

THE MONADNOCK



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CONTENTS

DIRECTOR'S MESSAGE	2
THE JESUITS IN NORTH AMERICA: A STUDY IN ENVIRONMENTAL CONCEPTUALIZATION. Henry Aay	4
STRUCTURE IN TRANSACTION SYSTEMS. Christopher Clayton	9
CULTURE AND AGRICULTURE ON THE AMERICAN FRONTIER Brad Baltensperger	22
THE PROBABILISTIC APPROACH TO SPATIAL THEORY. Kang-tsung Chang	30
ARCHITECTURE AND GEOGRAPHICAL STUDIES: A REVIEW. Stephen Hobart	36
AN ESSAY ON GROWTH POLE THEORY. D. David Miller	40
MIND, MEANING, AND MILIEU: PSYCHOLOGICAL NEED AND DESIGNED ENVIRONMENTS Ernest A. Wight Jr.	43
SPATIAL DYNAMICS IN CLASSICAL LOCATION THEORY Alfred Hecht	52
THE GRADUATE SCHOOL OF GEOGRAPHY.	56
ALUMNI NEWS	65
A NOTE ON THE QUESTIONNAIRE	80

DIRECTOR'S MESSAGE

This academic year is very special for Geography at Clark, marking the fiftieth year of the founding of the Graduate School of Geography by Wallace W. Atwood. Dedication of the new Geography facilities - with special recognition to the memory of John K. Wright, Historical Geographer and Geosophist, an adopted son of Clark - is one appropriate mode of celebration. Another mark of the occasion is the honor accorded to two major figures in American Geography: Clark could not have chosen two more distinguished geographers than Richard Hartshorne and Samuel Van Valkenburg on whom were bestowed Honorary Doctorates of Law at the anniversary ceremonies of April 17th. Very different in their contributions and their characters, Richard Hartshorne provided American geography with its philosophic and methodological rationale and Dr. Van made geography live for four decades of Clark students, in addition to having led the school during the critical middle third of its history. In honoring these two men, Clark honors the accomplishments of American geography and affirms the very special place that Geography holds in the life of the university.

This year also marks my sixth year as Director and the end of what might be described as a new development phase in the history of the School of Geography. The period of program restructuring, faculty expansion, student support and facilities renewal is behind us. Ahead lie the years of consolidation and maturing. We point with pride to our faculty, a youthful body of talented scholar-teachers that numbers fifteen full-time and three part-time, and to a graduate student body of 55 that is diverse, inquiring, and professionally-oriented. We consider the emergence of a significant undergraduate program, offering dual degrees and 7- and 5-year Ph.D.'s and M.A.'s, to be a partial fulfillment of our commitment to Clark to find a symbiosis of undergraduate and graduate life. That two of Clark's three Woodrow Wilson Fellows this year are Geography Seniors tells something about the quality of our undergraduate majors. Our new building, including laboratories and modern equipment will stand us in good stead for the next quarter of a century of Geographical researching and teaching.

Clark Geography is a distinct School of thought, with focus on the Man-in-Environment System; its programmatic structure builds on selected, interlocking subfield concentrations, with emphasis on problem orientation; its outlook, training and learning milieu are strongly inter- and multi-disciplinary; its commitment to a concern for social issues is firm. A development period is not without its setbacks and changes. Some staff turn-over, shifts in programmatic objectives, and disappointments over failure to develop certain sub-fields have occurred. But this was to have been anticipated; only if we had not ventured, would set-backs not have occurred. For the years ahead, I see the maturing of our scholarly base: a period of productive research by individuals and teams of scholars; a period of exciting teaching/learning in which faculty and students will share.

Coming as the culmination of the six most satisfying years of professional life, this year has nevertheless not been without its appointments and concerns, including doubtlessly the natural "let-down" that sets in as the development tempo slows and the initiation of new ventures lessens. Satisfaction with seeing the development phase fulfilled has been tempered by stress within the geography faculty and between some of our student body and faculty over issues of personnel and governance. Fundamentally, I see these issues as part of the broader question of the nature of the Academy - its central concern for the normal teaching/learning process, and the responsibility of faculty and students alike to maintain the university as the center for rational discourse. I remain committed to an open system of shared responsibility among faculty, students and administrators for the maintenance of the Academy, I continue to believe that our teaching and research should be touched by life," I hold to the belief that the campus is an appropriate place from which the individual has the responsibility to speak out on the issues of our times. I am opposed, however, to an Academy which is an excuse for anarchy, to an Academy wherein academic responsibility is actually fixed on the faculty that is the basis for its direction and continuity, and to an Academy which does not put a premium on the intellectual integrity of scholarship.

Personal sentiments aside, however, what is important is the future that has been built - it is broad and solid, focused and flexible. It provides great promise for the years ahead. To Clark geography alumni, who have a responsibility to the University as a whole to further its objectives and programs, I remind you of the major commitment that the University and governmental educational agencies have made to the rebuilding of Clark Geography. In the years ahead, your participation as partners in this effort will be required to enable geography to maintain its present momentum. An institution that shows itself capable of growth and development is an institution that has a claim upon the loyalties of its alumni.

Saul B. Cohen
Director

THE JESUITS IN NORTH AMERICA: A STUDY IN ENVIRONMENTAL CONCEPTUALIZATION

by

Henry Aay

World views play crucial roles in environmental perception and cognition (1, 6). The purpose of this essay is to suggest relationships between philosophical-theological ideas and environmental cognition and evaluation. The author wishes to show that the man-environment encounter need be investigated against background of prevailing philosophical tenets and cultural ideals. It is not held that principles such as these are consistently carried out, nor that they do not contain within themselves any antinomies. However, the discrepancy between ideal and practice, and the important consideration of internal contradictions within the value system of a culture are not treated here (3).

For each year beginning in 1610, the superior of missions in French Canada sent to France an account of achievements in the mission field (4). This yearly relation usually consisted of a number of reports submitted to the Quebec superior by Jesuit priests in the field. Widely read by the educated elite of France, the published relations were intended to solicit support for the French Canadian missionary enterprise (2, p. 91). In addition to this stated intention, the relations served to acquaint the European reader with the New World.

The Jesuit explorations ranged throughout a variety of physical environments: the Laurentian Shield, the St. Lawrence Valley, the Appalachian System and the Great Lakes Lowlands. Usually the Jesuit missionaries were the first to explore an area, and more importantly, they left extensive reports of their experiences. However, they were only peripherally interested in the North American environment; rather, their focus of interest was centered on rendering accounts of the mission enterprise. This is important as it might be construed from the following remarks that the purpose of the relations was to familiarize the European reader with the geography of North America. Indeed, the nature of activity within any given environment is a primary limiting factor governing environmental cognition and evaluation: activities may be carried out to a greater or lesser extent independently of their environments.

Three concepts central to the Jesuits' world view will be examined here: Nature/Grace, Utopia - a Canadian Corpus Christianum, and the Jesuit as scientist.

Nature/Grace

The Nature/Grace scheme splits reality into two realms: one of Nature that is chaotic and fallen into sin, and the other of Grace

God's gift, man's task) that perfects Nature, and develops the potentialities that are inherent in Nature. In short, the Grace of God is needed to perfect Nature (viewed here as an entire segment of reality not only the physical milieu). Important here is the notion that civilization is the product of a Christian way of life; the 17th century 'civilized' world was indeed the Christian world.

This conceptual framework runs both implicitly and explicitly throughout the Jesuit relations. Those parts of the world lying outside God's Kingdom of God are still deserts and howling wildernesses where the evil one has ruled since the beginning of time, and which frequently have lain fallow since the beginning of the world. Biard, of the first Jesuits in North America, concluding his description of the wilderness, writes in 1616:

Now we need not go out from our own hemisphere to see and recognize this truth; Greece and Palestine confront us, formerly as beautiful as Eden, today a mournful desert (4, Volume 3, pp. 31-33).

What is especially instructive in this quotation is that references to the environment are not merely theological metaphors but rather are meant to apply directly to the landscape. Palestine reece were viewed as extremely poor physical environments because turned away from God. Where God's Kingdom does extend however, writes:

The earth is a garden of delight where all blessings even temporal and worldly happiness follow the people (4, Volume 3, p. 31).

The environment itself constitutes an important part of this paradise. In short, Grace must be applied to nature so that God's Kingdom may be established.

Many other Jesuits echo this dualistic way of thinking; le Jeune, Superior of the French Canadian missions, opens the 1635 relation indicating that:

Now at last, New France is about to experience the blessings of the mother country; and right, triumphing over injustice, will cause these countries to cease being what they have been for so many centuries, - boundless forests, the abode of barbarism, and the land of infidelity. We begun to see some open country, through the clearings that have been made in different places. The families who are coming over every year are beginning to change the barbarism of

the Savages into the courtesy natural to the French;....the Faith will banish infidelity from its Empire (4, Volume 7, p. 255).

The desire of the Jesuits to have the land cleared, their guarded optimism with respect to North America's agricultural suitability (especially in the case of meadow and prairie landscapes), and their efforts to effect a sedentary way of life for the Indian population should be viewed in the light of this perspective.

Utopia: A Canadian Corpus Christianum

The Jesuits asserted that God's Kingdom must be extended into the wilderness of the New World. This garden would be realized by the conversion and sedenterization of the Indians, and the erection of a new social order - a model Roman Catholic society built along Thomistic lines in which the church would stand at the apex of society (5, pp. 14-15). Above all the decadence and corruption of Europe could be avoided. Vimont writes from the Quebec Mission in 1642 that

Lawsuits, ambition, avarice, lust, the desire for revenge, - which are the evil spirits of Europe, - are rarely seen here; our forests are not suitable for lighting their fires (4, Volume 22, p. 39).

and earlier he relates that

....the road to Heaven seems shorter and surer from our great Forests than from your large cities (4, Volume 18, p. 85).

LeJeune encouraging immigration writes in 1636 that people can

live here with more piety, more immunity, and more liberty. The din of Palaces the great uproar of Lawyers, Litigants, and Solicitors is heard here only at a thousand leagues' distance (4, Volume 9, p. 139).

To the Jesuits, North America represented the possibility of a new beginning, of a simpler (rural), less complex way of life, and of avoiding the secular currents that were beginning to rip into the hegemony of the Roman Catholic Church. Immigrants were therefore carefully screened. Only those who would be willing to establish a political theocracy in French Canada, and who by their exemplary Christian conduct would redirect the lives of the Indians were welcomed. Efforts of Huegenots and other free thinkers to immigrate were resisted, as were attempts to transplant the French feudal order to the New World (5, pp

The theocratic ideal of the Corpus Christianum thus gives a particular expression to the Grace side of the Nature-Grace tension posed in the preceding section.

Unit as Scientist

An undercurrent of objectivity, of careful description, of proceeding logically from one step to another runs throughout the entire relations. Nature is viewed calmly and systematically; description is sober and dispassionate, accurately detailed and carefully organized. Descriptions of Indian mores read like case studies in social anthropology; those of fauna and flora are exact and detailed. The Renaissance romantic is certainly not to be found in these missionary explorers; rather they are children of the age of reason (2, preface). Sight at discovering new flora and fauna, and aesthetic sensitivity to the landscape are kept to a minimum.

These attitudes may be explained on the one hand by the nature of the missionary enterprise, and on the other by the educational background of the Jesuits. With regard to the former, the physical world was regarded as an obstacle to be overcome, a barrier limiting the effectiveness of the missionary enterprise. Moreover, the explorer-environment encounter was harsh affording little aesthetic appreciation. As to the latter, the Jesuit explorers were highly trained in the physical sciences of their day as well as in theology and philosophy. Geography was their specialty; many had come to the New World from leading positions at French schools. Scholarly description and analysis, and a certain detachment from objects of reference necessary to science were trademarks of their vocation and are in evidence throughout the relations.

Conclusions

Before treating environmental perception and behavior specifically, it is important that the cultural/philosophical perspective from which individual or group views Nature be identified. In the case of the Jesuit explorers it is asserted that these macro-views form the background for the understanding of the explorer-environment encounter.

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STRUCTURE IN TRANSACTION SYSTEMS

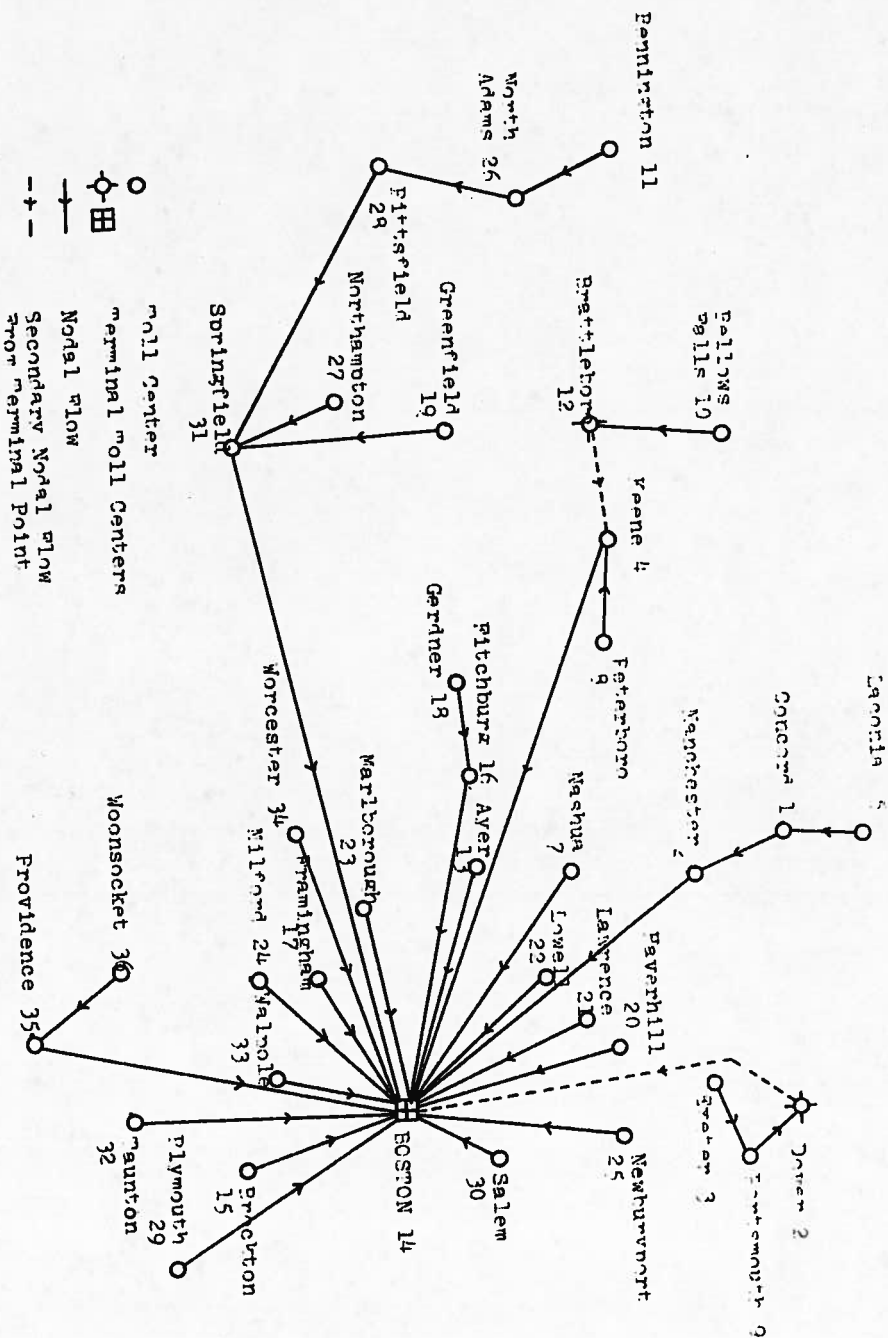
By Christopher Clayton

The following research note will explore some interrelationships between the structural characteristics of a system as exemplified and interpreted by two different modes of analysis. The system to be used in analysis is made up of the major urban centers of Massachusetts and adjacent parts of neighboring New England states. The linkages between places in the regional system are measured by means of the number of phone message units passing between them, and their associated trade flows, during a sample period.

Regionalization. The concept of regionalization has been, is, and most likely will continue to constitute one of the major concerns of geography. The concept has changed its appearance over the years but one overriding characteristic remains: internal consistency or homogeneity. This may be expressed in terms of the "natural region," the "urban region," the central "trade area" or "hinterland," the "social area" or the "economic region." All these characterizations of the concept of region (with the exception of the "social area" as early defined by Shevky and Bell, but mainly not its latter connotations) have this criterion of internal consistency and functional wholeness: the units contained within the region are more like any other member which is also contained within the region as measured on certain characteristics or on their degree of relatedness, than like any unit which is outside the bounds of the region or "group." And to this definition the constraint of spatial continuity of group members and one has one of the basic units of concern to geographers: the region. Thus the regional concept is one mode of classification of units, a classification which possesses as a major constituent the ingredient of space. It will be seen later, however, that this spatial component is in many cases more implicit than explicit and only rarely does space enter the taxonomic process as an independent variable in its own right.

Technique and Data Source. The methods of regionalization utilized as examples will be the graph--theoretic definition of nodality as used by Nystuen and Dacey (1) and a grouping or cluster technique proposed by Veldman (2). The results from both techniques will be compared in search for common underlying structural components present within the transaction system.

Briefly, the system to be regionalized is the organizational structure of a telephonic communication system in part of New England. The five New England states of Maine, New Hampshire, Vermont, Massachusetts and Rhode Island are part of the national Bell Telephone system and constitute a portion (as defined by them) known as the New England Telephone and Telegraph Company. This sub-system is further structured. The main forms of organizational structure which will concern us here are designated "Centers" and "Rate Points."



The Centers are major switching positions, high level interchange points all have the ability to communicate directly with the other nationwide toll centers. Rate Points are of a more localized nature and any communication outside their immediate neighborhood must be channeled through their regional center. The exchange is an even lower level organizational unit and constitutes an entity with a maximum of 10,000 telephones. The Rate Point exchange need not be coincident, but in non-urban areas they usually are further, are usually designated according to a "community of interest" criterion.

The system arbitrarily delineated here is made up of 36 Toll Centers: all in places. They are considered as a point - phenomenon but actually they possess areal characteristic since they are the major centers that serve and must fill up space. Moreover, each is fed by a number of Rate Points, which also have an areal definition.

Graph-Theoretic Nodality: Let us first consider the toll center data, which are in the form of a 36×36 non-symmetrical matrix of transactions, number of telephone message units passing between places. We shall apply to these data the graph-theoretic technique of nodality detection exemplified in the work of Nystuen and Dacy. Nodality is taken here to be the structure of dominance and sub-dominance exhibited by a set of interconnected entities. The "functional region" is thus defined. In practical terms this can be translated as follows: node i is sub-dominant to node j if and only if, the flow from i to j is the greatest outflow of point i , and the mass (somehow defined) of the terminating point j is greater than that of the originator point i . Following Nystuen and Dacy, mass is here defined as the total number of incoming flows to a point, i.e., its importance as a sink in the system. Thus the flow matrix is $[x]$, the nodal flow designated n_{ij} of point k is to point m , i.e., $n_{km} = x_{km}$ if and only if $x_{km} = \max x_{kj}$, $j=1 \dots k \dots N$ (where N is the total number of points in the system) and $\sum_{i=1}^N x_{ik} < \sum_{i=1}^N x_{im}$. If in the analysis $x_{km} = \max x_{kj}$, $j = 1 \dots k \dots N$ but $\sum_{i=1}^N x_{ik} \geq \sum_{i=1}^N x_{im}$, then point k is

classified as a "terminal point." There may well be several such points in the matrix but the most obvious one will usually be the node which constitutes the focal point of the entire system. Thus this arbitrary rule (although arbitrary, reasonably realistic) defines dominance in terms of size such that a small place may be subordinate to a large one, but a large one may not be subordinate to a smaller one.

The results of such a nodal analysis are shown in figure 1, and it is evident that the set of isolated points (toll centers) and their flow matrix (here shown) possess an associated graph (set of points and interconnections) which illustrates the gross structural composition of the system under consideration. Given such a nodal structure, it is quite simple to construct a dominance/subdominance hierarchy of relationships. This is shown in figure 2.

The structure thus delineated is not surprising, or previously unknown, in fact it is well supported by previous work in the area. Basically, the whole eastern part of Massachusetts is dominated totally by Boston which

Figure 2:

LEVEL:

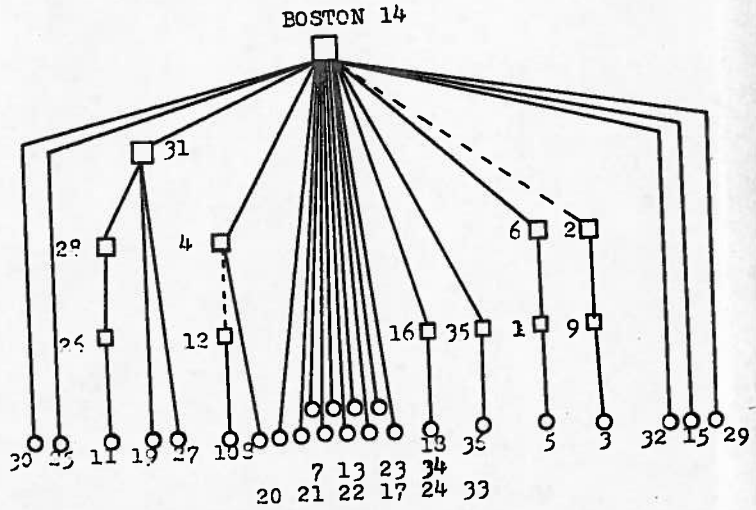
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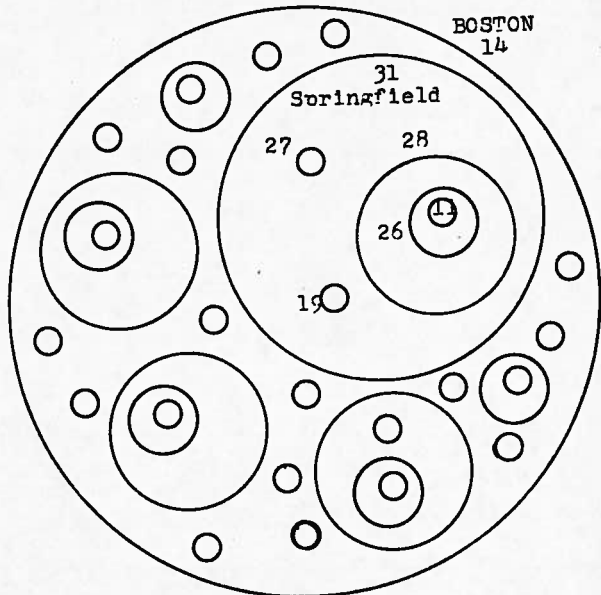
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2

1



A: HIERARCHICAL REPRESENTATION OF REGIONAL NODAL STRUCTURE OF PART OF NEW ENGLAND.



