ABSTRACT

CERTAIN FACTORS AFFECTING MOBILITY AND THE RELATIONSHIP BETWEEN SPATIAL AND SOCIAL MOBILITY OF UNIVERSITY FACULTY, PARTICULARLY SCIENTISTS ONTARIO, 1967-68

by

Gertrude Cécile MacFarlane

This study was designed to investigate certain types of mobility of university faculty. First, pre-career spatial mobility, exemplified in place of birth and places where higher education was received, was examined in relation to spatial mobility of university faculty during career. Second, the dependence of social mobility on the extent of spatial mobility was determined. The relationship of selected ascribed and achieved attributes, such as age, sex, and academic discipline, to spatial and social mobility was measured to establish descriptive accuracy, and to provide background for current concern regarding "brain drain" and "brain gain."

The faculty of all universities and colleges of Ontario, Canada, in the year 1967-68 constituted the universe. Secondary sources were used to establish a list of faculty names, and data were obtained from two letter-questionnaires, the first to all faculty, and the second to all "scientists." Frequencies were established by using the program ROUTINE PER COUNT. Contingency tables concerning

"scientists" only were constructed by using the program ROUTINE ACT.

Scores for spatial mobility and social mobility, computed for each scientist, were examined in relationship to other variables and to each other. Bogue's Social Economic Achievement Scale was used to establish a descending order of prestige of occupation which was compared with a descending order of totals of faculty scientists arranged by occupation of fathers.

The descriptive data showed that large proportions of Ontario faculty members were concentrated in the younger age categories. There were 11 times as many males as females. Native-born exceeded foreign-born by 11 per cent. Of the native-born, 62.6 per cent were born in Ontario. Three-fifths of the foreign-born were born in the United States and one-quarter in England. From 68 to 80 per cent of degrees received by Ontario faculty were granted in Ontario. Highest percentages of degrees granted outside Ontario were conferred in the United States and England. Of the total of the highest degrees received, the highest percentage was for Ph.D. Roughly twice as many university faculty respondents experienced some mobility outside Canada at each degree level as those who received their advanced training in Canada only.

Younger scientists had the highest record of spatial mobility, both in frequency and distance travelled. There was no appreciable difference between male and female scientists in frequency or distance of spatial mobility, although the percentage for "no spatial mobility" was higher for females than males. Foreign-born scientists moved more often and farther than Canadian-born scientists during their careers. There was little or no difference between those foreign-born whose first language was English and those who had another first language, in their propensity for number of moves or the distance of those moves. The frequency and distance of spatial movement was greater for those who had received at least part of their advanced training abroad.

University scientists who received their highest degree in 1965 or later rose in rank faster than any other group. There was no difference in rise in rank between male and female university scientists. There was almost no difference between rates of social mobility of natural scientists and social scientists. The rate of rise in rank was higher for foreign-born than native-born scientists but it made no difference whether they were born in English-speaking countries or not. Rise in rank was greatest for those who received some advanced training outside Canada,

and least for those who received all their advanced training in Canada. The rate of social mobility was not related to the prestige of father's occupation.

Finally, the rate of rise in rank was directly related to the number of spatial moves and their distance.

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by

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Sociology

1969

ACKNOWLEDGMENTS

This dissertation represents the culmination of a venture in cross-cultural interaction that could only have been possible in a setting of shared values and goals which scholars enjoy. The company of friends, colleagues and teachers who identified with the exercise is impressive by its numbers and for the fact that all members shared the three roles.

I express my thanks first to my adviser and Chairman, Professor J. Allan Beegle, whose extraordinary support and effort have far exceeded reasonable expectation. My further special gratitude is extended to my Co-chairman, Professor John Useem who first encouraged me to pursue the doctoral program; to members of my committee, Professor Jay Artis and Professor F. Waisanen who have given me more than my share of time and attention.

Three pre-doctoral grants from The Canada Council; aid in processing data from the Experiment Station, the Department of Sociology and the Computer Institute for Social Science Research, Michigan State University; and two teaching assistantships in the Department of Sociology at McGill University, have implemented my work and helped to bring it to completion more rapidly.

In addition to clerical staff of the Department of Sociology, there have been 17 people to whom I owe a debt in Quebec and Michigan. Special mention is due Mrs. May Couture for many drafts and final typing, my four sons who worked intensively on the survey for several months in 1968, five proficient young coders, and especially my colleagues, Nancy Tuma and Wayne Olin, who set up the computer programs for me and in the process taught me more than they realize.

I am grateful for many valuable discussions with Sal Restivo and Chris van der Pool on our shared interests, and for advice and comment from representatives of the Department of Manpower and Immigration (Ottawa), the Association of Universities and Colleges of Canada, and The Ontario Institute of Studies in Education. There have been innumerable helpful letters of comment, and I am especially indebted to Professor Howard Roseborough and Professor Earl Beach of McGill University, and Professor Anthony Richmond of York University for their time and advice in setting up my research problem. Many friends at Michigan State University have supplied continued support of many kinds, and I particularly acknowledge the constancy of Professor Ruth Useem, Professor Joanne Eicher and Professor Carl Eicher. Finally I recognize that without the generous response and support of the university faculties of Ontario there would have been no dissertation.

A study of this magnitude requires consent and support over a long period of time from one's family and I have had both. I thank my sons for their patience and help, and my husband for his tolerance and for much more, including his participation in this exercise as a valued colleague and teacher.

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CHAPTER I

INTRODUCTION

Definition of Research Problem

The most famous statement concerning the mobile man of knowledge was made in the first century[1] and ever since then mobile persons have been a source of anxiety to families, governments, seats of learning, and to the nations of which they are part. The anxiety is rooted three ways: first, and basically, should the scholar go where he has an opportunity to use his skills most freely and completely and thus by realizing his powers most fully make his maximum contribution to mankind (that is, should he see himself as a world citizen); second, should he see his first duty to his country which paid at least for his early education and may have invested heavily in his advanced training (that is, should he see himself first as a nationalist and then as a scholar); and third, what work location should he choose to ensure a satisfactory life in terms of the self-image posed by the first two items (scholar-world citizen, or nationalist-scholar)?

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[1] "A prophet is not without honor except in his own country," Jesus.

In this study the problems associated with the mobile intellectual, his patterns of movement and the problems they pose, require in broadest perspective, a consideration of two collectivities, their characteristics, their relationships, and the two social systems of which they are a part. The first collectivity is the international, intellectual elite, a world community with common values and goals. This collectivity has emerged in conjunction with the world trend towards industrialization and its emphasis on economic values. The second collectivity is the Canadian academic elite, in part linked to the world intellectual elite through the institutional segment identified with teaching and research, particularly in the sciences. The international cultural forum[2] to which the first collectivity belongs and to which certain members of the second belong or aspire, recruits its adherents from those who have certain discernable characteristics in common, among them a propensity for spatial mobility.

This study focuses on migration and social mobility of the second collectivity, the faculty in the universities of Ontario. Specifically, this investigation has three dimensions. First, it considers spatial movement of university faculty and selected characteristics related to

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[2]See Parsons, Talcott, "Professions," International Encyclopaedia of Social Sciences (New York: The MacMillan Company and the Free Press, 1968), 12: 542.

migration. Second, it examines social mobility in the university system and the relationship to selected attributes of university faculty. And third, it is concerned with the relationship between spatial movement and social mobility within the university system.

A great deal of public concern in Canada has been expressed over various aspects of the spatial movement of university faculty, particularly of scientists. On one hand, this concern takes the form of alarm over the prospect of losing highly trained scientists to other areas of the world. This so-called "brain drain" concern applies primarily to native-born and native-trained Canadian scientists. On the other hand, there has been concern for the foreign-born highly trained scientists who enter Canada as immigrants. This interest and concern runs the gamut from the problem of maximally utilizing skills to problems of adaptation to and integration in the Canadian social structure. This group continues to be the object of concern in the Federal Departments of Labour, Manpower and Immigration, and Education.

In general it may be said that research efforts in relation to the two groups have not been commensurate with the concern for them. Often recommendations have been made based upon inadequate samples. It is hoped that this study may contribute to the body of knowledge providing evidence on some of the migrational issues now debated in Canada.

Background of the Problem

The world community and its mobile population

All members of a national academic elite are not part of the international academic elite. A sense of membership in a world community of intellectuals assumes high efficiency and technical knowledge employed as the means to common ends. But this sense of membership is often missing. It is equally apparent that some universities organize for and encourage participation in foreign programs; other universities do not. While this study does not attempt an answer to these problems, their existence forms part of the context from which the present analysis is derived.

World-wide beliefs, values, and goals embraced by a world community of intellectuals implies free movement from one intellectual center to another. The decisive factor in location is that place where the individual's skills can best be utilized at a given time. If the ability of individuals varies in regard to free mobility it can be due to certain attitudes held, world view, self-image, and definition of academic role. It can also be due to previous experiences of spatial mobility. If the scholar was born outside the country where he is now living, a change of national identity was a part of his socialization. If higher education took him to a variety of locations, he

has had experience in identification with new intellectual settings. If his career has taken him from one location to another he will probably be equipped for further adjustment to new settings and work problems.

Whether spatial mobility is related to rise in rank within the university system, depends in part on the type of university. The organization of the university and its social structure will determine at least in part whether this type of identity with the world community and its cosmopolitan values is to be endorsed.

The "brain drain"

Initially, it appeared that the "brain drain" would be a major focus in the consideration of spatial mobility of university faculty in Canada. The Canadian press constantly alludes to the loss of trained personnel, particularly to the United States. University faculties as well express periodic concern in departmental and annual reports on this matter. Research has demonstrated, however, that a Canadian brain drain in absolute terms is non-existent. Both demographic and economic studies support the "ecumenical" or world view that the individual contributes most when he is in that setting anywhere in the world that is most ready to accept his skills. Although this is a logical perspective, the Canadian nationalistic view is still very real.

Numbers lost to universities and business organizations in the United States are replaced by immigrants having highly developed skills, particularly from Europe. Many Canadians teaching in the universities have received at least part of their graduate education in other countries, and a high percentage of university teachers, particularly in social science, come from the United States where they were trained. Although the basic data are unavailable, there appears to be at least a small number of highly trained people from the developing countries who, having received their higher education in the United States, are required to return to their own countries, and, having done so, wish only to return to the United States as permanent residents. One method of accomplishing the return is to take an assignment in Canada, which can be used as a "stop-over" point in returning to the United States. (It is relatively easy to enter the United States as a "British" citizen from Canada.) The total of skilled Canadian university personnel is at least temporarily increased by this skilled transient population.[3]

Universities have not fully examined why many skilled people today are able to move from country to

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[3]At the time of writing (July 1969) the concern regarding brain drain in Canada has lessened, and anxiety has shifted to the "invasion" of Canada by academic Americans particularly in the social sciences. Both symptoms appear to have their roots in a sense of uncertainty that besets countries with small populations and limited wealth.

country with ease, lack of emotional disturbance, or extreme concern, while others find it difficult or impossible. It is important to know why people come and go and which types can do this best. What patterns of migration are associated with what types of people? How can rise in rank be timed to fit these moves, or prevent them, and conversely, how does this type of migration affect social status?

Universities in Canada face the same types of problem found in educational institutions elsewhere. University enrollments are increasing rapidly and budgets are not keeping pace. The per capita investment in education is relatively low and may become lower on a per capita basis with the great increase in student numbers. Greater specialization requires increasingly long training. Equipment costs soar. There is also the anxiety already mentioned regarding the loss of highly trained students to other countries and the threat of "invasion by the Americans." Both problems loom large in Canadian academia. In all five regions, but particularly in Ontario where the greatest numbers of faculty, students and universities are concentrated, it is apparent that, caught up as Canada is in a period of rapid expansion, there will be ambivalence regarding her proper world role, regarding the urge to protect her investment in skilled personnel, and regarding new and heavy educational pressures. If Canada had a more

unified historical past (one main ethnic strain or a more genuine "melting pot"), a more congenial climate, or an earlier and more rapid increase in population, her lot might be easier. But as it is there seems an inevitable period of uneasiness ahead.

Order of Presentation

In Chapter II the theoretical background and relevant literature for this study will be reviewed. Chapter III concerns methodological procedures followed in obtaining, organizing, and analyzing the data.

The analytic section begins in Chapter IV with a description of the characteristics of the total number of respondents from the faculties of universities in Ontario in 1967-1968, and what the pre-career patterns of spatial mobility are.

In Chapter V the first concern is to establish how frequency and distance of spatial movement among university scientists in pursuing career are related to selected ascribed and achieved attributes such as age, sex, discipline, place of birth, and where advanced training was received.

An analysis of the rate of social mobility of university scientists follows. Changes in rank will be related to certain social and demographic variables such as

highest degree and when received, sex, discipline, occupational sequence, and social origin.

The final concern of the study is to establish the relationship between rate of social mobility, or rise in rank in the academic system, and the frequency and distance of spatial movement among university scientists.

CHAPTER II

THEORETICAL FRAMEWORK OF THE STUDY

Theoretical Framework in which the Study is Cast

Both empirical research studies and theory concerning the relationship of spatial and social mobility, especially within the structure of one occupation, are sparse. It is even more sparse when that occupation is academic teaching and research. Three areas of theory, however, are relevant to this linkage and have implications for this study. These three areas concern:

1. ecumene and its expression in world movements of people and ideas;
2. spatial mobility of occupational groups;
3. social mobility from one occupation to another and within a given occupation.

Basic to studies of academic personnel is the body of theory concerning ecumenical movements, and the concept of ecumene as it infers a sense of world citizenship among scholars and thus a relevant part of the theory relating to the "third culture." Associated with both these bodies of theory is the view of the scientist as an "automatic" world citizen. Neither of these two areas of theory is related

directly to this study, but each has a bearing on the development of the argument which the study entails.

The second area of theory is found in migration theory dealing with spatial movement of professionals. The relationship of this movement to social structure has been examined in a few studies and a limited body of middle range theory has emerged that is relevant.[1]

The third body of theory concerns social mobility as it relates to the "movement of individuals, families, and groups, from one social position to another," attempting to "account for frequencies with which these movements occur." Such movement is exemplified in intergenerational mobility which "compares the social position of parents and offspring," or in career mobility which "compares the social position of the same individual at different times."[2] This study is concerned with both aspects of social mobility although the major emphasis is on career mobility. While

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[1] See: Louis Parai, Immigration and Emigration of Professional and skilled Manpower During the Post-War Period, Special Study No. 1, Economic Council of Canada, June 1965.

Henry G. Johnson, "The Economics of the 'Brain Drain': The Canadian Case," Minerva, 3 (Spring 1965), 299-311.

Herbert G. Grubel and Anthony Scott, "The International Flow of Human Capital," American Economic Review, 56 (May 1966), 268-274.

[2] Hubert Goldhamer, "Social Mobility," International Encyclopaedia of Social Science (New York: The MacMillan Company and the Free Press, 1968), 14: 429-438.

there are many studies that examine movement from one social stratum to another and from one occupational stratum to another, no study was found that specifically examined the relationship of rise in rank within an occupation to degree of spatial movement, for more than a small sample.

The theoretical moorings for this study then emerge as selected fragments from the three broad areas outlined. The argument that bears directly on the specific concerns of this study develops from these.

Relevant Literature

Ecumene: world citizenship

The condition of ecumene, expounded by Kroeber[3] as an "interwoven set of happenings and products" creating corridors between societies by means of extensive communication infers spatial mobility in the broadest of terms. Hewes expands the concept further by describing an ecumene or ecumenical system as "a set of functionally interconnected civilizations . . . such that constituent civilizations tend toward a common and advancing technological base and come to share various styles, scientific, philosophical . . . and so on."[4] It is within such an

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[3] A. L. Kroeber, The Nature of Culture (Chicago: University of Chicago Press, 1960).

[4] Gordon W. Hewes, "The Ecumene as a Civilizational Multiplier System," The Kroeber Antheopological Papers, No. 25 (Fall 1965), pp. 73-110.

environment that scholars, men of knowledge, engaged in the pursuit of knowledge, have access to a world citizenry. They can become "middlemen between societies" and "the contact with members of disparate cultures" can become their habit. Useem has developed this notion in his discussion of "the third culture."[5]

The experience of ecumene and membership in the third culture is available to all scholars, but it is those members of the world community of scientists whose characteristics and goals are more recognizably shared who are more likely to experience world citizenship. Their engagement, often in teaching as well as research, is accompanied by norms of individualism and independence. They offer their knowledge freely as a gift to the world community, asking only for recognition from their peers.[6] Men and women, ideally disinterested and objective in pursuit of certified knowledge, share common goals, "irregardless of race, nationality, religion, class, or personal qualities."[7] This shared pursuit with its

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[5]John Useem, "The Community of Man: A Study in the Third Culture," reprinted from The Centennial Review, 7 (Fall 1963), 481-498.

[6]W. O. Hagstrom, The Scientific Community (New York: Basic Books, 1965).

[7]See Robert K. Merton, Social Theory and Social Structure, Part IV (New York: The Free Press, 1957).

accompanying world view can be accompanied also by a sense of freedom to move spatially, anywhere that others are involved in similar activities.

The discussion thus far has pointed out that the scholar can experience the role of world citizenship, the scientist within this large segment, even more so. But this need not be the case, nor is it in fact always so. One of the contentions of this study is that the scholar is more spatially mobile than the non-scholar and, within the body of scholars, the scientist more spatially mobile than the non-scientist. Gouldner, in his analysis of cosmopolites and locals, has identified some of the variables that appear to affect the degree of spatial mobility.[8] Although this study stresses the social structural implications of spatial mobility, Gouldner's recognition of the two types with their accompanying roles and the setting that produced them is noteworthy.

Spatial mobility

Although Richmond's[9] theory of the "transilient" is based on research in the area of migration of landed immigrants (i.e., those with permission to stay) and

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[8] Alan W. Gouldner, "Cosmopolitans and Locals: Toward an Analysis of Latent Social Roles," Administrative Science Quarterly, 2 (December 1957-March 1958), 282-480.

[9] A. H. Richmond, Post-War Immigrants in Canada (Toronto: University of Toronto Press, 1967).

members of the general labor force from Britain to Canada (and back), it is equally relevant to the subject of this study. Richmond's interest lies in the relation of subsequent moves to the initial move of these immigrants. His findings show that those most successful in adjusting to new conditions are the most likely to move again. Rather than viewing this phenomenon of "absence of roots" as carrying a negative connotation, Richmond suggests that it can be "positively functional in urban industrial societies." The individual has confidence and skill enough to move wherever his talents can be most effectively used. Desire to stay may be an indication of uncertainty and insecurity and not a measure of assimilation. Richmond does qualify this commentary to the extent that shared language is an abetting factor in case of adjustment, and immigrants whose first language is other than English have an additional complicating factor that will make cause and effect in the frequency of spatial mobility less clear.

Richmond traces the history of the British immigrant to Canada through his "next" move only, but the reason for the "move again" infers a cumulative quality in spatial mobility which is pertinent to this study of the relationships of spatial and social mobility. Social structural factors affecting degree of social mobility are implied in Richmond's study, and lead to the expectation that the mobile scholar who has moved successfully once will be more

likely to move again, and if successfully twice, will be more likely to move a third time, and so on. It therefore appears that the scholar who is a scientist and who has experienced spatial mobility (reflected in place of birth[10] and during higher education) will generally be more spatially mobile during his career than the scientist who has not experienced spatial mobility. Thus, there are "degrees of transiliency" among scholars, particularly scientists, the measurement of which could extend even into their career sequences.

Musgrove's[11] research on migration of occupational elites, especially scientists, bureaucrats, and intellectuals, indicates the economic structural factor as the main determinant in spatial mobility. Those who move have been pulled by "need" and pushed by oversupply or low prestige accompanied by low income. "Need is increasingly

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[10] See: Seymour Martin Lipset and Reinhard Bendix, Social Mobility in Industrial Society (Berkeley and Los Angeles: University of California Press, 1964), p. 50. In Table 2.4 the authors show in data from Stouffer's study on civil liberties that the professional and semi-professional occupational group with foreign born parents constitutes seven per cent of the total sample considered as opposed to those with native born fathers who comprise 14 per cent of the total. For what they are worth, these percentages may be compared with percentage of total of number of university faculty of foreign birth and of native birth as a test of spatial mobility in the family background as an indicator of choice of occupation in the university.

[11] F. Musgrove, The Migratory Elite (London: Heinemann, 1963).

interpreted as a response to changing social structure of the receiving areas. Exits balance arrivals in terms of needs and thus the migratory elite might better be called circulatory."[12]

Just as climate and housing no doubt, are among the determining factors in mobility, so is income. Thus, although the reason Musgrove posits for moves is outside the scope of this study, except as reflected in rise in rank, his recognition of the phenomenon and its nature is worth noting.[13]

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[12] Ibid.

