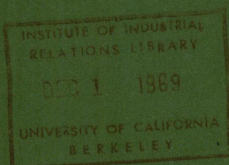components

of **OCCUPATIONAL**

CHANGE in the United States,

1950-1960

ROBERT L. ARONSON

Cornell University, New York State
School of Industrial and Labor Relations

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About the Author

Professor Robert L. Aronson has been a member of the faculty of the New York State School of Industrial and Labor Relations since 1950. A graduate of Ohio State University (B.A., 1940; M.A., 1941), he received his Ph.D. in economics from Princeton University in 1953. His teaching at the School has been largely in the field of labor-market economics, with a special interest in the economics of manpower. Professor Aronson is a former editor of the *Industrial and Labor Relations Review*. He has also been visiting professor at Ohio State University, the University of Louisville, and the University of California, Berkeley, and Fulbright research fellow at the University of the West Indies, Jamaica. During the summer of 1967, he served as staff economist to the Salaries and Structures Commission of the Government of Ghana. During the academic year 1968–1969, Professor Aronson spent a sabbatical leave as an employee of the U.S. Department of Labor, Bureau of Labor Statistics in its Division of Manpower and Occupational Outlook.

This study is an outgrowth of the author's continuing interest in the impact of technological and industrial change on labor markets. Two case studies of worker adaptation to such changes, one in an American industrial community and one in a developing economy, have been published. A methodological study of the problem of measuring the impact of federal programs and expenditure on the employment of scientific and technical manpower has just been completed.

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PART I

Major Occupational Groups, 1930-1960

With the resurgence and further development of interest in the study of manpower, occupational change and mobility have become a critical area in need of further study. Because an occupation most closely represents both the individual's productive contribution and the services required, the forces affecting changes in labor demand and supply ultimately manifest themselves in changes in the occupational structure of the labor force. At any given time, the occupational distribution of the labor force defines the nature of the work to be done and prescribes the character of the work force providing the services. Changes in job requirements resulting from changes in product demand or from technological and organizational change result in new patterns of labor utilization and relationships among those who provide labor services. Likewise, changes in education and preparation for work, sources of labor supply, attitudes toward occupational status and rewards for work, as well as opportunity and exigency, result in changes in the patterns of choices individuals make among the many tasks in a complex industrial society. Yet even the simplest questions about the processes involved in changes in the occupational structure of the labor force remain largely unanswered: To what degree is change in this structure patterned and predictable? How does the occupational structure of the labor force vary with the general level of employment? What are the differences among occupations with respect to the sources or components of change? How do various demographic and social characteristics of the labor force, such as age, sex, color or education, affect patterns of occupational change? Are there contrasting patterns of occupational mobility which distinguish declining from expanding occupations? What is the degree of lifetime attachment to a specific occupation or at what point in a working lifetime does such attachment manifest itself?

Few students of labor markets and manpower would or could venture confident answers to such questions. The principal reasons are methodological and not readily amenable to solution. First, a major difficulty is the problem of occupational classification, which has important effects on both the measurement of occupational mobility and its interpretation. Second,

and affecting especially intertemporal comparisons of occupational change and mobility, the reliability of observations obtained from workers' accounts of their job histories may often be imperfect or distorted by memory lapses or by the circumstances under which the information is collected, for example, whether or not the individual is currently employed. Third, the effort required to collect data on mobility has limited most studies to relatively small samples of workers drawn from rather particular populations; alternatively, the amount and quality of information available for the analysis of mobility, of all types, has often been by-passed in favor of broader coverage. Given sufficient resources of time and personnel, the investigator might overcome some of these difficulties. However, the design and execution of methodologically improved labor mobility studies, especially studies of occupational mobility, still lie in the future.

Interest in the substantive issues related to occupational change and mobility as well as in solving some of the methodological problems described above led me to investigate the model developed by Abram J. Jaffe and R. O. Carleton, the results of which were published in 1954 *(Occupational Mobility in the United States, 1930–1960)*. Jaffe and Carleton were interested in improving the procedures for estimating "the possible future manpower supply by occupation in the United States." Their approach applies techniques of demographic analysis to the study of intertemporal changes in occupational structure, and has yielded a description for recent intercensal periods of the amount of occupational change and an analysis of the major contributing components, including movements between occupational groups. The merits of this model are: 1) for relatively little cost, its scope and coverage of both workers and occupations are comprehensive; 2) it is applicable to all labor market conditions; and 3) it depends on the reliability of worker response and interviewer skill only to the degree of the original census data. The main disadvantage of the model is that labor force changes, including occupational mobility, are measured in terms of net movements of age-occupational groups between two census dates. The aggregate of job and labor force changes remains unknown. In addition, motivational and other factors accounting for the magnitudes and direction of mobility, at best, can only be inferred.

In testing their methodology, Jaffe and Carleton used data from the United States Census of 1930, 1940 and 1950. Their tests generated certain substantive findings about the long-term pattern of occupational mobility and the relationships among the components of occupational change. These findings were sufficiently interesting in themselves to raise the question of whether similar patterns and relationships would be found in the 1950–60 decade, or whether, as some students have speculated, there has been a marked shift away from the patterns of earlier decades. However, the orig-

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inal model was tested only on data for ten major occupational groups,[1] leaving open the question of whether more homogeneous occupational categories at the three-digit level may affect the mobility patterns and interrelationships involved. Fortunately, in this latter respect, the model will handle any level of occupational categorization.

The purposes of the present study are both substantive and methodological. First, it attempts to extend the findings of the original Jaffe-Carleton study to the 1950–60 decade by using identical major occupational groups. This phase of the study also permits, among other things, a closer approximation to lifetime mobility patterns by adding another ten years of work experience for those age cohorts who entered the labor force in the decade of the 1930's. A second objective is to test the effect of disaggregation into finer and more homogeneous occupational groupings on the interrelationships of the components of occupational change. In this phase of the study, comparison is made for the 1950–60 decade between the same relationships calculated on a ten major-group basis and those calculated on the basis of a selected group of 119 more detailed occupations. Last, an effort has been made to analyze and interpret various aspects of occupational change, especially in terms of their economic and labor market significance. Certain implications for further study and research are drawn from this analysis.