D: SET THEORETIC REPRESENTATION OF ABOVE STRUCTURE.
(Identification Numbers as in Figure No. 1)

as a whole cluster of directly dependent, satellite communities tied to it by the correspondence of code numbers and place names in Fig. 1). Boston is also, incidentally, the focal point of the entire system and a terminal point. No other place rivals Boston in dominance, but several locally dominant places do exist, the most important of which appear to be Springfield, Mass., and Keene, New Hampshire. Springfield has a relatively extensive set of subservient places attached to it (Northampton, Greenfield, Pittsfield, North Adams, and Bennington) and stands out as having much more nodality or centrality than its competitor to the east, Worcester. It would appear that the latter place is too close to Boston to be able to carve out any substantial niche in the nodal structure; it lies in the "shadow" of metropolitan Boston. Such a nodal structure can be translated into a dominance/subdominance hierarchy of relationships with the dominant place being of a higher order than the immediately subservient one. Thus, by definition, a node which is dependent upon one subservient node is of the next higher order, as is one which has two or more subservient places.

Lastly, one may ask about the spatial structure of such a system. If one can define the nodal structure of a set of points, and if each point has been attached to it a trade area of some extent, one can automatically fill space in a hierarchical manner. This can be illustrated as follows with the above analyzed data, the last step involving the translation of a non-spatial hierarchy into a system of spatial sets. It can be seen that the concept of spatial nesting is much better illustrated by the set-theoretic approach than the hierarchical structuring approach. See figure 2.

The next step in the analysis of the regional structure, still by means of the graph-theoretic definition of nodality, is to take a part of the previous system and analyze it at a smaller scale. Thus the 154 places (13 of the original toll centers plus 141 associated rate points) which constitute part of the western part of the system are considered this time as the population. At this scale the structure remains quite complex with many interconnections between areas and overlapping of zones of dominance. There is a substantial difference between the organizational structure assigned to the telephone company and that assigned by this analysis.

Lastly, analysis is made of the Springfield sub-system in isolation of other parts of the greater system and comparisons are made between its structure as so evidenced, and that structure illustrated earlier and shown by the use of the 154 x 154 matrix. This new matrix is 64 x 64 (4 toll centers and 60 rate points).

There is no change in structure as illustrated by the 64 x 64 matrix; linkages of dominance and sub-dominance being identical in each case.

It might be thought that the structure being isolated by this graph-theoretic nodal technique depends for its effectiveness on some size factor related to the nodes themselves. An attempt was made to analyze the flow system and to see the effects that sheer size might have on the structure and organization of the system. Thus the flows between places were weighted by population and the nodal analysis was repeated. The raw flow data was adjusted in the following manner: the flows from point i to all other points in the system were divided by the population "weight" of the node i . The structure isolated

in this 36 x 36 regional system differs very little when this alternative method is applied to it. Before weighting, the nodal flow from node number 9 was to node 2, which in turn was a terminal point (with a secondary linkage to node 14); after weighting the nodal flow was from node 2 to node 9, and 9 became the terminal point (also with a secondary linkage to node 14), i.e., these two nodes exchanged places. Thus in this instance, population size would appear not to be a factor in accounting for the nodal structure of the system. (Refer to Fig. 1 for unweighted nodal structure.)

The major conclusion to be drawn at this time is that here is an illustration of the nature of a well-defined system. What, at one level of inquiry appears as a whole is, at another level, seen to be composed of a group of sub-sets, each interconnected into the whole. With access to data of smaller enumeration units such as individual telephone exchange flow data, a more detailed picture of human group interaction would surely yield a yet more complex set of sub-systems and a more complete idea of the spatial integration of an area would be forthcoming. As it is, this is the lowest level of aggregation for which data is available and hence our analysis must end here.

It is felt that evidence has been presented of the efficacy of utilizing simple graph-theoretic techniques in the identification of the nodal and hence "functional" regionalization of part of New England. Here we have been concerned with the view of a region as a system; a set of elements and the relationships among these elements, rather than with the definition of the more traditional homogeneous, areally differentiated region. This approach, which is more concerned with spatial interaction than with areal segregation, aids in providing a more useful standpoint from which to view the interrelationships and linkages between the separate parts of the urban system. Moreover, these urban sub-systems in themselves may be thought of as metropolitan or urban regions. The graph-theoretic approach thus provides a dynamic picture; one viewed in terms of linkages and bonds rather than in terms of boundaries and barriers. The remaining question is as to whether or not the same data, analyzed using different techniques, will yield similar structural results.

Cluster Analysis: The second method of analysis utilizes one of a variety of clustering techniques: a hierarchical grouping procedure by the name of HGROUPE. HGROUPE is a computer program and the author, Veldman, (2) states the purpose of this program as "to compare a series of score profiles (over a series of variables), and to progressively associate them into groupings in such a way as to minimize an overall estimate of variation within clusters."

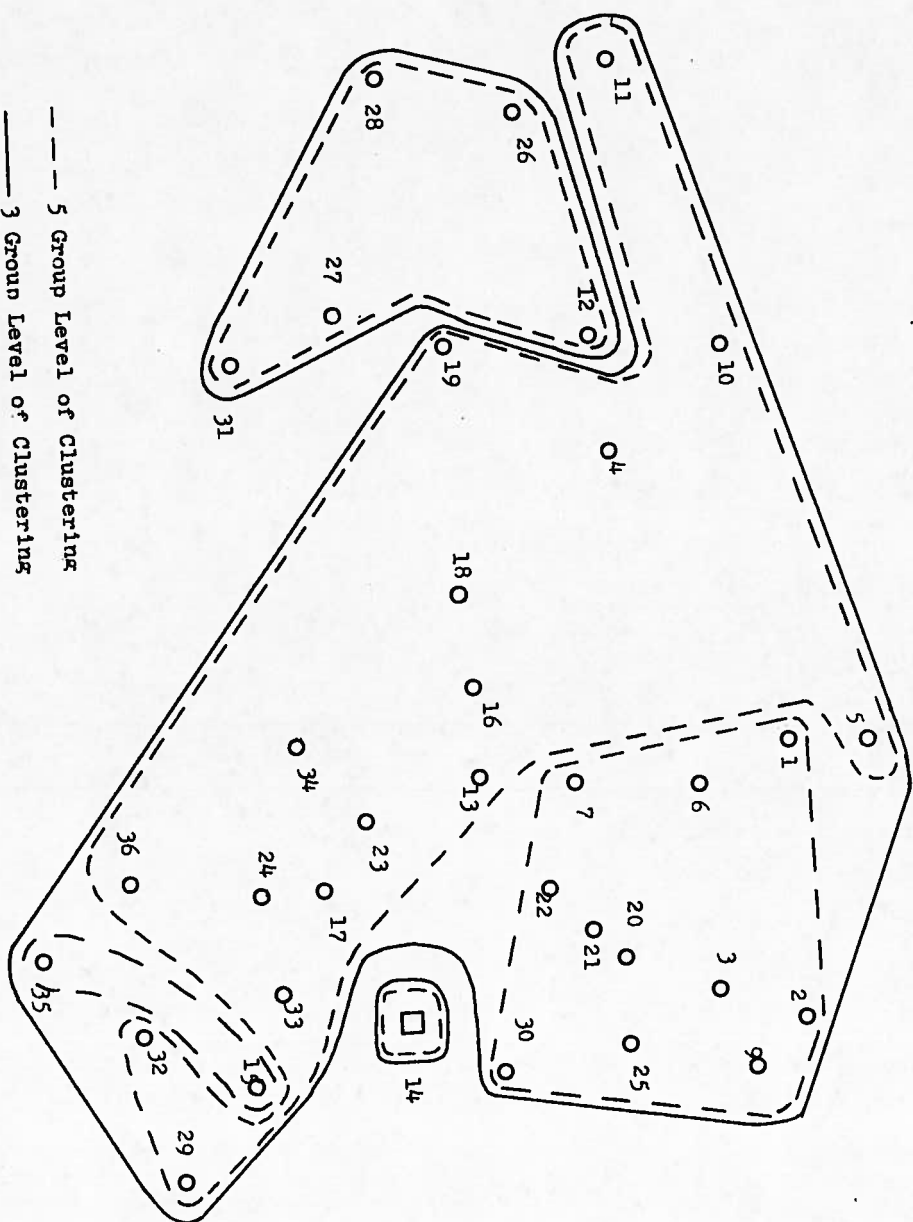
We mean by "score profile" the measurement of a set of observations, one at a time, over a set number of pre-determined criteria. These criteria could be such common known variables as rainfall, population density, rural population, or employment in manufacturing, which are measured over a set of areal units. The program, provided with such data, proceeds to group the observational units (be they countries, states, towns, etc.) into groups having maximal commonality within themselves and maximal differentiation between themselves. The criteria utilized here are flow profiles; hence the analysis yields a regionalization based on the concept of areal differentiation but one using as criteria of such differentiation indices of

mutual interrelatedness. This method has increasingly been used in geographical research as a classificatory device since the members of a group are more like each other than they are like any outside element; hence their use as a device of regionalization based upon a set of variables or criteria over which each areal unit is measured. In the case here each observation constitutes a place and this place is observed over $N - 1$ variables, where N is the total number of places in the population and where each variable is a measurement of flow magnitude. Thus, we are here comparing places by observing the variations in their outflow profiles. According to the technique, the more alike are these profiles, i.e., the more alike are their relative positions and functions in the $N \times N$ transaction flow matrix, the more likely are the places to be placed in the same group or cluster. Any place which has a highly individualistic profile will remain exterior to any group for the greatest possible time, as is the case with Boston itself in this example.

The 36×36 regional flow data matrix was analyzed using HGROUP and it appeared that the most meaningful classification or grouping occurred when there were (a) 10 separate groups, or (b) 5 separate groups. In the analysis there was a large increase in the "error term" associated with the classification if grouping were carried on an additional step. It was decided to illustrate the results before these steps occurred: this was the subjective decision based upon a set of objective decisions, a procedure common in the use of many such techniques.

At the stage of ten groups there were: (i) two isolated points; (ii) two large groups; (iii) one group of three points; and (iv) five pairs of points. This structure bears some striking resemblances to the nodal structure. The two isolated points constitute Boston and Springfield, later identified as the heads of the whole and largest sub-system respectively. One of the large groups contained 6 out of its 9 components which were directly dependent upon Boston and had no places dependent upon them and in addition were all northwest and north of Boston: the "Northshore" group. Of the 12 members of the second large group, 7 were also directly dependent upon Boston as shown in the nodal analysis although these points were mainly south and west of the metropolis. Of the 5 pair groups, all had at least one member which had at least one point subordinate to it in the nodal analysis. The last group of three members contained the point which constituted the second most important sub-system in the nodal system although only one of its companion points corresponded to its subdominants as earlier defined.

At the second "optimal" grouping level, that of five individual groups, only Boston remains as an isolated point. Two additional points (previously a pair group) join the "Northshore" group of nine, and a group made up of previously isolated Springfield and two pair-groups (of the 4 places, three are also classed as sundominants of Springfield in the nodal structure) appears. One pair-group remains; its reasons elude the author, and the other large group joins a previous pair-group and group of three to constitute a very diverse group standing between the "Northshore" and Springfield clusters.



At the level of three groups (not taken to be an "optimal" grouping, but an interesting one in the sequence of clustering) there remain the same Springfield conglomerate, isolated Boston, and the "rest of the world" group: illustrating the well-defined structure attributable to the Springfield cluster. The hierarchical cluster graph (see figure 3) illustrates the corresponding groupings at different stages and the succession of groupings that takes place.

Next will follow an evaluation of the clustering of the 64 x 64 matrix at the lower level of enumeration units, the O.T.U.s.¹

Figure No. 4 illustrates the distribution of places in the Springfield-Pittsfield sub-system as well as the nodal structure of these points (Bannington is illustrated but not included in the analysis). The sys-system is bi-nodal, i.e., Springfield and Pittsfield are terminal points but are treated here as a single entity since Pittsfield is definitely less complex than Springfield and of a lower central order and thus dependent upon the latter at the higher levels of organization.

When this matrix is entered into the cluster analysis there occur several seemingly "significant" breaks or places at which the groupings appear to be "optimal." First, there is the point at which 14 groups exist than at the 10 group level and lastly the 7 group level (Fig. 5) and a few comments will be made about each configuration and its relationship with the nodal structure.

Of the 14 groups, 13 contain 5 or fewer points and of this total of 28 points, 14 were identified earlier as nodal points. The clusters fall into two spatially separated groups: groups 1, 2, and 3 contain members which are all directly dependent on Pittsfield, and groups 5, 6, 7, 8, 9, 10 and 11 contain points that are directly (in the cases of 5, 6, 7, 10 and 11) dependent upon Springfield and indirectly dependent (groups 8 and 9).

With ten clusters, 9 contain six or less points and the structure is very similar to that just described above. Groups 2 and 3 join to form group 2 and now contain three nodal points in their own right which are directly dependent upon Pittsfield. In the Springfield sub-set of clusters, three of the five (including the cluster with six members) contain members which are directly dependent upon Springfield. The last grouping illustrates the further concentration of this trend of fewer groups with more members and a mixing of the constituent parts: ones that are nodal and ones that are not, ones that are directly dependent upon either Springfield or Pittsfield and those that are indirectly dependent upon them.

¹ O.T.U.s are Operational Taxonomic Units and are the modules or basic building blocks which are entered into the analysis and subsequently grouped together into higher order units of greater generality and smaller specificity.

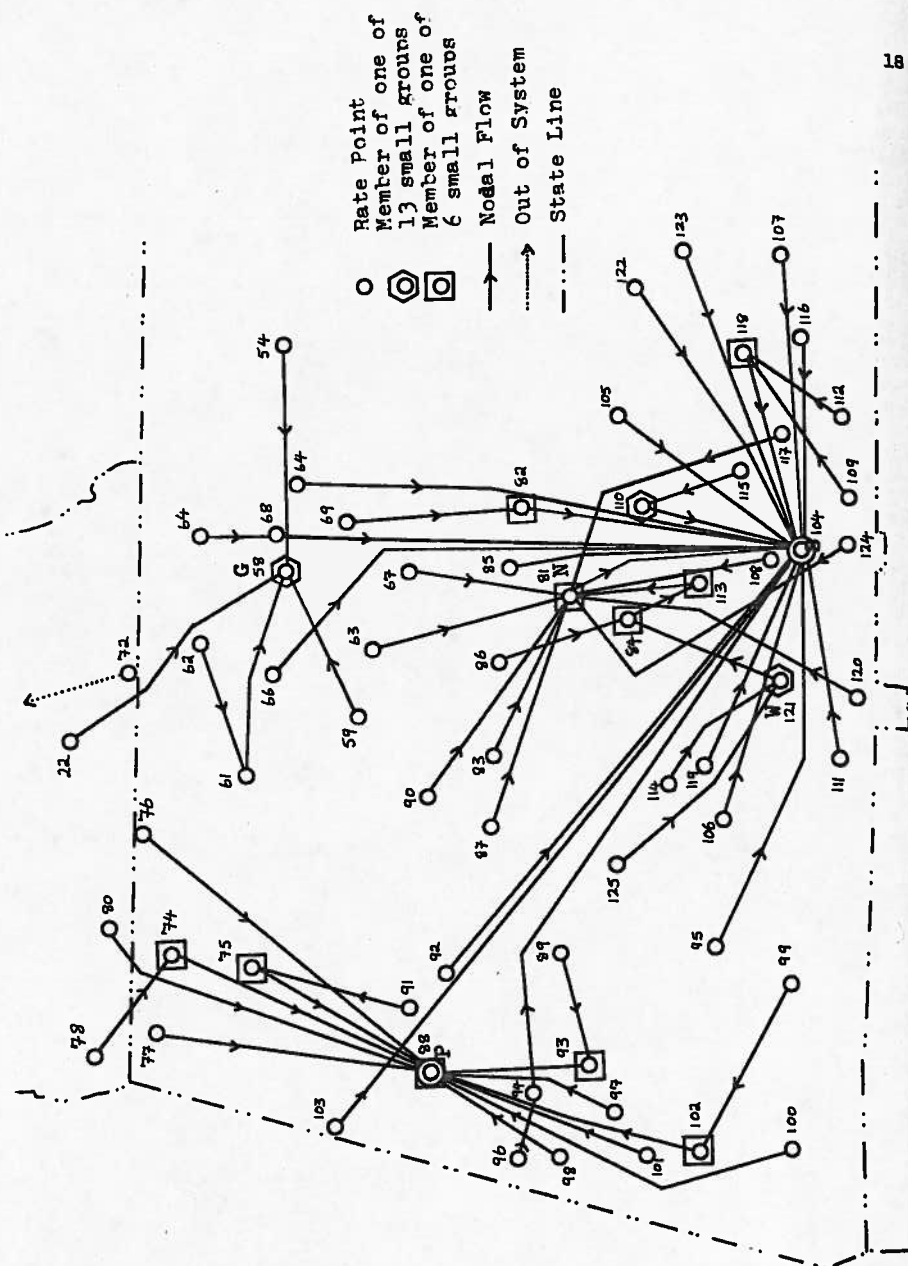
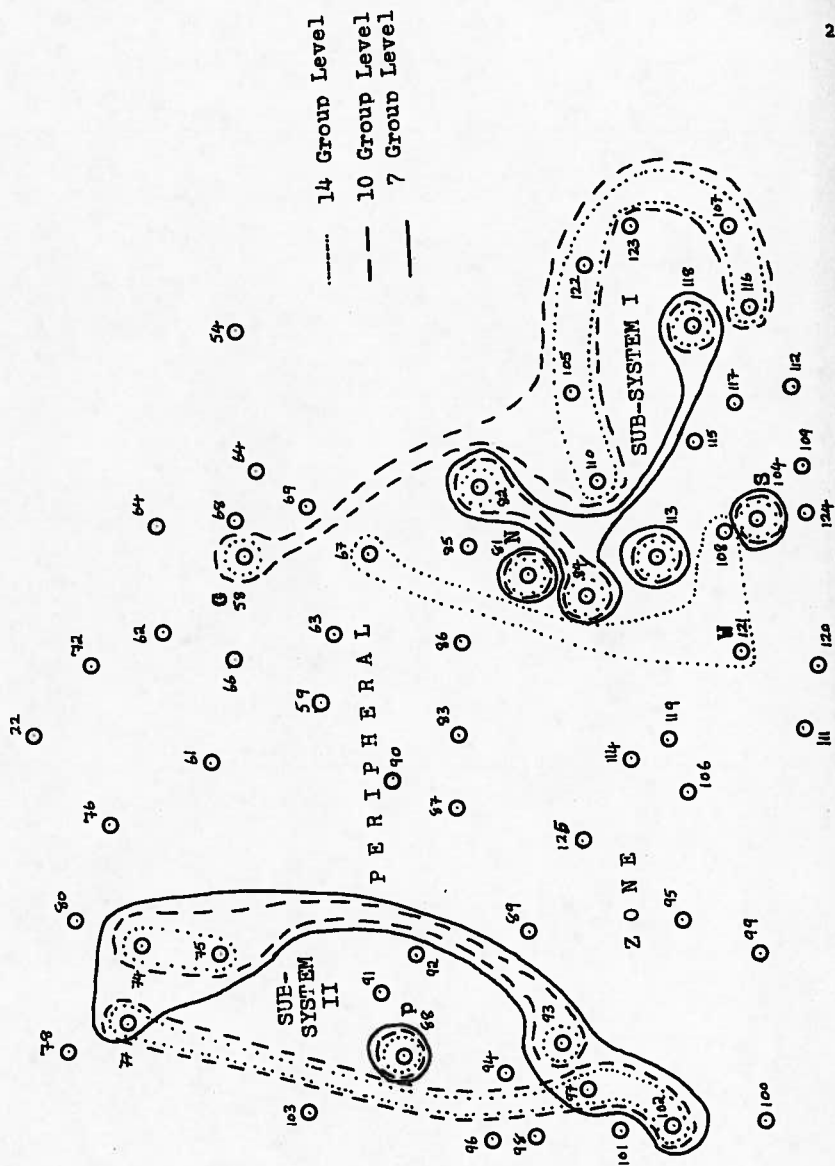


Figure 4. SPRINGFIELD - PITTSBURGH SUB-SYSTEM NODAL STRUCTURE

LIST OF PLACES IN SPRINGFIELD-PITTSFIELD
SUB-SYSTEM

19

	S	Springfield	91	Dalton
	P	Pittsfield	92	Hinsdale
	G	Greenfield	93	Lee
	N	Northampton	94	Lenox
	W	Westfield	95	Oris
	22	Jacksonville (Vt.)	96	Richmond
G	54	Orange	97	Stockbridge
	58	Greenfield	98	West Stockbridge
	59	Ashfield	99	Sandisfoeld
	60	Bernardston	100	Sheffield
	61	Charlemont	101	Housatonic
	62	Colrain	102	Great Barrington
	63	Conway	S 103	Hancock
	64	Millers Falls	104	Springfield
	66	Shelburne Falls	105	Belchertown
	67	South Deerfield	106	Blandford
	68	Turners Falls	107	Brimfield
	69	Montague	108	Chicopee
	72	South Halifax (Vt.)	109	East Longmeadow
	74	North Adams	110	Granby
	75	Adams	111	Granville
	76	Monroe Bridge	112	Hampden
	77	Williamstown	113	Holyoke
	78	Pownal (Vt.)	114	Huntington
N	80	Stamford (Vt.)	115	Ludlow
	81	Northampton	116	Monson
	82	Amherst	117	Wilbraham
	83	Chesterfield	118	Palmer
	84	Easthampton	119	Russell
	85	Hatfield	120	Southwick
	86	Williamsburg	W 121	Westfield
P	87	Worthington	122	Ware
	88	Pittsfield	123	Warren
	89	Becket	124	Longmeadow
	90	Cummington	125	Chester



It is interesting to note that as clustering continues step by step towards one huge heterogeneous group, the last group of single membership is the one with Pittsfield (when it constitutes one of five groups). Springfield remained isolated as a one-member group up to and including the 6-group stage, as did Holyoke.

