.7830	-0.9325	0.2529	-0.6774	1.4186	-0.5486
9	1.4668	0.2927	-1.3189	1.1568	-0.3818	0.6149	0.2534
10	0.7641	0.3999	1.1800	0.6105	-1.1132	0.4152	-0.3274
11	1.3571	-0.0244	-0.4422	0.8526	-0.0860	-0.3212	-0.5486
12	1.4081	0.2800	0.2345	1.2000	0.1651	0.6907	0.6400
13	1.0953	-0.3855	-1.2189	0.6907	-0.4642	0.9459	-0.5486
14	1.3872	-0.4088	-1.7103	0.1088	-1.2576	0.5448	-0.5486
15	0.6586	-0.0107	-0.4020	0.9920	0.7126	1.0021	-0.3049
16	1.0944	-0.3060	-0.8114	-1.3059	-1.3419	1.1187	-0.5486
17	1.2512	0.1399	-0.6322	0.8988	-0.6257	1.6611	-0.5486
18	1.8031	-0.5809	-0.9935	-0.2503	-1.6246	0.8565	-0.5486
19	1.0069	-0.1995	-0.4626	-0.4990	0.3307	1.4160	1.1601
20	1.2720	-0.7267	-1.1016	0.0351	-1.0044	1.7125	-0.5486
21	-0.0333	-0.0107	0.0746	0.4559	-0.8706	1.2759	-0.5486
22	-0.2127	0.0452	0.6433	0.5591	0.2737	-0.4559	-0.2163
23	-0.4315	0.5803	0.1940	1.2248	0.2953	-0.3252	0.0672
24	-0.5519	-0.3468	0.2619	0.3728	-0.4093	-0.4564	-0.5486
25	1.2157	-1.2315	-0.8489	-2.6653	0.3129	0.6165	-0.5486
26	0.2241	-0.8192	0.9718	-0.3363	0.6070	-1.9517	-0.5486
27	0.0159	-0.9332	-0.8637	-1.5459	0.7080	-1.1385	-0.5486
28	-0.9545	-0.9421	1.5073	-1.9068	2.1133	0.6923	-0.5486
29	-0.4543	0.1293	1.2456	-0.0000	1.0160	-0.4737	0.0520
30	-0.6657	-0.2333	-0.2888	-0.6636	0.5809	-1.5497	0.3556
31	-1.1181	0.3710	-0.8701	0.0776	1.5321	-0.3029	-0.5486
32	-0.3194	-0.5204	-0.8739	-0.3399	1.2351	-2.3293	-0.5486
33	-1.0384	0.2183	0.7885	0.8008	0.1982	-1.5574	-0.3137
34	-0.0049	-0.6324	0.0101	-0.5338	-0.7411	-0.3204	-0.4451
35	-0.9852	-0.6420	1.1007	-0.6836	-0.7939	-1.1401	-0.5486
36	-1.1663	1.4322	-0.1441	1.5991	-0.5672	0.0945	1.5995
37	-1.5988	-0.3806	1.8784	-0.3594	-0.0839	-0.6663	-0.5486
38	-0.5481	0.7213	1.4304	1.8146	1.4527	-0.9858	-0.5486
39	-1.4656	5.3734	1.5965	1.2124	-0.4468	-0.3053	4.0200
40	-0.9649	0.4521	1.9987	1.1210	0.7303	-0.3544	1.7148
41	-1.0329	-0.1454	1.9974	-0.4254	-0.7230	0.5146	-0.3714
42	-1.1639	0.4593	2.4377	-0.2200	-1.1978	-0.2532	1.4227
43	-1.1190	0.2476	0.3133	0.6090	0.3904	-0.4372	0.7340
44	-1.4698	-0.7967	0.0817	-0.3714	-0.7359	-1.0075	-0.3973
45	-0.1811	-0.9931	-0.1712	-1.2488	-1.3266	0.3924	-0.5486
46	-1.0391	-0.1385	-0.0842	-0.5618	-0.1722	-0.2586	-0.5486
47	-1.2157	-0.1800	0.3620	0.7176	0.3826	-2.5974	-0.4132
48	-0.0811	-0.8463	-0.7420	-0.6053	-0.1543	-0.4471	-0.3344
49	-0.5414	-0.5536	-0.7629	-0.6483	0.5123	0.2303	-0.5486
50	-0.4048	1.0672	-0.0081	0.3214	2.3187	0.4720	0.0937
51	-0.1057	-0.4783	-1.4924	-1.7203	1.3165	1.0849	-0.1794
52	-0.3855	-0.7169	-0.9377	-1.4441	0.9113	1.3300	-0.0022

APPENDIX X

MEANS AND STANDARD DEVIATIONS FOR CONCENTRIC ZONES AND SECTORS OF CONTROLLED FACTOR SCORES

Dimensions		Concentric Zones			Sectors					
		1	2	3	1	2	3	4	5	6
	Size	15	26	11	14	12	5	6	5	10
Ethnic-Immobility	Means	1.1627	-0.3756	-0.6977	-0.3182	-0.7640	0.2408	0.9759	0.6799	0.3164
	S.D.	0.3143	0.8659	0.5069	1.0437	0.7540	0.9836	0.7603	0.8596	0.6774
Economic Status	Means	-0.0325	0.1843	-0.3914	0.1885	-0.0842	0.6349	0.0933	-0.3419	-0.3653
	S.D.	0.4332	1.3397	0.4383	1.5589	0.6931	1.0741	0.7258	0.3716	0.5529
Stage in Life Cycle	Means	-0.6244	0.4584	-0.2319	0.2439	0.5431	-0.1516	-0.4193	-1.0250	-0.1533
	S.D.	0.7348	1.0881	0.5423	1.1012	1.0805	0.8674	0.7410	0.7615	0.6905
Educational Status	Means	0.4368	-0.1221	-0.3070	-0.0893	0.0691	0.0791	0.4329	-0.2330	-0.1407
	S.D.	0.7110	1.2144	0.6137	0.9930	0.8804	0.8307	1.1484	1.2944	1.1927
Salary Worker Status	Means	-0.5787	0.2834	0.1192	0.3083	-0.3994	0.2884	-0.4319	0.1342	0.0956
	S.D.	0.6651	1.1159	0.8606	1.1092	0.6448	1.3941	1.4704	1.0366	0.6316
Selfemployed Status	Means	0.7956	-0.0841	-0.8861	-0.4224	-0.3194	0.4797	0.1761	0.9193	0.1695
	S.D.	0.6292	0.8508	1.0022	0.9728	1.0301	0.9133	0.5362	0.3120	1.2152
Foreign Origin	Means	-0.2577	0.3137	-0.3901	-0.0906	0.1467	0.6441	-0.0814	-0.1278	-0.2585
	S.D.	0.5247	1.2996	0.2635	1.2146	0.9335	1.9544	0.4754	0.4904	0.5403

APPENDIX XI

MEANS AND STANDARD DEVIATIONS OF REDESIGNED CONCENTRIC ZONES

Economic Status Dimension				Educational Status Dimension			
	Size	Means	S.D.		Size	Means	S.D.
Inner Zone	27	0.3124	1.1252	Inner Zone	30	0.3475	1.0019
Outer Zone	25	-0.3374	0.7528	Outer Zone	22	-0.4738	0.8260

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