The Occupational Mobility Model

Although the Jaffe-Carleton model is fully explained in their original work, a brief summary of their method will be helpful in understanding the procedures followed and the results achieved in this study. We may begin by considering the inadequacies of other ways of describing changes in the occupational distribution of the labor force. Occupational structures of the labor force may be compared for any two points in time, for example between two census dates, either by comparing the percentage distributions of the labor force or by comparing the percentage changes in the size of each occupational group. Such procedures would permit roughly correct but limited inferences about past trends in occupational demand and supply, for example, inferences about relative increases in demand and/or supply of labor to the various occupational groups. Nevertheless, such a procedure would not permit us to disentangle the components of these occupational movements, which reflect a variety of demographic, social and economic influences. It would not help us to determine whether in a declining occupation, for example, the reduction in employment resulted in a relatively high

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[1] Census socio-economic or occupational groups provide for eleven categories; however, because of the small numbers of men involved and the similarity of occupational level, private household workers and service workers except private household were merged in a single category.

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rate of withdrawals from the labor force or in increased movement into other occupations. Similarly, on the supply side, it would be important to know whether the needs of particular occupations are being met mainly from new entrants to the labor force or by movement between occupations. Inferences of this kind would permit us to understand more about the processes of labor force formation and development, and would have practical applications in projecting manpower supply and occupational trends.

The cohort-component model of labor force behavior permits analysis and answers to questions of the kind just outlined. A labor force cohort is an age-group whose personal identity, except for losses due to death or retirement, is assumed to remain unchanged through time, though its occupational (or other) characteristics may change. Cohort analysis traces the occupational history of particular age groups (or cohorts) from the point in time when they first enter the labor force through any specified later point in time. In principle, this occupational history could be traced through the entire working life of a cohort until the last member had left the labor force through death or retirement.[2] The occupational history of the cohort, as represented by its occupational distribution at successive points in time, is assumed to have an underlying continuity *and* to be unique to that cohort because of the particular economic and social conditions attending its entrance into the labor force and affecting its occupational distribution at all subsequent dates. Thus, for example, the age-cohort 20–24 entering the labor force during the decade of the 1930's would be expected to have a different occupational history from the age-cohort 15–19 entering during the same decade. It is even more obvious that the occupational experiences of the 20–24 age cohort in the 1930's would differ from its counterpart age cohort in the 1950's. Cohort analysis alone would provide description and comparison over a given time period between the present occupational distribution of an age group and its own past occupational distributions, or between the occupational distributions of different age groups.

Although the results of cohort analysis are useful per se, mainly for comparing changes in working life histories of labor force groups, in the Jaffe-Carleton model the changes over time in the occupational distribution of an age cohort also provide the means for analyzing the components of that change. Component analysis distributes the changes in the occupational distribution of an age cohort among deaths, new entries into the labor force, retirements, and net movements between occupations. Except for deaths, which are independently computed, each of the remaining components is

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[2] Comparability of census occupational data, in fact, presently limits such an analysis to a period of 30 years. The average working lifetime of males in the U.S. in 1960 has been calculated as 48.3 years, at age 14. U.S. Department of Labor, *Manpower Report* No. 8 (July 1963), Table A.

estimated by comparing the observed occupational distribution of an age cohort with an expected number in each occupation on the assumption that no change took place in the cohort's occupational distribution. For new entries and retirements, the observed occupational distribution of the male population for a single year of age — derived by smoothing 5-year age classes — determines the rates for estimating the expected number by occupation in the cohort's next higher year of age. This operation is performed for the census year at the beginning of a decade and for each intercensal year. The differences between the expected and the observed values are summed and regrouped by 5-year age classes. By convention, the sums of the differences for the beginning-of-decade age classes, 5–24, become unsurvived new entries, and the sums of the differences for age classes, 40–64, are designated as retirements. New entries and retirements are then adjusted by the application of census survival rates to give estimates of the numbers of deaths in each 5-year age-occupation group; these survival rates, it should be noted, are assumed to be identical for each occupation. When added to the beginning-of-decade numbers in each 5-year age-occupation group, these adjusted numbers become the expected numbers at the end of the decade. Net mobility between occupations is calculated as a residual in a balancing equation which exhausts the difference in the observed and the expected numbers in each age-occupation group between two census dates.

The model combining these two types of operations, cohort and component analysis, may be more easily visualized in its algebraic expression: $O_2 = O_1 - D + NE - R \pm NM$, where O_2 represents the numbers in an age-occupation group at the end of a census decade, O_1 the numbers of those in the age cohort in the occupation ten years earlier, D equals the estimated number of deaths occurring in the age-occupation cohort during the intercensal period, NE and R, respectively, represent estimates of new entries and retirements in the age-occupation cohort during the decade, and NM is an estimate of the numbers who either left or entered the age-occupation cohort within the labor force during the decade. The equation is of the balancing type which forces the intercensal change in the numbers in the age-occupation cohort into one or another of the four components. The change in the numbers in an occupation during a census decade, of course, is the algebraic sum of the changes in the components of each age-occupation cohort.

Since the more detailed procedures used to estimate the components of occupational change in the 1950–60 decade were identical with those developed by Jaffe and Carleton,[3] only a bare statement of the essentials and

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[3] A. J. Jaffe and R. O. Carleton, *Occupational Mobility in the United States, 1930–1960* (King's Crown Press, 1954), chaps. 8–13.

some comment on the related methodological problems are necessary. The procedures may be divided into (1) preparation of the data and (2) computation of the components of occupational change.

As in the original study, two successive population censuses of the continental United States were the primary source[4] of the data in this study, which are the male populations, ages 5–75, and the experienced civilian male labor force classified by occupation and five-year age classes in the 1950 and 1960 censuses. Application of the model has been restricted to males thus far because of a necessary assumption of continuity in labor force attachment; the variability of female labor force participation would probably require major changes in the assumptions and estimating procedures used in the model. For the ten major occupational groups, the *Classified Index of Occupations and Industries* was used to compare the 1950 with the 1960 groupings. Altogether, only 28 differences in occupational classification were found between the two censuses; in only one of these, however, did it appear that an occupational subgroup had been moved from one major classification to another.[5] The labor force numbers actually used for 1950 were taken from the Jaffe-Carleton study, rather than directly from the census of 1950, since they already had been adjusted for those men reporting no occupation. Occupations not reported in the 1960 census were similarly redistributed; it was assumed that the larger number and proportion of these would not significantly affect comparability with the 1950 data.[6]

Smoothing was required to obtain estimates of population and labor force by single years of age for each census and intercensal year. The necessary population data for the years 1950–59 came from a special report.[7] The 1960 population data and five-year age data for the male labor force were smoothed to single years by application of Sprague multipliers; for the intercensal years the observed numbers in each occupation by single years of age were obtained by linear interpolation. An additional problem of adjustment was imposed by inconsistency in the tabulation of the labor force by age be-

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[4] U.S. Bureau of Census, *Census of Population: 1950,* vol. IV, *Labor Force,* Part 1-B, *Occupational Characteristics; Census of Population: 1960,* vol. II, Part 7-A, *Occupational Characteristics.* Data for Alaska and Hawaii are not included.