Figure 5 shows a composite view of the three separate stages and it illustrates well the spatial structure of the region: two nodal centers of Springfield and Pittsfield, each surrounded by its group of sub-dominant nodal points which themselves act as minor organizational points at lower levels of the social hierarchy. There shows up well a "Peripheral Zone" between these two areas of high cohesion: an area filled with lowest order places, the majority of which are associated with the Springfield sub-system.

Lastly Figure 4 shows the places which act as nodal or organizational centers in the structure of the region, i.e., they form the centers of some level of social organization. These same points are also identified as the strongly independent group members in the grouping procedure. Thus, of the 16 nodal centers of varying degrees of attraction 10 are identified at the 7-group level of clustering by HGROUP and 13 are isolated at the 14-group level. There would appear to be a highly significant relationship between structures isolated by each procedure.

In conclusion, the applicability of analyzing flow systems by graph-theoretic and cluster techniques has hopefully been illustrated and the similarities that exist between the outcomes seem to be quite striking.

The author prefers to think of a "region" as a socio-economic system operating both in space and through time. It is felt that one of the major components of such a system is the linkages: the bonds of varying strengths that bind the parts into a coherent functioning system. It is felt that more will be learned of this interrelatedness of places and areas, one with another, by viewing areal units or regions as functional sub-systems, each of which contributes to a higher level of human organization and is contributed to by lower levels of socio-economic organizations. What one must remember is that regionalization in any form is merely one of many classifications, devices or constructs of the human mind in its groping efforts at gaining a better understanding of the complexities of human actions and artifacts and what at one time and level of inquiry may at a subsequent time or level of investigation, constitute part of the system under study.

The fact remains that by using data, which possess the inherent quality of expressing a degree of relatedness or interaction between places, in two different methods of analysis, one similar to the "formula," the other similar to the "functional" regional approach, we have been able to illustrate the similarities that exist in the structures so identified. The structure of spatial interaction may well be made up of compartments and corridors.

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CULTURE AND AGRICULTURE ON THE AMERICAN FRONTIER

By

Brad Baltensperger

The question of acculturation of groups to new environments has long been of concern to social scientists. Often this has been studied on a relatively small scale, but information is readily available for analysis of larger societal trends. The mass migrations from Europe to the United States during the last half of the nineteenth century provide a case in point. The responses of various immigrant groups to the new land, society, and culture have attracted much attention. This paper surveys the studies of one group, German immigrant farmers, and their agricultural and locational behavior in the Midwest in the nineteenth century.

The great influx of German-speaking peoples to the United States reached two high points in terms of absolute numbers: in the early 1850's German immigration was very strong, reaching 215,000 in 1854; following a decrease in volume during the Civil War, German immigration attained an all-time high of 250,000 in 1882. (6, v. 1, pp. 585-586) In large part these immigrants settled in the Midwest, primarily in a belt running from Illinois and Wisconsin to central Nebraska and Kansas. A high percentage of the new residents of the Midwest established themselves as farmers.

Numerous historians, geographers and sociologists have concerned themselves with the place of the immigrant in western agriculture, and more specifically with the relationships between the immigrant's cultural heritage and his response to the land and the frontier. These writers have made various statements and hypotheses regarding the immigrant, and especially the German in the West. If one is interested in attempting to find some definitive solutions to the questions and problems posed by these scholars, he must first consider the state of the discussion to date. Having these ideas in mind, he can then proceed to find answers and to pose theories and hypotheses.

Scholars have pointed out that vast differences existed between German and American agriculture in the nineteenth century. In Germany the farmer was a peasant rather than a businessman. Farm mechanization was very limited in Europe as compared with the United States, especially during the latter half of the nineteenth century. Land in Germany was limited in quantity and the economic position of the farmer was a precarious one, a fact that was largely responsible for his emigration. The arriving immigrant was looking for financial security and was bringing with him a set of cultural values which would strongly influence his farming activities. (22, VI, pp. 142-144)

Almost without exception, students of the problem have agreed with the sentiment expressed in the eighteenth century by Dr. Benjamin Rush that Germans had a different conception of farming than Americans and that the former expressed the difference in their agriculture in America. (20) As Joseph Schmitz expressed it, "when the German farmer . . . came to Wisconsin and bought a piece of land, one purpose dominated his mind - to make a farm for a home, and establish a family estate." The German saw the farm as a permanent home, in

contrast to the American, the apostle of the rapidly moving frontier, who sought the land for rapid economic gain. (22, VI pp. 142-144) Land to the German was a sacred trust. "Family traditions were largely built up and the land belonging to the family." (11) The patriarchal farm was the goal of the immigrant. (8, pp. 61-62) The most exaggerated view of the trusts states, "the German, with his tender home feeling, whose farm had been won by hard toil from an unbroken wilderness, petted it as a mother and her child. His only object was to improve his homeland, and leave it bequeathed to his posterity." (10, p. 146; see also 6, v. II, p. 30; 1, pp. 37; 9, pp. 31-32; 18, p. 498; 12, p. 40)

Very little in the way of hard evidence has been submitted to substantiate these claims. Only one measure has been used, and that infrequently. It has been reasoned that under such a system, the farmer would be expected to obtain most of his labor from the family, but little from the farm or market. Jordan points out that Germans in Austin and Waller Counties, Texas paid lower total wages per year for labor, on the average, than did Americans, but he ignores the fact, which he reported earlier, that Germans had less land, less improved land, and generally fewer numbers of livestock, and would therefore have needed less outside labor. He attributes the difference to greater German dependence on family labor. (15, p. 112; see also 4, 145-149)

In any event, writers usually concede that the German was closer to the land than the American. Additional evidence is indirect. It logically follows that the German would tend to establish a permanent farm on which he and his family would live for many years. Under a stable situation the patriarchal farm would be able to prosper. (21, pp. 87-89; 8, pp. 61-62) Two scholars have met this problem head on with statistics, though these relate only to foreign-born farmers and are not broken down by nativity groups to reveal the position of the German with respect to the American or to other foreign-born persons. Bogue and Curti maintain that on the Wisconsin and Iowa frontiers immigrant farmers were no more persistent, indeed often less inclined to stay on one farm from one census year to the next, than were the Americans. (2, pp. 25-26; 4, pp. 67-75) But the specific question of the German has still not been satisfactorily met and solved.

A corollary of the idea of greater German persistence is that the German farmer replaced the speculative native farmer when the latter moved on to a new frontier. The area surrounding the German farmer was slowly bought by him to provide land for his sons and the basis of the patriarchy was established. (11, pp. 315-316; 22, VI, pp. 143-144, 277; see also 17, p. 283)

The third expression of German agricultural distinctiveness resulted from this supposed high persistence rate. Because the German planned to be on the land for a long period of time, he was more concerned with conserving soil and protecting the land. The German farmer, it has been asserted, was more careful in clearing ground for his farm, not being content to "girdle" trees by cutting a ring of bark around the trunk and allowing the tree to die, but by cutting the trees and burning the branches and stumps, a much more permanent arrangement which was neater and indicated the German's intended persistence. (7, pp. 207-208; 19, pp. 218-219; 22, VI pp. 143-144, 275) The

German farmer's concern with conservation has been related to crop rotation, selective clearing of wooded land, the use of stone retaining walls to retard erosion, the extensive use of lime and manure, growing of clover to replenish soil fertility and the fact that tobacco was not grown in colonial Pennsylvania. (6, v. II, p. 29; 16, p. 416, 420-421; 12, p. 34; 15, p. 175; 7 pp. 202-207; 24; 23, pp. 46-47, 53-54) Only Cagliardo has seriously questioned the generally held assumption that Germans were more careful stewards of the land than Americans. (7, pp. 202-207)

One particular aspect of this conservative land use attitude and a reflection of the patriarchal farm idea was a more diversified agricultural economy among the German immigrants, according to many studies to date. The argument is that the Germans were less in need of markets and therefore less commercialized than their American neighbors because their conservation and their family farm operation allowed them to diversify and produce most of their needs by themselves. While the American concentrated on the wheat economy of the frontier, the German raised small fields of many crops, had a garden for home use, a timber plot for farm needs, and an orchard. Though diversity has not always been explicitly related to greater self-sufficiency, the implication is obvious. (7, pp. 198-199; 12, p. 34; 22, VI, p. 276; 24)

The reasoning is that because the German was more diversified, he was able to get started with a small acreage in the west. He could clear 10 acres during his first year on a new farm to provide his family with the necessities of life. As he was familiar with a system of intensive tillage, this small plot would suffice while he slowly cleared the rest of his land over a period of ten or twenty years. The Yankee, on the other hand, was impatient to get into business. Being less concerned with establishing a way of life than with pursuing a business, he cleared as much land in as short a time as possible; this enabled him to put as much land under cultivation, particularly wheat, as his effort would allow. (15, pp. 101-103, 169-174, 194)

Jordan has suggested that the opposite was true - that the German was highly dependent on markets and commercial activity, but he relied almost completely on impressionistic information while hard data was available. (22, VI, pp. 143-144)

Several respected scholars have studied the question of scale of farming operations on the frontier with regard to native and foreign-born residents. They have generally found that the immigrant did start with a smaller amount of land, machinery, livestock and productions, but this is related primarily to the immigrant's economic status, not to his cultural preferences. The results have been mixed. In some cases the immigrant remained far behind the native farmer in scale. (2, pp. 211-212; 3, pp. 32-34; 15, pp. 97-101, 167-169; 4, pp. 80-81, 180-200, 210) Curti found that immigrants were sometimes farming on a smaller scale, but more often on approximately the same level as native Americans. Both he and Jordan worked with Germans as a separate group. (4, pp. 80-81, 180-200, 210; 24) The evidence, therefore, is mixed and is confused by the fact that most writers have attempted to explain scale in terms of economic status, not culture. In at least one case the writer was not attempting explanation at all, but was merely reporting facts.

American attitudes and the ways in which they relate to those of the Germans are essential to an understanding of the distribution of the immigrant farmers, according to the proponents of the above discussion of the German cultural heritage. While the German sought to establish a conservative, semi-subsistence farm economy, the American was caught up in the frontier spirit. The consequence of generations of expansion in North America were two: the American was hardy, aggressive and accustomed to making a home in the wilderness; and he was optimistic about the continued expansion of settlement.

Hanse states that the advice of those who had settled in the American West spread the word to their friends in Germany, "let the Americans start the clearing; they alone possess the specialized technique." He claims that the German had an "innate aversion to the wilderness with its solitude and loneliness and primitive mode of life." Those Germans who tried to make it in the wilds generally drifted back to civilization as soon as possible. After spending their first winter on the prairie with little fuel and no livestock, the Germans agreed that the frontier should be left to the Americans. (8, pp. 65-66, 74) According to Hawgood, the German was not a frontiersman by temperament, but preferred "the comforts of civilized life." (9, p. 24; 22, VI, pp. 138)

The American was imbued with the feeling that the frontier would never end. Nothing, he believed, could stop the march of improvement toward the west. The native-born farmer believed that a good farm site once passed up was lost forever, while transportation facilities would arrive in due time, but the German was more cautious. Having lived in a stable agricultural system all of his life, the sudden thrust of the German into the dynamism of the American frontier must have been bewildering. Being conservative, he was willing to wait until transportation networks were available before he moved any distance from "civilization." He wanted to wait for settlement to prove the viability of an area before casting his lot there. (22, VI, pp. 133, 142-144)

Thus the American with his speculative spirit was willing to settle on the frontier where the German feared to go, according to the argument. When the American faced possible failure on his old farm due to low prices or yields, he moved west to establish a larger farm where he could grow wheat on a larger scale. (22, VI, p. 135) For him, supposedly, the move to the frontier was a common, uneventful undertaking. For the German such action was highly unlikely as he wanted to be near markets. This position is stated succinctly by Hawgood:

"(the) immigrant's . . . cautiousness in locating near to established markets, . . . his refusal to speculate in land or to gamble on the future of a district, . . . his preference for partly developed to virgin land, for settlement . . . could not but prevent him from having a place on the furthest frontier . . . the nineteenth century German immigrant was not essentially, whether by choice or by circumstance, a pioneer." (9, pp. 23-23)

Hawgood's reasoning goes like this: "It is quite remarkable how, again and again, the Germans seemed to start settling in a territory in large numbers

only when it was about to become or had just become a state of the Union." (9, pp. 22-23) He elaborates this argument with some extremely colorful logic. Ohio, which became a state in 1803, received large numbers of Germans from 1820 on, but the large influx of them came later in the century, when the frontier was well to the west of the state. The Germans constituted only five per cent of the population of Cincinnati in 1830, but this rose to 40 per cent German stock by 1900. "Yet the population of Cincinnati was already over 6000 by the year 1816. Thus in one of the most "German" cities of the United States, the Germans were not the pioneers." (9, pp. 24-26)

Raney agrees with these conclusions in his study of Wisconsin. In that state Germans were so concerned with accessibility to the market that they concentrated along the shore of Lake Michigan to take advantage of the markets and transportation routes. (19, p. 218; see also 5, pp. 315-318, 21, pp. 89, 92; 22, VI pp. 125-145)

This equation of frontier avoidance with concern over accessibility to markets is contradictory to the idea that Germans were less commercialized and more subsistence-oriented than the Americans. If the immigrant farmer was providing for nearly all of his family's needs, he would have no interest in markets for his goods. Naturally, diversification does not necessarily imply great self-sufficiency, but the argument is that the Germans were definitely less commercial than the American wheat farmers, who were totally commercial. Therefore the Germans should have had less concern with markets. Perhaps the frontier was not at all incompatible with the market and that dichotomy has been overemphasized.

Those who maintain that Germans avoided the frontier because of their inability to cope with the hardships of frontier life state that Germans were more inclined to replace Americans who were heading west. The Germans invested their savings in neighboring lands as was mentioned earlier. In this way an area with small initial German settlement became more "German" with time. (23, VI, pp. 138, 139, 278; see also 14, p. 120)

There are two major scholars who disagree with the above generalizations. Hildegard Johnson emphasizes the number of frontier settlements by Germans. They established homes directly on the frontier in Hall, Pierce and Cedar Counties in Nebraska, Stearns and Pierz Counties, Minnesota, and in several locations in Michigan and Wisconsin. The best-known frontier German settlement was in New Ulm, Minnesota, established by Germans many miles from the nearest settlers. (12, pp. 25, 40; 13)

Bogue indicates that Germans settled on prairie sections in Iowa and Illinois quite frequently. He states, "So rapidly did the immigrants move into many prairie counties that it was utterly impossible for them to have found enough native Americans to sell out." (2, p. 21)

More examples, however, are not sufficient when one is attempting to discern a general tendency of a part of the population. One can find examples of nearly every kind of activity, however unrepresentative they may be, if he looks long and hard enough. A more systematic appraisal is needed.

Many of the central features of the above explanations of the contrasts between German and American reactions to the west may be summarized (Figure 1).

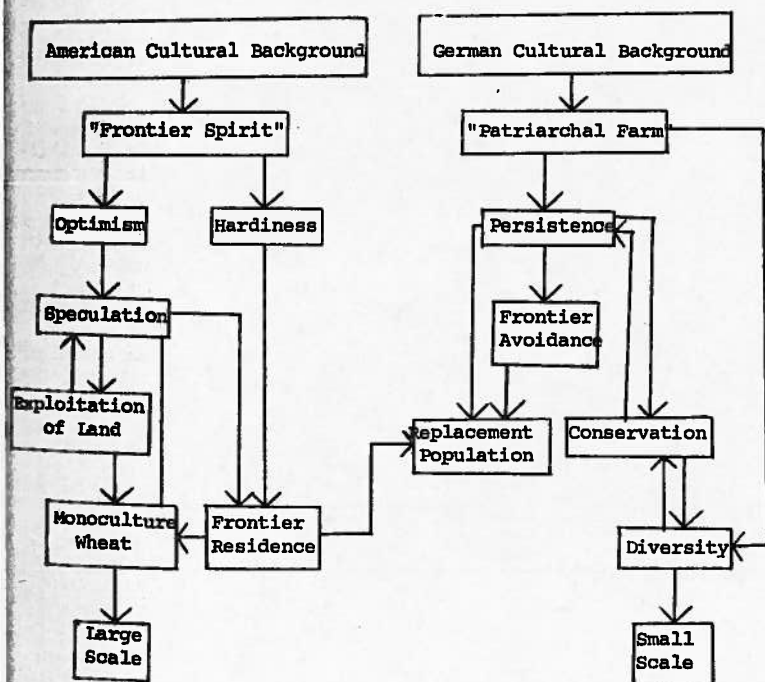


Figure 1

In general, the diagram indicates that the American, being used to expansion, is surrounded by the frontier spirit. Because of this he is optimistic and hardy. His optimism makes him apt to speculation in land farm from accessible markets. Because he is speculative and hardy he is likely to take up residence on the frontier where he will raise wheat on a large scale in order to make rapid gains on his investment. Raising only wheat and being speculative, the American uses the land in an exploitive manner. When the soil fertility is thereby exhausted, he will be forced to speculate in better land.

The German, on the other hand, being accustomed to a stable rather than a dynamic society and culture, wishes to establish a family farm. In order to do so, he must remain on the land for a long time. Because he plans a long tenure, he buys land from Americans who are moving on to the frontier, while avoiding the frontier himself. He also uses better land practices because he will be on the land for many years and this conservation results in the maintenance of soil fertility, which enables him to remain on the same farm. Part of this conservation approach and a result of the basically self-sufficient family farm is a great deal of diversity in the agricultural operation which means that the immigrant can "make it" on a small farm which he will gradually expand.

As has been indicated, there have been several scholars who have disagreed with major portions of the model of immigrant behavior and there is inconsistency within the model itself. Even though some objective studies have been made, they were not attempts to answer the questions being posed here. There has not yet been a suitable analysis of German farming behavior in the nineteenth century United States. Manuscript census data, deed and tax records, manuscript collections, periodicals and newspapers provide massive resources for such a study.

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THE PROBABILISTIC APPROACH TO SPATIAL THEORY

by

Kang-tsung Chang

Recently a number of new approaches to studying spatial form have been introduced in geography. Having been generally discussed by Harvey and King (3, 7), these approaches include probability distributions, Monte Carlo simulation techniques, Markov Chain models, Fourier analysis, spectral analysis, spatial autocorrelation, Q-mode factor analysis, and trend surface analysis. Many of these are still in the experimental stage, but geographers have already asked how these approaches can contribute to spatial theory or geographic theory.

Geographic Theory and Probability Theory. A general theory in geography, according to Harvey (4, p. 129), "will explore the links between indigenous theories of spatial form and derivative theories of temporal process." The links run in both directions, and therefore a general theory can be extended to the total complexity of the "man-environment system in space." With the concepts in Harvey's discussion, i.e., spatial form, temporal process, and linkage, an abstract model of spatial studies is presented graphically (Figure 1).

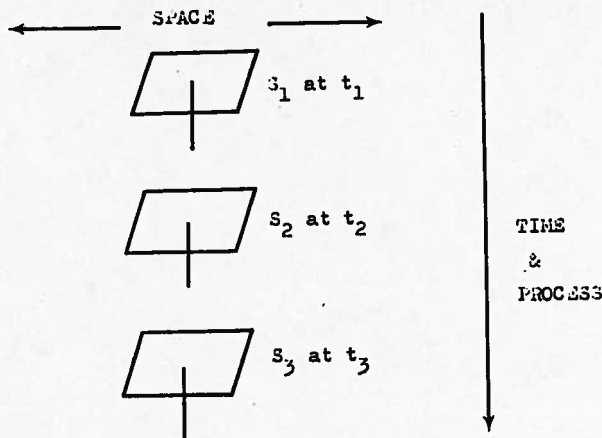


FIG. 1

In Figure 1 the spatial form, S , is sampled at different points in time, i.e., t_1 , t_2 , and t_3 ; S_1 may be different from S_2 , and S_3 may be different from S_2 . The differences result from process (and time) running on the previously existing spatial pattern. A main objective in spatial theory is thus to explain and/or predict the evolution of spatial forms in terms of process.

An immediate problem shown in Figure 1 is that spatial form consists of discrete samples in time while process is a continuous phenomenon. In other words, there exists a "black box" between two consecutive points in time, which transforms one spatial form into the other. It is because of this fact that probability theory--theory of uncertainty--has been found useful in studies of spatial forms.

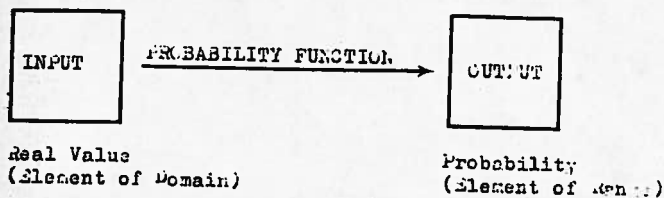


Fig. 2

Figure 2 shows probability theory in a simple illustration. The linkage between the input (a real value) and the output (a probability) is the probability function, a derivation from some initial postulates. For example, assuming that a success means head and a failure means tail, what is the probability of having 2 successes in 3 tosses of a fair coin? The postulates in this example are: (1) the probability of having a success ($1/2$) is the same as that of having a failure; and (2) experiments (tosses of the coin) are independent (the probability of having head in the second toss is not influenced by the outcome of the first toss). The probability function derived from these two postulates is the well-known binomial function:

$$\binom{n}{k} p^k p^{n-k}$$

where n is the number of tosses; k , the number of successes; and p , the probability of having head (success). Consequently, the probability of having 2 successes in 3 tosses is $\binom{3}{2} (1/2)^2 (1/2)^1$, or 3 in 8 chances.

The real meaning of probability theory lies in a statement such as 3 in 8 chances. It suggests that the outcome may be different in every 3 tosses of a fair coin, that is, the outcome may be random, but that the outcome follows some rule, i.e., a probability of 3/8, which may be best called statistical regularity. The concept is then: random does not mean irregularity but statistical regularity.

The use of probability theory in studies of spatial form assumes that process may be described by the postulates, and thus the probability distribution function may be applied to predict the spatial form. The approach is deductive. The problem is, however, to explain the postulates, i.e., equal probability, independent events, etc., with geographic meaning.