[13] Although beyond the scope of this study, "type of university" is probably the other most important factor in determining when, where, and why the individual moves. Caplow and McGee examine the problem of "the vacancy, the search, and the replacement," the stages in employing individuals. Choices are made in terms of the type of university as well as the person hired, representing the intersection of the career of an individual and the history of an institution. Rate of social mobility will depend on how well the individual fits the image of the university. Brown emphasizes the alternate aspect of the process by asking how a candidate decides on a new job. He posits that the final decision to move to the new job is based on the characteristics of the job itself; and, with Musgrove, that salary is the primary determinant.

There are a few further points on type of university of more general character. The person who is an excellent choice for a post in the university which has a program of international concerns may be a poor choice for becoming a permanent resident. If he adapts easily he may as easily move on further. The small new university with small departments and little ability to shift and adjust to absences of personnel may be little inclined to choose the person who would be desirable in the larger world-oriented university.

Thus, not only is the flair for spatial mobility an asset for recruitment to the world elite of intellectuals,

Social mobility

Among the few studies of occupational mobility of professional workers there are oblique references to university faculty. Reiss[14] locates the "highest and most distant" migration with "new" professionals in the university faculties, those in social and natural science.

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but it may or may not be an asset for successful performance in a particular university. Even though the representatives of intellectual disciplines carry a high leadership status throughout the world, and though the university is the organization locus of these disciplines, individuals demonstrating varying degrees of internationalization will find that the emotional climate and structure of a particular university as well as its organizational resource will determine whether it is equipped to receive personnel of their type.

The immigrant to Canada may become a transilient Canadian and a very useful one if he finds an appropriate niche, or he may never become a Canadian at all, but continue in his spatial mobility to new parts of the world. These factors are especially cogent for the university faculty immigrant. Whether they are considered advantages will depend on where he is placed. Only in special cases will the characteristics of successful world mobility be guarantee of a permanent citizenry and satisfactory membership in the academic community.

See: T. Caplow and R. J. McGee, The Academic Marketplace (New York: Basic Books Inc., 1958).

D. G. Brown, The Mobile Professors (Washington, D.C.: American Council on Education, 1967).

[14] Albert J. Reiss, Jr., "Occupational Mobility of Professional Workers," American Sociological Review, 20 (December 1955), 693-700.

Ladinsky[15] verifies this position, also placing college professors in the most highly mobile group. He further suggests, and he is the only researcher found who does so, a relationship between spatial and social mobility. He points out that since there are relatively few career stages and levels of advancement within an organization, career advancement will usually be accomplished by changing organizations. The present study can further test this finding as to whether spatial mobility tends to accompany social mobility and if the universalistic norms of the academic system encourage spatial mobility.

Apart from the two studies mentioned above, there are a number which deal with trends in social mobility that can be further tested in this study. First there are the intergenerational mobility studies comparing the social position of parents with offspring. They offer directional assistance in the analysis of the data of this study. Lipset and Bendix, comparing data from a number of countries, show "evidence of considerable upward mobility from routine non-manual, manual and farm occupations to high levels of non-manual occupations and farm owners, from father's occupation to son's occupation, and that in six countries "a large minority of the sons of the industrial

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[15]Jack Ladinsky, "Occupational Determinants of Geographical Mobility Among Professional Workers," American Sociological Review, 32 (April 1967), 253-264.

labor force achieve non-manual positions."[16] The specific measure of manual father to academic son or daughter as shown in this study, can be compared with findings recorded by Lipset and Bendix and, because of freedom to rise, based more on skill than on other prestige factors such as income, religion, reputation of family, among the members of the academic hierarchy, the index of upward mobility as reflected by comparing social position of parent and child could be higher.[17,18]

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[16] Lipset and Bendix, Social Mobility in Industrial Society, pp. 17-26.

[17] This method of comparing data arrived at by "comparison with the past" (occupations of father and son) with data arrived at by "comparison with other countries" combines two of the three types expounded by S. M. Lipset and Hans L. Zetterberg, "A Theory of Social Mobility" in Sociological Theory (eds. L. A. Coser and B. Rosenbert) (New York: The MacMillan Company, 1964).

[18] See: John Porter, The Vertical Mosaic (Toronto: University of Toronto Press, 1965).

T. B. Bottomore, Elites and Society (New York: Basic Books, Inc., 1964).

Both Porter and Bottomore discuss intellectuals as being in a sense outside the customary processes of class, status, and power, since they have an automatic claim to a place of honor. They represent the ideal of social organization "epitomizing rationality, impartiality and other worldliness." The social composition of the intellectual elite group (the academics included) is thus different from other elites; it consists of "one-way people." It offers opportunity for members of lower class to rise; and, although Porter discusses and deplores the absence of completely free access to education for all (limited only by ability), both Porter and Bottomore infer that "once in" the rise in rank should proceed independently of the factor of occupation of father.

A further reference to the relationship of social and spatial mobility in Lipset and Bendix quotes a paper by Carlsson in which he posits that "geographical mobility in terms of individuals residing outside the country of their birth (thus inferring those who have experienced spatial mobility in terms of place of birth) is highest for the upward mobile." Carlsson suggests that migration is a result not a cause of social mobility. Whether migration causes upward mobility, or the reverse, Carlsson posits a relationship when he asserts that "the main factor is the marked association of high geographical mobility with high social and occupational status."[19]

The literature in the areas of migration, occupational mobility, and career mobility is relevant to this study but has not been quoted in detail because it does not throw light, except indirectly, on the particular problem of concern. Form has referred to the differences inherent in the scientific community, different from other occupational spheres where "there are interacting and contradictory techniques and social forces concerned with allocating occupations and accompanying reward systems."[20] In the scientific community there is a communion of interest,

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[19]Lipset and Bendix, Social Mobility in Industrial Society, footnote, p. 160.

[20]W. H. Form, "Occupations," Encyclopaedia of Social Science, 2: 245.

values, etc., which is "part of its definition." Again, regarding career mobility generally, it is not orderly and regular for most, but "for professionals (i.e., highly trained individuals) it is more orderly since the worker begins on a professional level." These differences thus restrict the applicability of the general literature.

Analyses of migrational flows, even when broken down into census occupational categories, are not sufficiently relevant to apply to one sub-category, especially one with apparent and distinctive differences.

The position in this study regarding migration theory as background for the study is that although the general determinants are the same for all migration, the particular characteristics of the population considered remove the phenomena concerning it to an exceptional category. The fact that the body of theory on ecumene embraces the migration of highly skilled people in a particular manner is thus more apt, as a particular aspect of migration theory, for the study in hand.

Although all migration theory must recognize the social structural implications of movements of people it is not based on these implications as is a study of a sub-section of the category of highly trained and skilled personnel. The spatial mobility characteristics of academic personnel, particularly scientists, may be

expected to differ even from those of other skilled occupations as well as from those of migrational movements as a whole.

The dichotomy of "push" and "pull" factors, whether it assumes that man is naturally sedentary or given to wanderlust, is of little use in this study for such "causes" are not within the scope of our study. Similarly, Petersen's "conservative and innovating" types[21] require data in terms of "underlying causes, facilitative environment, precipitants and motives," and of distinction between "personal motives and social causes" - that is, the immigrants' level of aspiration.

Further, since migration of intellectuals is, as Petersen points out, "free," as opposed to "punitive, forced, impelled, or mass," and since, because it may involve innovating types who seek novelty or improvement, it is comprised of relatively small numbers, and it becomes even more difficult to compare with migrants generally.

The actual pattern of migration among university faculty, particularly scientists, will probably show some patterns identical or similar to the differentials found for other types of migrants. For example, just as in

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[21]William Petersen, Population (New York: The MacMillan Company, 1961), pp. 607-609.

international migration and rural-urban migration, young adults will probably tend to move more frequently than older adults. Family status has not been measured in this study, but unquestionably marital status and the presence or absence of children would be expected to have a bearing on the mobility of academic personnel. But, above all else, the peculiar characteristics of the occupation itself will tend to produce different patterns of spatial mobility from those of other groups. Migration of university faculty is not wholly economically oriented. Political considerations have played more than a small part in the migration of intellectuals. Further, the psychical factors that often intervene make the usually accepted generalizations regarding migration rather remote or even hazardous for the particular population considered in this study.

Emerging from the relevant literature are two theoretical areas in which hypotheses are linked. One concerns the cumulative quality of spatial mobility among university scientists and the other the unique quality of social mobility whether intergenerational or within occupation among university scientists.

Based upon Richmond's theory of the "transilient," it can be assumed that the amount as well as the distance of spatial mobility during academic careers will depend upon the degree of spatial mobility reflected in the place of birth (foreign versus native-born), and in the degree of

spatial mobility during the acquisition of higher education. Since all migration appears to be selective in some manner for age and sex, it is expected that these variables will be related to spatial mobility during academic careers.

If the scientist is automatically a world citizen and if he shares with other scientists a common world view, self-image, and specific patterns associated with life style directed toward common goals, then a high degree of spatial mobility should be a characteristic of world citizenship and of the scientists within it. Further, since degree of spatial mobility is an indicator of successful membership in world citizenry, then the rise in rank or social mobility of the successful membership should depend in part on the high degree of spatial mobility throughout the entire career.

The argument just expressed concerns the individual once he is in the academic hierarchy. It is further assumed that since entrance to the academic hierarchy is based largely on ability rather than occupational inheritance, prestige of family, family income, religion, and so forth, the intergenerational flow represented by frequency of difference in occupation of father compared with occupation of son, as seen in manual occupation of father to academic occupation of son, should be greater than that shown in the corresponding comparison of manual occupation of father to non-manual occupation of son.

The expectations on intergenerational occupational flow follow logically from a consideration of the studies of general occupational categories as against the particular requirements for entry into the academic world.

The assumption of the dependence of social mobility on spatial mobility is based on the general body of theory of ecumene (Kroeber, Hewes, Useem), the image of the scientist (Hagstrom, Merton, Gouldner), the fragmentary allusions to the relationship of spatial and social mobility in Lipset and Bendix,[22] and the studies of Reiss[23] and Ladinsky.[24]

Hypotheses

The theoretical background leads to the following hypotheses and accompanying argument.

I. General Hypothesis

The frequency and distance of spatial movement among university scientists in pursuing career is related to selected ascribed and achieved social attributes as follows:

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[22]Lipset and Bendix, Social Mobility in Industrial Society.

[23]Reiss, "Occupational Mobility of Professional Workers."

[24]Ladinsky, "Occupational Determinants of Geographical Mobility Among Professional Workers.

Specific Hypotheses

a. The frequency and distance of spatial movement is inversely related to age.

b. The frequency and distance of spatial movement is greater for males than for females.

c. The frequency and distance of spatial movement does not differ for natural and social scientists.

d. The frequency and distance of spatial movement is directly related to past movement as reflected in place of birth and place where advanced training was obtained.

   i. Frequency and distance of spatial movement will be greater for foreign-born than native-born.

   ii. Frequency and distance of spatial movement will be greater for foreign-born from English speaking countries than for those from non-English speaking countries.

   iii. Frequency and distance of spatial movement will be greatest when some advanced training was received outside Canada, intermediate when advanced training was received at more than one Canadian university, and least when all advanced training was received at one Canadian university.

II. General Hypothesis

The rate of social mobility of university scientists in the university system is related to selected ascribed and achieved social attributes as follows:

Specific Hypotheses

a. The rate of social mobility of university scientists in the university system is inversely related to time highest degree was awarded.

b. The rate of social mobility of university scientists in the university system is more rapid for males than for females.

c. The rate of social mobility of university scientists in the university system does not differ for natural and social scientists.

d. The rate of social mobility of university scientists in the university system is:

   i. Higher for foreign-born than native-born.

   ii. Higher for foreign-born from English-speaking countries than for those from non-English-speaking countries.

e. The rate of social mobility of university scientists in the university system is greatest when some advanced training was received outside Canada, intermediate when advanced training was received at more than one Canadian university, and least when all advanced training was received at one Canadian university.

f. The rate of social mobility of university scientists in the university system is not related to the prestige level of father's occupation.

III. General Hypothesis

The rate of social mobility of university scientists in the university system is directly related to the frequency and distance of spatial movement among university scientists.

Rationale

Since the young scholar usually enters the university system at the lowest rank, he often has less to lose and more to gain by frequent moves. On occasion, migration is caused by the income factor. New, less prestigeful, and less physically attractive universities must offer higher salaries to attract new personnel. At other times personnel will be enticed to move for no greater salary but for higher rank. In either case, the bargaining position is improved for the "next move." An individual can usually move only once a year, but the number of moves per unit of time is expected to be higher for the younger age categories. Although prestigeful assignments on a leave of absence basis will probably be more frequent for the older age categories, the acceptance of new appointments with the risk involved in going to unfamiliar locations is expected to occur more frequently in the younger age cohorts.

Since spatial mobility of women is often affected by the moves of spouses and since the career of married

women may be interrupted during the child-bearing and child-rearing periods, the professionally logical time for women to move will often come after the high spatial mobility period of the husband has passed. Since a woman is less likely to be able to accept professional assignments at the time when her husband is most likely to be spatially mobile, and since when she is free to move he will be less spatially mobile, the frequency of moves of professional women will be less than that of men. For the unmarried woman, the inhibitions to migration are cultural, though lessening.

Although in more populous and more wealthy countries opportunities in business and research are often more varied and more numerous for natural scientists than for social scientists, in Canada where all opportunity is limited it is expected that new openings for employment will not occur more frequently for one type of scientist than another.

The cumulative aspect of spatial mobility inferred in Richmond's theory of the transilient is expected to be reflected in pursuit of career in greater spatial movement for foreign born than native born, both as to frequency of moves and distance. Experience in successful adjustment to new cultural patterns and social organization is expected to motivate the individual to move again, although this cause and effect relationship may be blurred in the case of

foreign born from non-English speaking countries. The latter group will often move no further after one struggle with a new language as well as with a new geographical location and way of life.

The impetus to "move again" during pursuit of career is expected to be reflected in the frequency and distance of moves experienced during advanced training. Each successfully accomplished move will encourage the university scientist not only to move again but to be ready to go further.

Turning to a consideration of the rate of social mobility it is expected that, because of the greater number of employment opportunities today, the rate of social mobility of university scientists will be greater for those whose highest degree was received most recently.

Again, because certain stages of the life of females are committed to non-professional pursuits, social mobility is expected to be higher for men than women, or at least to peak at different stages from those of women.

Although the natural scientist is more inclined than the social scientist to enter the business world temporarily between stages of employment in the university, his rise in rank is expected to be no faster than the social scientist, who, even if he accepts positions outside the academic community, will stay in closer touch with it.

Since rate of social mobility is expected to be associated with the university scientist's awareness of and ability to accept his "world citizenship," and since the transilience of the successful scientist is reflected in part in foreign birth, it is expected that the rate of social mobility of university scientists will be higher for foreign born, and especially for those who are English speaking. Since transilience may be considered a positive factor in rate of social mobility as reflected in diverse location of the individual's advanced training institutions, it is expected that the degree of spatial mobility during advanced training will affect the speed of rise in rank, and further that variety of work experience outside Canada will affect the rate of rise in rank.

In a survey of findings of inter-generational studies Goldhamer reports that "only one-quarter or less of the over-all variance in filial status is accounted for by parental status" and "consequently other factors, taken collectively, play a more important role in determining the status of the son than does parental status."[25] Thus, not only may it be assumed that entry into the academic system is not dependent on the father's occupation, but similarly rise in rank within the system need not be dependent on father's occupation.

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[25]Goldhamer, op. cit.

The argument to this point has dealt with the nature of the rate of spatial mobility and then of the nature of the rate of social mobility. It may be expected further that the rate of social mobility is directly related to frequency and distance of spatial mobility.

CHAPTER III

METHODOLOGICAL PROCEDURES

The over-all content of this chapter concerns the unique characteristics of the research problem and the methodological procedures used in meeting these characteristics. Although the basic focus of the study was to be a specific type of migration of a particular occupational group, one of the major difficulties was to determine a manageable universe that had representational validity for other populations and which could be identified with a specific geographical site with defined boundaries. The determination of the site of the study, the problem of access, sources of data, definition of members of faculty and the identification of "scientists" within faculty were matters that needed consideration first. Methodological procedures that followed ranged from establishment of the method of data collection, pre-testing, and a consideration of discrepancies, to the development of a method for considering non-response. Analysis of the data required special methods of recording and organizing the data, the development of mobility scores, and a consideration of testing of results. A detailed discussion of these items follows.

Ontario is the province of greatest population and wealth (see Figure 1), and in 1967-68, roughly one-third (22 out of 61) of the universities, accredited by the Association of Universities and Colleges of Canada, were located here (see Table 1 and Figure 2). Since an attempt to conduct a survey for the whole of Canada was impractical, not only because of expense, but because of the danger of a lower level of response, it was decided to focus on the faculties of all accredited institutions of one province, a more manageable and, at the same time, acceptably representative population.[1]

In addition to the fact that the universities and colleges in Ontario represent one-third of the total for Canada, they also are distributed through five student enrollment categories in about the same proportion as the total. The exceptions are the first and second categories. The "big six" universities in the first category, of which Ontario has only one (Toronto) while Quebec has three (McGill, University of Montreal, Laval) (the remaining two being the Universities of British Columbia and Alberta) constitute one exception. The second is in the large

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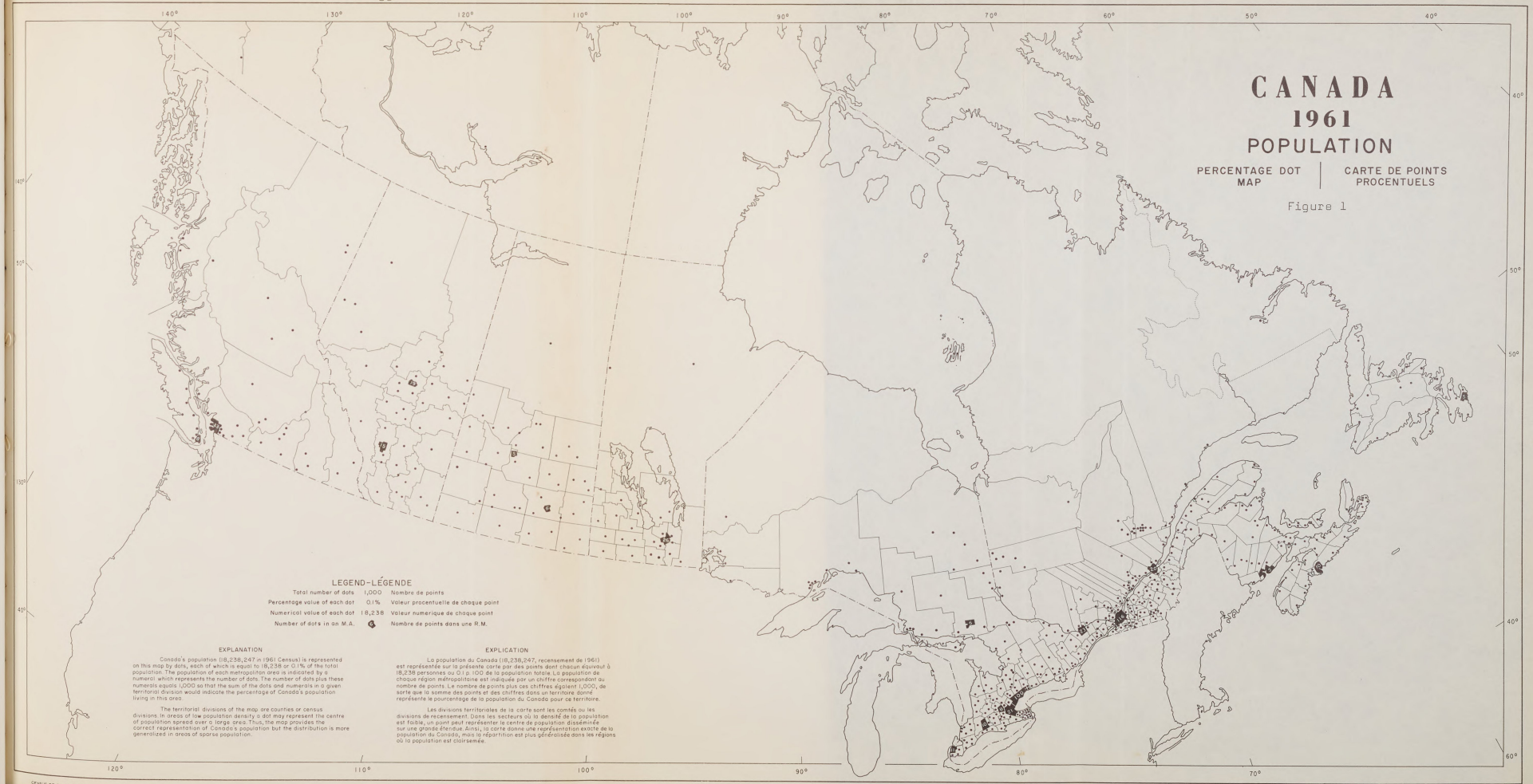
[1]It has been suggested that because there are more universities and colleges in Ontario than any other province, and representing much higher investment, it is not representative of Canada as a whole. It is not representative of other provinces or other regions, but, since it represents as large a sample of the total for Canada as it does, and because it represents the range of university types found in Canada, it was felt to be a legitimate area of study.



