

THE MONADNOCK

"It is sometimes said that experimentation deals with less immediate or less practical problems than does common sense."

- Ackoff

Staff News.....	1
Guest Lecturers.....	1
Research at Clark.....	2
Paper - Ben Howatt.....	3
Paper - John Lowe.....	8
Paper - Dick Pike.....	12
Alumni News.....	20
Obituary.....	30

Volume XXXV, No. 2

May, 1961

The Monadnock is regularly published twice a year in December and May by the Clark University Geographical Society, Worcester, Massachusetts.

John C. Lowe, Editor with volunteers
Agnes Keuper, Typist
Robert Paul, Business Manager Emeritus

STAFF NEWS

This coming summer, Dr. Van will continue his work on the evaluation of the standard of land use in Europe. This time he will be travelling and working in Yugoslavia.

Dr. Murphy will spend as much of his time as possible on the completion of his book. Publication date is announced as "the very near future." He also plans to attend the AAG meetings in Lansing.

Dr. Warman will run a workshop for teachers. He will also be kept busy with the map program for a high school text he is completing. He hopes to "squeeze in" a Caribbean cruise with his family.

Dr. Birch has planned a camping trip to the Pacific Coast with family. This will provide him with a memorable "get acquainted view" of the North American Continent. He will also attend the six-week course on quantification in geography to be given at Northwestern.

Mr. Burnham will unleash cartographic skills into a new group of eager beavers.

GUEST LECTURERS

Dr. Paul Siple brought a new film which he accompanied with a short and fascinating lecture on his most recent work on the theory of the shifting poles.

Dr. O.H.K. Spate, of the Australian National University, presented three short, but highly concentrated, lectures on the geography of Australia.

Mr. Keith Clayton, visiting lecturer at Harpur College, gave an interesting lecture on the glaciated regions of Great Britain in which he put forth the possibility of six different glacial periods.

Professor Gilbert F. White brought us some of the results of the work done at the University of Chicago on flood control. His dynamic presentation demonstrated quite clearly the place of geographic research in policy-making.

Professor William Garrison of Northwestern gave three lectures on the methods of the new school of geographers. His lectures, entitled: "The Application of Quantification to Geographic Research," "The Statistical Model in Geographic Research," and "The Mathematical Model in Geographic Research," gave us a fair sampling of the work done by the "quantifiers."

Professor Phil Church, head of the Meteorology Department of the University of Washington, gave a lecture on dynamic meteorology.

Professor Hans Schultz, from the Free University of Berlin, was able to visit us briefly. He presented two lectures: the first on the Sudan, and the second on the Berlin Problem.

RESEARCH AT CLARK

A STUDY OF THE EFFECTS OF FREEWAYS ON CENTRAL BUSINESS DISTRICTS
by R.J. Huhtanen, P.J. Mika, R.E. Preston, and Dr. R.E. Murphy

This research was directed by Dr. Murphy, who was awarded a contract by the Bureau of Public Roads in the spring of 1960.

The research involved land use mapping and data collection in three cities: Richmond, Virginia; Long Beach, and Oakland, Calif.

The Murphy-Vance technique of CBD delimitation was used so that the results of the investigation in the three cities would be comparable. A pre-freeway land use map of the CBD in each city was constructed in order that changes in land use since the construction of the freeway could be determined. Other factors, such as the land value trends, as well as business and traffic volumes in the CBD, were analyzed. The results of this research were published in a report sent to the Bureau of Public Roads in February, 1961.

SEMINAR ON MODELS IN GEOGRAPHIC RESEARCH

The increasing use of models, both statistical and mathematical, in geographic research prompted Drs. Murphy and Birch and several of the interested graduate students to investigate these new techniques. The group met in informal seminars and discussed examples of research using models. Among those models discussed were the von Thunen model of agricultural land use, Garrison and Marble's article demonstrating the existence of an optimum solution to the location problem in agricultural location theory, and the gravity and potential models used by Harris and J.Q. Stewart. Our visiting lecturer, Dr. William Garrison, both in his lectures and in the individual discussions, provided new sources and ideas which will enable us to increase our understanding of models and their role in geographic research.

In answer to many queries, the following, very diverse, papers represent some of the research which has been carried out during the past semester in a seminar on the use of quantitative methods in geographical research. This seminar was conducted by Dr. Walter F. Wood of Natick, who is himself conducting research in quantitative terrain analysis for the Office of the Quartermaster, U.S. Army.

CONSIDERATION OF A METHOD OF PROBLEM FORMULATION

Benjamin F. Howatt

Ackerman points out in Geography As A Fundamental Research Discipline that the type of geographical study which advances the field is that type of study which serves as a building-block for further research. These "building-blocks," as Ackerman calls them, provide a frame of reference from which the researcher can work. It follows then that progress can be made only from the slow process of adding "blocks." It is maintained in other circles, however, that progress can be hastened through the exploration of new and different ideas-ideas which are not necessarily based upon knowledge and insight gained from past research.

The former school adheres to the principle that background knowledge leads to the formulation of a new problem. In order to solve this problem, the geographer seeks quantitative data that will assist him in his task. The latter school, while not adhering to inherited insight, resolves to what is commonly called "fooling around with data." Those that proceed along this line will argue that new and fresh research problems can be formed which also will advance the field. By concentrating on existing data at the outset and through the aid of statistical measures, the geographer can realize the presence of relationships that heretofore had not been known.

Present-day geographers are well aware of the philosophy and practice of the former group. On the other hand, little is known of the beliefs of the latter group. Actually the two schools are not as different as they might seem to be. Both evolve a problem which they attempt to solve, but they differ in their approach toward problem formulation. This paper has as its intent an exploration of the methods utilized by those who "fool around with data."

In that the premise for study is the revelation of relationships that exist between data, these students assume that there is order in the universe. They are seeking at the outset then to bring this order to the fore. This, as has been mentioned, is implemented through the use of statistical devices. The use of statistics in research is not new; nevertheless, these students utilize such measures in a different phase of the research program.

Does the organization that is assumed actually exist in reality or is the organization brought about through statistical manipulation? It would be argued that the organization exists in reality, otherwise the concept of organization in the universe would not have been conceived by man, and that statistical presentation of this organization merely brings better focus to the existing order. It could also be advanced that by stressing the relationships between phenomena-represented by empirical data-at the outset, the researcher can focus his attention on a theoretical level of problem formulation which leads to more penetrating analysis.

An attempt is made here to explore the procedure of problem formulation that is utilized by students of this latter school.

Because of the availability of data, this student chose to confine his "exploration" to Latin American international trade. At the outset it seemed advisable to obtain some indication of the relationships that existed between international trade and other factors within the same political framework.

Trade is usually measured in terms of value of imports and exports. In order to avoid the use of absolute values, ratios and percentages were used as often as possible. Value of imports per capita were used instead of the conventional measures mentioned above. The following were chosen to serve as other characteristics of each nation:

1. Literacy (percentage)
2. Percentage of population in cities of over 5,000
3. Gross national product per capita
4. Birth rate per 1,000
5. Death rate per 1,000
6. Mean relief
7. Year of independence
8. Population of largest city

The purpose of this phase of the study was to determine what relationships existed between international trade, as measured by the relative indicators that were mentioned (considered from here on as x variables), and the characteristics listed above (considered from here on as y variables). To determine these relationships the statistical measure, coefficient of rank correlation expressed by the formula below was used.

$$1 - \frac{6 \sum d^2}{n^3 - n} = r$$

Some would argue that any correlation between these two sets of variables would have no meaning because they are not related; that is to say, there would be no reason for a connection between value of exports per capita and mean relief. This argument would reflect the attitude of the former school. They might further state that because no one had found any relationship between these two factors in the past, one should not work from the assumption that they are related. Maybe they are not, but the possibility should not be discounted on that basis alone. It might also be argued that any significant correlation found between such variables would be a "nonsense correlation"—a correlation found between factors of an entirely different nature. Is it not possible that, with the wide range of phenomena with which geographers have to deal, important relationships exist between phenomena which have not been considered in past geographical study?