Geographic Implications of Probabilistic Postulates. To explain postulates of probability theory with geographic meaning first requires an examination of some concepts in geography. Harvey (4, pp. 116-127) classified the basic concepts for "an adequate geographic theory" into derivative and indigenous concepts; the former include economic concepts, psychological and sociological postulates, and physical postulates, and the latter include temporal processes, region and hierarchy, and geometry (location, distance, "nearness," pattern, and morphology). The classification is useful but not at all complete. For example, political postulates may be as important as economic concepts, and many other concepts from the sciences of physics and biology (e.g., the entropy concept and the contagious process) also contribute to geographic thinking.

Compared with Harvey's classification, the scope of geographic theory used to be confined in partial analysis of the spatial system. Location theory serves as an example. Pred, (10, pp. 4-5) in favor of a geographic, rather than an economic location theory, argued that

...the abstraction and constructs of existing location theory provides only partial insights, for the 'real' spatial organization of economic activities is, at any time, the product of both economic and noneconomic forces... (A geographic location theory) would embellish existing (economic) location theory by taking into account irrational behavior, imperfect knowledge, other psychological variables, socially dictated constraints, and the impact of existing patterns on subsequent patterns (processes).

Isard and his colleagues (6) recently extended partial equilibrium theory into a general political-social-economic equilibrium theory with an emphasis on the decision-making process at different levels. In short, location theory should not be limited to economic concepts but should be brought to an aggregate level to cope with a complex spatial system.

A general theory at the aggregate level will be complementary to partial analyses of the spatial system. Bramhall (1, p. 474) in his introduction to general equilibrium, stated:

...At one stage he (the location analyst) examines at closer range, so that each subject is seen in its own peculiarity and unique nature; but at other times he sees objects for their generic nature, abstracting from individual aberrations in order to see overall patterns and relationships. Thus general and partial

equilibrium approaches are not competitors, but essential complements.

It is the understanding of a need for a general theory, at the aggregate level, that makes probabilistic postulates meaningful in geography. A clarification of this statement will be made specifically on the words "random" and "independence" which are often used in the probabilistic approach to spatial form.

Random. As explained previously, the word random implies statistical regularity, which may be transformed into a probability surface in a spatial context. Suppose that a model is needed to explain and/or predict the relative position of a new place to an existing place, a, in Figure 3. A stochastic (random) model may state the location of the new place as having a probability of $1/10$ within 5 miles, $2/10$ within

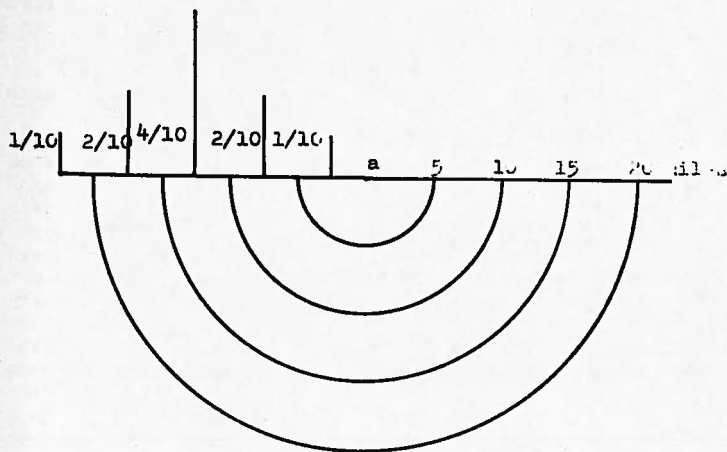


Fig. 3

5-10 miles, $4/10$ within 10-15 miles, $2/10$ within 15-20 miles, and $1/10$ outside the 20-mile radius. These probabilities imply that the chance of having a new place is highest in the third zone from the existing point and decreases in both directions; they are used as a surrogate for an aggregate of numerous, interacting factors. If the knowledge of interactions among individual factors is scant, it is meaningless to employ highly simplified deterministic models with predefined cause and effect relationships (9, p. 232).

The probabilistic approach was successfully used in Hågerstrand's diffusion study (2). The mean-information field represents a probability surface, and the distribution of points (receivers of information) is generated by drawing random numbers in the Monte Carlo method. Implicit in the simulation model is the idea that the real world represents only one of many possible outcomes; this is difficult to comprehend without reference to the concept of randomness.

Independence. "Independence" in probability theory means that the probability of a certain event in an experiment is not influenced by the outcome of its previous experiment(s), and "dependence" means otherwise. Statistical dependence is an important operational concept. Although it cannot be confirmed in any spatial phenomenon, it may be used as a substitute for a complex system of interdependent phenomena. For a clarification of this statement he may again refer to (economic) location theory, in which the distribution of points (industrial sites or central places) is dependent upon principles of maximum profit and minimum cost. But this dependency when applied to the real world is, a biased one because there are many other dependencies e.g., social, psychological, physical, and political. The undue emphasis on a specific dependency will cause problems in the explanation of geographic phenomena.

A geographic theory can no longer be built on the basis of individual dependency, and an aggregate of dependencies (may be called interdependence) is now needed. The probabilistic approach provides one possible solution. This is demonstrated in Hågerstrand's diffusion model: imagine that a study region is divided into equal grids, each grid having the same probability of receiving an innovation. As soon as the innovation is located, however, the probability surface is changed, with the grids closer to the origin of innovation having higher probabilities than the other grids. Dependence is expressed in the differential of probabilities. On the other hand, independence is implied in each simulation, for the location of the second receiver is not influenced by the location of the first receiver from the same origin. The idea of dependence and independence operating at different levels is also found in a nonsimulation approach to spatial form in Neyman's model (Neyman Type A distribution) for describing the spread of larvae around litter (8). Litters are first distributed randomly. Their locations then differentiate the probability of finding larvae in a study region. But independence is at the same time hypothesized in the distribution of larvae of the same litter. The origin-offsprings principle has been successfully applied to settlement theory (5).

Summary. A summary of the discussions can be made as follows: the probabilistic approach is aimed at overall patterns and relationships of the complex spatial system, and the probabilistic postulates are based on the aggregate of numerous, interacting, interdependent factors. With this understanding, the probabilistic approach to spatial theory may be justified.

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ARCHITECTURE AND GEOGRAPHICAL STUDIES: A REVIEW

by

Stephen Hobart

Despite some early attempts to incorporate the study of architecture and architectural history in meaningful, theory-based geographical studies geographers have dealt relatively little with architecture until fairly recently. Even then, as in many of the other new interests in geography, it came in the back door via other disciplines, primarily history, anthropology, and psychology.

Traditionally the use of architecture has been relegated in geography to (1) a supplementary or pictorial role in regional studies, or to (2) ideographic-descriptive studies of elements in the landscape of a non-theoretical nature. The former mode is and was most prevalent, and most of us can readily conjure up photographs of dwellings in regional textbooks where the pictures were used to give the reader a "typical" example of the architecture of the region under discussion. At worst, this approach made an implicit assumption that such dwellings were a result of the physical environmental restraints imposed; and at best, an implication that the architecture was somehow derived from the cultural matrix of the region. While the environmental deterministic assumption has been proved overly simplistic, the latter implication deserves elaboration at the hands of the regional geographer.

The second traditional role of architecture in geography, that of ideographic-descriptive studies, may have been (and indeed still is) interesting and informative, but without reference to either some kind of theory or problem-solving format it remains sterile, and does relatively little to enhance our progress toward understanding the world or solving geographic problems. Both of these liabilities, together with the improper uses of architecture at the regional level are fortunately now being corrected in studies undertaken by geographers and others interested in spatial phenomena vis-a-vis architecture.

There are four broad areas of concern where geographers and non-geographers are currently using architecture in their research. Those areas of concern are: (1) the landscape-ecological school, (2) the regional school, (3) the historical geography school, and (4) the geosophical school.

The landscape-ecological school, defined broadly as made up of those interested in man-land relations as manifested in the cultural landscape, has been particularly active in using architecture to further our understand-

*No attempt has been made to cite an exhaustive list of all research in the architecture-geography interface; rather an effort has been made to sample the type of research being carried out.

ing of man's environment (11). Some, such as the authors in Kates and Wohlwill's special issue On "Man's Response to the Physical Environment" in the Journal of Social Issues, are engaged in the behavioral and environmental design implications of architecture/geography (9; 6), while others such as the urbanologist Kevin Lynch and the architectural critic Allan Temko, have concentrated on delimiting problem areas and needs, especially of the urban scene (15; 28; 2), and are progressing toward meeting those needs (25). The landscape school has also witnessed a continuation of studies previously limited solely to description with the important addition of setting these studies within a theoretical or quantitative framework (10). A fresh infusion of new tools and skills such as infra-red photography as explained by Borden and Green (3; 5), has added demonstratively to the value of these types of studies, resulting in the posing and testing of diffusion models (4), and the measuring of innovation acceptance/rejection rates, among other interests.

The ecological side of the landscape school has witnessed a consideration of architecture by anthropologists like Rapoport and Hall (24; 7) who are concerned with the inter-relations between man the culture bearer and the physical environment as studied through the artifacts of buildings of all types, particularly so-called "primitive" and ancient buildings. The ecological school as exemplified by Tunnard, Pushkarev and Nairn (29; 20) is currently concerned with the spatial dimensions and problems of uncontrolled urban growth resulting in a fresh perspective on man as an agent of change. Thus, the landscape-ecological school has, through the inclusion of architecture as a part of the real-world reality and through the perception of that reality, enabled geography to expand significantly the understanding of the environment.

The regional school has not yet utilized the potential inherent in architectural studies, with a few conspicuous exceptions. Some, such as Glassie (4) have used architecture as a means of finding and delimiting culture hearths, then measured diffusion outward from the hearths. A delightfully new approach to the study of a micro-region is evidenced in Swain and Mather's book on the St. Croix border country (27). On balance, however, much potential remains for the regional school to use architecture as both an element of a cultural matrix making up a given region and/or as a defining criterion for delimiting regions themselves.

The historical geographers were fairly quick to adopt architecture and especially architectural history as a basis for delving more deeply into an area's past landscape. Architecture lends itself especially well, as shown by Price and Wilson (23; 30), to this area of study as buildings tend to offer fairly permanent records of cultural-spatial activities within the landscape. Such material artifacts have been approached from both the "great man" or elite point of view as in the Prairie School Review and the Journal of the Society of Architectural Historians (22; 8) and from the folk tradition as in the new journal, Pioneer America (21).

The historical geography school merges into the geosophical side of geography vis-à-vis architecture in that the latter is a reflection of how and what we feel about our environment, particularly (though by no means exclusively), in the past (12; 31). Geosophy, as concerned with all aspects

and the totality of geographical knowledge, offers an opportunity to explore man's subjective (conscious and unconscious) geographical feelings toward the environment (26; 17) be it an urban skyline connoting man's dominance over Nature; an endless row of crackerbox houses in slurburbia connoting a feeble attempt to live with Nature; or a successful attempt at living in Nature as exemplified in the Pueblos of the Southwest. All of these feelings are a result of an architect (formally or informally, directly or indirectly) interacting with a client, resulting (for better or for worse), in a changed, modified, desecrated, or enhanced natural landscape. One fruitful line of research in geosophy (which quite naturally merges with the landscape-ecological school) now being pursued by scholars such as Lowenthal and Prince, Appleyard et. al. (13; 14; 1) of "spatial esthetics" - the esthetic awareness of architecture as a major factor in understanding the environment (particularly urban) and arriving at solutions toward spatial-esthetic problems (16; 18; 19).

Conclusion: The intention of this article was not to denigrate past uses of architecture in geography, but rather to point out some of the many new uses and possibilities now recognized in a particularly viable interface between two disparate fields - geography and architecture. It is hoped that geographers, will take note and avail themselves of the work already accomplished in this interface and pursue it even further.

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AN ESSAY ON GROWTH POLE THEORY

by

D. David Miller

The existence of unequal economic growth rates between different countries has long been recognized, but the question of how to bring about a more equitable distribution of global wealth remains unanswered. On a smaller scale, there is a growing concern with the analogous problem of disparities in economic growth rates of different regions of the same country. One or two usually central regions have very high growth rates, over-population, urban and industrial sprawl, over-taxed basic services, and pollution. Other usually peripheral regions have low growth rates, depopulation, underemployment or underemployment, declining industries, and disfigured environments. Given that a country seeks to maximize the welfare of its inhabitants, it is obvious that optimal national economic growth in the short-run has to be sacrificed in order to promote regional economic growth. In other words, policies are designed to stimulate the growth of developing regions using subsidies from developed regions. At the same time, developed regions are given a temporary respite during which they have the opportunity to solve some of the monumental problems that overdevelopment has created.

The problem of how to simultaneously stimulate the growth of developing regions and curb that of developed regions has engaged the attention of regional planners in several countries for many years. The case of Paris versus the rest of France is a classic example of over-concentration. Repeated attempts have been made by the French to decentralize factors of production from Paris, with little long-term success. Recently, however, the French school of space economists has developed a framework, growth pole theory, on which regional development strategies may be based. More recently, the growth pole idea has been taken up by other countries wishing to find solutions to problems of regional underdevelopment.

Even a cursory glance at the literature on growth pole theory indicates that there is much confusion surrounding the concept. The seminal work was by Perroux; his obscure style, lack of formal definitions, and poor development of a given topic have led to his work being extensively interpreted and elaborated on by others. As a result, growth pole theory is, as yet, merely a collection of very raw sometimes contradictory hypotheses.

To provide some firm ground from which to start, one of the many definitions of a growth pole may be quoted:

A growth pole is a complex of economic elements, concentrated in a geographical space, between which exist certain elements that support growth (3, p. 22).

This definition, though lacking in precision, combines the viewpoints of the two schools of growth pole theorists, the functional school and the geographic school. The former argues that growth poles are abstract and have no location; the latter that they are physical objects having a definite location.

Two types of growth pole are recognized, natural growth poles and induced growth poles. A natural growth pole is an historic settlement which continues to grow spontaneously. One of the basic arguments of growth pole theory is that if the variables responsible for the emergence of a natural growth pole can be discovered then, by means of policy, these variables can be juxtaposed elsewhere, and a growth pole induced. This is the second type of growth pole, which eventually also becomes a self-sustaining settlement.

Dissatisfied with the static classical models produced to explain economic growth, Perroux proposed an alternative dynamic model based on a simple observation (2, p. 309):

...growth does not appear everywhere at the same time; it shows itself at points or *pôles de croissance*, with variable intensities; it spreads itself by several channels and with variable terminal effects for the economy as a whole.

Perroux claims that innovations are the small beginnings in which a growth pole has its origins. New firms replace old firms, new industries replace old. In turn, a new firm is itself replaced when an innovative firm produces the same good at a lower cost, a better good at the same cost, or an alternative good as cheap as, or cheaper than, its competitor.

This model is dynamic, for it explains, in part, the process of economic growth. It is also cyclic, for an innovation promotes the growth of the firm, which, in turn, promotes the growth of the industry and the industry can then finance future innovations. The model is also cumulative, because the magnitudes involved in each cycle are larger than those of the previous cycle; this is because of the general growth of the industry and the fact that secondary innovations are generated via forward and backward linkages. Hence, innovative firms and industries, the firms and industries linked to them, and the places at which they are located, grow at a faster rate than their counterparts elsewhere. Eventually, an economic complex is built up, to be sustained, in part by economies of agglomeration.

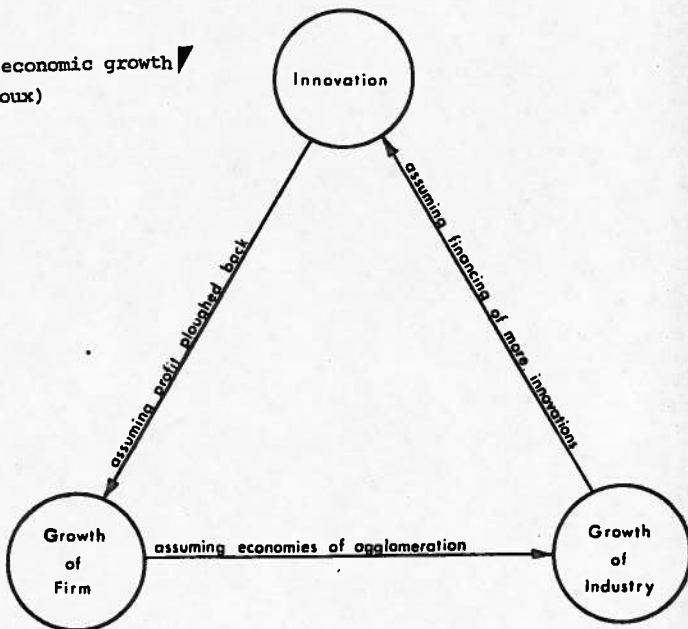
Two elements are missing from the model: firstly, criteria for determining the location of the growth pole; secondly, a mechanism to encourage innovative industries to locate at certain points. The latter is not an insoluble problem. A natural location can be made undesirable, even illegal by legislation. Conversely, legislation can make an unattractive alternative location more attractive. Grants, interest-free loans, and reduced taxes can be offered; land, factories, and machinery supplied; communications facilities, and energy supplies built. Although inducements encourage firms to locate in a given place, they do not guarantee that the firm will be innovative. It can only be supposed that if the firm is willing to take the chance of locating in a developing region in the first place, it will be enterprising enough to innovate, given the chance.

The single biggest flaw of growth pole theory is that it assumes an urban place yet gives no indication of the place's size or economic characteristics. As Jansen says (1, p. 70):

The explanation of the location of economic activities lies for a major part outside for (sic) the growth pole theory. The theory rather takes economic growth as a point of departure and states that it stimulates other economic activities.

From the few empirical studies available and from the observation of theory put into practice, it seems as if each developing region requires unique solutions to its problems. The most that growth pole theory can attempt to do is to offer some rather general rules for the choosing of growth poles and for their economic composition.

A model of economic growth
(after Perroux)



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MIND, MEANING, AND MILIEU :
PSYCHOLOGICAL NEED AND DESIGNED ENVIRONMENTS

by

Ernest A. Wight Jr.

Introduction. Much of our concern, lately, for the "environment" is misdirected. The doomsday rhetoric that bemoans the defiling of streams is an environmental issue for the trout more than it is for man. Admittedly, the massive and sometimes irresponsible intervention by our technology on the natural milieu has reached serious proportions. However, this impact on nature is only part of the larger issue of the environment for man which is essentially designed and/or built. Because our built environments exist and are connected ecologically to larger natural systems, we cannot ignore the relationship. But, we must consider the human environment to be essentially designed and built, and not natural. There are, of course, varying degrees of naturalness in the human environment, relating to, for example, levels of technological development, climate, and economic activity. Yet, even the most sober and conservative forecast would readily conclude that the city is the future of man.

If the city is man's future, one could argue that the land is man's past. In a hunting-gathering or an agricultural mode of existence, the physical abode is a retreat from natural elements, and is not a dominant part of the human environment. The natural landscape is where most of the economic and social activity takes place, especially in the less severe climates. As our technological capability grows with our population, so does the need and opportunity for large, complex and densely populated designed environments become greater. We might ask at this point, what the social-psychological costs have been for this trip from the land and village to the city. On the other hand, what has man to hope for in achieving the city as a place for human habitation?

The main thrust of this discussion will be an examination of the capacity of the city to satisfy the emotional and intellectual needs of the individual. Because I can only suggest what these needs are, and speculate on the implications for urban design, there will be more questions raised than answered. The most I could hope for in this case is an improved definition of the problem that will open up new research possibilities.

Not by Bread Alone. One of my major assumptions concerning psychological need and the physical environment is that there exists in all individuals both a need for roots and a need for new experience. There is a tension between these polarities, and the individual tends to operate to harmonize the two. Another way to think about this dichotomy is to think of a continuum that ranges from ultimate belongingness to extreme alienation. Neither of these states is commonly experienced, but the heuristic can perhaps serve to help us conceptualize the problem.

This continuum can be thought of as operating in two different, but not separate, dimensions. One kind of search for roots and quest for

adventure is an historical-biographical journey that takes place largely in one's head. The world within which these trips take place is essentially a temporal one, with obvious spatial imagery as the stuff of such dreams. It is pictures of places that give form to the fantasies of our personal histories. The other world in which this continuum operates is the spatial-behavioral one, the world where "real" cities abide. Our explorations for new experience and search for a sense of belongingness take on a stronger spatial, and temporally horizontal dimension as our quest becomes more behavioral and less dreamlike. It is in this second realm of built environments that we will focus our concern.

Before we confront the actual design problems relating to psychological need, it is important that we expand on the concepts of belongingness and alienation as they take form in spatial settings. The juxtaposition of two polar lists might lead to a clearer picture of the problem.

Environmental Qualities and Psychological States

<u>Belongingness</u>	<u>exploration</u>	<u>Alienation</u>
rootedness	←	anxiety
familiarity	→	unfamiliarity
orientation		disorientation
privacy		novelty
obviousness		ambiguity
security		insecurity
permanence		impermanence
smallness		largeness
surrender		resistance
organization		randomness
inextricability		separateness
friendliness		hostility
friendliness		tenseness
predictability		unpredictability
responsiveness		unresponsiveness
womb-like		uncertainty
regularity		chaotic
comprehensibility		meaninglessness
independence		victimization
continuity		surprisingness
simplicity		puzzlingness
connectedness		disconnectedness

The environment provides an opportunity or setting for these qualities and states to exist. The desirability and probability of these states and qualities being realized is a design issue. The means by which these environmental decisions are made are cultural and political issues. But before we discuss the design question perhaps we should return to the ideas in our list.

It is well documented in the psychological literature that organisms:

1. explore their environment from positions and states of security.
2. seek new experience as the result of a "natural" tendency.
3. display exploratory behavior to a greater extent when the environment is more complex than when it is simple.
4. display strong attachments to pieces of territory.
5. in moving through environments, tend to favor certain routes over others.

Using these assumptions as a framework, let us examine their implications in human psycho-environmental terms. It is difficult to argue safely that exploratory behavior is motivated by some mechanism leading to the survival of the individual. Yet, I suppose one could argue that environmental exploration increases the probability of survival in that there is a greater likelihood of the individual finding food. There is also a greater probability of the individual's subjecting himself to more danger. So, this line of reasoning does not clearly support the "food hypothesis." Another, more appealing, possibility is that the more exploration engaged in by the individual, the larger the territory he renders familiar, thereby increasing survival probability by reducing uncertainty. The well publicized sense-deprivation experiments strongly suggest that a stimulus-rich environment is crucial to mental and emotional health and development. Environmental exploration tends to increase the absolute amount and variation of sense experience. Therefore, in arguing from a negative position, we might be safe in suggesting that exploratory behavior has survival value in that when it does not occur, we can witness negative and undesirable behaviors. It is only necessary, however, for this discussion to assume that for possibly no "reason" at all, people must explore their environments, and to have no opportunity to do so will lead to certain pathological conditions of the individual, if not a marked arrestation of his total development.