[5] Even this is a doubtful case. The three-digit occupation, "Insurance adjusters, examiners, and investigators" appears to have been included with insurance agents and brokers in the sales workers category in 1950, but under clerical and kindred workers in 1960. However, this may also have been derived from "Clerical and kindred workers, not elsewhere classified." Reclassification in 1960 of n.e.c. occupations accounted for most differences in occupational listings between the two censuses.

[6] In the 1960 census no occupation was reported for nearly 2 million (4.6 percent) males in the experienced labor force. In 1950, the number and proportion of "Occupation not reported" were both less than half of 1960.

[7] "Estimates of the Population of the United States, By Single Years of Age, Color, and Sex, 1900 to 1959," *Current Population Reports,* Series P-25, No. 311, July 2, 1965.

tween the two census years; in 1950, the entire labor force was divided into five-year age classes, but in 1960 ages 35–54 were grouped in two ten-year age intervals. At an early stage in the project, Professor Jaffe furnished estimates of the five-year occupation age classes for these ages, and these as well as his estimates of all other five-year age occupation groups were adopted for 1960 labor force estimates and as controls in the preparation and adjustment of the data on three-digit occupations.

Two criteria governed the selection of the 119 detailed occupations — consistency of job title and size of the occupation. For the former, it was assumed that a given occupational title represented the same collection of tasks and duties in 1950 and 1960. To avoid the possibility of erratic results because of small numbers, a minimum of 50,000 members in the occupation in at least one of the two census years was generally adopted as the second criterion. Exceptions to this rule were made in a few instances, either because of special interest in the occupation — for example, designers and medical technicians — or because the occupation was needed to exhaust the reported numbers in a major occupational group. The group, "farmers and farm managers," for example, contains only two detailed occupations, one of which had less than 50,000 members. Of the occupations selected, ten are "dummy" or residual occupations needed to balance the major occupational groupings, since the model requires data for the entire labor force. A listing of the selected occupations is given in Appendix Table VII.

The 109 substantive occupations represent 80 percent of the 1960 experienced male civilian labor force. Estimates of five-year detailed age-occupational groups for ages 35–54 in the 1960 labor force were made by applying ratios derived from Jaffe's estimates for the major occupational groups and adjusting pro rata for nonreported occupations.

Two methods of computation proved necessary to carry out all of the calculations for both the ten major occupational groups and 119 detailed occupations. For the broad occupational groupings two sets of results are available; one was obtained directly by computation with a desk calculator and the other is a byproduct of electronic computer calculation of the detailed occupations.[8] Because the latter method used Professor Jaffe's estimates as controls, and thus assured greater comparability with his results for earlier years, the discussion of the ten major occupational groups is based mainly on the computer output. Since the computer program does not provide mobility, entry, or retirement rates by age, the desk calculator was needed to estimate these values for the major occupational groups. The

[8] The project was well under way as a manual operation before it was learned that Professor Jaffe had produced a computer program for the model, which he generously made available to the author. The original procedure was continued as a learning process that would assist in understanding the behavior of the model and interpreting results.

exact magnitudes of the results actually differ slightly between the two techniques, but do not significantly affect the patterns and interrelationships.

Occupational Change and Mobility, 1950–1960

The general pattern of occupational change in the decade 1950–60 is presented in Table 1, which shows for each of the ten major occupational groupings the absolute and relative changes in the size of the occupation and estimates of the size of each of the four components of change. For the male labor force[9] as a whole only two types of events take place — accessions through new entries into the labor force and separations because of death or retirement. The relationship among these components provides a rough indication of intercensal turnover in the labor force, "rough" because the model does not permit estimation of the withdrawals and subsequent re-entries into the labor force during the decade. Thus the net change in the size of the labor force, about 7.3 per cent, is less than a third (28.5 per cent) of the new entries for the decade; or, since total new entries equal the algebraic sum of deaths, retirements, and net changes in the size of the labor force, more than 7 of every 10 new entrants during the decade were needed to replace men who left the labor force because of death or retirement. New job opportunities thus absorbed only about a third of the 1950–60 growth of the labor force.

For each of the occupational groups, however, these general relationships do not hold. Net change in the size of an individual occupation during the decade results from a balance between new entries and separations which now include movement into or out of other occupations as well as deaths and retirements. When net mobility is added to account for the decade change in the size of an occupation, various distinctive patterns of occupational change emerge. Although all but three of the ten occupations grew more rapidly than the labor force as a whole during the decade, net mobility behaved differently among these growing occupations. Professional and technical workers, nonfarm managers and proprietors, and craftsmen and foremen each acquired substantial numbers of workers from other occupational groups. Clerical and sales workers, operatives and laborers, both farm and nonfarm, on the other hand, were obviously major ports of entry into the labor force, but during the decade all of these also experienced net losses in the flow of workers between occupations. The combined influence of deaths and retirements also varied among the occupational groups. For example, deaths and retirements together accounted for more than half of the decline in the size of the farmers and farm managers group, but among farm

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[9] Hereafter, all references to the "labor force" will be understood, unless specified, as the male civilian labor force.