EXPLANATION

Canada's population (18,238,247 in 1961 Census) is represented on this map by dots, each of which is equal to 18,238 or 0.1% of the total population. The population of each metropolitan area is indicated by a numeral which represents the number of dots. The number of dots plus these numerals equals 1,000 so that the sum of the dots and numerals in a given territorial division would indicate the percentage of Canada's population living in this area.

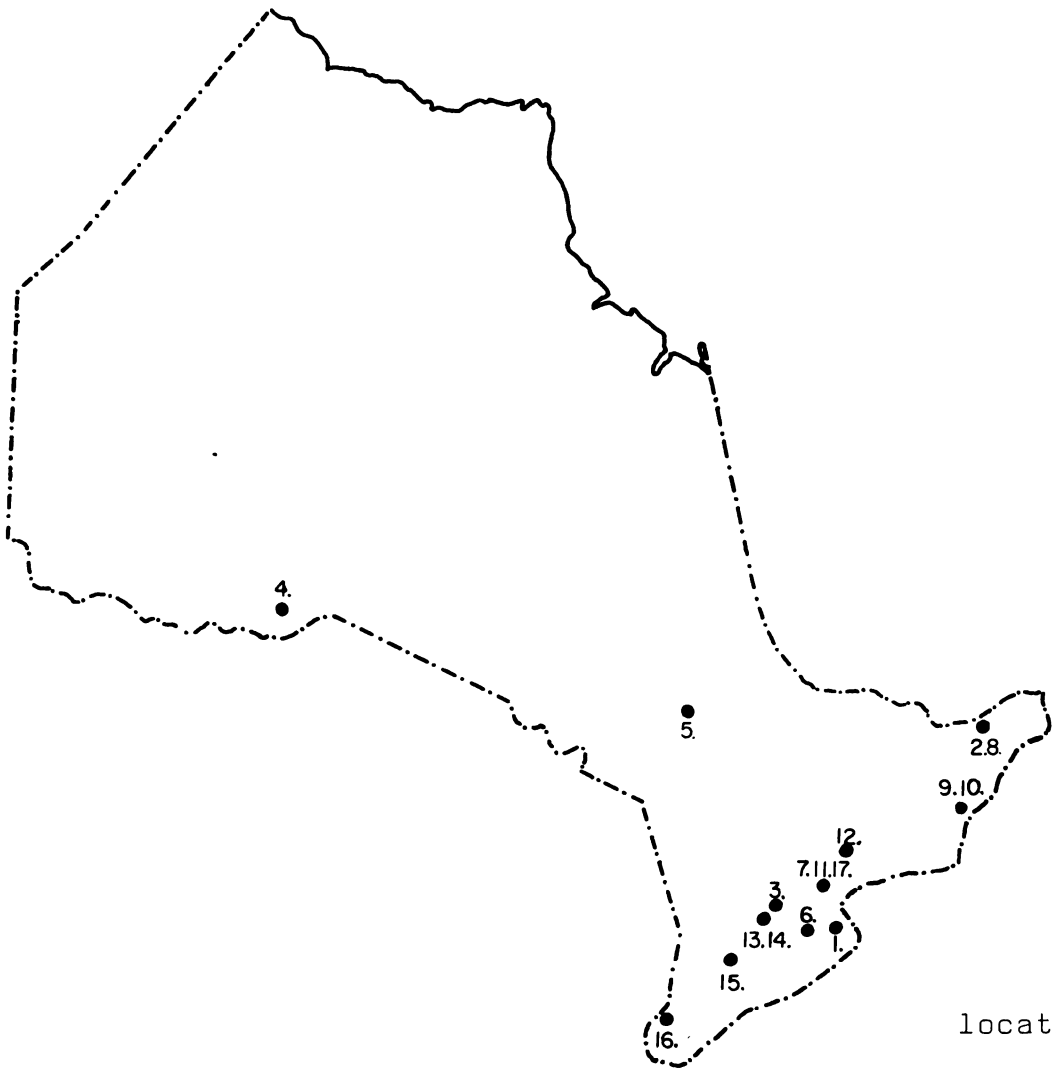
The territorial divisions of the map are counties or census divisions. In areas of low population density a dot may represent the centre of population spread over a large area. Thus, the map provides the correct representation of Canada's population but the distribution is more generalized in areas of sparse population.

EXPLICATION

La population du Canada (18,238,247, recensement de 1961) est représentée sur la présente carte par des points dont chacun équivaut à 18,238 personnes ou 0.1 p. 100 de la population totale. La population de chaque région métropolitaine est indiquée par un chiffre correspondant au nombre de points. Le nombre de points plus ces chiffres égalent 1,000, de sorte que la somme des points et des chiffres dans un territoire donné représente le pourcentage de la population du Canada pour ce territoire.

Les divisions territoriales de la carte sont les comtés ou les divisions de recensement. Dans les secteurs où la densité de la population est faible, un point peut représenter le centre de population disséminée sur une grande étendue. Ainsi, la carte donne une représentation exacte de la population du Canada, mais la répartition est plus généralisée dans les régions où la population est clairsemée.

Founded
1957
1942
(1888)1964
1946
1960
1887
1872
1848
1841
1874
1827
1960
1957
1910
1878
1857
1959



UNIVERSITY	LOCATION	NUMBER
BROCK	St. CATHARINES	1
CARLETON	OTTAWA	2
GUELPH	GUELPH	3
LAKEHEAD	PORT ARTHUR	4
LAURENTIAN	SUDBURY	5
Mc MASTER	HAMILTON	6
OSGOODE HALL	TORONTO	7
OTTAWA	OTTAWA	8
QUEEN'S	KINGSTON	9
ROYAL MILITARY COL.	KINGSTON	10
TORONTO	TORONTO	11
TRENT	PETERBOROUGH	12
WATERLOO	WATERLOO	13
WATERLOO LUTHER.	WATERLOO	14
WESTERN	LONDON	15
WINDSOR	WINDSOR	16
YORK	TORONTO	17

Figure 2. Map of Ontario with location of universities indicated.

number of universities with 500-1000 graduate students in Ontario, five times as many as the rest of Canada (see Table 2).

Problem of Access

Social research surveys on an extensive scale are not common in Canada. Those that have been conducted tend to be demographic in nature. The fact that funds are difficult to procure for the independent researcher means that most surveys that have been conducted are sponsored by government or smaller agencies seeking answers to some applied problem. One of the major concerns of the independent researcher is the problem of access.

Although the stereotype of the Canadian has changed and is still changing, the tendency is to think of him as defensive, private, and individualistic. The Canadian tends to see himself this way. It is common to assume that the researcher has no right to knowledge of the citizen's private affairs. It is therefore necessary for the researcher to be aware of a sequence of accepted rituals which might be identified as part of traditional British social structure, and which have been perhaps over-emphasized in Canada. It is through the "correct" observance of these rituals that much formal interchange is accomplished. The mention and recognition of mutual friends, the letter of introduction, letters of thanks for

TABLE 2. The regions of Canada and their numbers of universities by graduate student population categories

Graduate Student Population Categories	Ontario	British Columbia	Prairie (Alta., Sask., Man.)	Quebec	Atlantic (N.B., N.S., P.E.I., Nfld.)	Total
Over 1000	1	1	1	3	0	6
500 - 1000	5	0	1	0	0	6
100 - 500	3	0	2	1	2	8
Under 100	7	1	3	2	7	20
No graduate students	6	3	2	3	8	22
Total						62

For the rest of Canada, except in 5 cases,* variation in numbers of graduate students is in the same proportions as in variation in total student population categories.

*Loyola and University of Victoria have a relatively large number of undergraduates and no graduate students. Sir George Williams, Memorial University and University of Saskatchewan (Saskatoon) have a relatively large number of undergraduates and a relatively small number of graduate students.

preliminary favors, are examples. The devices of recognizing in advance the possibility and right of refusal without sanction or loss of face, and of care in never taking cooperation for granted are other important attributes of the interaction process.

Canada also shares to a degree some of the structural characteristics of academic social systems of developing countries that affect the conduct of research. The majority of academics are not habitual typists. Many do not have typewriters in their offices. Academic departments seem perennially short of secretarial help, and there cannot be an assumption of prompt replies to letters. The larger and better known universities may well be the slowest to reply, even to routine requests; and there is the implication of having many more important things to attend to than "this endless procession of questionnaires." The small new university may, on the other hand, be more prompt and more cooperative. The Registrar himself answers many requests and inquiries and sees his response as one mechanism for building a positive and forceful image of the "new university" as being "on the ball," well equipped, and highly efficient. The larger university feels and shows the pressure of inadequate administrative machinery in coping with the greatly increased load of multiple responsibility associated with rapid expansion. It is more difficult to abandon or modify old methods than to begin with the newest ones.

Defensive nationalism can be another structural problem, even for the Canadian researcher, if the study is under the supervision of a university outside the Commonwealth. There is the implied query of, "Why could they not have stayed home to do this research?" Even when support is provided by a Canadian grant (which implies official Canadian approval) the respondent may question the legitimacy of the position of the researcher. Intrusion of privacy is distasteful enough, but from outside the country often considered even more questionable.

It is therefore important in setting up a research design to make arrangements for accommodation of the above factors, not only because the social structure and the interviewees demand it, but because, if the interviewer is a Canadian, and equally aware of the factors, he cannot function unless he feels, also, that the structural requirements are being met.

Lipset[2] has referred to the recognition and acceptance of authority in Canadian society. The presence of the authority structure is implicit in the foregoing discussion. The egalitarian values of the United States, for example, and their implied rights are conspicuously absent. In Canada there are fewer rules, but a greater consensus on acceptable authority structure, and how it operates.

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[2]Lipset, Seymour M., The First New Nation (New York: Basic Books, Inc., 1963), Chapter 7.

With the factors of formal structure of the academic social system, of problems connected with the mechanics of administration and management, of differences in university image, of defensive nationalism, and of the structural position of the student researcher in mind, priorities in methods of data collection in Canada are apparent. It was felt that the greatest possible emphasis should be placed on secondary data.

Data Sources

At the outset it was hoped that almost all of the information required could be obtained from documentary materials such as university calendars, annual reports, staff directories. It was felt that the remaining items could be procured from Who's Who and various listings of scholars.[3] It soon became apparent, however, that variation in format made the former inconsistent and the latter laborious, and not a source for all people contacted. For example, some universities listed faculty but not their degrees, others listed degrees but not where obtained. In some cases alphabetical and less detailed lists were provided but with no mention of department or discipline. Lists by department in catalogues indicated rank, while alphabetical lists tended to omit them.

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[3] A considerable number of respondents pointed out that information asked for was "in the registrar's office," or in Who's Who, or like sources.

It was then decided to use lists, catalogues and directories to establish the list of faculty names, and after that to move immediately to the covering letter together with a questionnaire. Two such letters were considered necessary. In many cases some of the data required were already known from secondary sources and there was the risk of the "impatience factor" which might lower the returns. Nevertheless, the questionnaires would guarantee uniformity throughout.

Identification of Total Faculty and of "Scientists"

Decisions had to be made as to which persons constituted the faculty of a university. Administrative officers were not included unless their names appeared again in the list of teaching faculty in the various departments. Beyond this listing, inclusion was based on the indication that the individual had a full-time appointment as a teacher and/or researcher. Thus, research assistants, demonstrators, and teaching assistants were not included. Those chosen carried the rank of professor, associate professor, assistant professor, lecturer or instructor. Emeritus professors were not included, but visiting professors who were to stay for a period sufficiently long to be placed on faculty lists received the questionnaire.

The category of scientist was established by the

respondents in answer to the first letter by naming their department and discipline and by further stating whether they were identified with natural science, social science, the humanities, or "other." This sub-division is used in the International Encyclopaedia of Social Sciences. In stating "other" fields to which they were affiliated, informants often enumerated special areas that they called science. Anyone who qualified by either categorization as a scientist was included in the list for the second mailing. The decision to divide science into the two categories of "natural" and "social" was based on the tables prepared by the National Science Foundation in Scientists and Engineers from Abroad 1962-64.

There were occasional cases that were difficult to classify, and there were a number of factors that affected decision on whether an individual was a "scientist" or "non-scientist." The types of degrees, the level of highest degree, the date when the highest degree was received, indication of research interest, even any indication of the respondent's self-image as a "researcher" or a "man of knowledge" were taken into consideration. All doubtful cases were discussed before decision was taken. Some respondents who categorized themselves as scientists in answer to the first letter and who thus received the second letter, returned the latter unanswered because they "were not scientists." The difficulty in effecting perfect

decision on categorization led to the use of quotes for the terms "scientist" and "non-scientist." Every effort was made to establish accuracy but it became apparent that, no matter how great the effort toward objectivity, the human factor in decision-making was very real, and, even if consistent, then consistently imperfect.

Method of Data Collection

When the design for data collection was set up certain basic discrepancies were apparent. The naming of the members of the universe was based on lists that were indicated by the Registrars of the universities as most nearly accurate for the academic year 1967-68. It is almost inescapable, however, that some are less accurate than others. For example, most calendars are prepared in the spring for the fall admissions, prepared before new faculty are appointed and before some have resigned. Those who move within the province are occasionally picked up in other university listings or forwarded from the old university. Staff directories such as Toronto's, for instance, are compiled for the current year usually in January-February. These lists are more accurate for current personnel, but they carry less information on the individuals.[4]

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[4]See directories of University of Ottawa and University of Toronto.

This problem of complete accuracy of the universe for a given point in time is apparent, but the listings supplied by the Registrars were as accurate as it was possible to procure. The mobility history of a pre-defined group of people who shared certain characteristics was defined to be the item for consideration.

The first letter-questionnaire sent to every member of the universe (i.e., all faculty named on the catalogue and directory lists of Ontario colleges and universities) requested information on (1) age, (2) place of birth, (3) department and discipline, (4) self-categorization of work, (5) sequence of degrees and where received. Answers to items (1), (2), and (4) could only be obtained by requesting them from the faculty person himself (see Appendix A,1).

The second letter was sent to all "scientists." Information was requested on (1) occupation of father when the faculty member was in high school; (2) occupational sequence since acquiring highest degree enumerating type of position and rank, location, employer and time period; (3) plans to move for the academic year 1968-69, and where.

The letters with questionaire were arranged to use only one letter-size sheet. Each one was personally signed by the researcher and the name, department, and address of the recipient were typed in by hand. All envelopes were stamped by hand. Attention was paid to previous research

on the mechanics of conducting surveys. An effort was made to minimize the time and effort of the respondent, but at the same time not only to procure necessary information but to ensure a high level of response. It was assumed that although the recipient might resent intrusion, at the same time, he would recognize the effort to treat him as an individual. To save the respondent's time, wherever possible, answers were requested as check marks in spaces provided, or as single word answers.

The research problem was stated in the first letter as simply as possible. An effort was made to point out that the study, as part of a pre-doctoral program, had official recognition (The Canada Council), that it was privately conducted, and that the researcher was working on an advanced academic level (Ph.D.). The location of the department and university of the researcher were omitted, since the study was based in the United States. It seemed advisable to indicate that every effort had been made to employ impersonal sources for information before asking individuals. Although it had been impossible to procure research funds from any one agency, it seemed important to recognize the official interest and approval that had been shown by various departments of Government, again demonstrating that the study was considered worth doing and that the results would be useful.[5]

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[5]In spite of this careful analysis of the structural implications involved in conducting the study, some

Although it was not pointed out, it was felt that the form was so easily filled out and mailed (a return addressed stamped envelope was enclosed) that many would complete it and re-mail at once. Mention was not made of this obvious fact, nor of the desirability of a high level of response because any element of "pressuring" was considered unwise. That is, a door had to be left open for the legitimacy of refusal. On the other hand, a formal statement of thanks was included. Respondents were reminded that all information received would be kept strictly confidential. This statement implied that names were important for a list and for identification with a university, and for identifying answers from the second letter with the first; but that once the information was thus identified, coded, and placed on cards, the names were no longer of significance.[6]

In the second letter the same structural implications and the same mechanical devices used were recognized, as

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respondents complained that the researcher had not identified herself in sufficient detail ("Who are you?" "Your qualifications are not satisfactory to me"; "What agency is sponsoring this survey?"). One respondent pointed out the mention of the "knowledge and interest" of government agencies as a clever way of "name-dropping" and suggested the researcher had by various ingenuities in the letter demonstrated that she had "missed her calling."

[6] Some respondents tore the answer section from the part of the letter with the name and address on it, and thus made their information of limited or no use. Others said that "since the form said the information was confidential this implied anonymity" they would not associate the information with their name.

had been in the first. The addressee was thanked for his cooperation in answering the first letter and was given a short explanation of the purpose of the letter and informational items needed (See Appendix 1B).

The response to the questionnaires was high. Table 3 shows the universe to be 7050 and the first letter questionnaire was sent to these individuals. The only two low university responses were from Osgoode Hall Law School which at the time of the study was an independent professional school and from Waterloo Lutheran. Part of the difficulty in connection with the latter was a confusion with Waterloo in typing of addresses. Every effort was made to rectify the error but some letters were not delivered obviously, and, if they were, the recipient would feel less than cordial to an incorrectly addressed envelope and letter heading.

The non-valid responses were due mainly to returns that had been separated from the name in the letter heading. Non-identifiable returns were mainly returned forms with no entries and returned envelopes with no letters. The non-response items are self-explanatory.

It appeared that spoiled responses might have been due to lack of comprehension of the letter by those whose first language was not English. The returns showed, however, that foreign born whose first language was not English numbered 102, foreign born whose first language was English

TABLE 3. Numbers of valid and non-valid responses compared with numbers of non-responses of faculties of universities of Ontario, 1967-1968*

University	Total Faculty		First Questionnaire							
			Valid response		Non-valid response				Non-response	
					Spoiled		Non-identifiable**			
	No.	%	No.	%	No.	%	No.	%	No.	%
Brock	74	1.05	47	63.51	0					
Carleton	300	4.25	216	72.00	16					
Guelph	537	7.61	367	68.34	44					
Lakehead	139	1.97	89	64.03	10					
Laurentian	128	1.81	81	63.28	10					
McMaster	432	6.12	307	71.06	26					
Osgoode Hall	26	0.37	13	50.00	0					
Ottawa	445	6.31	275	61.79	32					
Queen's	569	8.07	396	69.59	38					
R.M.C.	115	1.63	87	75.65	2					
Toronto	2319	32.89	1476	63.65	131					
Trent	89	1.26	64	71.91	5					
Waterloo	463	6.56	274	59.17	34					
Waterloo Lutheran	141	2.00	19	13.47	5					
Western	583	8.27	407	69.81	33					
Windsor	285	4.04	152	53.33	7					
York	405	5.75	272	67.16	5					
Total	7050	100.00	4532	64.28	398	5.36	30	0.42	2090	29.94

*The total response represented 70.6% of the universe for first questionnaire and 90.7% of scientists for second questionnaire.

**Since non-identifiable responses could not be associated with universities it was not possible to ascertain exact numbers of non-responses.

Table continued

TABLE 3. (continued)

University	Second Questionnaire					
	Valid response		Non-valid response Spoiled		Non-response	
	No.	%	No.	%	No.	%
Brock	23		0			
Carleton	98		5			
Guelph	236		12			
Lakehead	41		1			
Laurentian	26		4			
McMaster	138		18			
Osgoode Hall	3		0			
Ottawa	106		5			
Queen's	175		6			
R.M.C.	34		3			
Toronto	610		35			
Trent	30		0			
Waterloo	126		7			
Waterloo Lutheran	17		2			
Western	185		17			
Windsor	47		9			
York	116		5			
Total	2011	84.7	129	6.0	385	7.9
Non-usable	45					

numbered 104, and the remainder (Canadian born) numbered 346.

Pre-Testing and Discrepancies

The ideas and assumptions of the study were reviewed with colleagues, advisers, and Canadians working in similar areas and the design of and items for the questionnaire were discussed and pre-tested by them. There were, however, one or two items that could have been improved. In the first letter, in the check categories, the choices were meant to have the check placed in front (e.g. _____ Humanities;). The misprint of a colon for a semi-colon (_____ Natural Science: _____ Social Science:) meant that in some cases there was confusion about where the check should have been placed. In almost all cases the difficulty could be identified, however, and corrected.