The amount of environmental exploration that will occur seems to be a function of at least three variables: 1. the degree of environmental complexity (opportunity for arousal); 2. degree of security of the individual within the environment; and 3. the propensity of the individual to explore. The whole idea of a cubby-hole, a niche within the total milieu that one can call home, is a very important one. The need to have such a place that one can strongly identify with seems to be an essential characteristic of all people. Sometimes the period of occupancy is brief, and what occurs is a series of home niches. Nevertheless, these home places serve as safety points from which the individual can range out into the larger territory to engage in exploration and new experience. Perhaps what we are talking about is a main headquarters (home base), and a series of safety places within the environment from which we carry on our explorations.

I mentioned earlier in this discussion two dimensions in which the journeys or explorations take place. The one dimension or universe of exploration I have termed historical-biographical is in part phantasmagorical, in that complete reconstruction of experience is impossible. The distortions and adaptations of our tracings of experience are, in fact, attempts to give order and continuity to our life experience, from which we derive an identity. Because this continually shifting narration is colored, shaded, and illuminated by our unique biographies and psychological makeup, it becomes impossible to even ask questions concerning which parts of the story are real, and which are phantasy. The process of internalizing the places of our "real" experience, gives a unique, existential quality to our phantasy trips. Our excursions into our heads involves largely a process of retrograde mapping of the connections between events that occurred in places. Essentially it is a search for roots and safety places, perhaps terminating in the uterus which is the first environment of the individual. The excursions also reach further into the more remote historical regions by way of myth, and other tracings to the past. I bring this up now, because it seems to me that if we can understand something of this existential search for roots in the historical-biographical dimension, then we can gain some insight into what our explorations might mean as they take place in a more immediate sense within extant space. The reason why this kind of consideration of historical-biographical exploration is important to think about has a great deal to do with the fact that our trips within this realm are strictly geographic. We grope for images of places. It is the journeys from place to place within our heads that constitute the reach backward. The reminiscences of our childhood are made of the smells, sounds, and sights of places we have really occupied, or imagined we have.

What this all means in regards to the spatial-behavioral dimension of environmental exploration remains to be discovered. What an individual needs from an environment in terms of his sense of psychological well being cannot be clearly articulated by him, nor can it be determined by anyone else. The best we can do is to get a sense of the range of psychological need of an aggregate that uses a given environment. This assessment of need would be based on certain broad assumptions about the nature of the human condition, cultural variations, as well as arguments rooted in psychological theory. The design implications, once there is an assessment of need, would be to create diverse opportunity within an environment (the city) for varied use of the milieu by the people it serves. The best a planner could do in designing or adjusting a city would be to create diverse spatial opportunity within a scheme and range defined by his need inventory, as well as his psychological and environmental theories.

The activity that occurs within the spatial-behavioral dimension of environmental interaction provides us with the raw materials for our phantasy trips that take place within the historical-biographical dimension. We can then argue that in order to improve the quality of our "head trips", we must improve the quality of our "real" environmental interactions. Becoming aware of our psycho-environmental needs, and developing the capabilities for their satisfaction within large urban environments, is one of our most important challenges.

Much of what can be identified today as mental and emotional illness can be described as some form of alienation. I mean by this a disconnect-

adness from self, place, others, the end product of labor etc. A great deal of this pathology can certainly be related to environmental factors. We live in a time of great mobility; socially, psychologically, and geographically. This high degree of movement has its cost in a greater risk and incidence of the alienation of the individual, especially from place. This perpetual tripping sharply reduces the opportunity for rootedness and belongingness. We need strong emotional identification with place in order to gain the security necessary for environmental exploration. Growth and self realization are, thereby, made possible under conditions of ever expanding sense experience potential. The perception of change through engaging in new experience allows us to create new definitions of situations, and to invent new meanings. This continual reorganization of the world conceptually leads us to new and higher levels of awareness, which is, in effect, personal growth. Because environmental exploration is necessary for the growth of the individual, the environment should be so designed as to not only provide wombs, but also never-ending opportunity for new experience.

Up to this point, the term environment has been used rather loosely to designate the physical setting within which we operate. Let us narrow our consideration of the human environment to mean the city, and all that this suggests. Present population growth rates, and spiralling technological capability greatly increases the probability that huge, densely populated cities will become the human environment.

Connectedness--The Need and Fulfillment. The opportunity for environmental connectedness has to do with places or points within a territory, and the movement between these points. We can talk first about the desirable characteristics of places, and their capacities to serve the individual's need for a sense of security or belonging. It has been well argued by ethologists and others that at least the higher animals seems to have a basic need for a little piece of this earth that they will defend as their very own. (This becomes a sort of womb away from womb.) One makes a piece of space his home by putting his unique mark on it. (Dogs urinate along the boundaries of their territory, but humans tend to use other means.) The city must provide the individual with the opportunity to achieve this niche, his highly personalized piece of space. The designer of such opportunity ought to create great diversity of niche types, but under-design each so that a high degree of imprint on the niche can be exercised by the occupant. He thereby makes it his own, not only by virtue of ownership (assurance of permanency), but because he causes the place to be an extension of his being. As he is unique, so is his niche. The issue of location permanence, and protection of the niche from unwanted change seems to be quite an important source of security of the individual. He wants to shape and personalize his niche, so he requires that the construction and materials be responsive and yield to his efforts. Yet, only he should bring change, not the outside world. His niche should resist change from without, but be changeable from within.

Picture a settler who builds with his own hands a house made from the wood and clay he worked from the land. He becomes connected physically and emotionally to every corner and splinter of wood. He can relive his relationship to the materials because he fashioned his niche with his own hands. He is one with his environment because he and his environment are both bound together in his unique biography. He has internalized his environment, and it has become part of his identity. Even the trees and

rocks around his house become a part of this internalization because the rate of change, though not fully controlled by him, is such that he can perceive in these things a continuity with his past.

What does this have to do with cities? This romanticizing about bygone styles of life will get us nowhere unless we understand what was good about it, and try to achieve it with new forms in cities. A city home should provide an individual with the sense of ultimate safety and belongingness.

Although the occupant will most likely be unable to build it himself, he should be able to incorporate his home into his biography. It should have characteristics of stability of location, as well as a quality of responsiveness to the hand of the occupant. His home should afford him the opportunity for private experience and meaning. It should also give the feeling of separateness from the rest of the world, and enclave or sanctuary from the uncertainties of the larger urban milieu. There are certain circumstances that would require a home niche to be a place of environmental surrender. In this case the interaction between the individual and his environment would be of minimal importance, and the opportunity to be swallowed by his surroundings would be the desired effect. This arrangement would make the individual be a passive participant in the environmental situation, at its mercy, so to speak. The niche can play the role of mother when the need arises.

To follow this line of discussion centering on the city's capacity to provide opportunities for spatial connectedness, let us turn to the whole issue of movement throughout urban environments. When an individual ranges out from his niche his movements from point to point within the larger territory are carried out, in part, within the context of security and familiarity as requisites for this travel. (I am purposely leaving for later discussion the whole matter of exploration.) Why individuals tend to favor some pathways over others involves a host of esthetic, physical, and some other obscure psychological sets of motivations. Nevertheless, it seems fairly well agreed upon by psycho-geographers that people do tend to repeatedly follow certain paths in their planned trips through the city. There seems to be two major means by which a traveller achieves connectedness with the environment during trips. One way comes from the sense of moving over familiar and safe ground, and periodically reaching familiar safety places. Another source of connectedness is the traveller being able to orient himself at any time during the trip. Connectedness in transit is never achieved to the degree possible in the niche. Orientation is being used here to mean the ability of a traveller to place himself spatially in relationship to where he has been, and where he is going. His location at any point can be determined, in a dynamic sense, by himself only if it is possible for him to form a locational image that can be imposed on this spatial-temporal continuum. Compass direction, as a mode of orientation, seems unimportant if the individual is able to make some spatial sense of his movements within his environment. There is little agreement among investigators of orientation as a phenomenon, concerning the modes of cognition that lead an individual to be able to navigate a territory. There may be several variations of stimulus-response, and gestalt modes of spatial cognition and orientation. However, the aspect of familiarity is most certainly at play in enabling one to move about a city with some degree of pleasure and security. The paths

and points are rendered imageable and familiar by the traveller, and so, become spatial connections. Traceability to the home niche must always be possible for the traveller, this nexus being the umbilical cord, or the slender tether that makes the ranging out psychologically possible. (This need for traceability to the home niche is analogous to the need for traceability to one's origins within the historical-biographical dimension.)

Exploration and Adventure—The Need and Opportunity. As I mentioned in an earlier section of this discussion, it is difficult to explain exploratory behavior in any simple way. For the purposes of this paper, let us try to establish a relationship between the need for environmental connectedness, and the need for environmental adventure. At first glance, these needs seem to be at opposite poles, but with further examination, we realize that they are strongly tied together. As the individual achieves a home niche, and as he becomes able to range out from this niche, he is, in effect, learning more and more of the environment. The greater the range, the larger is the portion of the total environment he is rendering familiar. His explorations, or spatial departures from the known, provide the means for establishing more and stronger connections with the environment than he had before. More exploration makes possible more connectedness as larger and larger amounts of territory become familiar. Places and routes are integrated into a cognitive scheme within the individual, reducing the probability of spatial alienation. This again, is a process of environmental internalization.

Niche building seems to satisfy a need for security and belongingness, and exploratory behavior seems to satisfy a need for new experience. The degree of environmental exploration is a function of the state of security of the individual, the environmental factors capable of arousing this behavior, and the tendency of the individual to explore. We have already discussed the security issue. The tendency of the individual to explore is too elusive a quality to deal with effectively here. What we can discuss are those properties of environment that seem to contribute to the triggering of exploratory behavior. If environmental comprehensibility satisfies a need for a sense of connectedness, then perhaps the opposite quality will satisfy the need for environmental adventure.

In real life environmental situations the states of belongingness, and arousal for exploration are bound together in a reciprocal feedback arrangement. For the intellectual convenience of dealing with these ideas, however, we have separated the two states and their opportunities for fulfillment. Of course, the infinite variability of biographies which result in the uniqueness of each individual's meaning system is only being suggested here, but regrettably it is not possible to treat of this dimension to the extent it deserves.

An environment, in order to be able to arouse the individual to explore, must have the qualities of changeability, ambiguity, novelty, inscrutability, etc. There should be large aspects of the milieu that are not immediately comprehensible to an actor within it. Too much change and ambiguity would result in environmental chaos, and would cause individuals to seek the sanctity of more achievable parts of the environment. This would result in a limitation of the new experience opportunity, and would stultify growth.

For instance, I particularly enjoy visiting the Boston Museum of Fine Arts because I have a very unclear mental map of its internal layout, and in my wanderings enjoy many surprises. On the other hand, I can go quite directly to certain rooms and collections at will. My visits to the museum provide me with a sense of belongingness as I feel I am returning to an old familiar place, and at the same time it gives me the opportunity to discover new things and experience a sense of wonder at the never-ending catacombs and crannies.

The absolute size of individual action spaces will become smaller as the need and opportunity to travel great distances for new experience gets smaller. So when the crowding of the earth's surface reaches certain levels so as to make long-range travel undesirable, environmental satisfactions will have to be derived from interactions with smaller, urban environments. Cities will have to be dynamic enough to create opportunity for continual new experience, and yet provide the opportunity for rootedness at the same time. The street patterns must have enough regularity to make orientation possible, yet present enough complexity and ambiguity to arouse interest for exploration. Buildings should be of great variation in size and design, and be so located as to suggest a certain amount of incongruity and puzzlingness. There should be streets and buildings that produce expansiveness as well as enclosed and tortuous inscrutability.

Cities will have to be large, and of high population density. The largeness and complexity of urban environments should be counterbalanced with the opportunity for cloistering. The neighborhood or micro-village concept would support another expression of belongingness by creating the means for shared experience and meaning. The realms of environmental meaning and experience seem to be:

1. private --- niche
2. shared --- micro-village
3. ambiguous --- urban milieu

Summary. Is the city a fall from the land, the city with its unvariegated visual field, reduced opportunity for roots, and less traceability to one's origins? Is the image of pastoralism that dominates our sentimental yearnings for simplicity an image we must reject in order to achieve the "good" life in our designed environments? What have we sacrificed, and what have we to gain from our trip to the city?

I have argued that we cannot return to land as such, but must understand how to approximate the satisfactions of the land in cities where man must live. His needs for belongingness must be achievable within cities by allowing him to enjoy a highly personalized home niche that can become an extension of his being and thereby part of his identity. Much of the urban landscape must, on the other hand, be tantalizingly incomplete and ambiguous to provide the individual with the opportunity for variation and shifting of meaning.

Everything is always changing, yet we derive great comfort from our concepts and categories that become obsolete as soon as they are formed. In order for us to grow in our ability to be aware of what exists outside of our generalizations, we must have the opportunity to constantly re-formulate our

definitions of what's out there, as well as what's in us. This growth can be measured as heightened consciousness, or the reaching of new levels of awareness. We cannot reach these new levels of awareness if we do not have the opportunity to create new definitions. The perception of change, and the engaging in continual new experience allows us to make these new definitions. Therefore, constant exploration within an environment yields new experience and the perception of change.

Exploration is more likely to occur when the environment provides both the opportunity for connectedness, and the stimulation for departures from the familiar.

SPATIAL DYNAMICS IN CLASSICAL LOCATION THEORY

By Alfred Hecht

The object of this paper is to examine some spatial dynamic aspects of classical Weberian Location Theory.¹ The precise subject is to determine how the minimum transport cost location, determined from a locational figure, will shift with a change in the location of a resource.

Suppose that the location of two resources, R_1 and R_2 , which are needed for the manufacturing of a product sold in one market location, M , is as shown in figure 1, i.e., the three points if joined form a straight line. Furthermore, let us first assume that both raw material resources are an equal distance from the market, and that the forces operate on an isotropic plain as specified by Weber. It is of some interest to examine the shift in the minimum transport location as the location of one raw material, say R_1 , changes.

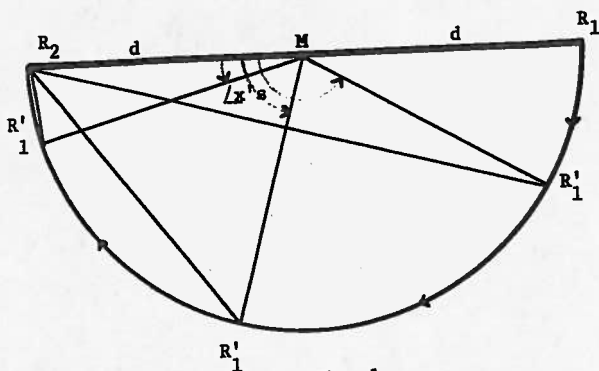


Fig. 1

We know that production will take place at the market M if M lies between both raw materials used in the manufacturing process, (Fig. 1) and if the weight of the final product is greater than the weight of any one raw material used in the manufacturing process. Should the location of the two raw materials coincide, and the sum of the weights of the raw materials used in the manufacturing process be greater than the weight of the final product, i.e., gross materials are involved in the manufacturing process, then production will take place at the site of the two raw materials. This would be the case if R_1 in figure 1 had moved to R_2 . In such a case the production location would have changed a distance of d units and would have been accomplished by moving resource R_1 a linear distance of $2d$ units and an angular distance of π radians or 180 degrees.

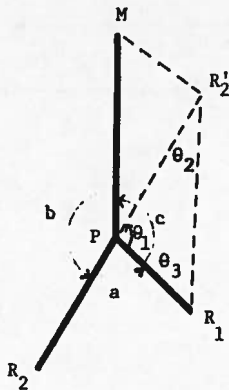
Now a question arises as to how the spatial relocation of production is related to a shift in the location of a resource. Does a slight change in the location of R_1 in the direction shown in figure 1, for example, produce a slight deviation of the minimum transport cost location away from M , or

is the relationship between resource and production location a discontinuous one, in that a certain minimum displacement of R_1 has to take place before a shift in production location will also take place?

The above question can be answered partially by assigning specific weight values to the locational weights in figure 1, and by examining the behavior of the production location as the location of a resource changes. Suppose it takes $3/4$ ton of raw material R_2 and $1/2$ ton of raw material R_1 to produce one ton of finished product. With the geometric arrangement being linear (Fig. 1), production will take place at M as indicated before. But suppose that R_1 now changes its location to a point $\pi/6$ radians clockwise from its original location, but still remains a distance of d units from M . Will the least transport cost manufacturing location still be at M ?

Before this question can be answered the locational forces operating on the manufacturing location need to be examined. If transport cost is proportional to weight, then each manufacturing input will attract the production location to its geographic location with a force equal to its weight. Since transportation requirements are assumed to be uniform and continuous over space, the three forces operating on the production location will arrange themselves angularly such that a balance of forces exists (Fig. 2). This means that in figure 2 part of force R_1 and part of force R_2 is equal to the force with which the production point is pulled to the market location at M . Similarly R_1 and M combine part of their locational forces to counteract the locational pull of R_2 . This counter balance of R_2 is shown in figure 2 as R'_2 . By joining R_2 to R_1 a triangle is formed whose sides are proportional to the three forces acting on P ; this triangle is known as a weight triangle. Since the sides of the weight triangle is known, the angles can be determined by means of the cosine law.²

$$(M)^2 = (R_1)^2 + (R_2)^2 - 2 \cdot R_1 \cdot R_2 \cdot \cos \theta_1$$



Equilibrium Location

Fig. 2

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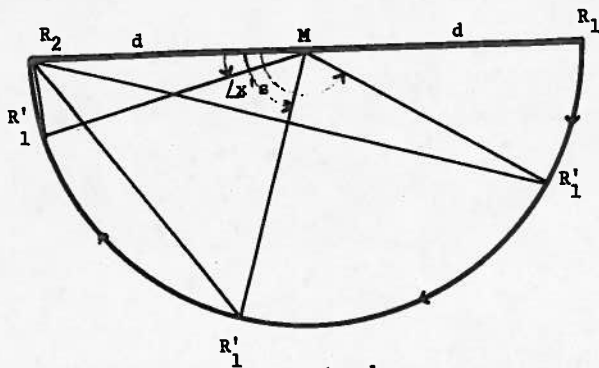


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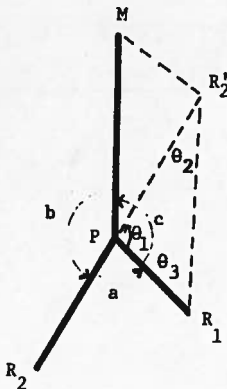
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$$(M)^2 = (R_1)^2 + (R_2)^2 - 2.R_1.R_2.\cos\theta_1$$



Equilibrium Location

Fig. 2

Once angle θ_1 in figure 2 is known, the angle a between force R_2 and R_1 at equilibrium can be determined ($180-\theta_1$). From the equation it can be seen that for any specific value of the location forces M , R_1 , and R_2 in which one force is greater than the sum of the other two, one and only one θ_1 exists ($0 < \theta_1 < 180$). This means one and only one angle a exists ($a = 180 - \theta_1$), and is determined irrespective of the location of the resources. Similarly b is equal to $180 - \theta_2$ degrees and c is equal to $180 - \theta_3$ degrees.

The information on the angles between the locational forces at equilibrium is extremely helpful in determining whether the production location P will be within a locational figure or at the corners of it. Let the angles R_2MR_1 in figure 1 be labelled x . A comparison can now be made between a change in the value of x and the constant $\angle a$ formed by P and the location of the resources. When P is within the locational figures formed in figure 1, $\angle x$ must be smaller than $\angle a$, since both angles stand on the same base R_1R_2 , yet one has a higher vertex M , forming a smaller angle than the other, P . Therefore, for a least cost transport location P to exist in a locational figure, $\angle a$, must be greater than $\angle x$. But if $\angle x < \angle a$ the angular relationships between the forces on P cannot be formed within the confines of the locational figure and P moves to the corner of the largest attractive force. Thus the critical angular deviation of R_1 from a straight line figure occurs when $\angle x$ is equal to $\angle a$. As $\angle x$ becomes smaller than $\angle a$, the location of P slowly moves towards R_2 . When R_1 reaches R_2 , P also reaches R_2 , see figure 3.

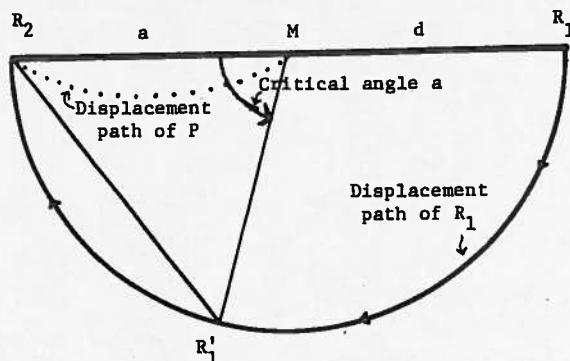
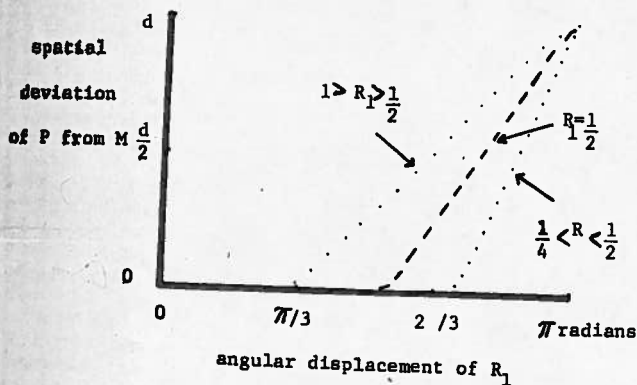


Fig. 3

The critical angle, or rather the angular quantum, needed to pull the production location P away from the market location is dependent upon various factors, one of which is the locational weights involved. In the example discussed above, if we substitute the weight values into the cosine formula and solve for θ_1 , we find that the critical angle is $75^{\circ}30'$ ($180-140^{\circ}30'$). Thus movement of P away from the market location M does not occur till R_1 is displaced $104^{\circ}30'$ counterclockwise from R_1 . Any angular displacement of

R_1 greater than $104^{\circ}30'$ will cause P to start moving towards R_2 as outlined in figure 3. The relationship between angular displacement of R_1 and production displacement from M can be seen in figure 4. If the weight of raw material R_1 used is greater than $1/2$ ton, yet less than one ton, the critical angle is larger and angular displacement is less before a spatial displacement of P from M occurs. The opposite holds true if R_1 is less than $1/2$ ton yet more than $1/4$ ton. See figure 4.