Using the coefficient of rank correlation, significant relationships were found to exist between value of exports per capita and death rate, value of imports per capita and death rate, value of exports per capita and gross national product per capita, and value of imports per capita and gross national product per capita. The two x variables were dealt with separately at this stage so as not to obscure subtle differences between exports and imports. This was unnecessary, however, and from here on the two were averaged together. Through an interpretation of the results mentioned, the researcher could formulate problems for research that might not have been conceived otherwise.

In order to illustrate further, however, it was decided to analyze these relationships. An 8 by 17 matrix was constructed (Table I) consisting of the deviations between the x and y variable in each test of correlation. In tabular form many more relationships can be seen than would be seen otherwise. To illustrate the possibilities offered in this type of exploration, it was decided to concentrate only on the arrangement of plus and minus deviations.

It can be seen from Table I that Mexico and Argentina both have

TABLE I

Minus deviations are underscored.

	1	2	3	4	5	6	7	8
Venezuela	<u>7</u>	<u>5</u>	<u>6</u>	<u>13</u>	<u>6</u>	<u>5</u>	0	<u>2</u>
Colombia	4.5	2	<u>2.5</u>	1.5	2.8	1.5	2.5	2.5
Ecuador	3.5	5	<u>1.5</u>	1.5	5.5	<u>1.5</u>	1.5	3.5
Peru	3.5	<u>4.5</u>	7.5	3.5	4.5	2.5	<u>5.5</u>	
Bolivia	5	<u>2.5</u>	5.5	9.5	6.3	3.5	<u>2.5</u>	2.5
Chile	2	<u>3</u>	<u>5</u>	0	3	2	1	3
Paraguay	2.5	10	7.5	<u>.5</u>	<u>.5</u>	13.5	<u>.5</u>	2.5
Argentina	4.5	4.5	2.5	3.5	4.5	4	3.5	3.5
Uruguay	<u>5</u>	0	0	1	<u>14</u>	<u>3.5</u>	<u>1</u>	
Brazil	13.5	4.5	<u>1.5</u>	5.5	2.5	7.5	6.5	6.5
Mexico	13	6	2	3.5	9	14.5	9	10
Guatemala	0	<u>6</u>	<u>5</u>	<u>5</u>	2	<u>4.5</u>	1	<u>5.5</u>
El Salvador	<u>7</u>	<u>5</u>	<u>6</u>	<u>9</u>	<u>8</u>	<u>9</u>	<u>7</u>	<u>5.5</u>
Honduras	<u>6.5</u>	<u>1.5</u>	.5	<u>.5</u>	<u>1.5</u>	<u>3</u>	<u>.5</u>	<u>6.5</u>
Nicaragua	<u>8.5</u>	<u>8.5</u>	2.5	.5	<u>8.5</u>	<u>7.5</u>	<u>5.5</u>	<u>5</u>
Costa Rica	<u>12.5</u>	.5	<u>2.5</u>	.5	<u>6.5</u>	<u>2.5</u>	<u>2.5</u>	<u>10.5</u>
Panama	<u>5</u>	4	2	<u>.5</u>	<u>4</u>	<u>10</u>	3	1

all plus deviations. What does this mean? It means simply that there must be some way or ways in which the two countries are similar—a way which contributes to this similarity. The reader can think of several ways in which the two nations are similar. Are they not even similar in shape?

Another avenue on which to proceed involved the computation of the average deviation for each nation (Table II). Both types of deviation were listed from highest to lowest as is shown in Table III. A plus deviation is thus paired with a comparable minus deviation. The procedure of pairing was uniform for the first six average deviations, but because of the excess of plus deviations, the lowest minus deviation (-1.2) was paired with the plus deviation which was most similar to it. Table IV is the same as Table III only the nations have been substituted for their respective average deviations. In what ways are the paired nations similar?

An interesting hypothesis can be presented. In 5 out of 7 cases the paired nations have similar shapes (Figure I).

It goes without saying that results such as these would lead to interesting problems for study, but what actually can be concluded from such findings by the advocates of this approach? They might answer in this manner:

1. In asking if there is order in the universe, one is asking about the nature of reality.
2. To shed light upon reality we must rely upon what systematic statistical devices seem to indicate.
3. Consequently, there is an order in the universe because statistical procedures brought this order to the fore.

1. Venezuela	-5.5	16. Costa Rica	-4.6
2. Columbia	1.3	17. Panama	-1.2
3. Ecuador	2.2		
4. Peru	1.4		
5. Bolivia	3.5		
6. Chile	1.1		
7. Paraguay	4.3		
8. Argentina	3.8		
9. Uruguay	-3.4		
10. Brazil	5.6		
11. Mexico	8.4		
12. Guatemala	-3.0		
13. El Salvador	-7.1		
14. Honduras	-2.4		
15. Nicaragua	-5.1		

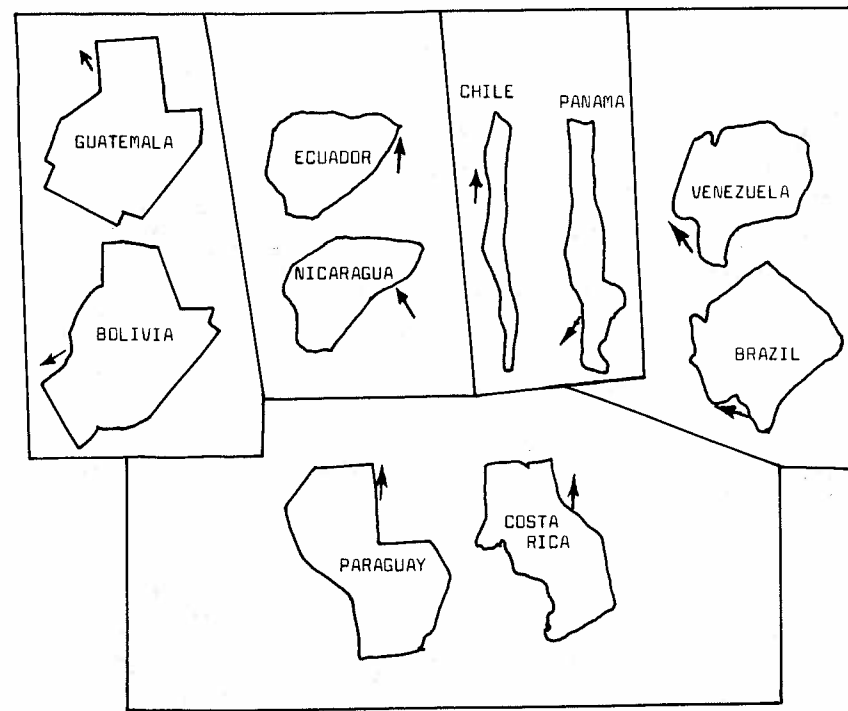
8.4	-7.1
5.6	-5.5
4.3	-4.6
3.8	-3.4
3.5	-3.0
2.2	-2.4
1.8	
1.4	
1.1	-1.2

TABLE IV

Mexico	El Salvador
Brazil	Venezuela
Paraguay	Costa Rica
Argentina	Uruguay
Guatemala	Bolivia
Honduras	Ecuador
Columbia	
Peru	
Chile	Panama

FIGURE I

↑ North arrow



A MEASURE OF KEYNESS OF INDUSTRIES
WITHIN AN INDUSTRIAL COMPLEX

John C. Lowe

PURPOSE

It is the purpose of this paper to develop a method for measuring the "keyness" of industries within an industrial complex. This is a measure of the significance of the various industries in their contribution to the proper and continued functioning of the complex.

INTRODUCTION

The industrial complex, defined as a "set of activities occurring at a given location and belonging to a group (subsystem) of activities which are subject to important production, marketing and other interrelations",¹ is the economic framework of a country. The complexity of this

¹ W. Isard et al. Methods of Regional Analysis: An Introduction to Regional Science, New York: John Wiley & Sons, 1960, p.377.

structure varies with the level of development of the individual country.

The activities of an industrial complex are dependent upon one another, but the magnitude of this interdependence varies with the individual industries. Thus, it is possible to distinguish between two very different types of industries: 1) producer-oriented, and 2) consumer-oriented. It is apparent that, although the consumer-oriented industries represent the "raison d'etre" of the complex itself, i.e., they are the means to the ultimate satisfaction of consumer demand, the producer-oriented industries are the cause for the continued functioning of the complex. Functionally then, these are the most important industries. It is possible to conceive of an industrial complex as being made up of activities placed along a continuum which varies from 1) complete association with the other industries of the complex, and 2) complete association with the ultimate consumer. It is the object of this paper to develop a measure of this continuum of association.