A second imperfection appeared in the second letter. In an effort to meet the criticisms of the first letter in that the framework of the study was not clearly enough explained, mention was made of the letter being sent to "all scientists" and, in brackets, that the third stage would deal with a random sample of social scientists.[7] Approximately three per cent replied that they were not

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[7] As it transpired, the idea of the third stage was abandoned because of the high response to the first and second letters.

scientists but social scientists and would be glad to reply in the third stage. This outcome was not foreseen, because the dichotomy natural-social was discussed with social scientists. Probably, in discussion, the question was not raised because the discussants were equally informed of the whole study in its broadest sense and of the reasoning behind it. The discrepancy had to be corrected by a third letter (see Appendix 1C) to those who responded in this manner.

Non-Response

Although the response level was high, about 70 per cent for the first mailing, and 85 per cent for the second mailing, the problem of non-response remained. A sample of 250 from the total list of non-respondents was taken, thus comprising every tenth non-respondent on the master list. Each person was located in the catalogue from which his name was taken and coded for the available information. Information items on the sample included name, university, "scientist," "non-scientist," sex, category of work, place where degrees were obtained, highest degree, present rank. All items were not available for all members of the sample. Percentage of total was taken for items on which information was available in the sample and compared with percentage of total for information supplied by respondents in the same categories. The results are shown in Table 4.

TABLE 4. Non-respondents compared with respondents of faculties and universities of Ontario, 1967-68

	Non-respondents		Respondents	
	No.	% of usable total	No.	% of usable total
Scientists	134	64.4	1966	43.4
Non-scientists	74	35.6	2566	56.6
NA	33			
		100.0		100.0
Male	207	85.9	4158	91.7
Female	34	14.1	373	8.2
		100.0		100.0
Category of work				
Natural science	37	15.2	1416	31.2
Social science	43	17.8	893	19.7
Humanities	68	28.2	1188	26.6
Law	-	-	40	.9
Medicine	28	11.6	339	7.5
Nursing	-	-	39	.9
Engineering	24	9.9	235	5.2
Other	25	10.3	378	8.3
NA	16	6.6	3	.1
		100.0		100.0
Place degree obtained				
1 or more outside Canada	64	66.0	2655	67.4
Different universities in Canada	7	7.1	615	15.6
All in same university in Canada	26	26.9	665	16.9
NA	144		6	.1
		100.0		100.0
Highest degree obtained				
Bachelor's	21	11.3	259	5.7
Master's	43	23.2	1128	24.9
Ph.D.	102	55.3	2556	56.4
Other	19	10.2	581	12.8
NA	57		8	.2
		100.0		100.0
Present rank ("scientists" only)				
Instructor or lecturer	56	26.5	148	8.1
Assistant professor	67	31.8	586	32.1
Associate professor	42	19.9	591	32.4
Full professor	46	21.8	496	27.4
Other and NA	30		145	
		100.0		100.0

The similarities between non-respondents and respondents are exhibited in Table 4. In some instances the differences are noteworthy; in others they are relatively small. With respect to where degrees were obtained, 66.0 per cent of non-respondents and 67.4 per cent of respondents reported locations outside Canada, while 34.0 per cent of non-respondents compared with 32.5 per cent of respondents received degrees in Canada. The distribution between "different universities in Canada," and "all in the same university in Canada" was quite different, however, and may reflect a type of conservatism in non-respondents in that they do not like to answer questionnaires and are relatively stable. In regard to "highest degree obtained" there is high degree of correspondence between non-respondents and respondents, except for the greater frequency of bachelor's degrees for non-respondents, 11.3 per cent, and for respondents 5.7 per cent. The record of "present rank" was obtained for scientists only in the questionnaire, but for the non-respondents it was secured from the catalogues. Comparing the non-respondent sample with the scientists there is a consistently lower proportion of non-respondents at all levels except instructor or lecturer. The greater proportion of instructors among non-respondents is roughly balanced by the greater frequency of associate professors and full professors among scientists. The larger

percentage of instructors among non-respondents could be due to greater difficulty in locating individuals at this level since there is greater mobility among the members of this group who return often temporarily to further study and to non-academic assignments. The difference at the associate professor level is noteworthy but there seems no logical explanation for this difference.

Among the total of non-respondents, 64.4 per cent were scientists and 35.6 per cent non-scientists; among respondents the corresponding percentages were 56.6 and 43.4 per cent. The difference can be explained at least in part by the not ascertainable category for non-respondents which accounts for 13.7 per cent of the total. If the NA were added to non-scientist the differences between non-respondents and respondents would be reduced. Proportions of females to males differ to a considerable degree. That is, 14.1 and 85.9 per cent for male and female non-respondents, and 8.2 and 91.7 per cent for comparable respondents. In category of work the percentages for non-respondent and respondent are almost the same for social science (17.8 and 19.7 per cent) and humanities (28.2 and 26.6 per cent). The differences lie in natural science where there is twice as large a percentage for respondents in relation to non-respondents. The non-respondents, however, show larger percentages in medicine, engineering and "other" fields than respondents.

Our evidence shows that the non-respondents tend to differ from respondents in selected ways. At the same time, they seem to be similar in selected attributes. In about half of the items on which comparison was made (Table 4), respondents and non-respondents differ; in the other half there is a high degree of correspondence.

Recording and Organization of Data

The information from the questionnaires was coded for "non-scientist" in Stage 1 and "scientist" in Stage 2. There are 59 variables and the frequencies for these were established by using the program ROUTINE PER COUNT. Descriptive tables were constructed on the basis of this print-out. Stage 2 analytic tables were constructed by using contingency tables established by using 22 of the 59 variables and the program ROUTINE ACT.

Mobility Scores

A score for spatial mobility for each individual was computed by dividing the number of moves the respondent had had by his number of years of work life, and multiplying the score by 1000. The scores were divided into three levels, low intermediate, and high, with approximately

equal frequencies in each sub-division. The coding of these levels showed:

		Score	Frequency
0	= 0	0	840
1	- Low	1 - 125	379
2	- Intermediate	126 - 238	317
3	- High	239 - 800	402

9 - Scores 997-999, which covered those whose spatial mobility score was 997; those whose number of years of work life was 0 (that is, less than 1); those for whom the number of moves or the number of years of work life was NA.

A score for social mobility was computed by dividing the number of positions the respondent had had (including the present one), by the number of years of work life minus the number of years in the present position. The numerator was an item of concern since it was apparent that many faculty members had moved in and out of the faculty system in changing jobs. It seemed more realistic to assume that these moves were advantageous in gaining rise in rank whether they were in the academic system or not, and therefore should be chosen in total as the numerator rather than the moves that marked changes in rank (i.e., assistant, associate, full professor) in the academic system, for the small number who had never left the system. The score therefore emerged as a measure of relationship of number of positions reported to number of years from the beginning

of employment to attaining present rank in the academic system.

The scores resulting from the division were multiplied by 1000, examined for frequencies, divided into low, intermediate, and high, and coded as follows:

	Score	Frequency
1 - Low	1 - 103	426
2 - Intermediate	104 - 188	459
3 - High	189 - 750	387

9 - 0, Scores 995-999

The score of social mobility was thus computed and coded for 1272 individuals who held the rank of assistant, associate, or full professor, each of which indicated rise in rank in the academic system. Category 9 included those with no social mobility; those with frequency of social mobility 995; those for whom number of years of work life equalled number of years in present job, which gave a 0 in the computation denominator and meant that the individual had had only one appointment (the first); those for whom number of years in present job was coded as 7 which was "15 or more" years, making computation impossible; those who were not coded as assistant, associate, or full professor; those for whom number of years of work life was NA; those for whom there were "8 or more" jobs reported or for whom number of jobs was unknown; those for whom the number of years at present job was "8 or more" or NA.

By computing these spatial and social mobility scores it was possible to examine the relationships of the scores with other variables as well as with each other.

The nature of the body of data used in this study affected decisions on methods of testing. The data comprise a proportion of a universe and therefore cannot be considered a sample, much less a random sample. It is thus legitimate to examine how far the data items deviate from each other but not to compute a level of significance of difference.[8] To examine differences, therefore, the items of tables were examined quantitatively, and in the verification or rejection of the hypotheses the data in almost all cases speak for themselves.

This chapter has discussed the methodological procedures employed in procuring and examining the data concerning spatial and social mobility of university faculty. The question of whether spatial mobility is related to social mobility is the basic concern of the research design. The answer to this question will be found in the discussion of the findings related to the sequence of hypotheses, developed to examine whether mobility has taken place and under what conditions. The next chapter will describe the faculty of the universities of Ontario with

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[8]Denton E. Morrison, and Ramon E. Henkel, "Significance Tests Reconsidered," The American Sociologist (May 1969), pp. 131-140.

regard to affiliations, personal characteristics, and higher education, followed by a chapter which will report how spatial mobility has taken place, how rise in rank has taken place, and how these items are related.

CHAPTER IV

SELECTED CHARACTERISTICS OF THE FACULTY

The analytical portion of this study falls into two parts. The first is basically descriptive and is concerned with the university faculties of Ontario, both "scientists" and "non-scientists." The present chapter is allocated to this objective. The second is devoted to testing of hypotheses and is concerned only with the "scientists" on the faculties of the universities in Ontario. This analysis is presented in Chapter V.

The purpose of the present chapter is to provide a background which may be useful in interpreting the results of the tests of hypotheses. In addition, the characteristics examined form a body of data of interest and utility in their own right. The characteristics considered include present university affiliation, age, sex, disciplinary affiliation, country of birth, location of institutions from which degrees were granted, date at which degrees were granted, highest degree received, and spatial mobility during graduate training. In most instances, results are shown for "scientists" and "non-scientists" separately.

Selected Characteristics

University affiliation

The affiliation of university faculty respondents classified as "scientist" and "non-scientist," is found in Table 5. The number of respondents is approximately proportional to the size of the faculties in the several universities in the province of Ontario. The University of Toronto (including universities federated with it) accounts for approximately one-third of all faculty respondents. Western (including Huron and Kings College) ranks second in number of respondents with less than one-tenth of the total. As shown in Table 5, less than 100 respondents each (i.e., 2.2 per cent or less) are affiliated with the following Ontario universities: Brock, Lakehead, Laurentian, Osgoode Hall, Royal Military College, Trent and Waterloo Lutheran. While "non-scientists" outnumber the "scientists," the percentage distributions of these two categories differ little from that of all faculty.

Several observations concerning Table 5 seem to be essential. First, the large proportion of faculty respondents from Toronto means that over-all findings will be heavily weighted in terms of what is true for this university. Second, it is to be expected that the number of "scientists" and "non-scientists" will be related to the educational objectives and specialization of the particular university. Guelph, for example, accounts for about 11 per

TABLE 5. Affiliation of university faculty respondents, Ontario, Canada, classified as "scientist" and "non-scientist"

Affiliation*	Total		Scientist		Non-scientist	
	No.	%	No.	%	No.	%
Brock	47	1.0	22	1.1	25	1.0
Carleton	216	4.8	95	4.8	121	4.7
Guelph	367	8.1	218	11.1	149	5.8
Lakehead	89	2.0	40	2.0	49	1.9
Laurentian	81	1.8	25	1.3	56	2.2
McMaster	307	6.8	136	6.9	171	6.7
Osgoode Hall	13	0.3	4	0.2	9	0.4
Ottawa	275	6.1	99	5.0	176	6.9
Queen's	396	8.7	172	8.8	224	8.7
Royal Military C	87	1.9	33	1.7	54	2.1
Toronto**	1476	32.6	611	31.1	865	33.7
Trent	64	1.4	30	1.5	34	1.3
Waterloo	274	6.0	127	6.5	147	5.7
Waterloo Lutheran	19	0.4	14	0.7	5	0.2
Western***	407	9.0	181	9.2	216	8.4
Windsor	152	3.4	46	2.3	106	4.1
York	272	6.0	113	5.8	159	6.2
Total	4532	100.0	1966	100.0	2566	100.0

Percentages may differ slightly from 100.0 due to rounding

*The "popular" labels were used for coding for universities and are used here

**The totals for Toronto include those universities federated with it: St.Michaels, Trinity and Victoria

***The totals for Western include Huron College and King's College

cent of the "scientists" and less than six per cent of the "non-scientists." These figures reflect the fact that until 1964 Guelph was the Ontario Agricultural College and School of Veterinary Medicine, and only since that time, as a university, has begun to broaden arts and humanities offerings.

Age

The age of university faculty respondents, classified as "scientist" and "non-scientist," is summarized in Table 6. As shown in this table, large proportions of Ontario faculty members are concentrated in the younger ages. This is true of "scientists" as well as "non-scientists." Approximately 54 per cent of faculty are under 40 years of age; only about five per cent are 60 years old and over. While small differences may exist in the age distribution of "scientists" and "non-scientists," none of these differences seems to merit comment. The predominance of youthful faculty in the universities of Ontario would seem to reflect the large recent expansion in university students in Canada as well as the United States.[1]

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[1]Professor Fred Elkin of York University has pointed out that "until recently both geographic and social mobility were relatively low." Thus, it may be logical to conclude that the explosion in numbers is related to greater spatial mobility.

TABLE 6. Age of university faculty respondents, Ontario, Canada, classified as "scientist" and "non-scientist"

Age	Total		Scientist		Non-scientist	
	No.	%	No.	%	No.	%
Under 29	637	14.1	247	12.6	390	15.2
30-34	933	20.6	425	21.6	508	19.8
35-39	885	19.5	397	20.2	488	19.0
40-44	717	15.8	349	17.8	368	14.3
45-49	527	11.6	227	11.5	300	11.7
50-54	371	8.2	149	7.6	222	8.7
55-59	219	4.8	82	4.2	137	5.3
60-64	154	3.4	59	3.0	95	3.7
65 and over	75	1.7	26	1.3	49	1.9
NA	14	0.3	5	0.3	9	0.4
Total	4532	100.0	1966	100.0	2566	100.0

Percentages may differ slightly from 100.0 due to rounding.

Sex

As Table 7 shows, male and female numbers are far from equal in the university faculties of Ontario, with males comprising 91.7 per cent of the total respondents. The extent of this unequal proportion may, however, be representative of the distribution in professional life generally.[2]

It was apparent that there were, however, a great many women in the universities teaching part time without formal appointment and without formal rank in the academic hierarchy. If these individuals had qualified for inclusion in this study the female percentage would have been higher.

More men were "scientists," 94.6 against 89.6 per cent, but twice as many females were "non-scientists," 10.4 as opposed to 5.4 per cent "scientists." These items are perhaps noteworthy because they perpetuate the "female stereotype."

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[2]Since women are somewhat self-conscious about their identity in the academic world it is unlikely that any individuals were "lost" because of mistake in identification due to poor delineation in catalogues and directories. Some respondents called attention to their sex by corrections on the questionnaire or by identifying with the researcher in wishing her "good luck" sending "good wishes" and the like; and a number commented on the mobility problems of the married woman, especially with children, who was "required" to be where her husband was.

TABLE 7. Sex of university faculty respondents, Ontario, Canada, classified as "scientist" and "non-scientist"

Sex	Total		Scientist		Non-scientist	
	No.	%	No.	%	No.	%
Male	4158	91.7	1859	94.6	2299	89.6
Female	373	8.2	106	5.4	267	10.4
NA	1	0.0	1	0.1	0	0.0
Total	4532	100.0	1966	100.0	2566	100.0

Percentages may differ slightly from 100.0 due to rounding.

Disciplinary affiliation

The disciplinary affiliation of university faculty respondents, classified as "scientist" and "non-scientist," is shown in Table 8. The highest percentage, for natural science (31.2 per cent), exceeds that of humanities by five per cent and social science by approximately 12 per cent. The percentages for the other affiliations are relatively very small (0.1 to 8.3 per cent).

The basic question posed by Table 8 is why there are any "non-scientists" in natural science and social science, and why there are any "scientists" in the humanities. The reason for the discrepancies lies mainly in the fact that the information in Table 8 is based primarily on the respondent's self-categorization. If he could not accept the first questionnaire classification of the three "primary intellectual disciplines" then he would see a unique category for his field of work such as "life sciences" and would place himself in "other" while the initial decision on "scientist" versus "non-scientist" might have placed him in the "scientist" category, as a natural scientist.[3] On

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[3] Another type of difficulty was pointed out by Professor Philip Wright of Guelph University. The arbitrary classification of the agricultural economist as social scientist often is "detrimental to him in procuring research support funds since often his research is designed as a joint project with 'natural science people'" and often the nature of the joint work is closer to the interests of natural science concerns than to those of social science. The dual role requires a special categorization.

TABLE 8. Disciplinary affiliation of university faculty respondents, Ontario, Canada, classified as "scientist" and "non-scientist"

Disciplinary Affiliation	Total		Scientist		Non-scientist	
	No.	%	No.	%	No.	%
Natural science	1416	31.2	1095	55.7	321	12.5
Social science	893	19.7	576	29.3	317	12.4
Humanities	1188	26.2	18	0.9	1170	45.6
Law	40	0.9	19	1.0	21	0.8
Medicine	339	7.5	214	10.9	125	4.9
Nursing	39	0.9	5	0.3	34	1.3
Engineering	235	5.2	30	1.5	205	8.0
Other	378	8.3	8	0.4	370	14.4
NA	3	0.1	1	0.1	3	0.1
Total	4532	100.0	1966	100.0	2566	100.0

Percentages may differ slightly from 100.0 due to rounding.

the other hand, there were instances where the respondent might be in economics or sociology and have categorized himself as being in humanities. In some cases these could have remained this way in coding, for special reasons.[4]

The fact that the table shows law classified in almost equal numbers in "scientist" and "non-scientist" (19 and 21) reflects a difference in the "mystique" of the profession of law. Some law faculties are now caught up in inter-disciplinary approaches, with social scientists such as criminologists, psychologists and so on employed full or part time. In these faculties the respondent will be inclined to view himself as a social scientist.[5]

Country of birth

Native or foreign birth of university faculty respondents, classified as "scientist" and "non-scientist," is summarized in Table 9. There is an almost equal distribution of Ontario university faculty respondents of

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[4]There were cases also where somewhat exotic fields were rejected by the researcher as "social scientist" but may have been recorded that way by the respondent or the coder. Examples of these categories were: kinesiology (the study of human physical movement), even explained as a form of non-verbal expression or communication; computer science applied in social science; business administration, physical education and social work.

[5]I am indebted to Professor Maxwell Cohen of McGill University for this commentary. He adds, however, that no matter what the drift in regard to "science" or "non-science," the sense of membership in the profession of law supercedes this other identification.

TABLE 9. Native or foreign birth of university faculty respondents, Ontario, Canada, classified as "scientist" and "non-scientist"

Place of birth	Total		Scientist		Non-scientist	
	No.	%	No.	%	No.	%
In Canada	2495	55.1	1121	57.0	1374	53.5
Outside Canada	2029	44.8	843	42.9	1186	46.2
NA*	8	0.2	2	0.1	6	0.2
Total	4532	100.0	1966	100.0	2566	100.0

Percentages may differ slightly from 100.0 due to rounding.

*Since the NA is small it is included to complete the total for each category.

native birth and of foreign birth, 55.1 and 44.8 per cent. Table 9 also shows that those of native and foreign birth differ little when classed as "scientists" and "non-scientists." Although there is concern currently regarding "reverse brain drain," it is noteworthy that there are 11 per cent more Canadian born faculty members in Ontario than those who are non-Canadian born, and there is a 15 per cent difference in favor of Canadian-born scientists.

The province of birth of university faculty respondents, as found in Table 10, shows a large proportion born in Ontario, 62.6 per cent. This is not so much a reflection of universities that follow the "silver cord" tradition and hire "their own" (either by birth or graduate training), as it is a demonstration of the disproportionately high number of graduate students trained in Ontario. There are relatively few other Canadian universities preparing enough graduate students to meet the needs of their own departments, let alone those of other universities. As Table 10 shows, there are almost four times as many faculty members born in Ontario as born in the Prairie Region (17.6 per cent). Apart from the 10.3 per cent born in Quebec, which is relatively small, the percentages for British Columbia (3.9 per cent) and for the Atlantic Region (5.6 per cent) are very modest.