Another factor that influences the spatial displacement of P is the distance of R_1 from M. If, for example, R_1 is a distance of $1/2 d$ units from M, the maximum displacement of P would only be $1/2 d$ units, and the final location of P would coincide with R_1 , not R_2 . If, on the other hand, R_1 would initially have been more than d units away from M, the analysis is identical to the one discussed above.

Conclusion. The above paragraphs have focused upon the changing geometrical arrangements of locational weights and the minimum transport cost location in classical location theory. It has been shown, starting from an original linear arrangement of three locational weights in which the middle weight is the largest one, that it requires a minimum quantum of angular displacement of one locational resource to cause the minimum transport cost location to deviate from the central weight location M. Furthermore, this critical angle can be determined if the actual forces of the locational weights are known.

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1. Hoover, Edgar M., Location Theory and the Shoe and Leather Industry, Harvard University Press, Cambridge, 1937.
2. Isard, Walter, Location and Space Economy, John Wiley, New York, 1956.
3. Vance, Elbridge P., An Introduction to Modern Mathematics, Addison-Wesley, Reading, Massachusetts, P. 384.
4. Weber, Alfred, Theory of the Location of Industries, translated by Carl J. Friedrich, University of Chicago Press, Chicago 1929.

THE GRADUATE SCHOOL OF GEOGRAPHY

JOHN L. ALLEN, Post-doctoral Fellow, is continuing research into aspects of exploratory behavior and finishing a book on the Lewis and Clark Expeditions. He has recently published, "Geographical Lore and American Images of Louisiana Territory" (Western Historical Quarterly, April, 1971).

JEREMY ANDERSON, Associate Professor, continues his research on remote sensing of the agricultural systems of Puerto Rico and on the spatial behavior of children. In August he participated in the A.A.G. meetings in San Francisco. A new son, Benjamin Audrain, was born in November and is now actively engaged in micro-spatial exploration at home. Older sons Jeffrey and Eric have annexed 0.29 and 0.12 square mile activity spaces respectively. Janet is most tolerant of her intrepid explorers.

SISTER MARY ANNETTE, O.P., Post-doctoral fellow 1970-71 has recently published "Sociology and Planning" in Town Planning Review (April 1971); and Society and Milieu in the French Geographic Tradition, A.A.G. Monograph No. 6 (forthcoming July 1971). She also presented a paper "Social Space and the Planning of Residential Areas" at the Boston meetings of the A.A.G., April 1971. Sister Annette has given guest lectures during the past academic year at the City University of New York, The University of Chicago, The University of Montreal and Syracuse University. She has been invited by the President of the IGU Commission on the History of Geographic Thought to present a lecture at their Symposium on "The Origins of Human Geography: Friedrich Ratzel and Paul Vidal de la Blache" in Budapest, August 1971. She has also declined several other lecture invitations "because of exhaustion."

ROBERT J. BECK, Visiting Lecturer in Psychology and Geography (Psychogeography).

LEONARD BERRY, Professor of Geomorphology will return from Tanzania this summer to take up full-time teaching duties.

JAMES BLAUT, Professor of Geography, reports that he has published seven articles this year "none of them worth reading," and is in the process of writing two books: The Peasant World and Environmental Learning (with David Stea). He is currently studying geographic learning in early childhood in connection with the Place Perception Project.

MARTYN J. BOWDEN, Associate Professor, has been in England this academic year on a leave of absence where he has been conducting research on Viking settlement. He presented a paper on the growth of central districts of large cities during the Wisconsin symposium on the New Urban History (to be published under the editorship of Leo Schnore). Other publications include "Downtown through Time: Delimitation, Expansion, and Internal Growth," in April 1971 Economic Geography and a review of C.T. Smith's, An Historical Geography of Europe Before 1800.

NORMAN CARPENTER - "My duties as a Research Associate in Cartography include drafting, supervision of undergraduate draftsmen, computer programming, map design, teaching, and heavy lifting. My published work is in pictures rather than words, so far, and largely anonymous. Research at the moment is in the direction of computer graphics, particularly with the pen plotter. The summer of 1971 will be devoted primarily to my M.A. thesis on computer generalization of lines."

SAUL S. COHEN The year which, has been devoted equally to departmental affairs and outside scholarly concerns, started with a family vacation in Prince Edward Island. Departmental affairs included completion of the design for a new undergraduate program and 7- and 5-year A.B.-Ph.D. and A.B.-A.M. programs, the undergraduate honors course, development of a readings course in Black Politics and Political Geography, and continuation of Political Geography teaching assignments. In January, a joint article with Lewis D. Rosenthal, "A Geographical Model for Political Systems Analysis," was published in the Geographical Review. Professional concerns included service as Local Arrangements Committee chairman for the AAG Annual Meetings in Boston, membership in the AAG Ad Hoc Committee for Research Planning and Development, election to the Council of the AGS and Membership in the Commission on Geography and Afro-America. I also continued my active interests in broader educational and research problems as Chairman of COMPASS (Consortium of Professional Associations), member of the National Leadership Training Institute for Training of Teachers, and Consultant on Geography, the National Science Foundation. Two new activities developed: responsibility for an ad hoc committee convened by USOE and NSF to mobilize available scientific manpower for public education, and membership in a task force assigned to advise on USOE educational training policy for the coming year. Needless to say, this realm of activity required considerable travel within the country. In addition, I paid a visit to the U.K. and specifically to Oxford during the winter to consult with Clarendon Press. As the year draws to a close, I find myself engaged in wrapping up many loose ends as a prelude to my Sabbatical, which is expected to be spent as Visiting Professor of Geography at the Hebrew University in Jerusalem.

RICHARD A. HOWARD, Director of Computer Services has been "busy teaching" and has "numerous projects."

GERALD J. KARASKA, Professor of Geography and editor of Economic Geography reports that he is "making a few friends and many enemies" through his editorial efforts.

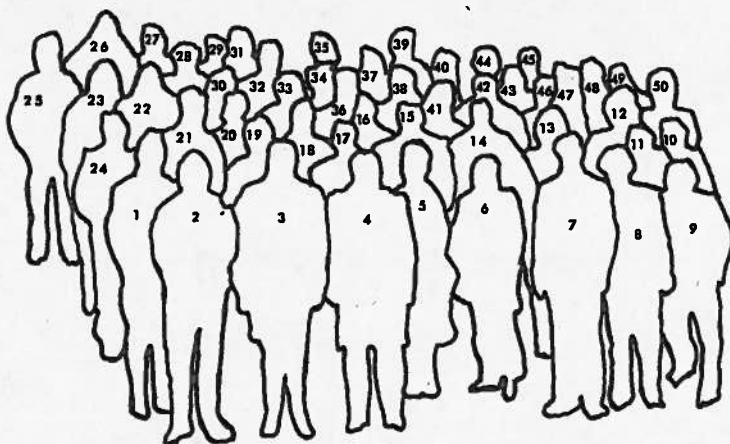
ROBERT W. KATES, Professor of Geography, is currently on leave of absence in Tanzania.

ROGER KASPERSON, Associate Professor of Geography and Government is presently conducting research on Water Reuse Systems in U.S., especially obstacles presented by public acceptance questions, economic feasibility, and attitudes of water managers, and is writing a book Geographic Dimensions of the Polity for Prentice-Hall. "I am mostly enjoying those moments when I ambulate through the Connecticut woods while my 2-year old son educates me on the joys of nature."

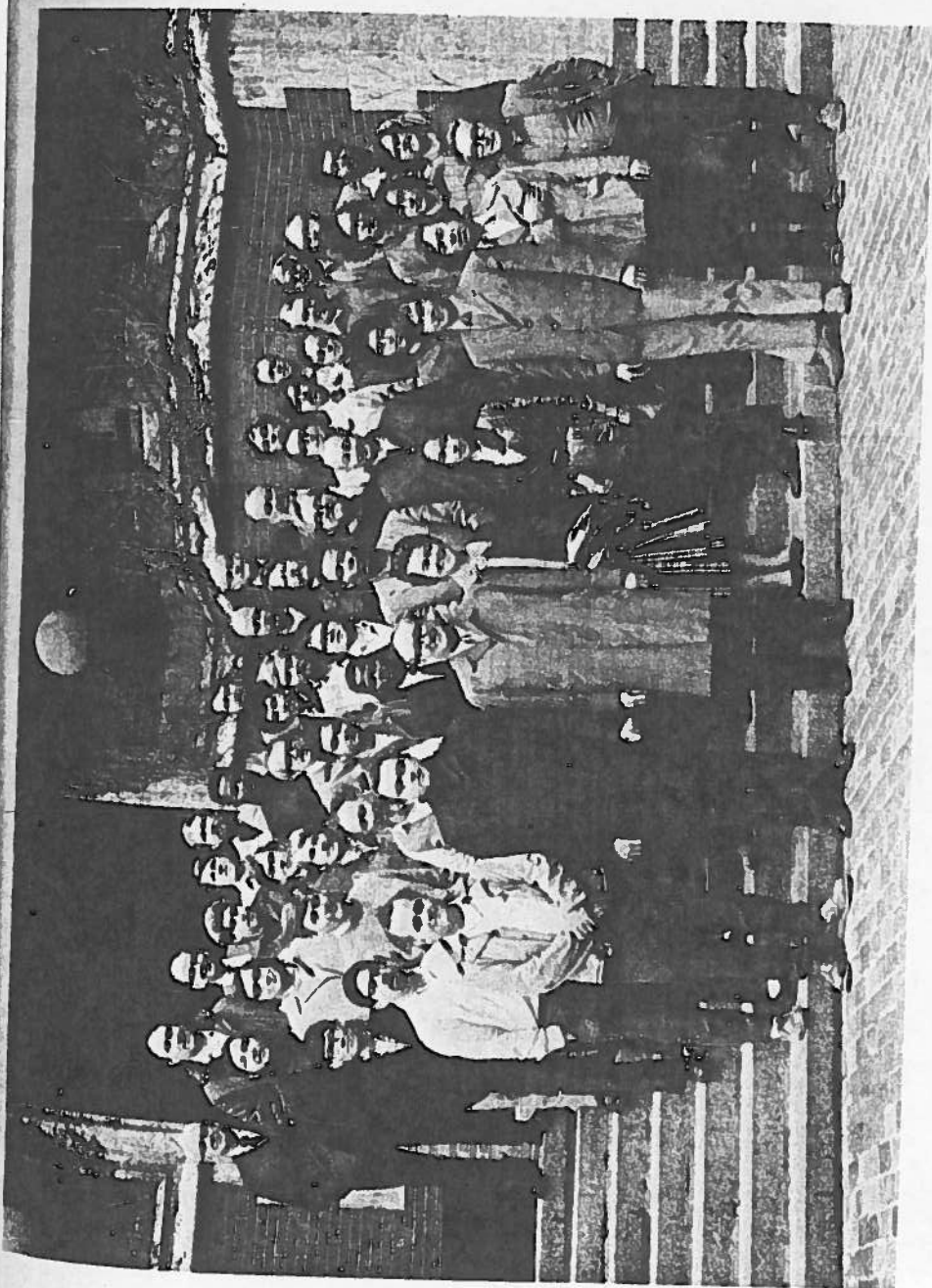
DIANE KNOS, Professor of Geography, has directed the TTT Program (2nd semester) including "30,000 Committee Meetings." More specifically, he has been working with TTT fellows with the teaching of teachers in programs for public school children and undergraduate classes. He has also been working on learning models applied to the teaching of geography.

WILLIAM A. KOELSCH, Associate Professor of History and Geography, spent the summer of 1970 under an NSF Faculty Development Grant in research in midwestern and western manuscript collections locating materials for the history of Clark; and has been awarded an American Philosophical Society Penrose Fund Grant to continue this summer in libraries on the East Coast. He will be on leave of absence Spring 1972 in order to get some long-deferred writing completed. Dr. Koelsch's recent publications include an article, "Monitoring Historical Geography," in the Proceedings, AAG, Vol. III (1971) and a review of Mayer and Wade, "Chicago: Growth of a Metropolis," in Economic Geography, April 1971.

LAWRENCE LEWIS, Assistant Professor, has been continuing research into mass wasting processes in the tropics. His most recent publication is "Effects of Dams on Stream Morphology" in the Journal of the Indiana Academy of Science.



- 1) T. Hankins, 2) R. Howard, 3) G. McCleary, 4) S. Cohen, 5) Sr. Annette,
- 6) N. Morales, 7) G. Hinzmann, 8) R. Beck, 9) E. Wight, 10) G. Hyland,
- 11) D. Amaral, 12) H. Cummings, 13) D. Dronsick, 14) W. Carolan, 15) J. Thornton,
- 16) D. Seamon, 17) M. Mujwahuzi, 18) W. Lezama, 19) D. Dworkin, 20) N. Carpenter,
- 21) E. Zube, 22) E. Weiss, 23) A. Hecht, 24) K. Liaw, 25) H. Warman, 26) D. Miller,
- 27) W. Koelsch, 28) K. McGinty, 29) N. Crawford, 30) C. Clayton, 31) D. Ferguson,
- 32) J. Copes, 33) L. Solomon, 34) L. Lewis, 35) J. Allen, 36) B. Ryder,
- 37) R. Boucher, 38) S. Hobart, 39) H. Prince, 40) D. Knos, 41) M. Dwyer,
- 42) R. Pond, 43) R. Morrill, 44) B. Baltensperger, 45) A. Schmuelli, 46) S. Wilson,
- 47) W. Murphy, 48) R. Kasperon, 49) G. Karaska, 50) B. Wilson.



THE GRADUATE SCHOOL OF GEOGRAPHY
1970-71

GEORGE McCLEARY, Assistant Professor, has, in addition to the Herculean task of guiding Clark's Cartography Program, been able to journey back and forth across the country from one professional meeting to another, have a third child, and maintain his sanity.?!

RAYMOND E. MURPHY, Professor Emeritus of Economic Geography, "I have just finished reading the copyedited proof of my book, The Central Business District Inquiry, which is being published by Aldine-Atherton. Also, I am at work on a new edition of The American City: An Urban Geography. These two books represent my activities -- current and for a couple of years to come.

RICHARD PEET, Assistant Professor, edited an issue of Antipode on the Geography of American Poverty in December and was the coordinator of A session at the Boston AAG meetings on the same topic. His paper, "Poor, Hungry America" appeared in The Professional Geographer, April 1971.

HUGH PRINCE, Visiting Professor, Semester 2, 1971. "I relinquished the editorship of AREA, published by the Institute of British Geographers, before coming to Clark in February. During my brief visit I was able to gain a great deal from a discussion of a forthcoming article on "Real imagined and abstract worlds of the past" to be published in Progress in Geography III later this year. Clearly, some new ideas will have to be taken into account in any future writing on the method of historical geography. Above all, I enjoyed many informal talks and exchanges of views with graduate students and faculty about deeper issues of academic enquiry. For those free discussions I am truly grateful."

DAVID STEA, Visiting Associate Professor, was on academic leave from Clark during the period Mid-January to Mid-April, 1971. "I spent a most interesting and provitable period teaching in the School of Architecture and Urban Planning at U.C.L.A., and in the Faculte' de L'Amenagement at L'Universite de Montreal." Dr. Stea has also busied himself with attendance at meetings in the U.S. and Canada and delivery of lectures in U.S., Canada, England and France. He has numerous articles in press; and is currently working with Roger Downs of Penn State University on a Book about Cognitive Mapping to be published by Aldine in December 1971.

HENRY J. WARMAN, Professor of Geography, has published two articles on major concepts of Geography. In the Journal of Geography, "Globalism - A Concept and Its Development" (January 1970) and "Perpetual Transformation - a Concept of Change and Choice" (December 1970). He has also completed a manuscript for a Rand-McNally paperback Human Resources of the United States (for senior high school). Dr. Warman reports that he is "looking forward to June when I will have the privilege of working with the N.D.E.A. Institute at Appalachia State University, North Carolina. Also, I hope to complete the revised, expanded, version of an Education textbook - Geography - Backgrounds, Techniques and Prospects (for Teachers)."

HANK AAY - Hank reports that he has shifted his academic direction to another track, to that of the philosophy of geography and the history of geographic thought. His major interest is currently centered on the nature and meaning of space. This summer Hank will teach urban geography at Waterloo Lutheran University.

DANIEL J. AMARAL

BRAD BALZENSBERGER - "I am in my second year at Clark on an NDEA Fellowship and working on a Ph.D. My major interest is in historical geography, especially of semi-arid areas, particularly the Great Plains. Work this year has centered on a study of German immigrants' perception of the midwest and upon images and image formation in the American West.

WALKER BANNING

RON BOUCHER - is a TTT Fellow involved in social geography.

WILLIAM B. CAROLAN, JR. - During the past year I made up and administered a pre-dissertation test of the efficiency of the 'apt' map, my version of the systematized, non-contiguous cartogram. Results were instructive and positive. I also gave a great deal of thought to "What is Geography?" As a result, I now have a concise, twenty-six page answer to that question, consisting of a definition of Geography, a rationale for that definition, and a categorized list of questions that Geography asks, from my point of view. The effort is not perfect, but I find it most helpful. I am planning to spend the Summer reading for my Ph.D. orals in the Fall. Next year will be spent working on the dissertation.

KANG-TSUNG CHANG - "See you next year at San Fernando."

CHRISTOPHER CLAYTON - "I shall be leaving Clark this year to take up a job (position, appointment) at San Fernando Valley State College. Hope to have my dissertation completed by the end of the summer and then develop my interest in additional geographic fields which I have recently neglected."

JOE COPES - is a COMGA Fellow is involved in geomorphology with an interest in geographic education. He plans to return to the faculty of Grambling College upon completion of his degree.

CLIFF CRAIG - on leave from Utah State University, Department of Geography as a first year graduate student - interested in social geography. At present involved in defining "social geography" as a major field of research interest at Clark, also with interest in urban geography and geography education. Brought to Clark as TTT fellow in Geography. "The land of Zion (Utah) looks better every day."

NICK CRAWFORD - Interests: Geomorphology, soils, quantitative techniques.

HARRY CUMMINGS - Honors graduate - University of Western Ontario. "My major interest lies in problems of rural development with the methods of quantitative analysis as a means of getting at the available data. The purpose of this focus is to get at one of the specific aspects of problems of poverty. I hope to return to Canada to work in government, in the Department of Regional Economic Expansion."

DAVID DRONSICK - "The 1970-71 academic year has proven to be a long and trying one. Then again, 1969-70 was nothing to write home about."

DAN DWORKIN - has survived.

DARRELL R. FERGUSON - Interests this year: (1) Passing orals; (2) Work under way - or in conceptualization stage; a. location decisions on noxious public facilities, b. system surplus energy flows - outside the system - the case of U.S. and Latin America, c. cognitive representations and decision-making in an urban political context, d. the spatial distribution of political behavior within a system, e. group perception of the environment, a case study of 6th grade students in Puerto Rico, Massachusetts, and Idaho.

JIM FONSECA - "I am working in political geography. Current interests are systems theory and Cuba."

TOM HANKINS - First year student in the Ph.D. program in Environmental Management.

KIRSTEN HARING - Cognitive anthropology continues to spread in epidemic proportions across the landscape of human geography; collecting more adherents by the day. "I had an enjoyable and productive January study period."

MELSETA HARRISON - comes to Clark from South Carolina. She is currently involved in Urban Social Geography.

ROGER HART - Most of the year spent continuing a horizontal move into psychology and compulsively writing a paper on the development of spatial cognition, both with the help of Gary Moore. Presently preparing Ph.D. dissertation on exploratory behavior and topographic learning in children. Continuing to push for the department becoming even more vital through the development of geo-psychology, psycho-geography, behavioral geography, or environmental behavior, but we can't even decide upon a title!

ALFRED HECHT - "This year's activities contained two highlights for me. One was the passing of the Ph.D. Oral examinations and the second, the presentation of a paper in conjunction with Peggy Lentz at the Northeast Regional Science Conference, called 'Conceptual and Parametric Modifications of Forrester's Urban Area Model.' With all the preliminaries out of the way, I can now start on the dissertation which will be my main work load this summer and next year."

GORDON A. HINZMANN, JR. - "Nothing worth noting, except my jump into the psycho-geography bag. Too bad they moved it just as I was jumping in."

STEVE HOBART - Steve asserts that he "sees light at the end of the tunnel" with only his dissertation to finish. He has been selected to attend an eleven week seminar in Yugoslavia this summer under AAG sponsorship and will return in the fall to New Hampshire to teach one course while finishing his dissertation.

GERRY HYLAND - is "trudging happily onward through the Ph.D. program in a milieu of vague specificity and rigid flexibility."

BILL LIZAMA - is getting ready "to go back to where I belong (Venezuela)," where he will do field work on his M.A. thesis on the Cassava farm system in Guayana.

KAO-LEE LIAW

ALAN LEE MARCUS - Clark B.A. 1970, Geography. Interests are both physical geography and resources.

FERRY MASSEY - under pressure from the Selective Service System is attacking a M.A. thesis on social space.

KEN MCGINTY - is working on M.A. thesis: The abolition of legalized slot machine gambling in Southern Maryland -- A study in political geography.

D. DAVID MILLER - reports that he is enjoying his fourth year of labouring in the Vinyards of the Graduate School of Geography.

JOE MINER

NUBIA MORALES - plans eventually to return to Colombia in the field of geographic education.

ROBERT W. MORRILL - "Personal Growth through interaction and meditation."

MARK R. MUJWAHUI - Graduate Student from Tanzania - E. Africa.

WALTER MURPHY - comes to Clark from, of all places, the University of North Dakota.

DICK POND - "This, my second year at Clark, has proved to be a fantastic year of growth - my own personal growth and the growth of our family. Diana and I are awaiting the birth of our first child with joyous anticipation."

RICHARD REID - no news - but, then, that is good news.

GRAHAM ROWLES

BRUCE RYDER - still here.

AVSHALOM SCHMUELI

DAVID SEAMON - "I'm a first-year graduate student interested in environmental cognition."