Table 1. Estimated Components of Occupational Change, Experienced Male Labor Force, 1950–1960

Occupation	1950	Net Change, 1950–1960	Percent of 1950	New Entries	Deaths	Retire- ments	Net Mobility
All occupations	42,265.6	3,084.0	7.3	9,567.5	2,559.2	4,028.0	—a
Professional, technical & kindred workers	3,076.0	1,643.9	53.4	790.3	133.4	196.9	1,184.0
Farmers & farm managers	4,222.2	-1,796.9	-42.5	203.7	494.8	643.9	-861.9
Managers, officials & proprietors	4,373.1	467.7	10.7	327.2	426.0	510.7	1,077.3
Clerical & kindred workers	2,749.7	531.6	19.3	859.1	91.7	187.3	-48.5
Sales workers	2,673.4	509.3	19.1	991.6	114.9	147.3	-220.1
Craftsmen, foremen & kindred workers	8,074.3	1,299.1	16.1	1,278.0	503.4	839.7	1,364.1
Operatives & kindred workers	8,737.1	990.4	11.3	2,231.2	227.0	680.6	-322.3
Service workers	2,614.6	297.6	11.4	726.2	293.3	320.6	147.9
Farm laborers & foremen	2,063.8	-722.1	-35.0	985.1	37.5	137.2	-1,532.5
Laborers except farm & mine	3,681.4	-146.5	-4.0	1,175.1	237.2	363.8	-788.0

Source: Appendix Table I.
a Because of rounding errors, algebraic sum may be greater or less than zero.

laborers and foremen these two components contributed less than a fourth of the separations. Retirements, on the other hand, outnumbered deaths in all ten occupations.

Are these interrelationships among the components of occupational change stable from decade to decade? Detailed analysis of this question will be found in Appendix Table I. To facilitate presentation of decade-to-decade changes in the pattern of occupational change, Table 2 has been prepared to show the numerically dominant component of occupational change for each of the ten major occupational groups for each of the three decades, 1930–40, 1940–50, and 1950–60. Stability measured in terms of the largest single component of change characterizes half of the ten occupational groups. In four of these groups the same component — new entrants to the labor force — is dominant; in the fifth — the professional and technical occupations — net in-mobility dominates change in each decade. In each of the other major occupational groups, some shifts occur in the relative importance of the various components during the three decades and from decade to decade, but the overall picture is one of relative stability in the structure of occupational change. To some extent, the shifts among the components may reflect short-term influences such as the general level of economic activity; for example, in 1940–50 and 1950–60 the dominance of in-mobility in the craftsmen, foremen group could have reflected the wartime and postwar shortages of fully trained skilled manpower and the consequent upgrading of workers in other occupations.

Table 2. Largest Single Components of Net Occupational Change, by Occupation and Decade, 1930–1940, 1940–1950, 1950–1960

Occupation	1930–40	1940–50	1950–60
Professional, technical & kindred workers	In-Mobility	In-Mobility	In-Mobility
Farmers & farm managers	Death	Death	Out-Mobility
Managers, officials & proprietors	Death	In-Mobility	In-Mobility
Clerical & kindred workers	New Entries	New Entries	New Entries
Sales workers	New Entries	New Entries	New Entries
Craftsmen, foremen & kindred workers	Deaths	In-Mobility	In-Mobility
Operatives & kindred workers	New Entries	New Entries	New Entries
Service workers	New Entries	New Entries	New Entries
Farm laborers & foremen	New Entries	Out-Mobility	Out-Mobility
Laborers except farm & mine	New Entries	Out-Mobility	New Entries

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There are also interesting decade-to-decade changes in the occupational distributions of *each* of the components of change. Table 3 shows the changes that have taken place in these distributions. Necessarily, since in each decade net mobility for the labor force as a whole is zero, the distributions for the in-mobility and the out-mobility occupations are shown separately. Except for deaths, the occupational distribution of any given component of change appears to be closely related to changes in the relative share of the occupation in the labor force — or to changes in the size of the occupation. Although not proportionate, increases or decreases in the share of new entries vary with changes in the beginning-of-decade share of the occupation in the labor force. A similar relationship may be observed in the decade-to-decade changes in the occupational distribution of retirements; except for sales workers (a slowly growing occupation for male workers), increases in the occupational share of retirements are associated with increases in the occupation's share of the beginning-of-decade labor force.

The decade-to-decade change in the pattern of net mobility, although also associated with changes in the size and share of occupations, is more varied. Declining occupations were the heavier losers of mobile workers in all three decades, but two growing occupations — sales workers and operatives and kindred workers — increased their contributions to the total of out-mobility between 1930–40 and 1950–60. Even between the two unskilled occupations there were differences in their mobility patterns over the thirty-year period. Although each contributed disproportionately to out-mobility, the nonfarm laborer pattern is more erratic than that of his farm counterpart. The rise in out-mobility among nonfarm laborers in the 1940–50 decade probably reflected the increased opportunity for occupational upgrading offered by the tight labor markets during most of that period.

Perhaps the most interesting aspect of Table 3 is the change in the dispersion of net mobility over the three decades. Out-mobility is concentrated among three major occupation groups in the 1930–40 decade, but dispersed among six occupations in the 1950–60 decade. The reverse pattern, of course, may be observed in the distribution of in-mobility, with four occupations (each of which increased its share of the labor force) absorbing the total of inter-occupational movement in the 1950–60 period.[10]

The foregoing observations suggest that the occupational distribution of a component of change over a decade, or between decades, may itself be a function of the relative size and rate of growth of the occupation. The importance of any component of change in accounting for changes in any given occupation, therefore, may be under- or overstated unless allowance is made for difference in the size of the occupation. Therefore, in Appendix

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[10] For a more detailed analysis and possible explanation of this phenomenon, see Part II.

Table 3. Occupational Distribution of the Components of Occupational Change, 1930–1940, 1940–1950, 1950–1960

	Number at Beginning of Decade			New Entries			Deaths		
	1930–40	1940–50	1950–60	1930–40	1940–50	1950–60	1930–40	1940–50	1950–60
All Occupations	37,448.3	39,083.9	42,265.6	9,737.6	9,944.3	10,775.1	5,449.5	4,021.4	3,806.9
	(in percent)			(in percent)			(in percent)		
Professional, technical & kindred workers	4.6	5.7	7.3	3.8	4.9	8.3	4.8	5.6	5.2
Farmers & farm managers	15.0	13.0	10.0	6.4	5.1	2.1	17.6	20.4	19.3
Managers, officials & proprietors	9.5	8.7	10.3	2.8	3.0	3.4	12.0	12.0	16.6
Clerical & kindred workers	5.6	5.8	6.5	6.8	8.2	9.0	4.6	4.4	3.6
Sales workers	5.7	6.0	6.3	6.3	7.1	10.4	5.5	5.3	4.5
Craftsmen, foremen & kindred workers	16.4	15.3	19.1	9.7	12.4	13.4	17.6	17.3	19.7
Operatives & kindred workers	15.5	18.3	20.7	21.4	24.7	23.3	13.2	13.0	8.9
Service workers	4.8	6.1	6.2	5.3	5.1	7.6	5.5	6.9	11.5
Farm laborers & foremen	9.6	8.4	4.9	21.0	16.3	10.3	6.2	4.5	1.5
Laborers except farm & mine	13.3	12.6	8.7	16.3	12.9	12.3	13.0	10.5	9.3

Source: Appendix Table I.