In order to simplify the problem, four different items are held constant, i.e., their effects are disregarded for the time being. These are: 1) market demand, 2) labor supply, 3) raw materials supply, and 4) capital availability. This makes it possible to study the complex as a separate entity.

METHODOLOGY

In order to evolve this measure of "keyness", two different measurements are necessary. The first one of these represents a measure of economic orientation for each activity: production and consumption. It is based on a unit level of input costs for the production of one dollar of output. This allows for comparability among the various industries. The second measurement is one of magnitude. It allows for a more realistic look at the industrial complex.

As the United States economy is by far the most highly developed today, its industrial complex represents the ultimate in the evolution of such a structure. As such, it could easily represent a suitable model for the economy of other nations.

A Measure of Economic Orientation- A comparison of output to input should provide a good measure of economic orientation. Accordingly, a key industry, geared to a production market, should have a high ratio of output to input. This may be stated formally as: 1) a key industry must contribute the largest amount to the greatest number of other industries, and 2) it must receive the least amount from the smallest number of these other industries. Thus, a key industry must maximize the ratio of its output to its input in the greatest number of measurements.

The data for this study was gathered from an input-output table compiled at Harvard in 1939.² From this table, which gives data for fifty-

2

"Inventories of Current Inputs: Required Dollars per Dollar of Output", folded map in W. Leontief, Studies in the Structure of the American Economy, New York: Oxford University Press, 1953.

one different industries, three different measures were selected for each one of the industries represented. These measurements were compiled for both input and output so that in all six different measurements were gotten.

Ao Total output *
Bo Number of industries receiving from industry x
Co Average value of output per industry receiving from industry x
(Ao/Bo) *
Ai Total input
Bi Number of industries giving to industry x
Ci Average value of input per industry giving to industry x
(Ai/Bi) *

* Values of input and output are given here in terms of interindustry flow of goods in the production of one dollar of output. It includes only the value of the goods exchanged.

In order to simplify the manipulation of this data, a coding system was used. Ratios were computed between each measurement and the mean of the distribution from which it was taken. To differentiate them from the original data, these ratios were represented as Ao1, Bo1, Co1, Ai1, Bi1, and Ci1 respectively.

From these ratios overall ratios were computed. The output-input premise was put into effect and the following were computed: Ao1/Ai1, Bo1/Bi1, and Co1/Ci1. These new ratios were in turn represented as Al, B1, and C1.

In order to ascertain the validity of these ratios, simple linear correlations were run between Al-B1, Al-C1, and B1-C1. It was found that the first correlation yielded an r of .7484 (table r is .354 at the 1% level of significance). The second correlation yielded a somewhat lower r value of .675. From these, it was concluded that the first measurement is significantly associated with the other two. However, the third correlation yielded an insignificant association with an r value of .1039.

It was on this basis that the third measurement (C1: value of output per linked industry/value of input per linked industry), was discarded. As this measurement is a direct function of the other two, its omission did not appear significant.

The remaining measurements (A1 and B1) were summed and averaged for each one of the industries. The resulting value, coded as AK, represents a measure of economic orientation based on unit output analysis.

This measure, however, is only representative of one dollar of output for each industry and does not take into consideration the total output of each industry. Thus, it was also necessary to evolve a measure of industrial magnitude.

A Measure of Industrial Magnitude- As a measure of magnitude, percentages of the total output for all the industries were computed from a summary table in the Leontief volume.³ This introduced the element of relative

3

"Summary of 1939 Capital Structure of American Industries," Appendix 1, *ibid*, p.486-493.

magnitude, especially important in this study.

These two measurements, for each one of the fifty-one industries, represent the necessary elements to compute an index of "keyness".

An Index of "Keyness"- This measure is simply the product of the measure of economic orientation and of the index of industrial magnitude. These indices are listed in Table 1 in order of importance so that the primarily producer-oriented industries are at the top of the list and the primarily consumer-oriented industries are at the end.

As can be seen from these indices, the distribution of these industries is highly skewed. This implies that the industrial complex is truly dependent upon a relatively small number of industries for its continued functioning.

Although an analysis of Table 1 might yield some very interesting results as to the distribution of the various industries along the continuum, the very nature of these purely theoretical results forbids such an analysis.

CONCLUSIONS

The preceding represents an attempt at a measurement of inter-industry efficiency and relative interdependence. In light of the fact that this is purely a study of an idealized structure, it is impossible at this time to either prove or disprove the results or the validity of this study. However, because these results represent the analysis of the economy of what may be considered to be the most highly developed nation of the world, it represents also an analysis of the most perfect existing industrial complex. Thus, an ideal structure derived from a perfect industrial complex should provide a valuable tool or model for the future development of underdeveloped countries. Thus, it is only through the direction taken in the future by economic planning that the validity of this work can be judged.

The writer is aware of the fact that the results here represented come from data which is no longer up to date. Thus, these results are no longer representative of the present day United States industrial complex. However, as stated in the purpose, this is not an attempt to uncover the structure, but rather, it is an attempt to derive a method for uncovering it.

Table 1. Indices of "keyness" by industry group.

<u>Industry Code No.</u>	<u>Industry Group</u>	<u>Index</u>
1-8	Agriculture	214.81
48	Bituminous coal	36.38
45	Petroleum and natural gas	27.19
46	Petroleum refining	22.47
53	Chemicals	11.75
18	Slaughtering and meat packing	10.37
43	Nonmetallic mining	9.12
22	Iron mining	8.98
38	Iron and steel, n.e.c.	8.43
24	Steel works and rolling mills	8.38
39	Nonferrous metal mining	8.36
56	Wood pulp, paper and paper products	7.67
40	Smelting and refining of nonferrous metals	3.33
67	Industries, n.e.c.	2.81
44	Nonmetallic mineral manufactures	2.23
54	Lumber and timber	2.04
9	Fishing	1.80
47	Anthracite coal	1.77
61	Clothing	1.62
57	Printing and publishing	1.41
31	Automobiles	1.31
42	Nonferrous metal manufacture and alloys	1.28
58	Cotton yarn and cloth	1.22
37	Electrical equipment, n.e.c.	1.14
21	Other food products	1.09
66	Rubber products	1.01
55	Furniture and other manufacture of wood	0.96
62	Other textile products	0.94
19	Manufactured dairy products	0.87
25	Iron and steel foundry products	0.67
49	Coke and manufactured solid fuel	0.62
60	Woolen and worsted manufacture	0.60
59	Silk and rayon products	0.50
63	Leather	0.46
23	Blast furnaces	0.46
34	Industrial and household equipment, n.e.c.	0.43
41	Aluminum	0.40
10	Flour and grist mill products	0.32
64	Leather shoes	0.19
15	Alcoholic beverages	0.18
20	Edible fats and oil	0.18
14	Starch and glucose products	0.12
26	Shipbuilding	0.12
32	Aircraft	0.07
17	Tobacco manufactures	0.07
13	Sugar refining	0.06
12	Bread and bakery products	0.04
30	Engines and turbines	0.03
29	Agricultural machinery	0.02
28	Munitions	0.02
65	Leather products, n.e.c.	0.02
11	Canning and preserving	----
16	Nonalcoholic beverages	----

THE ORDER OF VALLEY DEPTH

Richard J. Pike

INTRODUCTION

Research in the field of quantified terrain analysis proceeds on the premise that a defined and measurable order exists on the earth's surface. As the direct outgrowth of a study (1) which confirmed order among line-of-sight ranges (essentially, the spacing of ridges), the present paper seeks order among depth of valleys and a method for predicting the distribution of valley depths for a physiographic region.