ROBERTA SMILNAK

LES SOLOMON - "As a new grad student in the Clark Geography Department, I have felt a little like an army recruit. Having completed basic training (Core Course, proficiency paper, and tool requirements) and having attempted to assess the strategies and philosophies of the ranking officers (so as to avoid as much K.P. duty as possible), I feel that I am now ready to continue my tour of duty with rigor and insight. With my Ph.D. survival kit packed, mine detector activated, and compass in hand, a few rays of light can be seen shining through the maze ahead."

MARGARET STEPHENSON

JOE THORNTON

TED WEISS, this year has edited the Monadnock, added a second daughter to his family, and more or less cleared the academic decks for the start of a dissertation in the field of historical urban geography.

IRIS WHEATLEY - will leave Clark this semester for a year of teaching at the Inter-American University in San German, Puerto Rico.

ERNIE WIGHT, who took the photographs for this year's Monadnock, reports with pride that he has been "passive and obedient" this year.

BOBBY WILSON - is interested in social urban geography; more specifically, his research interest involves Black migration to large urban centers, and the problems of social space encountered by Black rural migrants to urban areas.

STEVE WILSON - is finishing a one-year science faculty NSF Fellowship in Environmental Management. His dissertation work is on effect of attitudes about water quality on environmental decision-making.

BOB WRIGHT - "gifts are easier to give than to do justice." Kotler, Neighborhood Government.

ERVIN ZUBE - is on leave of absence from the University of Massachusetts. He is a Ph.D. candidate in the Resource Management Program.

ALUMNI NEWS

Sherman R. Abrahamson (Ph.D. 1949), Deputy Director of the Office of Export Control of the Department of Commerce has recently written "Computer Manufacturing in Japan A Brief Survey" for the Foreign Service Institute of the Department of State.

Buton W. Adkinson (Ph.D. 1942) is now Director of the American Geographical Society in New York. He has served on a joint Unesco ICSU Committee on the Feasibility of a World Information System. He has also taken business trips to Poland, Yugoslavia, Israel, India and Australia.

Lewis Alexander (M.A. 1948, Ph.D. 1949) is Professor and Chairman of the Department of Geography and Director of the Master of Marine Affairs Program at the University of Rhode Island. He is also Executive Director of the Law of the Sea Institute, Program Committee Chairman for the 1971 AAG Ad Hoc Committee on Marine Geography.

Agnes Morgan Allen (M.A. 1934; Ph.D. 1937) is a Professor of Geography at Northern Arizona University and has served on the National Board of the American Association of University Women since 1966. During the summer of 1969 she vacationed in Western Canada and in 1970 she visited Eastern Canada.

David L. Ames (Ph.D. 1969) is currently Director of Long Range Planning and Research for the Ohio-Kentucky-Indiana Regional Planning Authority in Cincinnati. He has recently presented papers at the Public Affairs Council's Conference on Land Use in Washington and the International Building Exposition and Congress in Louisville. He states that "Graduate training in geography, in spite of its less-than-cohesive nature, is the best background for metropolitan planning and, hopefully, problem solving."

William R. Anderson (M.A. 1963) is now district sales manager for a farm machinery and irrigation equipment firm and is living in Central Nebraska.

Wallace W. Atwood, Jr. (M.A. 1927; Ph.D. 1930) is the Special Assistant to the President of the National Academy of Sciences. He and Mrs. Atwood (M.A. 1932) invite us all to visit them at their resort marina at Windmill Point, Virginia.

Simon Baker (Ph.D. 1965), Associate Professor of Geography at Florida Atlantic University in Boca Raton, Florida has worked with Henry W. Dill on two Airphoto Atlases of Rural United States, one of the Far West and one of the North Central U.S. area published as Agricultural Handbooks #372 and #384 by the Government Printing Office. An earlier article on "Tea Production in Ceylon" has been reprinted in Sourcebook World Resources: Eastern Hemisphere by Ginn and Company.

Nicholas Bariss (Ph.D. 1967) of the University of Nebraska has published "Gully Formation in the Loesses of Central Nebraska" which will appear in the Rocky Mountain Social Science Journal.

Mildred Berman (M.A. 1950; Ph.D. 1963) published "A New Look at the Maya Lowlands of Middle America" in the Journal of Geography. Her study of the location of the diamond-cutting industry is scheduled for publication in the June issue of the AAAG.

Robert E. Black (M.A. 1960) is continuing to work on his dissertation topic dealing with citizen input into the municipal decision making process concentrating on spatial behavior and individual perception at the neighborhood level. He is employed as Deputy Director and Director of Planning

by the Worcester Model Cities Department.

Paul A. Blackford (1967) writes that after four years research work with the Army he has returned to teaching as an Assistant Professor at Bridgewater State College, Bridgewater, Mass.

Clyde J. Bellinger, Emeritus professor at the University of Oklahoma, is conducting research on Suntide-radiation cycle theory as related to terrestrial heat balance and climatic cycles and trends.

Adelbert K. Botts (M.A. 1931; Ph.D. 1934) is Professor of Geography at Bowling Green State University, Bowling Green, Ohio.

Leonard W. Bowden (Ph.D. 1965), Associate Professor of Geography at the University of California, Riverside, has been appointed editor of The Manual of Remote Sensing to be published by the American Society of Photogrammetry. He plans to go to the University of N. South Wales in Australia, for a sabbatical leave next year.

Donald G. Brandon (1946-1947) is Associate Professor of Geography at Morgan State College in Baltimore, Maryland. He has been elected to membership in the faculty senate at Morgan, has spent part of last summer in Grand Bahama and Nassau "observing the type of life lived by the natives", and has served as a member of COMGA and has attended their meetings.

David D. Brodeur (M.A. 1960; Ph.D. 1963) is director of New Product Analysis for Urban Investment and Development Co. of Chicago, and Advisor to Environment Inc., a permanent exposition in Chicago to feature innovative housing and the world resources monitoring system devised by Buckminster Fuller.

R.J.E. Brown (Ph.D. 1961) is Research Officer of the National Research

Council of Canada. He reports that he is currently engaged in permafrost research and travels every year to northern Canada.

Terence Burke (1954-1955) is Associate Professor in Geography at the University of Massachusetts at Amherst. "I spent part of summer 1969 working in the Manuscript Collection of the National Library of Ireland studying 18th Century estate records. I expect to continue this research next summer."

Guy H. Burkham (A.B. 1916; A.M. 1922) is retired and continues to garden in Tatnuck.

Robert Guy Buzzard (Ph.D. 1925) recently retired as President Emeritus at the Eastern Illinois University in Charleston, Illinois. He is living in a retirement village called the "Leisure World," seven miles inland from Laguna Beach, California. He is proud of the three cash Scholarships in Geography which Gamma Theta Upsilon gave in his name for 1970-71. He points out that their Loan Fund nears \$100,000.

Harry H. Caldwell (B.A. 1941, Ph.D. 1951) is Professor and Acting Head of the Department of Geography at the University of Idaho in Moscow. He is editor of the Idaho Economic Atlas and is conducting a study on the "Environmental Impact in Idaho Batholith Land Uses" for the Public Land Review Commission.

Robert D. Campbell (Ph.D. 1949) is Professor of Geography at the University of New Mexico. Last spring he completed a study, Planning the Man-Environment Interaction, with L. Schlesinger and B. Schuchman.

Russell B. Capelle, Jr. has submitted the final draft of his thesis concerning the Impact of Snow-making

Technology on Southern New England ski towns. He has received a grant from the Urban Mass Transit Administration to study at the University of Pittsburgh. Russell is the father of a baby girl, Kimberlee Mara born March 25, 1970. She wishes her daddy lots of luck on his tentative dissertation topic "The Relationship of Network Density to Socio-Economic Variables in Pittsburgh: A Factor-Analytic Approach."

Borman Carls (M.A. 1934; Ph.D. 1935) is Professor and Chairman of the Geography Department at Shippenberg State College, Shippenberg, Pennsylvania. In 1971 he is President of the Pennsylvania Council for Geography Education.

Hans Carol (1958-1960) is Professor and Director of Graduate Programs in Geography at York University in Toronto, Canada. He is at work organizing the IGU symposium on the Theory of Geography for the IGU Congress in 1972 at York University.

Thomas W. Chamberlain (M.A. 1937; Ph.D. 1946) is a special assistant to the Provost and Professor of Geography at the University of Minnesota in Duluth. He and his wife toured the U.S.S.R. last September.

Catherine E. Cox (M.A. 1942) is Assistant Professor of Geography at Fitchburg State College, Massachusetts. In the summer of 1970 she traveled around the world visiting Helsinki, Berlin, Budapest, Ljubljana and Sapporo.

Harold F. Creveling (Ph.D. 1951) is Professor of Geography at East Central State College, Ada, Oklahoma. In the near future he plans to travel within the United States.

Floyd F. Cunningham (Ph.D. 1930) retired from Southern Illinois University in 1966 and more recently retired

from a position as Distinguished visiting Professor of Geography at Western Kentucky University in 1970. "I am unemployed but I have enough work mapped out to keep me quite busy the rest of my life." He is tending to 330 acres of land while working on his 13th, 14th and 15th books.

Nadine A.H. Deacon (1944-45, 1962) is chairman of the Geography Department at the Bishop Strachan School for Girls, Toronto, Ontario. A section and map in the new book Toronto: An Urban Study are based on her original research done in 1941. She is now teaching, homemaking and running and operating a farm.

Veva K. Dean (M.A. 1940; Ph.D. 1949) in retirement at Edgartown on Martha's Vineyard says hello to Dr. Van, Dr. Warman and Dr. Murphy and sends along a Christmas letter for her friends at Clark.

Sigismond de R. Diettrich (Ph.D. 1931) is Coordinator of University Special Programs, Federal Grants and Projects at the Interamerican University of Puerto Rico. His job requires frequent trips to Washington and New York.

Robert P. Donnell (M.A. pending) is Instructor of Geography at Massachusetts State College at Framingham. He finished a year's internship in urban and community planning at Universal Engineering Corporation and Thomas Associates in Boston in the spring of 1970. Presently he is working on the final draft of his Master's Thesis and assisted in planning Boston area field trips for the spring 1971 AAG Meetings in Boston.

John D. Dornback (1950-1952, Ph.D. 1967) is Assistant Chief of the Earth Observations Division at NASA's Manned Spacecraft Center in Houston. This

past year he delivered papers on NASA's Earth Resource Program in the United States, Mexico and Paris.

John R. Dunkle (Ph.D. 1955) is Assistant Dean and Professor of Physical Sciences and Geography at the University of Florida in Gainesville.

Farouk M. El Gammel (M.A. 1963, Ph.D. 1966) is director of the Geography Department at the University of Puerto Rico in Rio Piedras. He is currently involved in two research projects, one of which deals with the spatial/economic analysis of San Juan Area's water needs. The other is entitled "Psychospatial Analysis of the Behavioral Patterns of the Puerto Rican Public Towards Recreational Areas." In the drawing stage are two more projects, one of which aims at the study of the urban evolution of San Juan from Columbus to the present, and the other aims at producing a "National Atlas of Puerto Rico."

Richard Ellefsen (M.A. 1958) helped host the August 1970 meeting of the A.A.G. in San Francisco and has been doing research on California. He is Professor of Geography and Departmental Graduate Coordinator at San Jose State College, California.

Helen Balk Elwell (M.A. 1944) Professor of Geography and Anthropology at Stephens College, Columbia, Mo., spent about six weeks in South America last summer. She plans to conduct a seminar in India and Japan in the summer of 1971.

William Emerson (1968-70) would appreciate hearing from anyone who has information or experience concerning the economics and ecology of either contemporary or 19th century communes.

Bart J. Epstein (Ph.D. 1956) is Professor of Geography and Research Associate at the Center for Urban Regionalism, Kent State University, Kent Ohio.

William Belden Fairchild (M.A. 1937) is the Editor of Geographical Review.

Brad Fish is Professor of Geography at Cape Cod Community College in West Barnstable, Mass.

Roy J. Fletcher (Ph.D. 1960) is an associate professor at the University of Lethbridge, in Alberta. Last summer his family visited Japanese relatives in Osoha. Their third child (third son) was born in November.

Edwin J. Foscue (Ph.D. 1931) Professor Emeritus of Geography at Southern Methodist University, reports that he and Mrs. Foscue made a trip by ship around South America during the autumn of 1969; in the spring of 1970 they travelled by bus and train across the Sierra Madre Occidental of Mexico.

J. Keith Fraser (Ph.D. 1964) as its Executive Secretary has been spending most of the past year organizing the 22nd International Geographical Congress to be held in Montreal in 1972. He also attended the AAG Meeting held last August in San Francisco.

Robert French (1967-1969) is Assistant Professor of Geography at the University of Maine in Gorham.

Roland J. Fuchs (M.A. 1957, Ph.D. 1959) is Professor and Chairman of the Dept. of Geography at the University of Hawaii. He was Chairman of the Faculty Senate at the University in 1969-70. Last March and April he travelled in East and Southeast Asia.

Mahammad Hassan Ganji (Ph.D. 1954) is Professor and Chairman of the Dept. of Geography at Tehran University, Tehran, Iran. He is presently revising the Climatic Atlas of Iran, first published in 1968. Last

summer he visited Japan to participate in a World Meteorological Organization Conference and to see Expo '70.

Kenneth Gillman (Ph.D. candidate) is finishing his dissertation on the suburbanization of offices in the New York Metropolitan region.

Namir Ba'ad Girgis (Ph.D. 1957) Professor of Geography at Edinboro (Pa.) State College is working on a book about Mediterranean Africa.

Jim Glasgow (M.A. 1959) is Assistant Professor of Geography at State University College in New Paltz, New York.

Janet Allen (1960-1964) has visited Bermuda and Florida in 1968 and took a trip to Great Britain in 1970.

Peter A. Goheen (M.A. 1964) is Assistant Professor of geography at the University of Chicago. His book, Victorian Toronto, 1850 to 1900: Pattern and Process of Growth is published as University of Chicago Department of Geography Research Paper, No. 127.

Loren Gould (A.B. 1953, M.A. 1959) is Director of Institutional Studies at the Massachusetts State College in Worcester. He and his wife have a book in print, Crafts for the Elderly, which was the result of his wife's volunteer work with the elderly over the past three years. He visited New Orleans for the first time last May to attend the Meetings of the Association of Institutional Researchers. "I walked along the levee for a couple of miles, also went out on the river itself."

Donald W. Griffin (Ph.D. 1963) is Associate Professor of Geography at Western Illinois University at Macomb. In October 1970 he chaired an Urban Geography Session of the West Lakes

Meetings held at Northern Illinois University, DeKalb. Next summer he plans to spend six weeks in East Africa traveling and doing research.

Andreas Grotewold (M.A. 1951) Professor of Geography at the University of Missouri-Columbia is continuing his research into the post-World War II expansion of West Germany's foreign trade.

Alan Harris (1952) is presently Reader in Geography at the University Hull, Yorkshire, England. He is engaged in research concerning the historical geography of northern England.

Sister Mary Ursula Hank (Ph.D. 1958) is President of Mount Aloysius Junior College in Cresson, Pa. She recently traveled widely in Europe with a study group from Southern Illinois University and met with educators in eight cities to discuss post-secondary education.

Dorothea Burton Hawley (M.A. 1947; Ph.D. 1949) is Intelligence Research Supervisor for the Department of Defense. She reports that she was able to visit Los Angeles during a time of the Santa Ana and resulting fires.

Richard D. Hecock (Ph.D. 1966) is Associate Professor of Geography at Oklahoma State University. In the past year he presented papers to the Oklahoma Academy of Sciences, the Rocky Mountain Social Science Association, and the Michigan Academy of Arts, Sciences, and Letters, as well as publishing several articles. He is currently project leader for a study on latent demand for water-based recreation. He also reports the birth of a son, Doug, last September.

Clarke F. Hess (M.A. 1948) is Chair-

man of the Department of Counseling and Rehabilitation at Marshall University, Huntington, West Virginia.

Joseph E. Hickey, Jr. (M.A. 1960, Ph.D. in progress) is State Open Space and Recreation Planner for the Department of Agriculture and Natural Resources in Connecticut. He writes "My major occupational preoccupation is with the translation of planning recommendations into action in a fast-growing part of Megalopolis- a real challenge or a study in frustration, take your pick!"

Franklin Hodges (M.A. 1966) is an Assistant Professor of Geography at the University of Maine at Gorham. Presently he is helping put together a new university in southern Maine. Geography and Anthropology will be merged in the new system. His family is enjoying life on their "exurban" farm.

Gerry R. Hones (M.A. 1953) is Lecturer in Education at Bath University in England. This year he has written "The Geography of Education" dealing with curriculum developments for the teaching of geography in schools.

Joseph B. Hoyt (Ph.D. 1954) is Professor of Geography and Chairman of the Social Science Division of Southern Connecticut State College in New Haven. The Geography Department here has eight full-time and two part-time members and averages 15 to 20 majors a year. He also has been working on the 3rd edition of Man and the Earth which will be published in January.

Burt Hudgins (Ph.D. 1930) is retired and is living in Detroit, Michigan.

Gilbert J. Hunter, (M.A. 1959) is deliveryman for an appliance dealer and builder of water conditioning equipment near Pottstown, Pa. He has recently prepared a symposium on "rural-urban relations and the family" for

the local Rotary Club and is preparing an address on "Evangelical Ecology," inspired by a recent camping trip to the shores of Lake Huron.

M. Aminul Islam (Ph.D. 1964) is a Reader in the Department of Geography, University of Dacca, East Pakistan. He is currently engaged in Cyclone Hazard research in East Pakistan, sponsored by the I.G.U. Commission on Man and the Environment (in collaboration with G.F. White, I. Burton, and R.W. Kates). He is Secretary of the East Pakistan Geographical Society and Editor of The Oriental Geographer. He recently completed a paper on "Human Adjustment to Coastal Hazards: A Case Study of Char Jabbar."

Albert H. Jackman (Ph.D. 1953) will give up the Headship of the Department of Geography at Western Michigan University in January of 1972. He expects to spend the next eight months in Alaska and Canada studying attempts of government and private interests to reconcile seemingly incompatible objectives of the Conservationists and developers of natural resources in the Arctic and Sub-Arctic.

Preston James (Ph.D. 1923) is Maxwell Professor Emeritus at Syracuse University. He is teaching a graduate seminar there in the history of geographic ideas the first semester of 1970-71; he will teach a similar course at the University of Puerto Rico in the second semester. He has just completed the manuscript of a new book, All Possible Worlds: A History of Geographic Ideas. It will be published by Bobb-Merrill in late 1971.

J. Granville Jenson (Ph.D. 1946) is currently at Oregon State University.

Jessie M. (Thornton) Jessemann (M.A. retired) spent two months touring

Europe, visiting Paris, Rome, Lucerne, Amsterdam and London.

William C. Jeyasingham (M.A. 1952; Ph.D.) is the President of Jaffna College in Vaddukoddai, Ceylon. In addition to his administrative work, he teaches courses in climatology, political geography, and economic geography. He is also the editor of Religious and Social Issues which is published by the Christian Institute for the Study of Religion and Society.

Allen Wynne Jones (1962-1963) is Director of Marketing for the Wales Tourist Board after a December, 1970 promotion from Public Relations Manager. He has represented Wales in travel promotions in the USA, Canada, Germany, Holland and Sweden. Recently he stopped by Clark to look up old friends while on a summer tour of N.E. United States and S.E. Canada.

William F. Kanes, Jr. (M.A. 1954) is General Manager of the Worcester Area Chamber of Commerce. In 1970 he was named a Fellow of the American Industrial Development Council.

Lois R. Keller (M.A. 1929) is now retired. She reports that she toured Southern New England last August.

Lillian W. Kent (M.A. 1964) is Assistant Professor of the Evening Undergraduate School of Fitchburg State College in Massachusetts.

Edward Kersch (M.A.) is principal city planner for the Detroit City Plan Commission.

Harry B. Kircher (Ph.D. 1961) is Associate Professor, SIV-Edwardsville. He has co-authored a high school text in conservation entitled Our Natural Resources.

Ether L. Kistler (M.A. 1938) is retired from high school teaching.

Instead of spending this winter in Florida as she has since 1961, she is sticking out the cold winter months at her home in Nanticoke, Pennsylvania.

Clarence E. Koeppe (A.M. 1927; Ph.D. 1929) is retired and has traveled this past year to Central Europe, Iberia, Morocco, and Thailand. His new book is Tink of Nunda, a "true account of the events and situations which I experience as a lad at the turn of the century--humorous, sad, and unsophisticated."

Mary MacDonald (M.A. 1941) expects to receive her MBA from the University of Dallas in Irving, Texas this year.

Richard J. Kopec (Ph.D. 1965) Associate Professor at the University of North Carolina at Chapel Hill has published "Further Observations of the Urban Heat Island in a Small City" in the Bulletin of the American Meteorological Society. He is currently doing research on the Social and Physical Effects of Maximum Sea Level and a Bioclimatic Model for Southeastern U.S."

Theodore J. Laird (M.A. 1948) is Chief of the Geographic and Toponymic Branch of the Geographic Names Division, U.S. Army Engineering Topographic Command, Washington, D. C.

J. Alan Leach (M.A. 1969) is a First Lieutenant in the U.S. Air Force. He is an aircraft maintenance officer currently assigned to Davis-Monthan AFB, Tucson, Arizona.

Han Soon Lee (1965) Professor of Geography at Kyung Hee University in Korea is researching a paper entitled "Internal Migration of Population in Korea." He is also Evaluation Professor of Five Year Economic Planning for Korea and a part-time Research Planner under the Ministry of Construction.

Louis E. Leipold (M.A. 1946) has retired from his position as Chief of the Editorial Branch of Scientific Information and Documentation Division of the National Oceanic and Atmospheric Administration of the Department of Commerce. In July, 1970 he received the Bronze Medal awarded by the Department of Congress for "distinguished editorship over a six-year period and for superior supervisory performance for the past three years."

Minnie E. Lamaire (M.A. 1932, Ph.D. 1935) is Professor of Geography at Mount Holyoke College. This year she is working as a member of the local arrangements committee for the Boston meetings of the A.A.G.

Sally Lamaire (1968-70) is working on the last chapter of her thesis, "The Ecology of Infectious Drug Induced Diseases--Cases studies of the U.S. and Worcester, Mass.," and working part time in New York City. In addition, she is doing volunteer work with the Speaker's Bureau of the Environmental Action Coalition of N.Y.C.

Thomas Lewis (1966-1967) is Assistant Professor of Geography at Manchester Community College in Connecticut. He is completing his dissertation work at Rutgers and has published recent articles in the Journal of Geography, Science Education, Bulletin of the Connecticut League of Historical Studies and The Social Studies.