TABLE 10. Province of birth of university faculty respondents, Ontario, Canada, classified as "scientist" and "non-scientist"

Place of birth in Canada	Total		Regional total		Scientist		Non-scientist	
	No.	%	No.	%	No.	%	No.	%
British Columbia	97	3.9	97	3.9	45	4.0	52	3.8
Prairie Region			437	17.6				
Alberta	134	5.4			76	6.8	58	4.2
Saskatchewan	158	6.4			80	7.2	78	5.7
Manitoba	145	5.8			71	6.4	74	5.4
Ontario	1557	62.6	1557	62.6	693	62.2	864	63.0
Quebec	257	10.3	257	10.3	84	7.5	173	12.6
Atlantic Region			139	5.6				
New Brunswick	55	2.2			31	2.8	24	1.7
Nova Scotia	54	2.2			23	2.1	31	2.3
P.E.I.	14	0.6			6	0.5	8	0.6
Newfoundland	16	0.6			6	0.5	10	0.7
Total	2487	100.0	2487	100.0	1115	100.0	1372	100.0

See footnote to Table 11.

The country of birth of foreign-born university faculty respondents in Ontario is provided in Table 11.[6] Less than one-third of the foreign-born university faculty "scientists" were born in the United States and almost one-quarter in England; and approximately the same proportions of "non-scientists" were born in these two countries. Apart from these two large proportions there is a scattering over a range of 46 named countries; there were 106 who came from all other countries, not listed by name.[7] Among the 46 countries all areas of the United Kingdom are substantially represented, especially England (460) and Scotland (101). Canada's policy of exchange of intellectuals with China and the U.S.S.R. is reflected in their representation (49 and 31). Immigration policies favoring nationals of "beleaguered" countries of Europe are reflected in the numbers of foreign faculty born in Austria (29), Germany (85), Hungary (34), Poland (37), Czechoslovakia (29), and South Africa (23). Ties with certain other Commonwealth countries are reflected in the numbers born in India (80), Australia (40), and New Zealand (25). The encouragement of immigration of Dutch and Italian

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[6]Beginning with this table, non-usable responses or NA are deleted from the total and percentages are computed on the basis of usable responses.

[7]It was thought that all possible countries of birth had been listed, but one of the first responses from one of the universities named Turkey, which had not been included.

TABLE 11. Country of birth of foreign-born university faculty respondents, Ontario, Canada, classified as "scientist" and "non-scientist"

Place of birth outside Canada	Total		Scientist		Non-scientist	
	No.	%	No.	%	No.	%
United Kingdom						
England	460	22.6	203	23.9	257	21.6
Scotland	101	5.0	47	5.5	54	4.5
Ireland	32	1.6	11	1.3	21	1.8
Wales	25	1.2	9	1.1	16	1.3
Other Europe						
Austria	29	1.4	13	1.5	16	1.3
Belgium	11	0.5	2	0.2	9	0.8
Czechoslovakia	29	1.4	9	1.1	20	1.7
Denmark	5	0.2	5	0.6	0	0.0
Finland	2	0.1	1	0.1	1	0.1
France	47	2.3	7	0.8	40	3.4
Germany	85	4.2	39	4.6	46	3.9
Greece	11	0.5	5	0.6	6	0.5
Holland	30	1.5	13	1.5	17	1.4
Hungary	34	1.7	15	1.8	19	1.6
Italy	26	1.3	2	0.2	24	2.0
Norway	1	0.0	1	0.1	0	0.0
Poland	37	1.8	13	1.5	24	2.0
Spain	15	0.7	2	0.2	13	1.1
Sweden	2	0.1	2	0.2	0	0.0
Switzerland	14	0.7	7	0.8	7	0.6
U.S.S.R.	31	1.5	11	1.3	20	1.7
United States	591	29.0	243	28.7	348	29.3
Commonwealth (selected)						
Australia	40	2.0	19	2.2	21	1.8
India	80	3.9	35	4.1	45	3.8
New Zealand	25	1.2	9	1.1	16	1.3
Asia						
China	49	2.4	23	2.7	26	2.2
Israel	2	0.1	1	0.1	1	0.1
Iran	5	0.2	2	0.2	3	0.3
Japan	17	0.8	11	1.3	6	0.5
Lebanon	1	0.0	0	0.0	1	0.1
Pakistan	14	0.7	8	0.9	6	0.5
Taiwan	1	0.0	0	0.0	1	0.1
Other Asia	16	0.8	14	1.7	2	0.2
Africa						
South Africa	23	1.1	9	1.1	14	1.2
Egypt	14	0.7	5	0.6	9	0.8
Other Africa	7	0.3	2	0.2	5	0.4
South America	18	0.9	11	1.3	7	0.6
All other	106	5.2	39	4.6	67	5.6
Total	2036	100.0	848	100.0	1188	100.0

An NA of 9 (3 scientists and 6 non-scientists) for the grand total for Tables 10 and 11 could not be applied to either or both tables accurately due to a coding problem. The percentage thus computed were for known totals.

people at certain periods may be indicated by faculty born in Holland (30) and Italy (26). There is almost no sign of mobility of intellectuals to Canada from the Scandinavian countries. It would have been casually assumed otherwise, since Scandinavia and Canada in many ways share a common life style. The Scandinavians may have been drained off during an earlier period, or they may tend to choose to emigrate to the United States, since there are traditional patterns established for this movement. The other two items which attract comment are the numbers of faculty born in Japan (17) and South America (18). The number for France (47) would have been expected for universities of Quebec because of common language and general channels of cultural exchange, but it is of some interest to find this number for Ontario.

Thus, roughly 59 per cent of foreign-born Ontario university faculty members were born either in Great Britain (618) or in the United States (591). In many cases where the universities of Ontario cannot recruit from their own student graduates they are most likely to turn to one of these two countries for new faculty if they have the "prestige" or salary scale to attract them. The numbers indicate that after these first preferences there is a wide range from which choice has been made.

Location of institutions at which degrees were granted

An enumeration of the location in Canada of institutions granting degrees to Ontario university faculty respondents is shown in Table 12. As mentioned earlier, the percentages for Ontario universities are quite dramatic, ranging from 68.5 to 80.1 per cent, depending upon the level of the degree. Quebec is the only other provincial source worthy of note, ranging in percentage from 9.4 to 16.5 per cent.

The collapsed categories in Table 13 indicate the decrease in number of degrees at all levels granted to Ontario university faculty at institutions outside Canada. The percentages for England and the United States are the most noticeable. For Bachelor's, Master's, and Ph.D. degrees granted outside of Canada the United States, however, predominates by roughly 11, 48, and 35 percentage points over England. It is in the category of "Other" degrees that England exceeds the United States by roughly six per cent. It should be noted that the totals for types of degree increase from Bachelor's to Ph.D.[8]

The unusually high percentage of Master's degrees

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[8] Another noteworthy item not shown in the table is found in unusually high numbers of degrees granted by Italy and Holland in the Ph.D. and Other categories collapsed into Other Europe. Italy and Holland both contributed 15 Ph.D. degrees and Italy 18 Other degrees.

TABLE 12. Location of Canadian institutions granting Bachelor's, Master's, Ph.D. and Other degrees to university faculty respondents, Ontario, Canada

Province	Bachelor's Degree		Master's Degree		Ph.D.Degree		Other Degrees	
	No.	%	No.	%	No.	%	No.	%
Ontario	1758	68.5	1291	74.2	640	74.5	545	80.1
Quebec	259	10.1	185	10.6	142	16.5	64	9.4
British Columbia	135	5.3	65	3.7	19	2.2	11	1.6
Manitoba	102	4.0	35	2.0	6	0.7	20	2.9
Saskatchewan	98	3.8	57	3.3	17	2.0	9	1.3
Alberta	83	3.2	58	3.3	25	2.9	11	1.6
Nova Scotia	65	2.5	31	1.8	3	0.3	13	1.9
New Brunswick	59	2.3	14	0.8	6	0.7	4	0.6
Newfoundland	7	0.3	4	0.2	0	0.0	0	0.0
P.E.I.	1	0.0	0	0.0	0	0.0	0	0.0
Total	2567	100.0	1740	100.0	859	100.0	680	100.0
Not applicable	1965		2792		3673		3852	

TABLE 13. Location of institutions outside Canada granting Bachelor's, Master's, Ph.D. and Other degrees to university faculty respondents, Ontario, Canada

Location Outside Canada	Bachelor's Degree		Master's Degree		Ph.D. Degree		Other Degrees	
	No.	%	No.	%	No.	%	No.	%
United Kingdom								
England	432	29.1	264	17.4	424	24.0	162	30.3
Other U.K.	104	7.0	36	2.3	66	3.7	35	6.6
Europe								
France	23	1.5	36	2.4	47	2.7	59	11.0
Germany	19	1.3	7	0.5	36	2.0	21	3.9
Other Europe	71	4.6	56	4.0	78	3.8	77	15.1
United States	607	40.8	992	65.3	1055	59.8	131	24.5
Commonwealth								
Australia	39	2.6	17	1.1	20	1.1	12	2.2
India	70	4.7	52	3.4	15	0.9	10	1.9
New Zealand	21	1.5	19	1.3	6	0.3	1	0.2
Asia								
China	16	1.1	1	0.1	1	0.1	0	0.0
Other Asia	33	2.3	17	1.4	4	0.2	8	2.8
Africa								
South Africa	24	1.6	11	0.7	3	0.2	7	1.3
South America	6	0.4	2	0.1	3	0.2	4	0.7
All other	21	1.5	8	0.5	6	0.3	5	0.9
Total	1486	100.0	1518	100.0	1764	100.0	535	100.0
Not applicable	3046		3014		2768		3997	

granted in the United States (65.3) and the drop in percentage for Ph.D. degrees (59.8) may be an indication of the large number of mobile intellectuals who come to teach in Canada before the granting of their Ph.D. and who move again when this further hurdle is accomplished.[9]

A summary of location of institutions granting degrees to Ontario university faculty is found in Table 14. A remarkable reversal of trend is shown at the Ph.D. level. More Ontario faculty respondents received their Bachelor's degrees (63.3 per cent) and Master's degrees (53.4 per cent) in Canada than those who did not. For the Ph.D. degrees granted, however, Ontario universities depend heavily on outside Canada sources (67.2 per cent). That is, the higher the degree, the greater the spatial mobility demonstrated among those hired.

Date at which degrees were granted

The dates at which degrees were granted to Ontario faculty respondents are summarized in Table 15. The great intensification in numbers of degrees received by Ontario faculty respondents in roughly the last 25 years is shown reflecting the increase in numbers of faculty. At each

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[9]Even though in actual amount the salary in Canada may be no more, or less, for an individual, than that available in the United States, the added incentive of two years exemption from income tax in Canada may encourage a temporary faculty population at this academic level.

TABLE 14. Summary of location of institutions, in Canada and out of Canada, granting Bachelor's, Master's, Ph.D., and Other degrees to university faculty respondents, Ontario, Canada*

Degree	Total		In Canada		Out of Canada	
	No.	%	No.	%	No.	%
Bachelor's Degree	4051	100.0	2565	63.3	1486	36.7
Master' Degree	3258	100.0	1740	53.4	1518	46.6
Ph.D. Degree	2623	100.0	859	32.8	1764	67.2
Other Degree	1215	100.0	680	57.9	535	42.1

*Computations for this table were based on number of usable responses in each category.

TABLE 15. Date when advanced degrees were obtained by university faculty respondents, Ontario, Canada

When received	Bachelor's Degree		Master's Degree		Ph.D.Degree		Other Degrees	
	No.	%	No.	%	No.	%	No.	%
Before 1925	44	1.1	17	0.6	6	0.3	3	0.3
1925-1934	269	6.6	122	3.3	61	2.3	52	4.3
1935-1944	536	13.2	239	7.3	139	5.2	172	13.9
1945-1954	1333	32.8	910	28.0	423	16.2	317	25.6
1955-1964	1760	43.3	1604	49.2	1265	48.2	444	35.8
1965 and later	73	1.8	338	10.4	710	26.9	106	8.5
NA	46	1.2	37	1.2	26	0.9	144	11.6
Total reporting specific degree	4061	100.0	3267	100.0	2630	100.0	1238	100.0

degree level there has been an increase in numbers for each time category until 1965. From 1935 to 1964 the percentage of Bachelor's degrees received increased roughly four times (13.2 to 43.3 per cent), the percentage of Master's degrees received, seven times (7.3 to 49.2 per cent), and the percentage of Ph.D. degrees almost 10 times (5.2 to 48.2 per cent). Even the category of Other degrees received increased roughly two and a half times (13.9 to 35.8 per cent). The increase of degrees granted in the last 25 years reflects not only the increase of faculty and student numbers, but implies the necessity for greater spatial mobility among university faculty.

Highest degree received

A summary of highest degree obtained by university faculty respondents, classified as "scientist" and "non-scientist," is found in Table 16. This table shows that more than half (56.4 per cent) of Ontario faculty held the Ph.D. degree. The highest degree for one-fourth (24.9 per cent) was the Master's, and for approximately 18 per cent a Bachelor's as "other degree" was the highest degree held. As shown in Table 16, two-thirds (66.1 per cent) of the "scientists" held a Ph.D. while less than half (48.9 per cent) of the "non-scientists" held this degree.

TABLE 16. Summary of highest degree obtained by university faculty respondents, "scientist" and "non-scientist" Ontario, Canada

Degrees	Total		Scientist		Non-scientist	
	No.	%	No.	%	No.	%
Bachelor's	259	5.7	73	3.7	186	7.2
Master's	1128	24.9	371	18.9	757	29.5
Ph.D.	2556	56.4	1300	66.1	1256	48.9
Other	581	12.8	219	11.1	362	14.2
NA	8	0.2	3	0.2	5	0.2
Total	4532	100.0	1966	100.0	2566	100.0

Spatial mobility during graduate training

A summary of the extent and direction of spatial mobility during graduate training for Ontario university faculty is found in Table 17. The data in this table apply only to those holding more than one degree beyond the Bachelor's. Hence, mobility is shown for six categories of possible movement, four of which have a relatively large numerical base. These include: Bachelor's to Master's (3076), Master's to Ph.D. (2019), Bachelor's to "Other" degree (342), and Bachelor's to Ph.D. (469). The movement occurring during the process of degree acquisition is classified into four groups, namely, "In Canada," "Canada to Outside Canada," "Outside Canada to Canada," and "Outside Canada to Outside Canada." These groups are then further categorized either as to distance or direction of move.

In the movement potentially involved in "Bachelor's to Master's," nearly half (48.9 per cent) of Ontario university faculty remained in Canada and about one-sixth (16.6 per cent) went to a university outside Canada. Of the remainder, less than one-third (29.2 per cent) reported this degree change occurred outside Canada and only 5.3 per cent reported a Bachelor's degree outside Canada and movement to Canada for the Master's degree. Of all Ontario faculty involved in going from a Bachelor's to a Master's, one-third (33.5 per cent) remained at the same university

TABLE 17. Spatial mobility during graduate training of university faculty respondents, Ontario, Canada

Type of move	Bachelor's to Master's		Master's to Ph.D.		Ph.D. to Other		Bachelor's to Other		Master's to Other		Bachelor's to Ph.D.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1. In Canada												
Same university, same province	1030	33.5	447	22.1	5	5.2	109	31.8	46	23.2	66	14.1
Different university, same province	224	7.2	66	3.4	5	5.2	35	10.2	28	14.0	14	3.0
Different university, different province	250	8.2	108	5.4	3	3.1	34	9.9	11	5.9	14	3.0
2. Canada to Outside Canada												
To U.S.	441	14.3	280	13.9	10	10.3	15	4.4	14	7.0	62	13.2
To U.K.	62	2.0	112	5.5	2	2.1	17	4.9	11	5.9	38	8.2
To other Europe	10	0.3	51	2.5	8	8.2	14	4.0	9	4.5	3	0.6
To other Commonwealth	1	0.0	5	0.4	0	0.0	0	0.0	0	0.0	0	0.0
To all other	0	0.0	1	0.0	0	0.0	2	0.6	0	0.0	0	0.0

Table continued

TABLE 17. (continued)

Types of move	Bachelor's to Master's		Master's to Ph.D.		Ph.D. to Other		Bachelor's to Other		Master's to Other		Bachelor's to Ph.D.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
3. Outside Canada to Canada												
From U.S.	35	1.2	40	2.0	6	6.2	7	2.0	9	4.5	1	0.3
From U.K.	69	2.2	24	1.2	3	3.1	10	2.9	7	3.5	8	1.6
From other Europe	31	1.0	11	0.5	2	2.1	4	1.2	2	1.0	5	1.0
From other Commonwealth	8	0.2	10	0.5	1	1.1	1	0.3	0	0.0	2	0.4
From all other	21	0.7	3	0.1	0	0.0	2	0.6	0	0.0	1	0.3
4. Outside Canada to Outside Canada												
Same university	434	14.2	518	25.6	14	14.4	44	12.9	24	12.0	148	31.5
Different university, same country	357	11.7	203	10.0	19	19.5	25	7.6	9	4.5	63	13.4
Different university, different country	103	3.3	140	6.9	19	19.5	23	6.7	28	14.0	44	9.4
Total	3076	100.0	2019	100.0	97	100.0	342	100.0	198	100.0	469	100.0

in Canada, slightly less than one-sixth (14.3 per cent) moved to the United States for the Master's, and about the same proportion (14.2 per cent) went from a Bachelor's to Master's degree at the same university outside Canada. If we use as an index of "high" mobility that a national boundary be crossed in moving from a Bachelor's to Master's degree, then one-fourth (25.2 per cent) of Ontario faculty were highly mobile at this stage; about three-fourths were less mobile, with slightly less than half (47.7 per cent) staying at the same university.

Slightly more than 2000 Ontario faculty reported the degree sequence from Master's to a Ph.D. degree. This sequence was reported by 42.5 per cent as occurring outside Canada, by 30.9 per cent in Canada, by 22.3 per cent moving from Canada to outside Canada, and by 4.3 per cent moving from outside Canada to Canada. Of all Ontario faculty reporting the degree sequence, Master's to Ph.D., one-fourth (25.6 per cent) did so at the same university outside Canada, slightly more than one-fifth (22.1 per cent) did so at the same university in Canada, and less than one-sixth (13.9 per cent) took a Master's in Canada and a Ph.D. in the United States. It may be of special interest that 5.5 per cent of Ontario faculty reported a Master's in Canada and a Ph.D. in the United Kingdom; only 2.5 per cent went to other European countries for the Ph.D. Again, the highly mobile faculty (as

indexed by crossing a national boundary in moving from Master's to Ph.D.) amounts to about one-fourth (25.1 per cent). However, it should be recalled that over 40 per cent of Ontario's faculty moved from Master's to Ph.D. degree outside Canada.

As shown in Table 17, 469 Ontario faculty members went to the Ph.D. degree from a Bachelor's degree. As might be expected, more than half (54.3 per cent) did so outside Canada, presumably before entering Canada as academic professionals. However, this degree sequence was not infrequent in Canada at the same university (14.1 per cent) and in movement to the United States (13.2 per cent).

A considerable number of Ontario faculty reported an "Other" degree (i.e., not Master's or Ph.D.) as their highest degree following the Bachelor's. More than half participated in this degree sequence in Canada. Only about one-fifth reported crossing a national boundary in moving from the Bachelor's to an "Other" degree.

To remaining degree sequences, Master's to "Other" and Ph.D. to "Other" were infrequently reported by Ontario university faculty. In both instances, these sequence patterns appear characteristic of those completing training before entering Canada.

Thus, considerable mobility is exhibited by Ontario faculty at the time of graduate training. A large

proportion obtained advanced degrees outside of Canada and came to Canada as professional scholars. A common pattern in all degree sequences, however, is that of taking more than one degree at the same institution in Canada.

Table 18 shows a summary of spatial mobility during graduate training of university faculty respondents who are classified as "scientist" and "non-scientist." Here the first main category of Table 17, "all in Canada," is shown against categories two, three, and four combined into "all involving some move to or from Canada." We then see the detail of mobility concerning each degree granted for "all in Canada" compared with the remainder. In all categories but two, at least twice as many individuals experienced some mobility outside Canada as did those who stayed in Canada for their training at each degree level. In the spatial mobility representing Bachelor's to Master's and Bachelor's to Other the scores are roughly the same.