METHODOLOGY

1. United States Geological Survey topographic sheets of 1:24,000 were employed because they show significant topographic differences better than maps at a smaller scale. The nine maps were chosen subjectively. The first few were picked because their topographic homogeneity gave the method the best chance of working. Contour intervals on the nine maps ranged from fifty to ten feet.
2. On each map, a circle thirteen inches in diameter was drawn in that portion of the map that exhibited the greatest homogeneity of topography. An east-west and north-south traverse thru the center of each circle were drawn, yielding a ten-mile traverse, providing enough slope-direction changes for the study.
3. On cross-section paper, beginning with the first change in slope outside the circle and ending in the same manner, profiles of each traverse were drawn. Contour interpolation was used to include small changes in slope that otherwise would have gone unrecorded. Each slope-direction change on the profile was numbered. The total number for each map in this study ranged from thirty-six to one hundred, depending on the grain of the topography.
4. The vertical component of each change in slope direction, i.e. valley depth, was tabulated in the same order as on the profile and ranked from the smallest to the largest. The mean valley depth of the traverse, the percent of mean for each reading, and the cumulative percent of cases, i.e. percentile, for each valley depth were calculated. The last two values normalized the data.
5. On cross-section paper, a graph for each set of data was constructed. The percentile was plotted on the vertical axis and the actual valley depth on the horizontal axis. Figure 1 shows the curve obtained for the San Luis Rey (California) quadrangle. All nine curves have a similar general configuration, increasing at a decreasing rate. A second curve was constructed for each traverse in which percentile was plotted against percent of mean valley depth. This second curve, computed from normalized data, varied less than the curve employing actual depths. Figure 2 shows the second curve for the San Luis Rey quadrangle. The value of the percent of mean valley depth at the 100th percentile is ignored in any further computation as it is

a purely theoretical value, representing the maximum possible valley depth. In view of the infinite number of sample points that exist in the area, the real maximum valley depth probably differs from that on the curve.

6. A theoretical or composite curve was computed by obtaining the mean of the percent of mean valley depth at each of nineteen percentile levels from the fifth thru the ninety-fifth (at five-percentile intervals) for all nine curves and plotting the nineteen values on cross-section paper. This curve (Figure 3) is correlated visibly with the actual curves. Deviation from the theoretical curve is shown in Table I.

7. The validity of the theoretical curve was established quantitatively by correlating the composite curve with each of the actual curves. The resulting coefficients of correlation, ranging from .9583 to .9986 (Table II) were significant. Values of r of the same magnitude were obtained in the line-of-sight study (3). The r^2 s range from .9183 to .9973; in all but one of the sample areas, the theoretical curve describes the actual curve with better than 98% accuracy.

PREDICTION

Previous terrain research has demonstrated that even more precise analysis is possible if such qualifying factors as bedrock, natural vegetation, and climate are considered and the data grouped accordingly. More accurate predictions should result from stratified sampling of valley depth data. No attempt was made to evaluate the effect of map scale on the validity of the results, but there is reason to believe that results obtained from smaller scale maps would approximate closely those obtained in the present study. Furthermore, it is likely that after studying maps at other scales, a regression equation can be derived to predict what smaller scale maps will show.

With the order of valley depth established, a less laborious means of gathering data for the predictive method was sought.

Mean Valley Depth

By adapting the Wentworth equation (4), a method for predicting the mean valley depth was developed. On the maps used previously, contour-crossings were counted along the ten-mile traverses and the data inserted in the formula:

$$\text{MEAN VALLEY DEPTH} = \frac{\text{Map Contour Interval} \times \text{Number of Contour-crossings}}{\text{Number of Slope-direction Changes}}$$

The mean valley depth was calculated for the nine traverses and tabulated with the mean valley depths derived initially from the profiles. Table III shows the correlation, .9952, indicating a high degree of accuracy for the predictive method.

In using the predictive method, the effects of directional tendencies in the structure of the landscape can be eliminated by drawing

three or four small circles in the sample area and taking the traverse along their circumferences rather than along their diameters.

Distribution Of Valley Depths

The means derived by either method can be used to predict a distribution of valley depths thru a nomograph (Figure 3). Table IV, constructed from the nomograph, will give a cumulative distribution of valley depths for the region in question, if the mean valley depth is known. If this mean is a multiple of twenty-five, the valley depths at nineteen percentile levels may be read off the table. If the mean is some other value, the percentile levels may be interpolated.

PRACTICAL APPLICATIONS

The results of this study have wide military and civilian application. Several examples occurred to the writer and others were suggested to him:

1. How close to the ground and at what velocity can the pilot of a light reconnaissance aircraft fly with safety? How deep into each valley can he fly safely?
2. How much protection from aerial attack, nuclear explosions, and various types of ground weapons will there be for troops located at the bottom of a valley in a particular region?
3. How extensive a view of surrounding valleys can an observer obtain in a specific region and from a particular elevation?
4. To an army operating in a region whose mean valley depth is known, what types of equipment will be particularly effective or ineffective?
5. In a particular area, what should be the guidance system setting for a contour-following missile?
6. How does valley depth affect aerial reconnaissance from piston-engined aircraft, from jet and rocket-propelled aircraft, and from missiles carrying photographic equipment?
7. To what degree is the progress of a highly mechanized army impeded by the depth of valleys in a certain region?
8. How much effect does valley depth have upon microwave transmission, radio and television reception, and mobile telephone reception?
9. What influence does valley depth have upon highway planning?
10. What effect does valley depth have upon the micro-climate of an area? To what degree do the ridges of a certain region impede passage of air masses?
11. Can forest fire-fighting be conducted more effectively with a knowledge of the mean valley depth of an area?

12. Can variations in interregional transport rates be accounted for by variation in valley depth?

13. Could knowledge of the nature of valley depth in various areas contribute to a higher percentage of safe emergency aircraft landings?

SUMMARY

A discernable and predictable order exists on the earth's surface with respect to the depths of valleys. That this order probably bears some relation to that of other terrain dimensions, notably the spacing of ridges, is evidenced by the configuration of the theoretical curve, figure 3. Knowledge of the nature and distribution of valley depths may have considerable practical value.

.....

TABLE I

ACTUAL AND THEORETICAL VALLEY DEPTHS

Nine samples in the United States

Sample Area	Mean Valley Depth									
	Depth (Feet)									
	Percentile Ranges									
	.10	.20	.30	.40	.50	.60	.70	.80	.90	
Theoretical	23	35	47	60	76	96	120	152	202	
Anvil Points, Colo. 198	28	41	54	69	84	100	116	135	185	
Cumberland, Md. 238	10	20	32	47	68	90	120	135	215	
Hillsboro, Ken. 50	31	45	58	72	88	105	125	150	190	
Hot Springs, So.Dak. 108	17	24	34	43	58	82	110	160	220	
Jenks, Okla. 40	20	31	42	53	69	91	120	160	200	
Maverick Spring, Wyo. 70	27	38	47	56	71	91	115	160	230	
Rover, Tenn. 19	23	38	58	75	92	111	130	152	192	
San Luis Rey, Calif. 74	32	45	56	68	81	100	119	142	185	
Virginia, Minn. 27	21	30	42	55	71	93	127	160	202	

TABLE II

DISTRIBUTION OF VALLEY DEPTHS IN THE UNITED STATES

Correlation Of Actual Curves To Theoretical

<u>Sample Area</u>	<u>Physiographic Province</u>	<u>r</u>	<u>r²</u>
Anvil Points	Roan Plateau, So. Rockies	.9959	.9918
Cumberland	Appalachian Valley & Ridge	.9583	.9183
Hillsboro	Western Appalachian Plateau	.9965	.9930
Hot Springs	Black Hills	.9912	.9825
Jenks	Central Lowland	.9920	.9835
Maverick Spring	Wind River Basin - Exfoliation Dome	.9985	.9971
Rover	Nashville Basin	.9942	.9885
San Luis Rey	Lower California Border Province	.9962	.9925
Virginia	Canadian Shield - Glaciation	.9986	.9973