Dana A. Little (M.A. 1951, 1955-56) is self-employed as a consultant.

Miriam L. and Richard A. Lockhart (M.A. 1957) Miriam is awaiting the birth of the Lockhart's third child and has left her job as teacher of Spanish speaking adults in Boston. Richard has left the BRA to become Chief of Development Services for

the Cambridge Redevelopment Authority. They visited Miriam's homeland, the West Indies, this summer with their two girls.

Richard F. Logan (B.A. 1936, M.A. 1937) is Professor of Geography at UCIA. He was visiting Professor of Geography at the Hebrew University, Jerusalem, during the Spring of 1970, and continued field research in the Namib Desert of South West Africa during the Summer of that year.

Harriet Ruth Long (M.A. 1941; Ph.D. 1955) is Professor of Geography at Edinboro State College, Edinboro, Pa.

Robert and Aleta Looker (M.A. 1960; M.A. 1960) Robert is still Deputy Director of Planning for the City of Hartford.

Manuel H. Lopez (A.B.) retired in May 1970 from the U.S. Army Topo Command (formerly the Army Map Service).

Arthur C. Lord (M.A. 1959) is Associate Professor of Geography at Millersville State College, Pennsylvania.

John C. Lowe (Ph.D. 1969) is Assistant Professor of Geography and Regional Science at George Washington University in Washington, D. C. In the past year he contributed work to the Housing Market Study for the Metropolitan Miami, Florida Community Renewal Program. "Enjoyed 6 1/2 weeks of camping in a VW camper with two babies to the Pacific Northwest and Canadian Rockies."

Emanuel Maier (Ph.D. 1961) is Chairman of the Dept. of Earth Sciences and Geography at the State College of Bridgewater, Massachusetts. With sabbatical coming up in 1971, he will study and do research at the Max Planck

Institute in Munich, Germany. He is particularly interested in relating the territorial behavior of human groups to political geography.

Ronald M. McCall (M.A. 1963) is Assistant Professor of Geography at Shippensburg State College. He was Seasonal Park Naturalist for the National Park Service in the Summer of 1970.

Shannon McCune (Ph.D. 1939; LL.D. 1961), Chairman of the Department of Geography, University of Florida, spent the summer of 1970 conducting research in the Ryukyu Islands under a National Science Foundation Grant.

Henry R. McCutcheon (M.A. 1966; Ph.D. 1970) is currently Assistant Professor of Geography at Memorial University of Newfoundland, St. John's, Newfoundland.

Wallace E. McIntyre (M.A. 1947; Ph.D. 1951) is presently working for the federal government. He spent a month travelling in South and East Africa during early 1970.

Nathan Meleen (M.A. 1964) is Assistant Professor, Department of Natural Science, Oral Roberts University. He is currently studying the effects of stripmining on sedimentation and channel form changes on a stream in northeastern Oklahoma.

Michael G. Mensolan (A.B. 1949) Professor of Geography and acting Chairman, Department of Geography and Geology, Boston State College. He received a certificate in Latin American Studies from the Center in Latin American Studies, University of Pittsburgh. He visited the Caribbean Area and Venezuela in conjunction with work on a study of "Internal Migration in the State of Merida, Venezuela." He is completing a report for the Mass. Dept. of Public Health on "Family Health Coverage and Utilization of Medical Resources in Lynn, Mass."

Frederick S. Merriam (A.B. 1939; M.A. 1946) is Registered Representative of Waddell and Reed, Inc. New York City.

Claire Pirozzi Monier (M.A. 1965) is an Instructor at New Hampshire College in Manchester, New Hampshire. She has been awarded a grant to work with Franco-Americans under Title I of the Higher Education Act, 1965. She will be travelling to Florida for Christmas and to Europe at the end of January.

Andrew S. Moreland (M.A. 1951) is President of Ocean County College, a two-year community college located in Toms River, New Jersey.

Mahroo Tavakolian Morgan (M.A. 1964) is a Worcester housewife working against phosphate water pollution. She currently has two children, Anna Mitra (4) and Ralph (2).

Walter K. Morrison (M.A. 1952) is associated with the Nova Scotia Land Survey Institute, possibly the only school in North America that deals exclusively with the subjects of mapping, surveying and photogrammetry."

Benjamin Moulton (A.B. 1939) is Professor and Chairman of the Department of Geography and Geology at Hastings College in Hastings, Nebraska. He did field work in Alaska in the summer of 1969.

John Moulton (1958-1959) is Professor of Geography and Geology at Hastings College, Hastings, Nebraska. He and his wife spent last May in Europe.

Russell W. Muncaster (M.A. 1968, Ph.D. in progress) is still working on his dissertation while teaching at Waterloo Lutheran University in Waterloo, Ontario. He is an Assistant Professor in the Geography Department.

Richard E. Murphy (Ph.D. 1957) Chairman of the Geography Department at the University of New Mexico recently

presented a paper on "Regions of Erosional and Depositional Landforms" at an AAG meeting in Dallas. He has also been a visiting geographical scientist for the AAG at two Texas state colleges and a consultant for Harold D. Drummond's Our World Today Series.

W.G. Myatt (Ph.D.) Professor Emeritus after his 1969 retirement from Oregon State at Corvallis is enjoying geography firsthand in sunny Southern California.

Salvatore J. Natoli (M.A. 1957; Ph.D. 1967) is the Educational Affairs Director for the AAG in Washington, coordinating various educational projects including residual functions of the highschool Geography Project. He has been busy writing, and his work for the year includes: "Environmental Education: Geographical Phoenix," Maryland Geographer, October 1970; "Geography," Encyclopedia Britannica Yearbook 1970; Dictionary of Basic Geography, April 1970 with Chatham, Griffin, and Schmieder. He also has a forthcoming article in Economic Geography.

Mrs. J.W. Neff (Bobbie Newman) (M.A. 1965) is in the final stages of her dissertation research at the University of Tennessee.

Herman L. Nelson (Ph.D. 1954) is Professor of Geography at Wisconsin State University in LaCrosse, Wisconsin.

Norton Nichols, Jr. (M.A. 1950) is Assistant Superintendent Educational Services, Antelope Valley Union High School District, Lancaster, Calif.

Howard L. Ohman (M.A. 1949) works as a Physical Geographer for the U.S. Army Natick Laboratories in Natick, Massachusetts.

Kenneth Olson (1963-64) is Supervisor

of Secondary Teaching at Central Connecticut State College.

Ralph E. Olson (Ph.D. 1946) Professor of Geography at the University of Oklahoma has published A Geography of Water and two articles which he worked on related to a recent sabbatical in the Netherlands. Dr. Olson also notes the marriage of his daughter Karen.

Frederick E. Oxtoby (M.A. 1968) is a Ph.D. student at Monash University in Clayton, Australia.

Robert A. Paul (M.A. 1966) is an Associate Professor at Northern Essex Community College in Haverhill, Massachusetts, where he has been working hard at planning and ordering equipment and maps for the laboratories in the new college campus.

G. Etzel Percy (M.A. 1932; Ph.D. 1940) Professor and Chairman of the Department of Geography, California State College, Los Angeles, travelled during the summer of 1970 in the outer Hawaiian Islands, Soviet Central Asia and Western Europe. He co-authored with George Stevens, An Introduction to Geography, and is currently working on a monograph dealing with an overall survey of the world's 276 international boundaries.

Robert F. Perry, Jr. (Ph.D. 1957) is Chairman of the Dept. of Geography at the Massachusetts State College in Worcester. He has been conducting research on the development of Florida's east coast and notes that his department has expanded to ten men and over 100 majors, twenty-five percent of whom go on to graduate school.

Rafael Pico (M.A. 1934; Ph.D. 1938; LL.D. 1962) is Vice Chairman of the Board Banco Popular de Puerto Rico and he writes that he was elected International Boss of the Year 1970 by the National Secretaries Association

(Int'l). He has started the translation into English of his latest book Nueva Geografia de P.R. to be published in 1971 by Aldine & Co.

Richard J. Pike (M.A. 1963) is Geologist with the Branch of Astrogeologic Studies, U.S. Geological Survey. He writes: "Current research topics include multivariate analysis of topographic descriptions (lunar as well as terrestrial), numerical derivation of homogeneous topographic regions, and age-dependent variations in surface geometry of lunar and martian craters." He covered 6000 miles on a three week camping trip through the western U.S. and Canada in September, and sadly reports the ruination of the San Francisco Bay area through over-population, too many cars, and high-rise construction, "Smog in Paradise, folks!"

Richard E. Preston (Ph.D. 1964) is Professor of Geography at the San Fernando Valley State College in Northridge, California. He read an invited paper, "Recent Changes in the Form and Structure of Greater Los Angeles" before the opening session of the 1970 AAG meetings in San Francisco. His "Urban Development in Southern California Between 1940 and 1965" is being reprinted in California: Its People, Its Problems, Its Prospects, edited by Robert Durrenberger and published by the National Press. He presented a paper, "Centrality and Central Place Patterns," before the 1970 meeting of the Canadian Association of Geographers and wrote a guest editorial in the 1970 issue of the Albertan Geographer. "Work continues on the Measurement of 'Centrality' and on the Central Place System in the Pacific Northwest."

George B. Priddle (M.A. 1964, Ph.D. pending) is Assistant Professor of Geography in the Division of Environmental Studies, University of Waterloo, Ontario. He is presently conducting research on "Satisfaction Levels Achieved from the Wilderness Environment: and Identification and Calibration of the Relevant Parameters." He has co-edited with Bob Irving an Anthology entitled Crisis; his article, "How Geography Became Spatial and Found True Happiness," has been published in the Ontario Geographer.

Merle C. Prunty (Ph.D. 1944) is an Alumni Foundation Distinguished Professor of Geography at the University of Georgia, Athens; and continues research on land use in the south, and on remote sensing of grasslands.

Etha M. Pruser (M.A. 1954) is Professor and Chairman of the Department of Geography at East Stroudsburg State College, Pennsylvania.

John P. Radford (1968-70) is Lecturer at York University in Toronto. "This year is being taken up with writing a dissertation and with establishing a new course in urban historical geography at York."

Richard R. Randall (Ph.D. 1955) is manager of the Rand-McNally's Washington office. This year he will again be in charge of publicity for the convention of American Society of Photogrammetry and American Congress on Surveying and Mapping. For the second successive year he will also establish a convention program for Washington, D.C. High School students in an effort to open communications between ACSM/ASP and pre-college youth. His family of 2 girls (6 and 4) and one boy (14) is proving to be a "rewarding educational experience."

Ann Vollmer Reizer (1968-70) although living in Arroyo Grande, California has no news to report this year.

Edward Risley (A.B. 1946; 1946-48)

is associated with the Executive Staff, Division of Earth Sciences, National Research Council of the National Academy Sciences, Washington.

Walter W. Ristow (Ph.D. 1937) is Chief of the Geography and Map Division of the Library of Congress in Washington, D. C. In August through September he attended a conference of the International Federation of Library Associations in Moscow. While in the Soviet Union he visited Irkutsk, Novosibirsk, Tashkent, Bukhara, and Samarkand.

Ina Cullom Robertson (M.A.) is retired and lives in Port Charlotte, Florida.

J. Lewis Robinson (Ph.D. 1946) Professor of Geography at the University of British Columbia, has added yet another book to his publication list. He also reports that his wife, Jo, (M.A. 1943) has now recovered from a severe auto accident in June 1970.

Candida R. Ramirez de Roman (1946-47) is Associate Professor in Geography and acting chairman of the department at the University of Puerto Rico.

John Kerr Rose (1932) is Senior Specialist in Natural Resources and Conservation for the Congressional Research Service of the Library of Congress in Washington, D. C. He writes: "We are somewhat excited about the New Congressional Reorganization Act, the first since 1946. There is a new committee print, by The Joint Economic Committee: "The Economy, Energy and the Environment" of which I am co-author."

Lewis D. Rosenthal (1966-69) Assistant Professor of Geography at the University of Maryland, has jointly authored an article with Saul B. Cohen entitled "Political Action Area and Political Process: A Model for Political Systems Analysis" which appeared in the January 1971 issue of

Geographical Review.

Larissa (Hanvszczak) Sacovitch (1964-1965) is a social studies teacher at Burncoat High School in Worcester. She is still working on her thesis and has travelled to Eastern Canada recently.

Ronald R. St-Onge (1955-56) is Chairman of the Foreign Language Department of Smithfield (R.I.) High School. He travelled in Europe during the summer of 1970.

Paul V. Salley (M.A. 1950-51) is Chairman of the Geography Dept. at the Massachusetts State College in Salem. His family has grown to seven children - four girls and three boys.

Frederick S. Sanford (1948-50) is employed as Senior Systems Analyst for Sikorsky Aircraft in Stratford, Conn.

Anthony Sas (Ph.D. 1955) is Associate Professor of Geography at the University of South Carolina. He has published articles concerning military and naval matters in the Professional Geographer and Military Affairs. He is currently researching a military geography of World War II.

Christine Krause Schultz (1925-26) has just retired after 30½ years teaching Junior High School Geography and General Science.

Harvey E. Scott (M.A. 1963) is an instructor of geography at Chicago State College.

David Sharon (Ph.D. 1968) Senior Lecturer at the Hebrew University of Jerusalem visited Clark in December of 1970 and gave a short course in climatology. He is currently working on problems of micro-scale features of rainfall.

Earl B. Shaw (Ph.D. 1933) is Professor

Emeritus at Assumption College in Worcester. "I continue with a light teaching load and a small amount of research. During December 1970 and January 1971, Mrs. Shaw and I visited the American Mediterranean Coasts of Mexico, Central America, and Northern South America. Last June 1970, Assumption College gave me an Honorary Doctor of Science degree."

Ada M. Shawkey (1947-48) is Associate Professor of Geography at Massachusetts State College at Framingham. "Much of 1969-70 was devoted to planning for an undergraduate major in geography at Framingham." She attended the AAG meetings in San Francisco last August and a workshop in Remote Sensing at Berkeley.

James A. Shear (Ph.D. 1952) is Professor of Geography at the University of Georgia. He is continuing his research on water balance and drought.

Suk-Han Shin (M.A. 1967) is Assistant Professor of Geography at Eastern State College at Cheney and is expecting to finish work for his Ph.D. at the University of Pittsburgh. The topic of his dissertation is to measure environmental quality in Pittsburgh.

Julia M. Shipman is retired and residing in Southern Vermont.

Angelika Sievers (M.A. 1936) is Professor of Geography at Pedagogical University Niedersachsen, West Germany, Vechta Branch. She has recently returned from a journey to South Asia. Her recent publications include Nigeria (1970) and "South Asia" in vol. III of Illustr. Welt (Zurich, 1970).

Victor W. Sim (M.A. 1957) is Chairman of the Department of Geography at the University of Western Ontario in London, Canada. He hopes to be on sabbatical in England in 1971-72. He plans to visit the Soviet Union and

possibly Mainland China shortly.

Sue C. Simonds (1968-70) writes that "the past year has been spent finishing my thesis on the cranberry industry of southeastern Massachusetts, establishing a geography branch of the Liberal Arts Division at Roger Williams College, Providence, R.I., and working on the Woman's program for the Boston AAG meeting."

Govind Saran Singh (Ph.D. 1962) has returned from India and is now Associate Professor at Boston State College. He has published three books in India: Maratha Geo-Politics and the Indian Nation, A Political Geography of India, and Economic and Commercial Geography.

Albert W. Smith (A.B. 1943) is Professor and Chairman of the Geography Dept. at the University of Colorado.

David A. Smith (A.B. 1966, M.A. 1969) is presently a Mellon Fellow in the Dept. of Geography at the University of Pittsburgh. He is working on his dissertation and hopes to finish by the summer of 1971. He is proud to report the arrival of Brian Barlow last May.

Samuel W. Smith (B.A. 1949) is Associate Professor at Indiana State University.

John A. Sobol (M.A. 1949) is Professor of Geography at Memphis State University, Memphis, Tennessee.

Frank J. Sparicio (M.A. 1963) is Assistant Secretary of the Hartford Insurance Group, Hartford, Connecticut. Last summer he travelled with his wife and daughter through Colorado and New Mexico prior to attending the AAG convention in San Francisco.

Karl Stacey (Ph.D. 1955) is Professor of Geography at Kansas State University, Manhattan, Kansas. Last summer

he travelled in Great Britain and Ireland and in the summer of 1971 he plans to visit Japan for two months.

Reed F. Steward (M.A. 1963, doctoral residence 1968-70) is Assistant Professor of Geography and Anthropology at Massachusetts State College at Bridgewater. He has a forthcoming article in Journal of Geography, prospectively titled, "Linguistic Toponymy."

Robert G. Stone (1931-32) continues as Scientific and Technical Information Officer for Air Weather Service at Scott Air Force Base, Illinois. He has supervised the publication of a long series of Technical reports and manuals of the Air Weather Service, "some of which would probably interest geographers." Interested readers may inquire through him for information.

Vincent J. Talarico, Jr. (M.A. 1966) is teaching in Brewster, New York. He and his family plan to spend his 1971-72 sabbatical leave at the National University of Cuzco, Peru.

G. Tatham (Ph.D. 1934) is Master of McLaughlin College and Professor of Geography at York University in Ontario.

Bryan Thompson (M.A. 1965; Ph.D. 1971) Assistant Professor at Wayne State University has written "Immigrant Settlement in Urban Areas: Factors Influencing Residential Choice" which will be published in the NCGE Yearbook. Bryan also notes the birth of twin boys on October 22, 1970.

Margaret Anne Tindal (M.A. pending, 1971) is Instructor of Geography at Coppin State College in Baltimore. She has recently completed her thesis and attended the Conference for Geography and Afro-America in Atlanta. She plans to travel this summer in

Mexico and is working on several articles related to her thesis research.

Margie O. Tyson retired from Tennessee State University, Nashville last year. She plans to spend a large part of 1971 in the Virgin Islands and the Caribbean.

Eugene Van Cleef (Ph.D. 1926) Professor Emeritus, now retired from Ohio State University, has published a book, Cities in Action, and written an article, "My Reminiscences Concerned with Geography" for the Geographical Bulletin, Vol. 1, no. 1. Dr. Van Cleef also gave an address before the Geography seminar and faculty of San Fernando State College: "The last fifty years of Geography."

William Van Royen (Ph.D. 1928) writes that he resigned last July from the position of Director of the Division of Environmental Sciences of the Army Research Office, Durham, North Carolina.

Charles B. Varney (A.M. 1953; Ph.D. 1963) is now Professor in the Dept. of Geography - Geology at Wisconsin State University in Whitewater. In the summer of 1970 he returned to the states from 2 years teaching at the Chinese University of Hong Kong via Southern Asia, USSR, Scandinavia and Western Europe.

Paul P. Vouras (M.A. 1951) is Professor and interim Chairman of the department of Geography at William Paterson State College in Wayne, N.J. Last summer he did field work in Greece.

Carolyn C. Weiss, a research associate at Clark during 1968-70 currently holds the same position at Southern Illinois University at Carbondale. She is working in the Cartographic Research Lab on such projects as a color map supplement for the AAG and an animated cartography project illustrating Indian land. Carolyn encountered some hazards

of the profession when an Exacto-knife cut required eight stitches. She is also teaching a course on Remote Sensing.

Wells West (M.A.) is a Research Assistant at Barnard College and at Rutgers University.

Si West (M.A. 1941) is Contact Specialist for the U.S. Government in Philadelphia. His son is a sophomore at Clark.

Florence E. Wheeler (138, 1940 summers) is retired from teaching elementary and junior high school. She resides in Rutland, Mass.

Gary Whiteford (M.A. 1968) is Assistant Professor at West Texas State University in Canyon, Texas. Presently he is working on his dissertation at the U. of Oklahoma. In the past year he has travelled to Mexico and to his home "state" of Canada.

Bernt L. Wills (1942-43) continues as Professor at the University of North Dakota, Grand Forks.

David C. Winslow (Ph.D. 1948) is Professor of Geography, Indiana University of Pennsylvania, Indiana, Pennsylvania, and Editor of The Pennsylvania Geographer. He continues his containerization study, and visited ports in Texas, Lower California, California, and the Great Lakes Area.

Denis and Ingrid (Hansen) Wood (1967-69) Ingrid is a bank teller in Worcester after working for the US Census last summer. Denis, who has completed his Master's thesis after a stint at laying railroad track is back studying at Clark. His MA will be granted in June.

A.J. Wright (Ph.D. 1951) is now Chief Geographer of the National Ocean Survey, National Oceanic and Aeronautics

Administration in Rockville, Md.

Marion I. Wright (M.A. 1946) Professor of Geography and Chairman of the Social Science Department at Rhode Island College toured India and Europe for four months during sabbatical leave.

Leo J. Zuber (1948-49) has been appointed Director of the Planning Division of the Program Coordination and Services Office under HUD for the eight Southeastern States. His offices are located in Atlanta.

A Note on the Questionnaire

The Editor would like to thank all those who took the time to complete Monadnock's questionnaire, and especially those who added some very thoughtful comments about trends and values in Geography. Among the results of the questionnaire were the following:

Question 1: The current de-emphasis of regional geography is weakening the discipline.

	Workroom	Alumni 1960-1970	1950-1960	1935-1950	pre 1935
Agree	9%	41%	66%	58%	75%
Disagree	78%	43%	21%	13%	8%

Question 2: The establishment of new models and theories should be the main concern of geography today.

Agree	61%	46%	23%	10%	25%
Disagree	17%	35%	40%	52%	33%

Question 3: A knowledge of quantitative methods is essential for a geographer.

Agree	65%	62%	68%	68%	62%
Disagree	13%	16%	10%	20%	23%

Question 4: A central need in geography is to establish much closer and stronger relationships with other scholarly disciplines.

Agree	87%	92%	75%	66%	77%
Disagree	4%	3%	3%	3%	0%

Question 5: The main concern of geographical inquiry should be to find solutions to the practical problems of society.

Agree	75%	42%	41%	38%	54%
Disagree	13%	31%	22%	32%	31%

Question 6: More emphasis should be placed in graduate education on the teaching of geography as opposed to research in geography.

Agree	48%	39%	42%	55%	50%
Disagree	30%	28%	35%	23%	20%

Question 7: An understanding of the spatial behavior and perceptions of individuals is a prerequisite to an adequate understanding of most geographic problems.

Agree	55%	63%	53%	45%	55%
Disagree	22%	17%	23%	24%	18%