A final categorization on the characteristics of spatial mobility of Ontario university faculty respondents, classified as "scientist" and "non-scientist," is given in Table 19. This table shows a frequency of occurrence of degrees and the places where they were received. Summarized in this manner, and not by total of types of movement at each degree level, one or more

TABLE 18. Summary of spatial mobility during graduate training of university faculty respondents, Ontario, Canada

Places where degrees were obtained	Bachelor's to Master's		Master's to Ph.D.		Ph.D. to Other		Bachelor's to Other		Master's to Other		Bachelor's to Ph.D.	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
All in Canada	1504	48.8	621	30.7	13	13.5	178	51.7	85	42.9	94	20.1
All involving some move to or from Canada	1572	51.2	1398	69.3	84	86.5	164	48.3	113	57.1	375	79.9
Total	3076	100.0	2019	100.0	97	100.0	342	100.0	198	100.0	469	100.0

TABLE 19. Summary of spatial mobility during graduate training of university faculty respondents, "scientists" and "non-scientists," Ontario, Canada

Places where degrees were received	Total		Scientist		Non-scientist	
	No.	%	No.	%	No.	%
One or more outside Canada	2655	67.4	1129	64.6	1526	69.6
Different universities in Canada	615	15.6	289	16.5	326	14.9
All in same Canadian university	665	16.9	326	18.7	339	15.5
NA	6	0.1	3	0.2	3	0.1
Total	3941	100.0	1749	100.0	2194	100.0

degrees received outside Canada were registered for 2655 individuals, for degrees received from different universities in Canada the number was 615, and for all from one Canadian university, 665. The two categories for "in Canada" are, in total, about half the number received outside Canada. This is in rough calculation true for both "scientist" and "non-scientist," although the numbers in each of the three categories are slightly greater for "non-scientist" than for "scientist."

Summary

To summarize the body of data concerning selected characteristics of university faculty respondents, classified as "scientist" and "non-scientist," the following items may be enumerated:

1. The number of respondents is approximately proportional to the size of faculties, and, although "non-scientists" outnumbered "scientists," the percentage distributions of these two categories differ little from that of all faculty.
2. Large proportions of Ontario faculty members are concentrated in the younger ages. This is true of "scientists" as well as "non-scientists."
3. There are more than 11 times as many male faculty members as female faculty members. The percentage

of female "non-scientists" is twice as large as the percentage of male "non-scientists."

4. The disciplinary affiliation with the highest percentage is natural science (31.2 per cent), followed by humanities (roughly 26 per cent) and social science (roughly 19 per cent).
5. Native-born faculty respondents exceed foreign-born by 11 per cent. These categories are almost equally shared by "scientists" and "non-scientists."
6. Province of birth of native-born Ontario faculty "scientists" shows a 62.6 percentage for Ontario. Three-fifths of the foreign-born university faculty "scientists" were born in the United States and one-quarter in England. Approximately the same proportions of "non-scientists" were born in these two countries.
7. Percentages of the total number of degrees awarded by institutions in Canada to Ontario university faculty varied from 68 to 80 per cent, depending upon the level of degree. Percentages of total number of degrees awarded by institutions outside Canada were highest for England and the United States.
8. There is a marked increase in number of degrees received by Ontario faculty respondents during the last 25 years.

9. For record of highest degree received, Ph.D. degrees comprise the highest percentage (56.4 per cent), and numbers for "scientists" are 17 per cent higher than for "non-scientists."
10. Roughly twice as many university faculty respondents experienced some mobility outside Canada at each degree level as those who received their advanced training in Canada only. In all categories the numbers for "non-scientist" exceed those for "scientist."

CHAPTER V

ANALYSIS OF DATA

This chapter is devoted to the analysis of data relating to that segment of the university faculty in Ontario designated as scientists. A series of hypotheses, specified in Chapter II, will be tested. In essence the hypotheses to be tested concern (1) the relationship between the frequency and distance of spatial mobility and selected attributes of university scientists; (2) the relationship between the rate of social mobility in the university system and selected attributes of university scientists; and (3) the relationship between the rate of social mobility in the university system and the frequency and distance of spatial mobility. This chapter will be organized in relation to these three major hypotheses.

Frequency and Distance of Spatial Mobility

The first general hypothesis postulated that the frequency and distance of spatial movement among university scientists would be related to selected attributes of scientists. With respect to age and sex of university scientists, it was hypothesized that:

The frequency and distance of spatial movement are inversely related to age; and the frequency and distance of spatial mobility are greater for males than for females.

Briefly, it was reasoned that younger faculty members would be less committed to a given university, would be more actively engaged in the process of establishing status and rank, and would be less encumbered by personal responsibilities and commitments. Hence, younger faculty were expected to move more frequently and to cover greater distances than older faculty. Women, it was believed, have not yet acquired full equality with men as incumbents to positions on university faculties. In addition, decisions concerning mobility on the part of women are often conditioned by marriage and child-rearing. Therefore, it was expected that both frequency and distance of spatial mobility would be less for women than for men.

The data bearing upon the hypotheses concerning age and sex are found in Tables 20, 21, 22 and 23. Table 20, which relates frequency of spatial mobility to age, and Table 21, which relates distance of spatial mobility to age, give support to the proposition that younger scientists are more mobile than older scientists in terms of both frequency and distance. As shown in Table 20, the percentages of scientists classified as having a "low" frequency of spatial mobility generally increase with advancing age; those

TABLE 20. Frequency of spatial mobility of university scientists, Ontario, Canada, by age

Age	Total		Frequency of spatial mobility							
			No spatial mobility		Low		Intermediate		High	
	No.	%	No.	%	No.	%	No.	%	No.	%
Under 29	242	100.0	163	67.4	0	-	8	3.3	71	29.3
30-34	418	100.0	181	43.3	21	5.0	73	17.5	143	34.2
35-39	396	100.0	151	38.1	61	15.4	85	21.5	99	25.0
40-44	346	100.0	126	36.4	89	25.7	76	22.0	55	15.9
45-49	223	100.0	88	39.5	74	33.2	39	17.5	22	9.9
50-54	149	100.0	71	47.7	46	30.9	21	14.1	11	7.4
55-59	78	100.0	23	29.5	48	61.5	6	7.7	1	1.3
60-64	57	100.0	22	38.6	27	47.4	8	14.0	0	-
65 and over	24	100.0	13	54.2	10	41.7	1	4.2	0	-
NA	5	100.0	2	40.0	3	60.0	0	-	0	-
Total	1938	100.0	840	43.3	379	19.6	317	16.4	402	20.7

Frequency of spatial mobility not ascertainable for 28.

TABLE 21. Distance of spatial mobility of university scientists, Ontario, Canada, by age

Age	Distance of spatial mobility							
	Total		Ontario only		One or more other provinces		One or more abroad	
	No.	%	No.	%	No.	%	No.	%
Under 29	82	100.0	12	14.6	8	9.7	62	75.6
30-34	242	100.0	29	12.0	43	17.7	170	70.2
35-39	244	100.0	36	14.8	33	13.5	175	71.7
40-44	221	100.0	40	18.1	46	20.8	135	61.1
45-49	134	100.0	26	19.4	25	18.7	83	61.9
50-54	77	100.0	21	27.3	14	18.2	42	54.5
55-59	54	100.0	14	25.9	4	11.1	34	63.0
60-64	32	100.0	10	31.3	4	12.5	18	56.3
65 and over	12	100.0	0	-	4	33.3	8	66.7
NA	3	100.0	1	33.3	1	33.3	1	33.3
Total	1101	100.0	189	17.2	184	16.7	728	66.1

Distance of spatial mobility not ascertainable for 865.

TABLE 22. Frequency of spatial mobility of university scientists, Ontario, Canada, by sex

Sex	Frequency of spatial mobility									
	Total		No spatial mobility		Low		Intermediate		High	
	No.	%	No.	%	No.	%	No.	%	No.	%
Male	1833	100.0	784	42.8	366	20.0	299	16.3	384	20.9
Female	104	100.0	55	52.9	13	12.5	18	17.3	18	17.3
NA	1	100.0	1	100.0	0	0.0	0	0.0	0	0.0
Total	1938	100.0	840	43.3	379	19.6	317	16.4	402	20.7

Frequency of spatial mobility not ascertainable for 28.

TABLE 23. Distance of spatial mobility of university scientists, Ontario, Canada, by sex

Sex	Distance of spatial mobility							
	Total		Ontario only		One or more other provinces		One or more abroad	
	No.	%	No.	%	No.	%	No.	%
Male	1052	100.0	182	17.3	173	16.4	697	66.3
Female	49	100.0	7	14.3	11	22.4	31	63.3
NA	1	100.0	0	0.0	0	0.0	0	0.0
Total	1102	100.0	189	17.2	184	16.7	728	66.1

Distance of spatial mobility not ascertainable for 864.

classified as having a "high" frequency of spatial mobility decrease with increasing age. The nature of the associations specified, however, are not without exception. Similarly, as indicated in Table 21, the percentages of scientists reporting spatial mobility confined to the province of "Ontario only" generally increase with increasing age. Again in this case, the relationship is not without exceptions.

Tables 22 and 23, which relate frequency and distance of spatial mobility to the sex of university scientists, yield little support to the hypotheses that women are less mobile than men. The females exhibit higher proportions than males having no spatial mobility (about 53 compared with 43 per cent), but they exhibit lower percentages than males having "low" frequency of spatial mobility (about 13 compared with 20 per cent) (see Table 22). Relatively small differences between males and females are found in regard to distance of spatial mobility as depicted in Table 23. The percentages of male scientists whose spatial mobility was confined to the province of "Ontario only" and who had "one or more moves abroad" are 17.3 and 66.3, respectively. The comparable percentages for female scientists were 14.3 and 63.3.

Thus, it may be concluded from the evidence from university scientists in Ontario that frequency and distance of spatial mobility are inversely associated with age.

However, we conclude that little if any evidence supports the hypothesis that frequency and distance of spatial mobility are greater for males than females.

With respect to category of science affiliation of university scientists, it was hypothesized further that:

> The frequency and distance of spatial movement do not differ for natural and social scientists.

It was reasoned that, although business and research opportunities are, in some countries, often more varied and more numerous for natural scientists than for social scientists, in Canada where all opportunity is relatively limited it was expected that new openings for employment would not occur more frequently for one type of scientist than another.

The data in Tables 24 and 25 concern the hypothesis dealing with spatial mobility of natural and social scientists. Both tables give support to the proposition that there is almost no difference in spatial mobility in terms of frequency or distance between natural and social scientists. As shown in Table 24, there is a difference of about nine per cent between natural and social scientists for "low" frequency of spatial mobility, but for "intermediate" and "high" frequency of spatial mobility there is a difference of less than two per cent. As indicated in Table 25, a small difference between natural and social scientists is found with regard to distance of spatial

TABLE 24. Frequency of spatial mobility of university scientists, Ontario, Canada, natural and social scientists

Natural and social scientists	Frequency of spatial mobility									
	Total		No spatial mobility		Low		Intermediate		High	
	No.	%	No.	%	No.	%	No.	%	No.	%
Natural scientists	1082	100.0	437	40.4	240	22.2	173	16.0	232	21.4
Social scientists	568	100.0	265	46.7	74	13.0	101	17.8	128	22.5
Total	1650	100.0	702	42.5	314	19.0	274	16.6	360	21.8

Frequency of spatial mobility not ascertainable for 21.

TABLE 25. Distance of spatial mobility of university scientists, Ontario, Canada, natural and social scientists

Natural and social scientists	Distance of spatial mobility							
	Total		Ontario only		One or more other provinces		One or more abroad	
	No.	%	No.	%	No.	%	No.	%
Natural scientists	644	100.0	108	16.7	86	13.4	450	69.9
Social scientists	305	100.0	56	18.4	68	22.3	181	59.3
Total	949	100.0	164	17.3	154	16.2	631	66.5

Distance of spatial mobility not ascertainable for 722.

mobility for "Ontario only," but for spatial movement beyond the province of Ontario, whether in Canada or to "one or more places abroad," the difference is roughly 10 per cent. The percentages of natural scientists whose spatial mobility was confined to "one or more other provinces" and who had "one or more moves abroad" are 13.4 and 69.9, respectively. The comparable percentages for social scientists are 22.3 and 59.3.

Thus it may be concluded that the frequency of spatial mobility for natural and social scientists is approximately the same. We conclude, however, that the distance of spatial mobility does differ for natural and social scientists.

With respect to place of birth and language spoken among foreign-born, it was hypothesized that:

> The frequency and distance of spatial movement are greater for foreign-born than native-born; and frequency and distance of spatial movement are greater for foreign-born from English-speaking countries than for those from non-English-speaking countries.

It was assumed that the experience acquired by foreign-born in adjusting to new cultural patterns and social organization would lead to further spatial movement both as to frequency and distance. It was further assumed that the potential impediment to movement of a foreign

mother tongue would be removed for those born in English speaking countries. The data bearing on these hypotheses are found in Tables 26 and 27.

Table 26, which relates frequency and distance of spatial mobility to country of birth, gives support to the proposition that foreign-born scientists are more mobile than native-born scientists in terms of both frequency and distance. In Table 26 the percentages of foreign-born scientists increase from a "low" to a "high" rate of spatial mobility. The percentages of native-born scientists decrease from "low" to "high" rates of spatial mobility. Similarly, if the percentages for "Ontario only" are added to those for "one or more other provinces" to illustrate percentages for "in Canada" as opposed to those for "one or more abroad," the percentages of foreign-born scientists increase with greater distance, while the percentages for native-born scientists decrease with greater distance.

Table 27, which relates frequency and distance of spatial mobility to language of country of birth, yields little support to the hypothesis that foreign-born scientists from non-English-speaking countries are less mobile than scientists from English-speaking countries. Scientists from English-speaking countries show a lower proportion having "no mobility" score but the low, intermediate and high categories are within two percentage points of being the same.

TABLE 26. Rate and distance of spatial mobility of university scientists, Ontario, Canada, native born and foreign born

Nativity	Rate of spatial mobility									
	Total		No spatial mobility		Low		Intermediate		High	
	No.	%	No.	%	No.	%	No.	%	No.	%
Native born	1100	100.0	553	50.3	205	18.6	156	14.2	186	16.9
Foreign born	836	100.0	285	34.1	174	20.8	161	19.3	216	25.8
NA	2	100.0	2	100.0	0	0.0	0	0.0	0	0.0
Total	1938	100.0	840	43.3	379	19.6	317	16.4	402	20.7

Nativity	Distance of spatial mobility							
	Total		Ontario only		One or more other provinces		One or more abroad	
	No.	%	No.	%	No.	%	No.	%
Native born	549	100.0	142	29.9	127	23.1	280	51.0
Foreign born	552	100.0	47	8.5	57	10.3	448	81.2
Total	1101	100.0	189	17.2	184	16.7	728	66.1

Rate of spatial mobility not ascertainable for 28.
Distance of spatial mobility not ascertainable for 865.

TABLE 27. Frequency and distance of spatial mobility of university scientists, Ontario, Canada, by language of country of birth

Language of country of birth	Frequency of spatial mobility									
	Total		No spatial mobility		Low		Intermediate		High	
	No.	%	No.	%	No.	%	No.	%	No.	%
English	544	100.0	175	32.2	119	21.9	107	19.7	143	26.3
All others	297	100.0	110	37.0	57	19.2	55	18.5	75	25.3
Total	841	100.0	285	33.9	176	20.9	162	19.3	218	25.9

Language of country of birth	Distance of spatial mobility							
	Total		Ontario only		One or more other provinces		One or more abroad	
	No.	%	No.	%	No.	%	No.	%
English	371	100.0	29	7.8	41	11.1	301	81.1
All others	186	100.0	19	10.2	17	9.1	150	80.6
Total	557	100.0	48	8.6	58	10.4	451	81.0

Frequency of spatial mobility not ascertainable for 7.
Distance of spatial mobility not ascertainable for 291.

Thus it may be concluded from the evidence from university scientists in Ontario that the frequency and distance of spatial mobility are greater for foreign-born scientists than for native-born scientists. It may, however, be concluded that little or no evidence supports the hypothesis that the frequency and distance of spatial mobility are greater for foreign-born whose first language is English than for foreign-born whose first language is not English.

With respect to location of places where degrees were obtained, it was hypothesized that:

> The frequency and distance of spatial movement will be greatest when some advanced training was received outside Canada, intermediate when advanced training was received at more than one Canadian university, and least when all advanced training was received at one Canadian university.

It was believed that, as expressed in the argument concerning previous hypotheses, that the more the scientist had moved while acquiring his advanced training the more probable it was that he would tend to move more often and to greater distances in pursuit of his career.

The data which bear upon location of places where advanced training was received in relation to frequency and distance of spatial mobility are found in Table 28. The data give support to the hypothesis. With respect to

TABLE 28. Frequency and distance of spatial mobility of university scientists, Ontario, Canada, by location of places where degrees were obtained

Location of places where degrees obtained	Frequency of spatial mobility									
	Total		No spatial mobility		Low		Intermediate		High	
	No.	%	No.	%	No.	%	No.	%	No.	%
One or more outside Canada	1129	100.0	434	38.4	208	18.4	201	17.8	277	24.5
Different universities in Canada	280	100.0	135	46.7	59	20.4	37	12.8	49	17.0
All in same Canadian university	326	100.0	169	51.8	59	18.1	49	15.0	47	14.4
NA	3	100.0	1	33.3	0	0.0	1	33.3	1	33.3
Total	1747	100.0	739	42.8	326	18.9	288	16.7	374	21.6

Location of places where degrees obtained	Distance of spatial mobility							
	Total		Ontario only		One or more other provinces		One or more abroad	
	No.	%	No.	%	No.	%	No.	%
One or more outside Canada	688	100.0	85	12.4	89	12.9	514	74.7
Different universities in Canada	144	100.0	35	24.3	43	29.9	66	45.8
All in same Canadian university	155	100.0	49	31.6	28	18.1	78	50.3
NA	2	100.0	1	50.0	0	0.0	1	50.0
Total	989	100.0	170	17.2	160	16.2	659	66.6

Frequency of spatial mobility not ascertainable for 219.
Distance of spatial mobility not ascertainable for 758.

"no social mobility," proportions decline as anticipated; they increase as anticipated with respect to proportions having a "high" rate of spatial mobility. Similarly, the scientists who received "one or more degrees outside Canada" have the highest percentage of "one or more moves abroad." When the distance measure is restricted to Ontario only, the training categories are ordered as anticipated in the hypothesis.

Thus, it may be concluded from the evidence from university scientists in Ontario that frequency and distance of spatial mobility are greatest when some advanced training was received outside Canada. However, it is concluded that little or no evidence supports the remainder of the hypothesis concerning "intermediate" and "low" levels of frequency and distance of spatial mobility.

Rate of Social Mobility

The second general hypothesis postulated that the rate of social mobility among university scientists would be related to selected social attributes of scientists. With respect to the time highest degree was awarded, it was hypothesized that:

> The rate of social mobility of university scientists in the university system is inversely related to time highest degree was awarded.

It was reasoned that the relatively recent phenomenon in Canada of increased academic opportunity, in addition to the present tendency towards mobility, spatial and social, would be reflected in more rapid rise in rank for those scientists who received their highest degree most recently. Hence, it was expected that those who received their highest degree earliest would have experienced the lowest social mobility.

The data concerning the hypothesis concerning year highest degree was awarded are found in Table 29. The table relates rate of social mobility with year highest degree was awarded and gives support to the proposition that scientists who received their highest degree most recently rise in rank more rapidly than those who received their degrees earlier. As shown in Table 29, the percentages of scientists classified as having "low" social mobility increase with earlier date of receiving the highest degree; those classified as having a "high" frequency of spatial mobility decrease with earlier date of receiving highest degree.

Thus it may be concluded from the evidence for university scientists in Ontario that the rate of social mobility is inversely related to the time the highest degree was awarded.

Respecting sex of university scientists, it was hypothesized that:

TABLE 29. Rate of social mobility of university scientists, Ontario, Canada, by year highest degree awarded

Year highest degree awarded	Rate of social mobility							
	Total		Low		Inter-mediate		High	
	No.	%	No.	%	No.	%	No.	%
1925-1934	18	100.0	18	100.0	0	0.0	0	0.0
1935-1944	75	100.0	73	97.3	1	1.3	1	1.3
1945-1954	294	100.0	205	69.7	77	26.2	12	4.1
1955-1964	715	100.0	107	15.0	365	51.0	243	34.0
1965 and later	135	100.0	4	3.0	17	5.2	124	91.9
NA	31	100.0	19	61.3	9	29.0	3	9.7
Total	1268	100.0	426	33.6	459	36.2	383	30.2

Rate of social mobility could not be computed for 695

The rate of social mobility of university scientists in the university system is more rapid for males than for females.

Briefly the argument was that women did not have the same freedom to move to new positions as men and thus did not have the same range of choice nor of opportunity for promotion. It was further believed that at the age when greatest opportunity for promotion occurs, women are often temporarily preoccupied with child-bearing and child-rearing, and thus less eligible for promotion on returning to academic life. Thus it was expected that the rate of social mobility for women would be less than for men.

The relevant data on this hypothesis concerning sex are found in Table 30, but there is little support for the proposition that men are more socially mobile than women. Females and males exhibit the same percentages for "low" rate of social mobility (about 33 per cent). For "intermediate" rate of social mobility, females exhibit a lower percentage than males (about 32 compared with 36 per cent), but for "high" rate of social mobility females exhibit a higher percentage than males (about 35 compared with 30 per cent).