TABLE IV

PREDICTING DISTRIBUTION OF VALLEY DEPTHS

<u>% Cases</u>	<u>Distribution Of Valley Depths</u>									
	<u>Means... 25</u>	<u>50</u>	<u>75</u>	<u>100</u>	<u>125</u>	<u>150</u>	<u>175</u>	<u>200</u>	<u>225</u>	<u>250 Feet</u>
.95	61	122	183	244	305	366	427	488	549	610
.90	51	101	152	202	252	303	354	404	455	505
.85	47	93	140	186	233	279	326	372	419	465
.80	38	76	114	152	190	228	266	304	342	380
.75	34	68	101	135	169	203	236	270	304	338
.70	30	60	90	120	150	180	210	240	270	300
.65	27	54	80	107	134	161	187	214	241	268
.60	24	48	72	96	120	144	168	192	216	240
.55	21	43	64	85	106	128	149	170	191	213
.50	19	38	57	76	95	114	133	152	171	190
.45	17	34	50	67	84	101	117	134	151	168
.40	15	30	45	60	75	90	105	120	135	150
.35	13	26	39	52	65	78	91	104	117	130
.30	12	24	35	47	59	71	82	94	106	118
.25	10	21	31	41	51	62	72	82	92	103
.20	9	18	26	35	44	53	61	70	79	88
.15	7	15	22	29	36	44	51	58	65	73
.10	6	12	17	23	29	35	40	46	52	58
.05	4	9	13	17	21	26	30	34	38	43

TABLE III

PREDICTION OF MEAN VALLEY DEPTH

Correlation Of Mean Valley Depth

<u>Sample Areas</u>	<u>Mean Valley Depth (Feet)</u>		
	<u>Derived from Profiles</u>	<u>Predicted thru Wentworth Equation</u>	
Anvil Points	198	229	
Cumberland	238	235	
Hillsboro	50	59	r = .9952
Hot Springs	108	124	
Jenks	40	45	r ² = .9904
Maverick Spring	70	99	
Rover	19	26	(Table r = .798
San Luis Rey	74	86	at 1% level)
Virginia	27	27	

SAN LUIS REY, CALIFORNIA

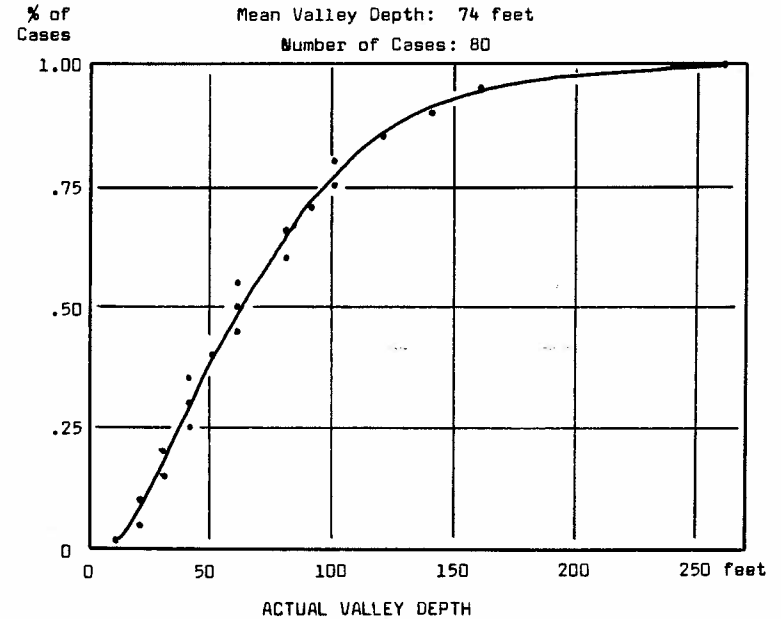
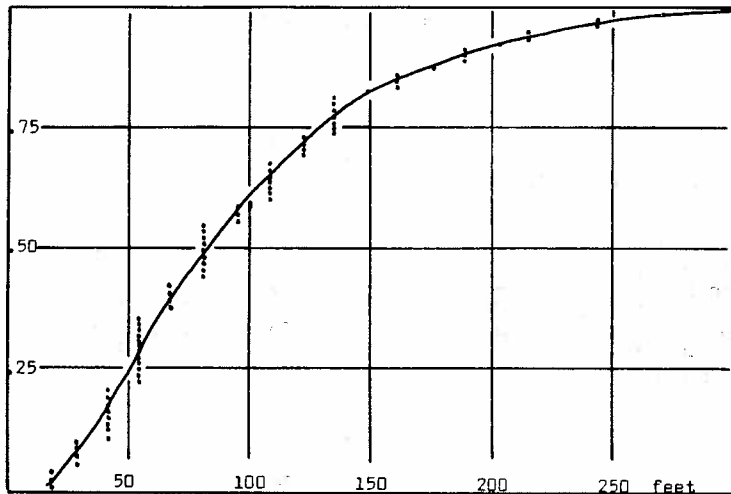


Figure 1

% of
Cases

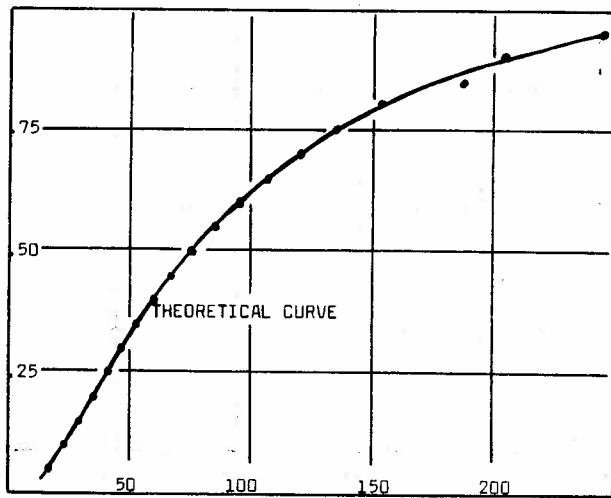
SAN LUIS REY, CALIFORNIA



PERCENT OF MEAN VALLEY DEPTH

Figure 2

% of
Cases



PERCENT OF MEAN VALLEY DEPTH

Figure 3

BIBLIOGRAPHY

1. Moroney, M.J., Facts From Figures, Penguin Books, William Clowes & Sons Ltd., London, 1956 ed., 472 pp.
2. Ostle, Bernard, Statistics In Research, Iowa State College Press, Ames, Iowa, 1954, 487 pp.
3. Wood, Walter F., "Ranges of Unobstructed Ground-to-Ground Visibility," U.S. Army Quartermaster Research & Engineering Center, Natick, Massachusetts, 1960, 11 pp. (Unpublished paper, quoted with permission of the writer.)
4. Wood, Walter F. and Joan B. Snell, "Predictive Methods in Topographic Analysis: I. Relief, Slope, and Dissection on Inch-to-the-mile Maps in the United States," Technical Report EP-112, U.S. Army Quartermaster Research & Engineering Center, Natick, Massachusetts, 1959 - Application of equation originally presented by C.K. Wentworth in "A Simplified Method of Determining the Average Slope of Land Surfaces," American Journal of Science, Vol. XX, 1930, p. 186.

ALUMNI NEWS

Sherman R. Abrahamson (Ph.D. '49), is doing research for the U.S. Government in Washington. He spent this summer travelling through Europe where he attended the IGU meetings.

Lewis Alexander (Ph.D. '49), Professor of Geography at the University of Rhode Island, is setting up a new geography department at that university. He is continuing research on offshore claims.

Agnes M. Allen (Ph.D. '37), Director of Division of Science and Mathematics at Arizona State College.

Esther S. Anderson (Ph.D. '32), is still geographer for the Bureau of the Census in Washington, D.C. She is currently serving on the AAAS Council, has been elected to membership in the Society of Women Geographers and attended the National Council of Geography Education in Cincinnati.

Wallace W. Atwood, Jr. (Ph.D. '30), Director of International Relations at the National Academy of Sciences-National Research Council. He is engaged in a research project involving the study of shoreline development and utilization of natural land resources for pleasure and recreation.

John P. Augelli (B.A. '43), Professor of Geography at the University of Maryland. He attended the IGU meetings this summer. He also has written an article on Dominican Colonization to be published in Economic Geography.

Hazel Handel Baker (M.A. '41), is a public school teacher in Painesville, Ohio.

Ruth E. Baugh (Ph.D. '29), is professor emeritus at the University of California in Los Angeles.

George Beishlag (M.A. '37), is professor of Geography at State Teachers College in Towson, Maryland.