Table 3, continued

	Retirements			Out-Mobility			In-Mobility		
	1930–40	1940–50	1950–60	1930–40	1940–50	1950–60	1930–40	1940–50	1950–60
All Occupations	2,652.5	2,610.1	3,893.6	2,547.4	4,355.1	3,427.2	2,547.4	4,355.1	3,427.2
	(in percent)			(in percent)			(in percent)		
Professional, technical & kindred workers	3.3	4.2	4.9	—	—	—	20.0	15.7	31.4
Farmers & farm managers	20.3	25.0	16.0	—	—	22.8	13.3	2.2	—
Managers, officials & proprietors	13.5	11.7	12.7	—	—	—	22.5	33.4	28.6
Clerical & kindred workers	3.7	3.3	4.6	4.9	2.1	1.3	—	—	—
Sales workers	5.2	4.2	3.7	—	0.3	5.8	0.9	—	—
Craftsmen, foremen & kindred workers	17.7	16.6	20.8	—	—	—	12.3	46.1	36.2
Operatives & kindred workers	11.3	10.9	16.9	—	2.4	8.5	11.8	—	—
Service workers	3.6	4.0	8.0	—	—	—	18.8	2.6	3.9
Farm laborers & foremen	6.4	4.9	3.4	73.0	56.6	40.6	—	—	—
Laborers except farm & mine	14.8	15.2	9.0	22.1	38.6	20.9	—	—	—

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Table II, we have calculated for each of the three decades and each major occupational group new entries, deaths, retirements, and net mobility, respectively, as percentages of the numbers in the occupation at the beginning of the decade. The sum of net changes in each occupation is also shown as a percentage of the numbers at the beginning of the decade, to facilitate comparison between decades and between occupations. The results indicate, with few exceptions, substantial decade-to-decade stability in the components of change, including net mobility. Except for farm and nonfarm managers, new entries account for a greater proportion of net change in the size of an occupation than either deaths or retirements in each decade, and the decade-to-decade changes in the percentages of each of these components in any given occupation do not vary as markedly as the occupational distributions of the components between the decades. On the other hand, this analysis illuminates the key role played by occupational mobility in the change in size of occupations and the occupational distribution. The absence of a consistent pattern from decade to decade suggests that mobility tends to be much more sensitive than any other component to short-run influences such as the business cycle or wartime manpower mobilization.

Examination of the interrelationships among the components over the three decades allows insight into the total process of labor force turnover and growth. For this purpose, new entries and net in-mobility are viewed as accessions, and deaths, retirements, and out-mobility as separations. For the entire period, the data for the labor force as a whole indicate a decline in turnover resulting from replacement need, i.e., because of deaths and retirements, and by implication, a corresponding increase in net job growth. Estimated replacement need absorbed more than 80 percent of the new entries in the 1930's but only 69 percent in 1950–60. In the intervening decade, a period of substantial manpower shortage, the ratio of deaths and retirements to new entries declined to almost 67 percent. That these developments occurred mainly through additional job growth is suggested by the very slight decline in the percentage of deaths and retirements at the beginning of each decade. The percentages for each of the successive decades were 21.6, 17.0, and 19.8.

The interdecade variability in the pattern of mobility among the occupations, as already indicated, is the most pronounced effect and remains so when the contribution of mobility to either accessions or separations is calculated. Except for professional and technical workers and nonfarm managers, and craftsmen in the 1940–50 decade, new entries account for the majority of accessions to the individual occupations, but with no pronounced trend in the contribution of in-mobility in any occupational group. Among the components that account for separation from occupations, the main feature of the three-decade period is the rise in the importance of retirements. In

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every occupation retirements as a percentage of total separations show a steady increase between 1930–40 and 1950–60. For the labor force as a whole, retirements as a percentage of separations increased from 33 to 61 percent over this period. Generally, blue-collar occupations increased their percentage of retirements to total separations more rapidly than white-collar occupations. The largest percentage increase in the proportion of retirements in any single occupation, however, was among clerical and kindred workers, with a 96 percent increase in the retirement proportion between the 1930–40 and 1950–60 decades.

The increasing importance of retirements in labor force separations undoubtedly reflects the combined influence of increased life expectancy and the introduction of public and private income maintenance programs for older workers. Variations in the relative number of retirements among occupations depend on the age distribution of the occupation and prevailing practices in the industries in which the occupations tend to be concentrated. Additional analysis is provided in Part II of this monograph for the influence of age distribution on the relative number of retirements. A general view of the demographic aspect of retirement, however, may be afforded by looking at the interdecade trend by occupation in the ratio of deaths to retirements. In Table 4, the decline in this ratio for the labor force as a

Table 4. Ratio of Deaths to Retirements, by Occupation, 1930–40, 1940–50, 1950–60

Occupation	1930–40 Ratio	1940–50 Ratio	1950–60 Ratio	Percent Change, 1930–40 to 1950–60
Professional, technical & kindred workers	2.9	2.0	0.7	−75.8
Farmers & farm managers	1.8	1.3	0.7	−61.1
Managers, officials & proprietors	1.8	1.6	0.8	−55.5
Clerical & kindred workers	2.5	2.1	0.5	−80.0
Sales workers	2.2	1.9	0.8	−63.6
Craftsmen, foremen & kindred workers	2.0	1.6	0.6	−70.0
Operatives & kindred workers	2.4	1.8	0.3	−87.5
Service workers	3.1	2.7	0.9	−70.9
Farm laborers & foremen	2.0	1.4	0.3	−85.0
Laborers except farm & mine	1.8	1.1	0.7	−61.6
All Occupations	2.0	1.5	0.6	−70.0

Source: Appendix Table I

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whole and for the individual occupations is dramatically plain. Generally, the decline has been greater for blue-collar than for white-collar workers and among those occupations with substantial proportions of wage and salary workers. Lack of social provision for retirement and a high proportion of self-employed, respectively, probably account for the more modest declines in the death-retirement ratio among managerial and sales workers.