Thus it may be concluded from the evidence from university scientists in Ontario that there is little or no evidence to support the hypothesis that the rate of social mobility is greater for males than for females.

TABLE 30. Rate of social mobility of university scientists, Ontario, Canada, by sex

Sex	Rate of social mobility							
	Total		Low		Inter-mediate		High	
	No.	%	No.	%	No.	%	No.	%
Male	1214	100.0	408	33.6	442	36.4	364	30.0
Female	54	100.0	18	33.3	17	31.5	19	35.2
Total	1268	100.0	426	33.6	459	36.2	383	30.2

Rate of social mobility could not be computed for 698

Concerning categories of work, whether natural science or social science, of university scientists, it was hypothesized that:

> The rate of social mobility of university scientists in the university system does not differ for natural and social scientists.

It was reasoned that, although opportunities in business and research may provide a wider choice of positions for natural scientists than for social scientists in the university system, it was expected that new openings for employment would not occur more frequently for one type of scientist than another. Therefore, it was expected that there would be little or no difference in rate of social mobility for natural scientists and social scientists.

The data bearing on the hypothesis concerning natural and social scientists are found in Table 31. This table relates rate of social mobility to category of affiliation. These data fail to support the proposition. Contrary to expectation, the rate of social mobility is higher for social than natural scientists. For "intermediate" rate of social mobility the percentages are approximately the same. For "low" rate of social mobility the percentage for natural scientists is six per cent higher than the percentage for social scientists (33 and 27 per cent), while for "high" rate of social mobility the comparative percentages are 30 and 36 per cent.

TABLE 31. Rate of social mobility of university scientists, Ontario, Canada, by natural science and social science

Category of work	Rate of social mobility							
	Total		Low		Inter-mediate		High	
	No.	%	No.	%	No.	%	No.	%
Natural science	744	100.0	242	32.5	277	37.2	225	30.2
Social science	334	100.0	90	26.9	123	36.8	121	36.2
Total	1078	100.0	332	30.8	400	37.1	346	32.1

Rate of social mobility could not be computed for 888

Thus we may conclude from the evidence from university scientists in Ontario that the rate of social mobility is roughly the same for natural and social scientists, although some variation occurs at the "low" and "high" levels.

With respect to nativity of university scientists it was hypothesized that:

> The rate of social mobility of university scientists in the university system is:
>
> i. higher for foreign-born than native-born.
>
> ii. higher for foreign-born from English-speaking countries than for those from non-English-speaking countries.

It was reasoned that since rate of social mobility is expected to be associated with the university scientist's awareness of an ability to accept his "world citizenship," and since the transilience of the successful scientist is reflected in part in foreign birth, it is expected that the rate of social mobility of university scientists will be higher for foreign-born. Since the necessity to master a second language might be an inhibiting factor in adjustment to the country of adoption it was expected that rise in rank would be higher for those from countries where English was the first language.

The data bearing upon these hypotheses concerning nativity and first language of foreign-born university

TABLE 32. Rate of social mobility of university scientists, Ontario, Canada, by nativity

Nativity	Rate of social mobility							
	Total		Low		Inter-mediate		High	
	No.	%	No.	%	No.	%	No.	%
Native-born	695	100.0	275	39.6	221	31.8	199	28.6
Foreign-born	573	100.0	151	26.4	238	41.5	184	32.1
Total	1268	100.0	426	33.6	459	36.2	383	30.2

Rate of social mobility could not be computed for 698

TABLE 33. Rate of social mobility of foreign-born university scientists, Ontario, Canada, by language of country of birth

Language of country of birth	Rate of social mobility							
	Total		Low		Inter-mediate		High	
	No.	%	No.	%	No.	%	No.	%
English	370	100.0	99	26.8	155	41.9	116	31.4
All others	177	100.0	42	23.7	77	43.5	58	32.8
Total	547	100.0	141	25.8	232	42.4	174	31.8

Rate of social mobility could not be computed for 1419

scientists are found in Tables 32 and 33. Table 32, which relates rate of social mobility to nativity, gives support to the proposition that foreign-born scientists are more socially mobile than native-born scientists. As shown in Table 32, the percentages of native-born scientists decrease from "low" to "high" rate of social mobility; the percentages for foreign-born increase from "low" to "high rate of social mobility. The nature of the associations specified, however, has exception at the "intermediate" level of rate of social mobility for foreign-born scientists (41.5 per cent). Table 33 yields little or no support to the hypothesis that foreign-born scientists whose first language is English will be more socially mobile than foreign-born scientists whose first language is not English. At every level of social mobility from "low" to "high" the percentages are almost the same (three per cent or less) for foreign-born scientists whose first language was English and for those whose first language was not English.

Thus it may be concluded from the evidence from university scientists in Ontario that the rate of social mobility is higher for foreign-born scientists than for native-born scientists. It may be further concluded that little if any evidence supports the hypothesis that the rate of social mobility is greater for foreign-born scientists from English-speaking countries than for foreign-born scientists from non-English-speaking countries.

Respecting location of institutions where advanced training of university scientists was received, it was hypothesized that:

> The rate of social mobility of university scientists in the university system is greatest when some advanced training was received outside Canada, intermediate when advanced training was received at more than one Canadian university, and least when all advanced training was received at one Canadian university.

It was reasoned that since transilience has been argued as a positive factor in determining rate of social mobility, the tendency to spatial movement as reflected in diverse locations of advanced training will be related to speed of rise in rank.

The data bearing on this hypothesis concerning location of places where advanced training was obtained are found in Table 34, and give support to the proposition that rise in rank for university scientists is directly related to spatial mobility during advanced training, as reflected in location of places where degrees were obtained. As shown in Table 34, the percentages of scientists with "low" rate of social mobility decrease with increasing level of geographic distance of places where degrees were obtained; those classified as having a "high" rate of social mobility increase with increasing level of geographic distance of

TABLE 34. Rate of social mobility of university scientists, Ontario, Canada, by location of places where degrees were obtained

Location of places where degrees were obtained	Rate of social mobility							
	Total		Low		Inter-mediate		High	
	No.	%	No.	%	No.	%	No.	%
One or more outside Canada	773	100.0	194	25.1	312	40.4	267	34.5
Different universities in Canada	182	100.0	72	39.6	57	31.3	53	29.1
All in same university	205	100.0	93	45.4	61	29.8	51	24.9
NA	2	100.0	0	0.0	1	50.0	1	50.0
Total	1162	100.0	359	30.9	431	37.1	372	32.0

Rate of social mobility could not be computed for 804.

places where degrees were obtained. At the "intermediate" rate of social mobility, however, the percentages for "one or more outside Canada" and "different universities in Canada" are unexpectedly high (40.4 and 31.3 per cent), and indicate that the nature of the associations specified is not without exception.

Thus it may be concluded from the evidence from the university scientists in Ontario that the rate of social mobility is directly associated with location of institutions where degrees were obtained. The relationship is not without exception.

With regard to prestige level of father's occupation in relation to university scientists, it was hypothesized that:

> The rate of social mobility of university scientists in the university system is not related to the prestige level of father's occupation.

It was reasoned that if only one-quarter or less of over-all variance between occupation of father and occupation of son can be accounted for by parental status[1] then the rate of social mobility within the academic system is no more dependent on the prestige level of father's occupation than was the entry into the academic system.

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[1] See Hubert Goldhamer, "Social Mobility," International Encyclopaedia of Social Science (New York: The MacMillan Company and the Free Press, 1968), 14: 429-438.

The data bearing on the hypothesis concerning prestige level of father's occupation of university scientists are found in Table 35. The order of occupations is established in descending order of prestige established by Bogue's SEA scale.[2]

The descending order of totals of faculty scientists arranged by occupations of fathers agrees with the descending order of occupations in the SEA scale except for those whose fathers were farmers and operatives. There are more of the former (132) and less of the latter (15) than would be expected. In addition, the number of "professional" fathers (412) is disproportionately large if compared with the relationship of scores in the SEA scale.

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[2]Bogue's Social Economic Achievement scale is based on the average of two items: expected income on the basis of educational attainment, and actual income received. Since, in Bogue's view, educational attainment reflects and determines cultural and technical status, these components, added to income, cover three of the total of five components that determine social position. The other two items are unique cultural traits of the individual and the grouping of factors such as prestige, esteem, respect, and power. He posits that this measure is more realistic than power measures of income alone, or of reputational prestige since occupation alone today reveals much less about an individual's personality, social life, or social position than it did even ten years ago. Bogue sees special value in his type of score in that its meaning does not change over time, it is comparable from place to place, and it thus makes historical and cross-cultural studies more comparable. It tests for existence of class boundaries but does not assume stratification.
See: Donald J. Bogue, Principles of Demography (New York: John Wiley and Sons, 1969).

TABLE 35. Rate of social mobility of university scientists, Ontario, Canada, by prestige level of father's occupation

Father's occupation	SEA Score	Rate of social mobility: Total			Low		Intermediate		High	
		No.	% of total	%	No.	%	No.	%	No.	%
Professional	39	412	35.73	100.0	147	35.7	145	35.2	120	29.1
Managers	37	174	15.09	100.0	59	33.9	66	37.9	49	28.2
Sales	29	149	12.92	100.0	52	34.9	53	35.6	44	29.5
Craftsmen	27	117	10.14	100.0	39	33.3	35	29.9	43	36.6
Clerical	26	90	7.80	100.0	25	27.8	40	44.4	25	27.8
Operatives	23	15	1.30	100.0	4	26.7	6	40.0	5	33.3
Service	20	36	3.12	100.0	8	22.2	13	36.1	15	41.7
Farmers	20	132	11.44	100.0	44	33.3	55	41.7	33	25.0
Laborers	18	28	2.42	100.0	8	28.6	8	28.6	12	42.9
Total		1153	100.0		386	33.5	421	36.5	346	30.0

Rate of social mobility not computable for 813

Prestige levels in descending order as determined by Bogue's SEA score.

An expansion of Table 35 (Table 35b) shows the distribution for the total Canadian population by occupation for 1931, the census year nearest the birth date of respondents having the highest rate of social mobility (ages 29-39) (see Table 37). Percentages of total population for 1931 are shown for the same occupational categories used in this study.[3] The professional category in 1931 comprised 5.7 per cent of the total. It thus becomes evident that the percentage of fathers of university faculty scientists who were professionals is very high in comparison with that of total for the year 1931. Reference has already been made to the high percentage of university scientists whose fathers were farmers. This intergenerational mobility of "farmer to university professor" was taken as an indicator of upward social mobility.

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[3]The categories for Bogue's SEA scale are based on the U.S. census, and this poses some difficulty. In addition, equivalent categories for 1931 are obtained as follows:

Professional: sub-category of service.

Managers, Craftsmen, Operators (combined): Mining, Quarrying, Oil and Salt wells, Manufacturing, Electric light and power, Building and construction, Transportation, Communication, Warehousing and storage, all combined, since impossible to separate out managers, craftsmen and operators from these.

Sales: Trade and Finance combined.

Service: sub-category "personal" of service.

Clerical, Farmers and Laborers did not require adjustment.

TABLE 35b. Distribution of population by occupation in 1931, and these categories by occupation of father of university faculty scientists, Ontario, Canada, 1968

Occupation of father	1931		1968		SEA score
	No.	%	No.	%	
Professional	220,942	5.7	412	35.7	39
Managers, Craftsmen, Operators	1,129,719	29.0	306	26.6	37 27 23
Sales (Trade and Finance)	350,735	9.0	149	12.9	29
Clerical	258,689	6.6	90	7.8	26
Service	357,029	9.2	36	3.2	20
Farmers	1,131,845	29.2	132	11.4	20
Laborers	437,115	11.3	28	2.4	18
Total	3,886,074	100.0	1153	100.0	

Data for 1931 compiled from Dominion Bureau of Statistics, Census of Canada 1931, Vol. VII, Occupations.

The 29.2 per cent farmers in the total working population of 1931 could be a part of the explanation for the high percentage of university faculty scientists having a father employed as a farmer. Numerically there was greater possibility for this frequency apart from prestige and other factors.[4]

A positive relationship of rate of social mobility to father's occupation would show the highest rate of social mobility for those whose father's occupation was at the highest prestige level, professional. This is not demonstrated. The rate of social mobility is greatest for those whose fathers were craftsmen (36.6 per cent), those in service occupations (41.7 per cent) and laborers (42.9 per cent). The rate of social mobility is greatest at the "intermediate" level for those whose fathers were in clerical or operative occupations and greatest at the "low" level for professionals, managers and those occupied in sales.

Thus it may be concluded from the evidence from university scientists in Ontario that the rate of social

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[4]Some consideration was given to the point in time at which the father's occupation should be named. The present would show the maximum level of the father's career or find him in retirement. The point in time when the faculty member was born might present a non-representative level of occupation since the father might not have made his final choice of occupation at that time. It was therefore decided to ask for the father's career at the time the respondent was in high school. This is the period when decisions are made about what route the child should take in higher education in preparation for career.

mobility of university scientists in the university system is not related to the prestige level of father's occupation.

Relationship Between Rate of Social Mobility and Frequency and Distance of Spatial Mobility

The third general hypothesis postulated that: the rate of social mobility is directly related to the frequency and distance of spatial movement among university scientists.

With respect to the relationship of rate of social mobility to the frequency and distance of spatial mobility, as hypothesized above, the data are found in Table 36. These data give support to the proposition that rate of social mobility is directly related to frequency and distance of spatial mobility. As shown in Table 36, the percentages of scientists classified as having "low" frequency of spatial mobility and limited distance of spatial mobility ("Ontario only") decrease with increasing rate of social mobility; those classified as having "high" frequency (rate) of spatial mobility and greatest distance of spatial mobility ("one or more abroad") increase with increasing rate of social mobility.

Thus it may be concluded from the evidence from university scientists in Ontario that the rate of social mobility is directly related to the frequency and distance of spatial mobility among university scientists.

TABLE 36. Rate of social mobility of university scientists, Ontario, Canada, by rate and distance of spatial mobility

Rate of social mobility	Rate of spatial mobility								Distance of spatial mobility							
	Total		No spatial mobility		Low		Inter-mediate		High		Total		Ontario only		One or more other provinces		One or more abroad	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	426	100.0	171	40.1	164	38.5	75	17.6	15	3.5	250	100.0	57	22.8	39	15.6	154	61.6
Intermediate	459	100.0	139	30.1	96	20.9	129	28.2	95	20.7	320	100.0	41	17.8	54	16.9	225	70.3
High	383	100.0	108	28.2	10	2.6	42	10.9	220	57.4	272	100.0	34	12.5	32	11.8	206	75.7
Total	1268	100.0	418	33.0	270	21.3	246	19.4	330	26.0	842	100.0	132	15.7	125	14.8	585	69.5

Rate of spatial mobility not computable for 698.

Distance of spatial mobility not computable for 1124.

CHAPTER VI

CONCLUSION

Summary

This study has been based on the assumption that spatial mobility is an attribute of academic life and those who can move with enthusiasm and ease from one assignment to another will not only be encouraged to move again, but will experience more rapid rise in rank as a result. This general assumption has risen out of the body of theory which is concerned with the international intellectual elite whose members share common values and common goals, and who are particularly represented by scientists.

The faculty of all universities and colleges of Ontario, Canada, in the academic year 1967-68 constituted the universe. Of the total of 7050, there were 4532 usable responses, of which 1966 were scientists. For this population it has been demonstrated that:

1. The number of respondents is approximately proportional to the size of faculties, and, although "non-scientists" outnumbered "scientists," the percentage distribution of these two categories differ little from that of all faculty.

2. Large proportions of Ontario faculty members are concentrated in the younger ages. This is true of "scientists" as well as "non-scientists."
3. There are more than 11 times as many male faculty members as female faculty members. The percentage of female "non-scientists" is twice as large as the percentage of male "non-scientists."
4. The disciplinary affiliation with the highest percentage is natural science with 31.2 per cent, followed by humanities (roughly 26 per cent) and social science (roughly 19 per cent).
5. Native-born faculty respondents exceed foreign-born by 11 per cent. These categories are almost equally shared by "scientists" and "non-scientists."
6. Province of birth of native-born Ontario faculty scientists shows a 62.6 percentage for Ontario. Three-fifths of the foreign-born university faculty "scientists" were born in the United States and one-quarter in England. Approximately the same proportions of "non-scientists" were born in these two countries.
7. Percentages of the total number of degrees awarded by institutions in Canada to Ontario university faculty respondents range from 68 to 80 per cent depending upon the level of degree. For institutions outside Canada the highest percentages are granted in England and the United States.

8. There is a noteworthy increase in the numbers of degrees received by Ontario faculty respondents during the last 25 years.
9. Approximately 56 per cent of the faculty respondents reported the Ph.D. as the highest degree attained. The proportion of "scientists" holding this degree was 17 per cent higher than that of "non-scientists."
10. At each degree level roughly twice as many university faculty respondents experienced some mobility outside Canada as did those who received their advanced training in Canada only. In all categories the numbers for "non-scientist" exceed those for "scientist."

With regard to spatial mobility, younger scientists have the highest record of spatial mobility, both in frequency and distance travelled. There is no appreciable difference between male and female scientists in frequency or distance of spatial mobility, although the percentage for "no spatial mobility" is higher for females than for males. Frequency and distance of spatial mobility of natural scientists and social scientists do not differ. Foreign-born scientists move more often and farther than Canadian-born scientists during their careers. There is little or no difference between those foreign-born whose first language is English and those who have another first language, in their propensity for number of moves or the distance of those moves. Finally, the frequency and

distance of spatial movement are greater for those who have received at least part of their advanced training abroad.

Regarding the rate of rise in rank or rate of social mobility, university scientists who received their highest degree in 1965 or later have risen in rank faster than any other group. There is no difference in rise in rank between male and female university scientists. The rate of social mobility is higher for social than natural scientists. The rate of rise in rank is higher for foreign-born than native-born scientists but it makes no difference whether they were born in English-speaking countries or not. Rise in rank is greatest for those who received some advanced training outside Canada, and least for those who received all their advanced training in Canada. The rate of social mobility is not related to the prestige of father's occupation. Finally, the rate of rise in rank is directly related to the number of spatial moves and their distance.

Discussion of the Findings

The contribution of this research and analysis is mainly substantive although an effort has been made to establish a model for studies of migration of members of the academic system. This mosel could be used for comparative studies of migration of professional populations. The substantive contribution of this dissertation is to the

body of knowledge in Canada concerning spatial mobility and professional manpower generally, and university faculty in Ontario in particular. Universities in Canada are concerned with patterns of mobility established by presently employed faculty, since the record they have established comprises a measure of predictability of retention as against future moves, and of "success" in terms of meeting requirements within and outside the academic community. The Department of Labour and the Department of Manpower and Immigration of the Canadian government are concerned with these items, since they are not only preoccupied with fluctuations in numbers in professional manpower in Canada, but in the causes of these fluctuations, and the factors involved in their occurrence. At present the study of the immigrant who is a professional is of special significance to the Department of Manpower and Immigration because it is this group that is considered to be the one that compensates for the loss of members of the professional manpower group out of Canada. Indicators of economic and social integration of the professional immigrant are thus of first importance. The fact that the model developed in this study may be used in a study of other professional groups as well as university faculty will be useful also to the Federal government of Canada, but the main interest of the study should be to the Province of Ontario where the investment in education is

higher than any other province of Canada.[1]

The emphasis of this study is social structural, and the processes by which the academic elite are distributed in the social structure are the major concern. There are, however, discernable psychological overtones, and these overtones should be the subject of further inquiry. How the scientist sees his role, what he considers to be the determining factors in spatial mobility, how he sees the relationship of his spatial mobility to his social mobility, his awareness of success or failure in the process, and his reasons given for either, are all items that could be pursued further. It is important that the facts of spatial mobility and the social structural implications of these factors be known but it is the placing of these against further knowledge based on psychological variables such as those mentioned above that could be even more valuable.

Although two of the universities of Ontario are French-speaking (Laurentian and Ottawa), the analysis does not provide for the separating out of the bicultural and

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[1] Since the direction of this kind of study is not solely towards all of Canada, or one province of Canada, there are problems of funding that should be mentioned. Although the special types of problem that are of concern to sociologists will require more frequent use of the kind of approach used in this study, the federal government wants all-Canada coverage and the provincial governments want study in greater depth for one province. Any research beyond analysis of census data or other such sources of raw data requires more support in the form of funds and/or time than the private researcher is able realistically to provide.

bilingual aspects of spatial and social mobility. There is a further implied problem of variation in cultural background of disciplines. For instance, in Canada political science has been much more ingrown than many other disciplines, and has had closer links with Britain than with the United States. Sociology, on the other hand, has followed American traditions. These factors could affect mobility.[2]

It was pointed out earlier that this study deals with a certain population in Canada at a certain time. There is no estimate of measure of those who have left Ontario and not returned. It has been suggested that those who have gone to stay may be the "best" and the "worst" and that the middle group may be those who have stayed. This possibility can be suggested but has not been established.