Nels A. Bengston (Ph.D. '27), has published an article on deepwell irrigation on the Nebraska loess plain and is revising Fundamentals of Economic Geography with Van Royen.

Mildred Berman (M.A. '50), teaches geography at the State College in Salem, Massachusetts.

Lloyd D. Black (M.A. '36), is an Assistant Chief in the Office of Area Development of the Department of Commerce and Adjunct Professor at the American University in Washington, D.C.

Carl Jr. and Gertrude E. (Grady) Bloomfield (M.A. '34, '35), are respectively counselor in high school and teacher in junior high school in Detroit.

Hans Boesch ('34-'35), Professor of Geography at Zurich University and Director of the Geographical Institute, has recently published a book on the Middle East. He is presently working on a World Economic Geography.

Clyde Bollinger ('29-'30), has recently published an Atlas of Planetary Solar Climate and is continuing research on Planetary Climatology.

Adelbert K. Botts (Ph.D. '34), Professor of Geography in New Jersey, attended the IGU meetings in Stockholm and travelled through Europe.

Bertrand P. Boucher (1951-52), is Assistant Professor at the Montclair State College in New Jersey. He announces the birth of his daughter born in October '59 as well as a great many articles published in the past year.

Hugh C. Brooks ('51), is Associate Professor in Springfield, New Jersey. He is a member of the Explorers' Club for work done in the Kala-hari. He is presently doing work on industrial location in the Transvaal.

J. Herbert Burgy (Ph.D. '30), is head of the Department of Geography and Geology at Bradley University in Peoria, Illinois. He spent his summer travelling through Colorado and the eastern U.S.

Meredith F. Burrill (Ph.D. '30), Director of the Office of Geography in the Interior Department, attended the IGU meetings and presided over the two week meeting of a panel of international geographic name experts at the United Nations in July.

Donald Burestein (1957-58), is presently the Director of Urban Renewal, Hastings-on-Hudson, New York.

Everett H. Bush ('51-'52), is assistant professor of Geography and Chairman of the Department of Earth Sciences at Wittenburg University in Springfield, Ohio. He has recently been elected vice-president of the Geography Section of the Ohio Academy of Science.

Henry Lewis Buzzard (M.A. '49), is a Senior Cataloguer in the Book Branch of the Library of the U.S. Army Map Service.

Robert G. Buzzard (Ph.D. '25), is completing his second year as Visiting Professor at the Arizona State University. He plans to retire in June to catch up on "loafing." (We are glad to have found you).

Robert D. Campbell (Ph.D. '49), Chairman of the Department of Geography at George Washington University has completed a two year study for the Quartermaster Intelligence. He is currently studying recreational use of U.S. shoreline for O.R.R.C., contributing to a Handbook of Arctic Basin for the Arctic Institute and acting as a consultant to Special Operations Research Office of the American University.

Norman Carls (Ph.D. '35), is still Professor of Geography at the University of Pittsburgh.

James J. Centorino ('51-'52), is assistant professor at Salem State College in Salem, Massachusetts.

Thomas W. Chamberlin (Ph.D. '46), is Academic Dean and Professor of Geography at the University of Minnesota.

Margaret S. Chew (Ph.D. '60), is Chairman of the Department of Geography at the Wisconsin State College in La Crosse.

Phil E. Church (Ph.D. '37), Executive Officer of the Department of Meteorology at the University of Washington, has spent two weeks at Pt. Barrow. He is still involved in directing work on drifting pack-ice stations in the Arctic Ocean. He is Chairman of a panel on Meteorology for the American Meteorological Society and on the Glaciological panel of IGU-IGC.

George S. Corfield (M.A. '31), is presently Associate Professor and Chairman of the Geography and Geology Department at the University of Nebraska.

Catherine E. Cox (M.A. '42), is Assistant Administration Officer for Naval Personnel in the New York Naval Shipyard. From her old post in Hawaii, she went to the IGU meetings via the Far East, Middle East, etc.

Clark N. Crain (Ph.D.), is presently Professor and Chairman of the Department of Geography at the University of Denver. He plans to expand the department following a Ford Foundation Grant to the University.

George B. Cressey (Ph.D. '31), is still Maxwell Professor at Syracuse University. He recently published a text on Southwest Asia, Crossroads, and is planning a revision of Asia's Lands and Peoples.

Harold F. Creveling (Ph.D. '51), is Professor of Geography at Stroudsburg, Pennsylvania. He spent his summer travelling through the southern and southwestern U.S.

Floyd F. Cunningham (Ph.D. '30), is Professor of Geography and Director of the Laboratory of Climatology at Southern Illinois University.

Robert A. Davis ('50), is Head of the Geography Department of Hillfield College in Hamilton, Ontario, Canada. He spent his vacations in Europe where he attended the IGU meetings.

Vera K. Dean (Ph.D. '49), is Professor of Geography in Fitchburg, Massachusetts.

George F. Deasy (Ph.D. '48), is Professor of Geography at Pennsylvania State University.

Coen Kiewiet de Jonge (Ph.D. '51), Geologist with the Shell Oil Company, spent one month in Europe this past summer.

David H. DuBiel ('56-'57) is a Planning Analyst in Phoenix.

John R. Dunkle (Ph.D. '55), is an Associate Professor at the University of Florida and is working as a research consultant for the St. Augustine Historical Restoration Commission.

Sidney E. Ekblaw (Ph.D. '34), is Professor of Geography and Chairman of the Department of Geology and Geography at the University of Kansas City. He attended the AAG meetings in Dallas, the Resources Conference on Water in Boulder, a field trip in St. Louis with the Association of Missouri Geologists.

Helen (Balk) Elwell (Ph.D. '43), lives in Columbia, Missouri. She has recently taken a 6-month trip through the Pacific Northwest and Alaska. She announces that her daughter was married in March, 1959.

Bart J. Epstein (Ph.D. '56), is Manager of property acquisition, Stop and Shop, Inc., Boston. He has recently published "Evaluation of an Established Planned Shopping Center," in Economic Geography, Jan. 1961.

Franklin C. Erickson (A.B. '28, M.A. '30, Ph.D. '35), is Professor of Geography, Department Chairman, and Associate Dean of the Liberal Arts College of Boston University.

Alan Harris ('51-'52), is Lecturer in Geography at the University of Hull, Yorkshire. He has recently written a book in Historical Geography which is to be published sometime this year.

Isabelle K. Hart (M.A. '27), is enjoying retirement at her home in Oswego, New York, where she had taught from 1941-1947.

Dorothea B. Hawley (Burton) (Ph.D. '49), is a transportation specialist for the Air Force.

Mrs. Frederick K. Hayes (Mary Ladd) (summers '40-'42) is living in Bethesda, Maryland, is a housewife and mother of two daughters, Elizabeth and Margaret.

M. Bahy Hefny (Ph.D. '50), is an Officer in the Cartographic Unit of the United Nations. He was co-author with Raye R. Platt of a book on Egypt in 1958.

Gerald H. Hones (M.A. '53), Master in Geography in Folkestone, Kent, has been doing work on the Land Utilisation Survey of Southern Kent.

George F. Howe (M.A. '24), is Associate Professor at the Central Connecticut State College in New Britain. He recently travelled through the Maritime Provinces.

George M. Howe (Ph.D. '56), is Research Meteorologist for Travelers Research Center in Hartford, Connecticut.

Joseph B. Hoyt (Ph.D. '54), is Professor of Geography and Chairman, Social Department at Southern Connecticut State College, New Haven, Conn. He has written an Introductory Geography text which will be published in January, 1962, by Prentice-Hall, Inc.

Bert Hudgins (Ph.D. '30), is retired as Professor Emeritus of Wayne State University. He has recently published Michigan-Geographic Backgrounds and is enjoying his fifth year of retirement travelling and visiting his grandchildren.

Ester Kinch Hunter (M.A. '40), has recently spent three weeks travelling by chartered sailboat in the Caribbean (from St. Martin to Grenada).

Mrs. Roy Huret (M.A. '28), is Chairman of the Sciences Department of the Brearley School in West Hartford, Connecticut.

Albert H. Jackman (Ph.D. '53), is a Professor of Military Science at Western Michigan University. He is writing papers on military geography and on the lateral movements of streams.