Correlates of Occupational Change

Thus far in the discussion, we have shown the substantial diversity in the patterns of occupational change, both in the distribution of the major components of change within occupational groups and in the occupational distribution of each of the components. Another major objective of the analysis is to discover whether there are systematic and significant relationships between various components of change and changes in the size of occupations. Here we repeat for the decade 1950–60 the analysis performed by Jaffe and Carleton for the earlier decades in an effort to discover whether similar relationships hold in the more recent period.[11] We follow the same convention of analyzing only the relationship between new entries, retirements and net mobility to change in the size of an occupation, on the ground that changes in death rates do not influence changes in labor market requirements. The rank-order correlations for the three decades are shown in Table 5.

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[11] *op. cit.*, pp. 26–27.

Table 5. Rank-Order Correlations Between Change in Occupational Size and Selected Components of Change, 1930–1940, 1940–1950, and 1950–1960

Percent Change in Occupation Size and —	1950–60	1940–50[b]	1930–40[c]
1. Percent Distribution of New Entries	.15***	−.29***	−.20***
2. Retirement Rates	−.89*	−.53***	−.76*
3. Net Mobility Rates[a]	.70*	.62**	.42***

*Significant at .05 level.
**Significant at .10 level.
***Not Significant.

[a] Net mobility as percent of number in the occupation at beginning of decade; out-mobility ranked in inverse order.
[b] Jaffe and Carleton, p. 27.
[c] Calculated from Appendix Tables I and II.

The results of this analysis generally accord with those developed by Jaffe and Carleton, although statistical significance among the components varies.[12] The changes in the occupational distribution of new entries and the intercensal growth of an occupation are weakly associated, if at all, in any of the three decades. This result comes as no surprise since, as already shown in Table 3, new entries tend to be concentrated in a few occupations in all three decades. On the other hand, the independence of the two variables points to a probably greater relative importance of the other components in the process of occupational growth. As in the earlier two decades, retirements and occupational change in 1950–60 continued to be inversely correlated; indeed, the value of this correlation is higher in this period than in the two previous decades. The greater retentive power of growing occupations implied in this negative association between retirements and changes in the size of occupations is consistent with the close positive association of occupational growth and changes in the volume and rate of net mobility. The role of retirement may also explain the puzzling fact that the volume of net mobility in the 1950–60 decade was less, absolutely as well as relatively, than in 1940–50, despite the increase in the size of the labor force between the two decades. Since the relative volume of new entries increased only slightly, and deaths decreased, the most obvious possibility is that the stronger association between net mobility and occupational size in 1950–60 derives much of its strength from the inter-decade increase in retirement rates and the consequent need to replace retired workers. The negative sign of the coefficient of rank correlation[13] between retirements and net mobility in 1950–60, however, indicates that growing occupations both retain relatively larger numbers of workers and recruit larger numbers from other occupations.

Effects of Earnings and Industrial Change

With the exception of deaths, each of the other three components of occupational change is a type of labor mobility. Entering or leaving the labor force, or changing one's occupation, reflects a choice presumed in labor market theory to be determined by weighing the net advantages of change in status against the net advantages of no change. Although two of the three components may also involve coercion rather than worker preference — in practice, both net mobility and retirement are frequently involuntary — it is of interest to determine the degree of association between the rate

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[12] Jaffe and Carleton reported no tests of statistical significance, but treated their findings as general tendencies. The test used here calls for a value of $r_s < -.648$ or $> .648$ for $n = 10$, at the .05 level of significance. Philip J. McCarthy, *Introduction to Statistical Reasoning* (McGraw-Hill, 1957), p. 383.
[13] $r_s = -.70$, significant at the .025 level.

and direction of change in a component and a measure of differential advantage. Literature on this topic provides two competing hypotheses concerning the causal factor that should predict the direction of movement: the classical wage difference thesis, which predicts that workers will move from lower to higher wage employment; and the so-called job vacancy thesis which explains mobility as a response to employment opportunities.[14] In this section tests are made of both hypotheses.

Tested against the hypothesis that mobility is a function of earnings differentials, only net mobility in two of the three decades conforms to the expected relationship. Table 6 shows that the intercensal rates of net mobility in 1940–50 and 1950–60 correlate positively with differences in occupational earnings levels.[15] Although the association between earnings and the rate of new entries is not statistically significant, the negative relationship may fit more closely the competing hypothesis that mobility depends on job opportunities rather than earnings levels. Since new entries are concentrated in the younger age groups, however, their relative lack of skill, experience and tested knowledge of the labor market would tend to distribute them disproportionately through those occupations where earnings levels roughly

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[14] Both hypotheses are succinctly described and empirically tested in the context of geographic mobility in Robert L. Raimon, "Interstate Migration and Wage Theory," *Review of Economics and Statistics,* vol. 44 (November 1962), pp. 428–438. Raimon's conclusions indicate that the two hypotheses are complementary rather than competitive, but that the wage difference hypothesis provides a more comprehensive and more useful explanation of mobility patterns.

[15] Net mobility, retirement and new entry rates were measured as percentages of the beginning-of-decade level of employment in an occupation. Earnings are median annual earnings in an occupation for the year preceding the terminal year of the decade.

Table 6. Rank-Order Correlations, Terminal Year[a] Earnings and Selected Components of Occupational Change, 1930–1940, 1940–1950, 1950–1960

Component	1930–40	1940–50	1950–60
New Entries	−.133**	−.394**	−.345**
Retirements	.109**	.188**	−.188**
Net Mobility	.352**	.745*	.867*

Sources: Earnings. 1939, *U.S. Census of Population: 1940,* vol. III. *The Labor Force,* part 1, U.S. Summary, Table 72; 1949, *U.S. Census of Population: 1950,* vol. IV, *Occupational Characteristics,* Table 23; 1959, *Statistical Abstract of the United States, 1965,* Table 316. Components of change, Appendix Table II.

* Significant at 0.05 level.

** Not significant.

[a] 1939, 1949, and 1959.