There are organizational implications that have hardly been touched on in this analysis. An example is prestige of universities, which might be measured with much greater detail and precision than was possible in this study. Several studies have developed criteria for this factor, and, as mentioned earlier, mobility of university faculty is partially dependent on this variable.[3]

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[2]I am indebted to Professor Fred Elkin of York University for this observation.

[3]See : David G. Brown, Mobile Professors (Washington: American Council of Education, 1967), 195-196.

The study erroneously implies that there is an equivalence of degrees. This is an over-simplification of a complex phenomenon. When it is accepted by many, for example, that a Master's in Cambridge is equivalent, in some fields, to a Ph.D. in Canada or the United States, there is a temptation to work out a series of equivalents. Since there is no formal structural acceptance of a series of equivalents, however, and since decisions on standing are made on an individual basis, it was not attempted. Equivalence of French and English degrees is another problem. The problem can be solved arbitrarily, but the web of cultural assumptions that surrounds the system of degree granting is very different in French and English universities.

Mention has been made of the need for study of the reasons why university faculty move. Beliefs about the international scientific community, of science itself, and the individual's view of his discipline in relation to these beliefs will affect mobility. Any way that this study can be linked to other studies that stress such factors as these will be advantageous.

Although this study deals only with spatial mobility within the academic system it should be extended to a consideration of the work experience of each individual. His moves in and out of the academic system and in and out of Canada carry an element of probability regarding next

move. The data of this nature have been collected and coded but have not been used in this study. There appears to be a cumulative quality in spatial mobility for the individual, move by move; it also appears that movement in and out of the academic system is more frequent in less developed and less institutionalized countries. The intellectual elite must be ready to serve in government, education, business, professions, even the church, as need arises. The degree of mobility from one institutional area to another may be an indicator of degree (inversely) of modernization, "westernization," specialization, or urbanization, depending on the thrust of the study. This type of direction could be the basis for comparative study.

Facts regarding spatial mobility and social mobility of university faculty scientists have been established in this study. The relationship of the two types of mobility to each other and to certain demographic variables has been demonstrated. The cumulative quality of spatial mobility has been indicated and the direct relationship of spatial mobility and social mobility has been demonstrated. Whether this spatial movement is ignited by a sense of membership in an international community or by the urge to break away from a restrictive network of local community patterns, is not established. Success resulting from ability to move freely may be attributable to an existential view of life. The very strength the mobile scientist

exhibits may lie in his ability to shut himself off from involvement in any local community, at home or abroad. All places may be alike to him.

APPENDICES

APPENDIX A

Appendix A.1.

4490 Sherbrooke Street, West,
Montreal 6, Quebec

I am writing to solicit your help in a study of the mobility of university faculty in the Province of Ontario. This Ph.D. research is being supported by the Canada Council through a pre-doctoral fellowship. The Federal Department of Manpower and Immigration, Ottawa, and the Ontario Departments of Labour and University Affairs have been consulted regarding this work.

While staff directories have been employed as far as possible, we find it necessary in the first stage to ask all university faculty members to provide additional basic information. Hence, this request. Please check the items below and return this sheet to me in the stamped, self-addressed envelope provided for your convenience. This information will, of course, be kept strictly confidential.

Thank you in advance for your help in ensuring the success of this study. I shall be very grateful for your prompt reply.

Sincerely yours,

(Mrs.) Gertrude MacFarlane

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1. Age (last birthday): _____

2. Place of birth: _____
(city or town) (province or state) (country)

3. What is your Department and discipline? _____

In what category would you classify your work? (please check)

_____ Natural Science: _____ Social Science: _____ Humanities:

_____ Other (specify) _____

4. Degrees:	Year Received	College or University	City and country
Bachelor's	_____	_____	_____
Master's	_____	_____	_____
Ph.D.	_____	_____	_____
Other (specify)	_____	_____	_____

Appendix A.2.

4490 Sherbrooke St. West,
Montreal 6, Quebec

Thank you very much for your help in supplying the information requested in the first stage of my research on the mobility of university faculty of Ontario. I am now at the second stage and am directing this letter (and accompanying request) only to the university faculty <u>scientists</u> in Ontario. (The third stage will concern information from a random sample of social scientists).

This time I need answers to three questions relating to career mobility. Please complete the form at the bottom of this page and return the full sheet to me. An addressed envelope is provided for your convenience. As before, your answers will be kept strictly confidential.

Thank you again for your help in this study, I shall be most grateful for your prompt reply.

Sincerely yours,

(Mrs.) Gertrude MacFarlane

- -

1. Occupation of your father or guardian when you were in High School

   ____.

2. Occupational sequence since acquiring highest degree (enumerate those of 9-months or more duration. Change of rank in same institution should be enumerated.)

	Type of Position and Rank, if applicable	Town or City, Country	Employer	Approximate Dates From	To
First					
Second					
Third					
Fourth					
Fifth					

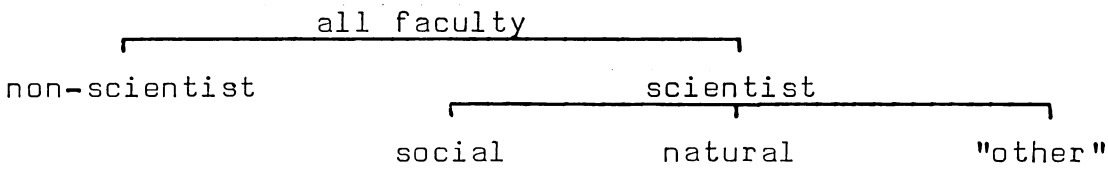
(continue on back if necessary)

3. Have you plans to move for the academic year 1968-69? Yes_____ No_____
   If yes, where? ____

Appendix A.3.

4490 Sherbrooke Street West
Montreal 6, Quebec

Thank you for your response to my second letter concerning the mobility of university faculty. I understand your argument in not answering the questions, but the categories I am using follow this plan:



The second letter was sent to all faculty who categorized themselves as some type of scientist in their answers to the questions in the first letter. Therefore, I should appreciate your response greatly, and am enclosing another copy of the second letter.

Sincerely yours

(Mrs) Gertrude MacFarlane

APPENDIX B

APPENDIX B.1.

RANDOM NOTES ON SPATIAL MOBILITY

One respondent pointed out that "people in rare subjects like me, are not mobile" (a professor of Sanskrit).

One physicist pointed out that it is probable that the research physicist will be more spatially mobile than the applied physicist. The former can work anywhere that he can find a desk and a library but the latter must stay with the equipment he has accumulated and with a university that will provide it.

Father _____ of the University of Windsor, called attention to the fact that although members of religious orders who teach in universities are mobile, their move from one post to another is part of their oath of obedience. They go where they are sent. Rise in rank does mean prestige for the order however, and since motives either for determining place of residence (i.e., housing, climate) or income are not studied, though recognized, it was decided not to separate out the members of religious orders. (There is danger in any case that in some instances the names would be "buried" in an indiscernable

fashion.) The degree of social mobility in terms of social rank carries prestige for all, though whether it is achieved in terms of desire to serve as against desire for goods is an obscure matter.

It was suggested that the natural and applied scientists would be more mobile than social scientists because their need for specialized training is better served elsewhere, particularly in the United States, than in Canada, but this did not prove to be so.

Although records of higher education sequence and of career sequence supply the main items of spatial mobility affecting rise in rank and further tendency to move, several correspondents pointed out to the writer that many academics took jobs between periods of study for higher degrees, especially in Canada, and these assignments also reflected spatial mobility. Other respondents were caught at a point in time when they were returning to student status for further study and hence were experiencing a temporary downward mobility.

One respondent reported place of birth as U.S.A. but commented that this item could be misleading since he was born of Canadian parents and had lived in Canada all his life.

Professor A. Deutsch of McGill University has pointed out the probability that the least mobile will be more nearly totally represented among the respondents than the more mobile. This seems probable partly because there is better access to those who have not moved. The mobile academics may have already moved again.

APPENDIX B.2.

A NOTE ON "UNIVERSITY IMAGE"

Every university has an image created partly by its students and graduates, partly by the faculty and administration, and partly by public reaction. Age and prestige, language emphasis, size, reasons for founding, budget and location are other factors that contribute to the composite picture of each.

Images of universities of Ontario are varied but they can be arranged into a few main types. The following comments are based on consensus of opinion and not on depth research. The University of Toronto is reminiscent of the British system in its arrangement of colleges, including Victoria University, University of St. Michaels College and University of Trinity College which are independent members of the Association of Universities and Colleges of Canada. It is one of the six largest universities of Canada, and has an international reputation, particularly for its medical training and research. The University of Toronto and Queen's are the "ivy league" and probably the most prestigeful English-language universities of Ontario.

Queen's University is particularly noted for its Presbyterian Scottish tradition, its high level reputation in medicine, both in training and research, and its traditional British emphasis in strength of disciplines. Although both the University of Toronto and Queen's University are nominally non-denominational they are associated with denominational emphases (for Toronto through its three denominational federated universities) while the Royal Military College in the same small city as Queen's University is the center for the training of officers for the Canadian armed forces. It is a relatively small college and limited in its offerings, but a prestige school in terms of training of the military elite.

The Université d'Ottawa is the old prestigeful bilingual university of Ontario with strong offerings in medicine, science, and law, and though labelled non-denominational is representative of the French Roman Catholic philosophy in advanced education.

The University of Western Ontario with its two denominational affiliates, Huron College and King's College, has become noteworthy for its "modern empirical approach" as has McMaster University. Both are older institutions and McMaster was founded as a denominational (Baptist) college. The University of Windsor falls in the same category as McMaster though its background lies in

the Roman Catholic tradition. Expansion of resources and offerings through government funding have changed their image and reputation.

Guelph University is another institution, one of the older schools, formerly a college of the University of Toronto, whose image has altered. Reputation in a limited field, as one of the two famous early agricultural and home economics colleges of Canada, and the first college of veterinary medicine in North America, has been transformed to an expanding progressive "young" university with emphasis still on the scientific areas related to agriculture. It continues to be noteworthy for its training in veterinary medicine.

Because of Ontario's density of population and income potential it has seen rapid expansion in numbers of universities and offerings during the last 25 years. Not only have there been transformations from denominational colleges and special emphasis colleges to government supported universities, but there has been the foundation of a number of smaller new universities of a more innovative type. The larger and more noteworthy of these are Carleton and York, interesting especially for their offerings in social sciences and unique fields, and Waterloo University.

The remaining schools on the list for 1967-68 are smaller and fall into one or other of the categories

outlined above. Osgoode Hall Law School (since affiliated with York University) has been somewhat similar in its status to the Royal Military College in its training for one of the elite professions, law. Waterloo Lutheran University is the one remaining independent denominational university in Ontario, it has a higher enrollment than most of the "younger" group of universities, and a longer history. It may eventually follow the trend set by others in the move away from church influence.

Of the four remaining universities, Laurentian has the largest enrollment (901) and offers undergraduate training in French and English. Lakehead, Brock and Trent all have enrollments of less than 500, and of the four, only Trent has any graduate students (four).

Laurentian and Lakehead are located in less developed northern areas of Ontario and their offerings seem to reflect at once a more practical and innovative atmosphere. Brock, and Trent even more, on the other hand, seem to over-emphasize the traditional British organizational plan.

The above factual comments are based on the AUCC report for 1967-68 and the remaining commentary may reflect some personal bias. (See Table 1 and Figure 2 .)

APPENDIX B.3.

A NOTE ON NON-RESPONSE

There was more than the usual variety of reasons for not receiving a response to the questionnaires.[1] Some have already been mentioned in the text, but the complete list comprises:

1. Request for translation into French; a number of letters were received in French saying the questions were not understood. In one case the respondent was obviously English-speaking but employed at one of the French universities.
2. Deceased. In one case a response from the secretary of the department recounted the violent death by murder of the young individual and a comment on the fortitude of the individual's family.
3. On travelling sabbatical and contact not possible.
4. Retired, as one respondent said, "to the beautiful shores of Lake Huron."
5. Visiting professor who had "gone home" and thus the letter-questionnaire had not been forwarded. The time factor was the deciding item in the decision not to re-mail for forwarding.

6. Letters returned by post office marked "moved, no forwarding address," or "insufficient address." A guess can be hazarded that the human factor was more than incidental since when mailing was heaviest to the largest university the breakdown was disproportionately high. The post office clerk in charge of M to P gave up almost completely. This was something of a financial crisis since each returned letter cost the researcher ten cents and it was still necessary to re-mail. (The return address on the outside envelope was omitted for reasons of privacy and this meant opening each letter to obtain the address of the correspondent and added cost to return the letter.)
7. Refusal to answer, and no response of any kind.
8. Return of respondent to student status.
9. Transfer of respondent to non-university employment. (In both items 8 and 9 the respondents failed to comprehend that a record was sought for those who were in the records as faculty during a certain time in a certain university.)
10. Reply too late to be classified. The survey was kept open for six months but a few came in as much as a year later even though the respondent had not changed his position nor been on leave.
11. Self-disqualification by respondent. Although listed in directories with academic degrees and as members of

departments, in a few cases respondents said they did not qualify. They were, for example, "machinist," or "specialist in bio-medical electronics."

12. Referral to other sources of information. Several respondents pointed out that "Every item you ask for is in Who's Who."
13. Invasion of privacy. There were numerous expressions of disapproval of "this type of study," irritation at being bothered so often by questionnaires to be filled out and so on. (In many cases, however, where these types of dissent were registered the respondent then answered the questions.)

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[1] A discussion on non-response appears in: C. A. Moser, Survey Methods in Investigation (London: Heinemann Educational Books, Ltd., 1958), 129-136.

APPENDIX C

APPENDIX TABLE 1. Present rank of university faculty scientists, Ontario, Canada

Present rank	No.	%
Instructor	148	7.5
Assistant professor	586	29.9
Associate professor	591	30.1
Professor	496	25.2
Special categories	105	5.3
NA	40	2.0
Total	1966	100.0

APPENDIX TABLE 2. Places where degrees were obtained for university faculty, Ontario, Canada

Places degrees obtained	Total		Non-scientists		Scientists	
	No.	%	No.	%	No.	%
One or more outside Canada	2879	63.52	1675	65.28	1204	61.24
Different universities in Canada	626	13.81	332	12.94	294	14.95
All in same Canadian university	1009	22.26	548	21.36	461	23.45
NA	15	0.41	10	0.39	5	0.25
Total	4529	100.00	2565	100.00	1964	100.00

APPENDIX TABLE 3. Number of years of work life of university scientists, Ontario, Canada

Years	No.	%
1-4	610	31.0
5-9	373	25.6
10-14	339	17.3
15-19	253	12.9
20-24	94	4.8
25-29	60	3.1
30-34	52	2.7
35-39	29	1.5
40-44	14	0.6
45-49	1	0.0
NA	11	0.5
	1966	100.0

APPENDIX TABLE 4. Distance of spatial movement based on positions held for university faculty scientists, Ontario, Canada

	No.	%
Ontario only	188	9.6
In one other province	167	8.5
In two or more other provinces	17	0.9
One or more abroad	727	37.0
NA	867	44.0
	1966	100.0

APPENDIX TABLE 5. Total number of positions for university faculty scientists, Ontario, Canada

	No.	%
One position	323	16.43
Two positions	452	22.99
Three "	521	26.50
Four "	327	16.63
Five "	195	9.92
Six "	84	4.27
Seven "	35	1.78
Eight or more positions	23	1.17
NA	6	0.31
	1966	100.00

APPENDIX TABLE 7. Summary of distance of spatial mobility by jobs held by university faculty scientists, Ontario, Canada

	No.	%
Ontario only	189	9.6
In one other province	184	9.4
In two or more provinces	728	37.0
One or more abroad	865	44.0
Toral	1966	100.0

APPENDIX TABLE 8. Frequency of spatial mobility of university scientists, Ontario, Canada, by place of birth

Place of birth	Total		Frequency of spatial mobility: No spatial mobility		Low		Intermediate		High	
	No.	%	No.	%	No.	%	No.	%	No.	%
B.C.	44	100.0	20	45.5	10	22.7	4	9.1	10	22.7
Alberta	75	100.0	30	40.0	18	24.0	6	8.0	21	28.0
Saskatchewan	78	100.0	36	46.2	20	25.6	12	15.4	10	12.8
Manitoba	70	100.0	30	42.6	7	10.0	12	17.1	21	30.0
Ontario	681	100.0	366	53.7	118	17.3	102	15.0	95	13.7
Quebec	83	100.0	39	47.0	21	25.3	6	7.2	17	20.5
New Brunswick	29	100.0	17	58.6	3	10.3	5	17.2	4	13.8
Nova Scotia	22	100.0	8	36.4	3	13.6	7	31.8	4	18.2
P.E.I.	6	100.0	3	49.9	2	33.4	0	0.0	1	16.7
Newfoundland	6	100.0	3	49.9	1	16.7	1	16.7	1	16.7
United Kingdom										
England	202	100.0	61	30.2	54	26.7	41	20.3	46	22.8
Other U.K.	65	100.0	25	38.5	11	16.9	15	23.1	14	21.5
Europe										
France	7	100.0	2	28.6	2	28.6	3	42.9	0	0.0
Germany	39	100.0	16	41.0	8	20.5	7	17.9	8	20.5
Other Europe	100	100.0	38	38.0	27	27.0	17	17.0	18	18.0
United States	241	100.0	78	32.4	47	19.5	43	17.8	73	30.3
Commonwealth										
Australia	18	100.0	4	22.2	2	11.1	4	22.2	8	44.4
India	35	100.0	12	34.3	1	2.9	7	20.0	15	42.9
New Zealand	9	100.0	3	33.3	2	22.2	3	33.3	1	11.1
Africa										
South Africa	9	100.0	4	44.4	3	33.3	1	11.1	1	11.1
Other Africa	2	100.0	1	50.0	1	50.0	0	0.0	0	00.0
Asia										
China	23	100.0	4	17.4	5	21.7	7	30.4	7	30.4
Other Asia	43	100.0	15	34.9	6	13.9	8	18.6	14	32.6
South America	11	100.0	4	36.4	2	18.2	1	9.1	4	36.3
All Other	39	100.0	19	48.7	6	15.4	5	12.8	9	23.0
Total	1937	100.0	838	43.3	380	19.6	317	16.4	402	20.7

Frequency of spatial mobility not ascertainable for 29.

APPENDIX TABLE 9. Distance of spatial mobility of university scientists, Ontario, Canada, by place of birth

Place of birth	Distance of spatial mobility							
	Total		Ontario only		One or more other provinces		One or more abroad	
	No.	%	No.	%	No.	%	No.	%
British Columbia	25	100.0	3	12.0	11	44.0	11	44.0
Alberta	43	100.0	8	18.6	14	32.6	21	48.8
Saskatchewan	41	100.0	11	26.8	12	29.3	18	43.9
Manitoba	40	100.0	3	7.5	17	42.5	20	50.0
Ontario	319	100.0	99	31.0	48	15.0	172	53.9
Quebec	44	100.0	10	22.7	11	25.0	23	52.3
New Brunswick	12	100.0	2	16.7	5	41.7	5	41.7
Nova Scotia	15	100.0	4	26.7	4	26.7	7	46.7
P.E.I.	3	100.0	1	33.3	2	66.6	0	0.0
Newfoundland	2	100.0	0	0.0	2	100.0	0	0.0
United Kingdom								
England	140	100.0	12	8.6	20	14.3	108	77.1
Other U.K.	41	100.0	7	17.1	5	12.2	29	70.7
Europe								
France	4	100.0	0	0.0	0	0.0	4	100.0
Germany	23	100.0	1	4.3	0	0.0	22	95.6
Other Europe	63	100.0	5	7.9	11	17.5	47	74.6
United States	164	100.0	9	5.5	14	8.5	141	86.0
Commonwealth								
Australia	15	100.0	1	6.7	0	0.0	14	93.3
India	23	100.0	0	0.0	0	0.0	23	100.0
New Zealand	6	100.0	0	0.0	2	33.3	4	66.6
Africa								
South Africa	5	100.0	0	0.0	0	0.0	5	100.0
Other Africa	1	100.0	0	0.0	0	0.0	1	100.0
Asia								
China	19	100.0	5	26.3	2	10.5	12	63.2
Other Asia	27	100.0	6	22.2	3	11.1	18	66.6
South America	7	100.0	0	0.0	0	0.0	7	100.0
All Other	19	100.0	2	10.5	1	5.3	16	84.2
Total	1101	100.0	189	17.2	184	16.7	728	66.1

Distance of spatial mobility not ascertainable for 865.

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