Preston E. James (Ph.D. '23), Professor and Chairman of the Department of Geography at Syracuse University, visited the Antilles during March of 1960. He is a member of the advisory committee to Life in the development of their new Atlas. He has published a number of articles in the NCSS 1959 Yearbook and has addressed that organization in Boston and the AAAS in New York.

Lane J. Johnson (Ph.D. '59), is instructor in geography at Wayne State University. He is presently engaged in research on centrality.

Marguerite Plante Keindard (M.A. '48), is a six grade teacher of geography and English at Malvern, Pennsylvania. She has recently travelled to Mexico City, Acapulco and Guadalajara.

Wilma B. Fairchild (M.A. '37), editor of the Geographical Review, attended the IGU meetings in Stockholm.

Maud B. Maso Fernandez is research assistant at the Inter-American Housing Center in Bogota.

Brad Fisk (M.A. '52), is a high school instructor in Chatham, Massachusetts. He has traveled to Puerto Rico and the Yucatan to round out prior visits to the Caribbean.

Charles N. Forward (Ph.D. '58), is Assistant Professor at Victoria College in Victoria British Columbia and is presently conducting a land use survey of southeast Vancouver Island, B.C.

Edwin J. Foscue (Ph.D. '31), is still Professor and Chairman of the Department of Geography at Southern Methodist University in Dallas. He was Chairman of the local arrangements committee at the AAG meetings and was an official delegate of NRC at the IGU meetings. He has recently published "East Texas: A Timbered Empire," Journal of the Graduate Research Center of Southern Methodist University.

Otis W. Freeman (Ph.D. '29), is presently retired. He has written encyclopedia articles, travelled in Mexico and around the world this past winter.

Alfonso J. Freile ('51-'52), is head of Ground Water Department of Ministerio de Minas in Venezuela. He has just completed his Ph.D. dissertation.

Alexander R. Gassaway ('57-'58), has just terminated twenty-seven months in the Finnmark Province of Norway on an ONR grant, working now on his dissertation.

John L. George (M.A. '56), is Instructor in Geography in Topsfield, Massachusetts. His daughter was born in December, 1959.

Loren N. Gould (M.A. '59) is Instructor at Worcester State College.

Howard L. Green (A.B. '47, M.A. '49), is employed by Montgomery Ward and Co., in Chicago as Store Development Manager. He has recently published an article in Economic Geography entitled "Planning a National Retail Growth Program," January, 1961.

Andreas Grotewold (M.A. '51), is Assistant Professor at the University of Missouri, and is working on a monograph on the geography of international trade.

Edna M. Gueffroy (M.A. '27), is Professor of Geography at Illinois State Normal University.

Neil W. Halkyard (M.A. '51), is Headmaster of Shephard Knapp School in Boylston, Massachusetts.

Eleanor E. Hanlon (Ph.D. '53), is a research associate with the Land Use and Management Program of Resources for the Future. She is on leave from Syracuse University. She has recently published "The Land Resources of the United States-Physical Base for Soil and Water Conservation."

Lois R. Keller (M.A. '29), is retired and lives in Cleveland Heights, Ohio.

Edward S. Kersch (M.A. '58), is an Intermediate City Planner for the city of Detroit. He announces the birth of his daughter born Sept. 28.

Mohammad Halim Khan (Ph.D. '57), is Professor and Head of the Department of Geography in the Faculty of Letters of Gadjah Mada University in Jakarta. He has recently published articles in the Indonesian Journal of Geography and for Focus.

Harry B. Kircher ('57), is Economist at the Federal Reserve Bank of St. Louis and lecturer at Washington University in St. Louis.

William A. Koalsch (M.A. '59), is a graduate student in the Department of History at the University of Chicago. He has published book reviews in Economic Geography. He presently is doing Ph.D. work in both of the departments of History and Geography.

Clarence E. Koeppel (Ph.D. '29), associate professor of Geography at San Diego State College plans to tour northwest Europe this summer with his wife.

Oliver H. Laine (Ph.D. '53), is Executive Dean of Catonsville Community College in Maryland.

George Langdon (Ph.D. '51), is Professor of Geography at the State College in West Chester, Pennsylvania. He is working on a world geography book.

Minnie E. Lemaire (M.A. '32, Ph.D. '35), is Professor of Geography at Mount Holyoke College and has published "Geography's Place in the Liberal Arts College," in the Jan. 1961 issue of School Science and Mathematics.

Urban J. Linehan (Ph.D. '55), lives in Silver Spring, Maryland.

Dana A. Little (M.A. '51), is a Planning Associate in the Department of Economic Development, Augusta, Maine.

Trevor Lloyd (Ph.D. '40), Professor of Human Geography at McGill University. Travelled to USSR and Eastern Europe and attended IGU meetings.

Mr. and Mrs. R. A. Lockhard (M.A. '57), live in Cambridge, Mass. He is an urban planner with Planning and Renewal Associates of Cambridge. She is a housewife.

Richard F. Logan (M.A. '37), is Associate Professor at the University of California. He has recently published a monograph on South West Africa for the National Research Council.

Harriet Ruth Long (Ph.D. '55), Professor and Head of Geography Department at Edinboro State College in Pennsylvania. She has travelled through Europe and attended the IGU meetings.

Mr. and Mrs. Robert Looker (Aleta Grillot) (both M.A. '60) live in New Haven, Connecticut. He is working as city planner for a consulting firm. They announce the birth of a daughter in April.

Arthur C. Lord (M.A. '59), is instructor in Geography at Central Michigan University and announces the birth of his daughter in March of 1960.

Emanuel Maier (Ph.D. '61), is presently a wrestling coach at Brandeis University. He hopes to teach again soon. His dissertation was just accepted. Congratulations.

Neva McDavitt (M.A. '29), Assistant Professor of Geography at Illinois State Normal University.

Grace Lee McIntosh ('31), lives in Rome, New York.

Paul Cross Morrison (Ph.D. '41), Professor of Geography at Michigan State University attended the IGU meetings with his family.

John M. Moulton ('59-60), is Chairman of the Department of Geography and Geology at Hastings College in Nebraska. He is currently doing research on "Irrigation on the High Plains."

Richard E. Murphy (Ph.D. '57), is Associate Professor at the University of Laramie. He has recently published an article in the Professional Geographer.

Salvatore J. Natoli (M.A. '57), is Associate Professor of Geography at Mansfield State College in Mansfield, Pennsylvania. He is working as co-author on a junior high school text on the Americas.

Norton Nichols, Jr. (M.A. '50), has recently been appointed Assistant Superintendent of Educational Services of the Antelope Valley Joint Union High School District of Lancaster, California.

Bruce C. Ogilvie (Ph.D. '56), is managing editor of Education maps for Rand McNally. He is also serving as Editor of Geography film strips for the Society for Visual Education of Chicago.

Howard L. Ohman (A.B. '46, M.A. '48), is presently employed as a physical geographer with the Quarter Master Corps in Natick, Massachusetts.

Ralph E. Olson (Ph.D. '46), is Professor and Chairman of the Department of Geography at the University of Oklahoma at Norman. He took an extensive 8,000 mile trip through the USSR after attending the IGU meetings.

Harry C. Parker (M.A. '38), is a museum specialist with the National Parks Service, Washington, D.C., indefinitely hoping to be transferred to the outdoors.

John W. Pauling (M.A. '56), has recently published an article for the Professional Geographer.

Robert F. Perry, Jr. (Ph.D. '57), is Professor and Chairman of the Department of Geography at Worcester State College. He is continuing research on agriculture in northeast North America.

Rafael Pico (Ph.D. '38), President of the Government Development Bank for Puerto Rico, is preparing two books: From Planning to Action and Economic and Population Geography of Puerto Rico, both in Spanish.

Victor E. Pitkin (M.A. '31), Consultant in Citizenship Education, Connecticut State Department of Education. He has contributed a chapter to the Yearbook of the National Council for Social Studies.

John A. Pogenstecher ('55-'56), is presently employed by the U.S. Government in Washington, D.C.

Merle Prunty, Jr. (Ph.D. '44), Professor and Chairman of the Department of Geography at the University of Georgia, is working on a monograph on the plantation complex of the South as well as on an advanced textbook on the geography of the South.