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conform to their imputed marginal value product and supply prices, irrespective of relative differences in employment opportunities.

Little remains to be said of the remaining aspects of the role of earnings and mobility, as reflected in Table 6. The relationship with retirement rates is not only weak but also varies in direction between the decades. With respect to differences in the strength of earnings-mobility relationships between the decades, again the limited number of observations is only suggestive of the influence of differences in the levels of economic activity, with association between occupational differences in earnings levels and any of the three components of change appearing generally weaker in the depression decade than in either of the two later decades. It should also be noted that the relationship between interoccupational mobility and earnings has been tested here with only one of two mobility measures available in this model. Because accessions and separations have been treated as on a continuum, the degree of association of each of these types of mobility with differences in earnings remains ambiguous. One possibility is that such a measure masks the extent to which differences in earnings act independently of employment changes in accounting for occupational differences in mobility rates. In Part II, this difficulty is examined further in the light of a more discriminating analysis made possible by data on detailed occupations.

According to the job-vacancy hypothesis, occupational mobility would be a function of changes in employment opportunities. Changes in employment opportunities for any occupation generally occur either because of differences in the growth of employment among industries or changes in the occupational composition of industries from other factors such as technological or organizational change. Studies of the 1950–60 decade strongly support the conclusion that differences in the rates of growth among industries explain most of the change in the occupational distribution of employment that took place during the decade.[16] Manpower projections also rely heavily on the assumption that occupational employment patterns *within* individual industries will tend to remain quite stable. But what may be true with respect to net change in the size of an occupation does not necessarily hold for the components that contribute to that change. For this reason, an effort was made to assess the degree to which the components of occupational change estimated by the model for 1950–60 were independent of the influence of changes in the size of industries. Census data are not available for a similar analysis of the two earlier decades.

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[16] Ewan Clague, "Effects of Technological Change on Occupational Employment Patterns in the United States," in OECD, *The Requirements of Automated Jobs* (Washington, 1964), Table 3, p. 109; National Commission on Technology, Automation and Economic Progress, *Technology and the American Economy,* vol. I, Appendix 1, "The Outlook for Technological Change and Employment," (February 1966), pp. 178–179.

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Analysis of the association between changes in employment levels by industry and the components of occupational change was made by constructing an index of occupational variance. The index is based on the assumption that the relative net change in the size of an occupation is a function only of the change in industry employment, with the corresponding expectation that the direction and percentage change of industrial and occupational employment would be identical for the period, 1950–60. The index value for any given industry-occupation pair is a ratio of the algebraic difference between the percent change in industry employment and the percent change in occupational employment in the industry to the percent change in industry employment taken without regard to sign. The algebraic sum of the industry-occupation indexes provides the index value for the occupation. Such computations were made for each of the ten major occupational groups and sixteen major industry groups, using changes in male employment by occupation within industries for consistency with the measures of the components of occupational change. The occupation indexes for the major occupations are shown below in Table 7; the industry-occupation indexes are displayed in Appendix Table V.

Table 7. Index of Occupational Variance, Employed Males, 1950–1960

Occupation	*Index of Variance*[a]
Professional, technical & kindred workers	17.93
Managers, officials & proprietors	4.64
Farmers & farm managers	0.10
Clerical & kindred workers	15.08
Sales workers	26.60
Craftsmen, foremen & kindred workers	2.34
Operatives & kindred workers	5.72
Service workers	27.82
Farm laborers	[b]
Laborers, ex. farm	1.963

Source: Appendix Table V
[a] Without regard to sign.
[b] Less than 0.01.

Taken by themselves these indexes are of some interest in pointing to the varying independent influence of changes in the level of industry employment on changes in the size of occupations. The values derived for the so-called white-collar occupations generally indicate a wide departure from the expectation that industry growth or decline accounts for most of the growth or decline in an occupation, while the manual occupations conform much

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more closely to that expectation.[17] Technological innovation, changes in the organization of work, and changes in the size of establishments very likely are among the factors that account for the variability of the indexes for the former group of occupations. For all of the occupational groups, the largest departures from the expected association were found in transportation, business and repair services, retail trade, telecommunications, construction, and agriculture, forestry and fisheries. Relatively low indexes of occupational variance were characteristic of most occupations in finance, insurance and real estate, public administration, professional and related services, utilities and sanitary services, and both durable and nondurable goods manufacturing industries. Despite these interindustry differences in the degree of stability of occupational structure, they are not offsetting. A statistically significant coefficient of rank correlation was found between the index of occupational variance and relative net change in the sizes of the occupational groups.[18]

The coefficient of rank correlation proved to be significant for only one of the three components of occupational change. The values of the coefficients of the following components, each of which was measured as a percentage of the 1950 levels of occupational employment and ranked against the measure of relative occupational variance, were:

New entries	.1152
Retirements	−.4485
Net mobility	−.5757

Though only the value for net mobility was statistically significant, the coefficient for retirements closely approaches significance. New entries clearly have little significant association with occupational variance. This difference among the components would at first seem to be in accord with the common sense view of the labor market that the behavior of experienced workers changing jobs or withdrawing from the labor force might be expected to be occupationally specific. New entrants, on the other hand, would be more responsive to general or industry-wide changes in employment opportunities. The negative sign of the coefficients for retirements and net mobility, however, disturbs this interpretation. If occupational variance and the behavior of these two components were really associated, the negative sign would mean that a substantial degree of independence between changes in the level of industry employment and changes in the size of occupations is adverse to quickened rates of retirement or to the propensity of workers to change jobs. It would be speculative to infer from such data

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[17] It should be noted, however, that occupation and industry are virtually identical for farmers and farm managers and the farm laborers.

[18] For this correlation, $r_s = .7697$, significant at the 0.05 level.

alone that workers near retirement age or even those with some labor market experience are necessarily less adaptable to technological and similar changes in occupational structure. We have no way of assessing the effects on mobility and retirement rates had occupational employment levels been almost entirely a function of changes in the levels of industry employment.