Etha M. Pruser (M.A. '54), is Assistant Professor of Geography at Newark State College in New Jersey.

Louis D. Quam (Ph.D. '38), is the Director of Earth Sciences Division, Office of Naval Research. He attended the IGU Congress in Stockholm this past summer.

Lawrence E. Randall (M.A. '50), is a pilot for MATS.

Yvonne Rebsyrol ('52-'53), is a journalist and cartographer for the newspaper Le Monde in Paris. She published articles on earthquakes, geophysics and geography in that publication.

Benjamin V. Reed (B.A. '49), is a geographer for the Bureau of the Census. He has just received his M.A. from George Washington University in Washington, D.C.

John W. Reith (M.A. '41), Chairman of the Department of Geography at the University of Southern California. He taught during the summer session at the Pennsylvania State University.

Agnes Renner (M.A. '39-40), is Chairman of the Department of History and Geography in St. Ambrose College, Davenport, Iowa. She spent six weeks in Europe this past summer.

M. Catherine Roberts ('38), retired in Potsdam, New York.

Ina Cullam Robertson (M.A. '25), is a field representative for an educational tour service in Dallas, and has been writing a tour guide for Colleges.

Mery Alice Roper (M.A. '44), still lives in Beverly, Massachusetts.

Carl W. Ross ('39-41), is a geographer at the U.S. Army Quartermaster and Engineering Center in Natick, Mass. He travelled through Europe last summer and attended the IGU meetings.

Robert W. Rucker (M.A. '28), is Associate Professor in the Earth Science Department at Bridgewater State College.

Edward D. Russell (M.A. '22), is at the State College in Framingham, Mass.

Richard E. Sands (Ph.D. '60), is Assistant Professor of Geography at Mackay School of Mines at the University of Nevada. He announces the birth of his daughter in August. He spent last summer doing research on Mexican climatology.

I. Made Sandy (Ph. D. '60), is a Geographer for the Geographical Institute of the Army in Djakarta, Indonesia.

Frederick S. Sanford ('48-'50), is a Production Planner for Sikorsky Aircraft in Stratford, Connecticut. His daughter was born in April, 1960.

Francis J. Schadegg (M.A. '37), is Chairman of the Department of Geography and Geology at Eastern Washington State College in Cheney. He is contributing a chapter on Africa in a world geography to be published shortly.

J. R. Schwendeman (Ph. D. '41), Head of the Department of Geography at the University of Kentucky. He taught six weeks of summer school in Monterrey, Mexico.

Marjorie Shank (M.A. '23), is still Professor of Geography at Southern Illinois University at Carbondale.

Ada M. Shawkey ('47-'48), is an Associate Professor of Geography at the State College in Framingham, Mass.

Julia M. Shupman (Ph.D. '28), retired in East Arlington, Vermont, took a trip through the west last summer. She is presently a clerk of the Arlington School Board.

Angelika Sievers (M.A. '36), is a Professor of Geography at State Teachers Training College in Vechta in Oldenburg, West Germany. She has published articles on Kerala and Ceylon.

Victor W. Sim (M.A. '57), is presently employed with the Geographical Branch of the Canadian Department of Mines and Technical Surveys. He is completing his Ph.D. dissertation at McGill University.

Helen Boyer Smith (M.A. '38), is a housewife living in Napa, California.

Helen L. Smith (Ph.D. '58), is Associate Professor of Geography at Wheaton College in Wheaton, Illinois. She has recently published an article in the Bulletin of the Illinois Geographical Society and has conducted a 17 day tour in Southeast Asia.

John A. Sobol (M.A. '49), is Assistant Professor at Memphis State University, Memphis, Tennessee.

Raymond E. Specht (M.A. '47), is Associate Professor of Geography at Wisconsin State College in Stevens Point. He has recently published "Functional Analysis of the Green Bay and Western Railroad," published by the Railroad. He is currently working on his doctoral dissertation at Northwestern University.

Karl Stacey (Ph.D. '55), Professor of Geography at Kansas State University, is Secretary of the Great Plains Division of the AAG.

Myron Starbird ('54-'55), is Professor of Geography at Farmington State Teachers College in Farmington, Maine.

L. Lemar Stephan, Associate Professor of Geography at North-east Louisiana State College. He is working on a film strip on the geography of Louisiana.

Reed F. Stewart ('58-'59), is Assistant Field and Statistical Secretary with the General Division of Research and Field Study of the National Council of the Protestant Episcopal Church in Evanston, Illinois. He was formerly teaching in Duxbury, Mass.

Hazel Latendress Stickney (M.A. '48), is an Assistant Professor in Livingston, Alabama.

Robert G. Stone ('31-'32), is Chief of Technical Information and Publications Divisions at the USAF Airweather Service in Belleville, Ill.

John L. Taylor (Ph.D. '53), is a consultant on Territorial and Indian Affairs for the House of Representatives in Washington, D.C. He visited Latin America and made a number of contributions on U.S. Territories for the Britannica Yearbook.

Jessie M. Thornton (M.A. '41), housewife, is spending time working on a coin collection, would like to hear from others who are interested--Mrs. J. M. Jesseman 267 South Street, Concord, New Hampshire.

Ray W. Tobey (M.A. '53), if retired in Fairfield, Maine.

Grady O. Tucker (Ph.D. '57), is store location research manager for Montgomery Ward in Chicago.

Mazie O. Tyson (summers), is still teaching at A & I State University in Nashville.

Shirley R. VanBlarcom ('52-'53), is a teacher of geography in Wheaton, Maryland.

James E. Vance, Jr. (Ph.D. '52), is Assistant Professor at the University of California at Berkeley. He is on the Social Science Research Council and has been on a faculty research grant in Cambridge, England

Eugene Van Cleeef (Ph.D. '26), is Professor Emeritus at the Ohio State University. He has recently published articles in Export Trade, the Magazine of Wall Street and in the Professional Geographer.

Wouter Van de Bunt ('51-'52), is manager for the Market Research and Commercial Planning of KLM Royal Dutch Airlines. He announces the birth of his second daughter in May, 1960.

William Van Royen, is a co-author of a publication on the development of the San Francisco Bay Area. He was also a member of an Army Scientific Advisory Panel which made a trip to Alaska and Greenland.

H. E. Van Toyl, Jr. Lives in Arlington, Virginia.

K. N. Varma (Ph.D. '55), is Head of the Department of Geography at the Government Hamidia College in Bhopal, India. He is currently preparing a textbook on Asia in English for use at the University level. He is also planning a summer trip to Kashmir with a group of students.

Charles B. Varney ('53-'54), is an Instructor in Geography and Social Sciences at the University of Florida. He recently published an AGS-Double-day booklet on the Dakotas.

Paul P. Vouras (M.A.), is Assistant Professor at Peterson State College in Wayne New Jersey, and is preparing a report on the geography of Greece.

Lillian H. Wallace (M.A. '41), is Associate Professor of Geography at Westfield State College, Mass.

Mildred M. Walmsley (Ph.D. '52), is Assistant Professor of Geography at Western Reserve University, Cleveland, Ohio. She gave a paper on the Ohio River Development at the IGU meetings

Aylward J. Walnut ('58-'59), is an Assistant Planner for the State Planning Bureau of the New Jersey Department of Conservation and Economic Development. He has contributed to a publication on zoning in New Jersey and a forthcoming volume on master planning.

S. I. West (M.A. '41), is Branch Chief in one of the agencies of the Federal Government and attended the IGU meetings in Stockholm.

Katheryne Thomas Whittemore (M.A. '25, Ph.D. '36), is presently Director of the Division of Arts and Sciences, State University College of Education, Buffalo, New York. She attended the IGU in Stockholm.

Marion I. Wright (M.A. '46), is Chairman of the Division of Social Sciences at the Rhode Island College.

Rose Zeller (Ph.D. '40), is retired from Eastern Illinois University and is anticipating a visit to California.

Leo J. Zuber ('48-'49), is Assistant Regional Director for Special Programs of Urban Renewal in Atlanta.

The Monednock deeply regrets to announce the death of Robert P. Condon (1958-1959), after a prolonged illness, at his home in Hyattsville, Maryland.