Age and the Components of Occupational Change

All labor market and labor mobility studies clearly indicate that age is an important predictor of occupational status and change. Age in this model discriminates between the components of occupational change, and the age distribution of the population and labor force, other factors constant, controls the relative contribution of each of the components to the net change in the size of the labor force. Other factors usually do not remain constant, however, and their influence on changes in the occupational distribution of the labor force over a decade will be reflected largely in the experience of the various age cohorts. Age-occupation patterns of new entries, retirements and interoccupational mobility should enable us to understand and interpret more clearly the process of occupational change during the 1950–60 decade. Comparison of the age patterns of this decade with those of earlier decades should add a further dimension to understanding. Each age cohort may be expected to have a pattern of occupational change different from that of every other age cohort in a given census period and also from that of its counterpart in earlier periods. We may also trace to a limited extent occupational working-lifetime patterns by examining the experience of particular age cohorts over the three-decade period, 1930–60. This latter analysis is pursued in the succeeding section.

One of the marked trends in the labor force during the past few decades has been the rise in the average age of entry, resulting mainly from the tendency of boys and young men to remain in school until later ages. Deferment of labor force entry continued during the decade of the 1950's but at a relatively slow rate. Jaffe and Carleton reported that in 1950, half the boys had entered the labor force by age 18.[19] Similar calculations for 1960 show continuation of this movement toward later entry; by age 18 in 1960, 47.5 percent of the boys were in the labor force.

Table 8 shows the occupational distribution of new entries by age for three decades, including the period 1950–60. It will be noted that each of the major occupation groups has a characteristic age profile, although the occupational distribution of new entries for any given age cohort varies from decade to decade. In general, the proportion of new entries increases

[19] *op. cit.,* p. 30.

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Table 8. Percentage Occupational Distribution of New Entries into Male Working Force, by Age, 1930–1940, 1940–1950, & 1950–1960

(Age at beginning of decade)

Occupation	1930–1940					1940–1950				
	5–9 years	10–14 years	15–19 years	20–24 years	5–24 years	5–9 years	10–14 years	15–19 years	20–24 years	5–24 years
Professional, technical & kindred workers	0.9	3.2	6.6	11.6	3.9	1.8	4.1	7.1	14.7	4.9
Farmers & farm managers	2.4	5.5	10.5	15.8	6.4	3.0	4.4	7.1	10.4	5.2
Managers, officials & proprietors	0.5	2.1	5.1	11.4	2.8	0.9	2.4	4.4	10.7	3.0
Clerical & kindred workers	5.9	7.9	6.5	1.2	6.9	7.1	8.6	9.2	5.8	8.3
Sales workers	6.9	6.1	6.2	6.2	6.3	9.6	6.3	5.6	5.4	6.8
Craftsmen, foremen & kindred workers	4.4	8.8	15.4	18.5	9.8	6.1	12.1	16.4	23.4	12.6
Operatives & kindred workers	17.2	22.8	22.9	22.2	21.5	21.0	25.6	27.9	25.1	25.3
Service workers	6.1	5.0	5.0	7.0	5.3	7.9	4.9	3.5	2.1	5.0
Farm laborers & foremen	33.3	21.4	6.5	—	20.7	28.2	18.0	6.3	—	15.9
Laborers except farm & mine	17.3	17.2	15.4	6.1	16.4	14.5	13.6	12.4	2.4	13.0
All Occupations	99.9	100.0	100.1	100.0	100.0	100.1	100.0	99.9	100.0	100.0

Table 8 (continued)

Occupation	1950–1960					Change, Ages 5–24	
	5–9 years	10–14 years	15–19 years	20–24 years	5–24 years	1940–50 to 1950–60	1930–40 to 1940–50
Professional, technical & kindred workers	2.7	8.8	14.0	22.1	9.8	3.9	1.0
Farmers & farm managers	1.7	1.9	3.4	6.3	2.6	−2.6	−2.2
Managers, officials & proprietors	1.1	3.3	6.0	11.2	4.1	1.1	0.2
Clerical & kindred workers	8.4	9.6	9.5	6.5	9.0	0.7	1.4
Sales workers	14.5	7.0	4.0	5.4	7.9	1.1	0.5
Craftsmen, foremen & kindred workers	8.1	14.5	21.2	27.2	15.7	3.1	2.8
Operatives & kindred workers	20.8	26.0	27.4	17.7	24.4	−0.9	3.8
Service workers	10.2	5.7	3.1	3.0	5.9	0.9	−0.3
Farm laborers & foremen	15.7	12.6	4.0	—	10.0	−5.9	−4.8
Laborers except farm & mine	16.7	10.6	7.4	0.6	10.4	−2.6	−3.4
All Occupations	99.9	100.0	100.0	100.0	99.8		

Sources: 1930–1940, 1940–1950, Jaffe and Carleton, Table 8, p. 29; 1950–1960 calculated.

with age in the more highly skilled occupations, while the reverse is true for the less skilled groups. This pattern remains largely unaffected throughout the period, and is apparently little influenced by changes in the absolute share of the occupations in the total of new entries.

Changes in the occupational structure of new entries during the 1950's were much more extensive than in either of the two previous decades. These changes generally followed the changes in the occupational structure of the labor force as a whole, which has attracted much recent attention and study of the underlying factors. The white-collar occupations and the craftsmen gained to a much greater extent than in the 1940's (see Table 8) while manual workers and the agricultural occupations had declines in their shares of new entries. Thus, the lesser skilled occupations continued to account for the larger share of new entries in the 1950's, but their relative position had been seriously undermined as technological changes and shifts in the industrial composition of employment reduced the number of job opportunities and the inducements to enter the labor force through these occupations.

Each occupational group has its own particular age distribution. In general, the more highly skilled occupations, as Table 9 shows for 1950–60, drew the largest numbers of new entries from the older age cohorts, reflecting the longer periods of education or formal preparation necessary for entry. As a result the median age of entry varied widely among the occupational groups, with a spread of almost six years between service workers and professional and technical workers. A distinct reduction in the modal age of entry, however, occurred between the 1940–50 decade and the 1950–60 decade. For the earlier period, Jaffe and Carleton found that the ten occupational groups divided into two modal age cohorts, with average intercensal ages of 20–24 and 15–19. The latter age cohort included all occupations except the professional and managerial groups. In the 1950–60 decade, sales workers, the service occupations, and nonfarm laborers drew their largest numbers of new entries from the cohort whose average cohort age during the decade was between 10–14 years. Two of these occupations grew more rapidly than the labor force as a whole in 1950–60, while the sharp decline among nonfarm laborers during the previous decade was brought to a near halt. The most likely explanation of the shift is that the 1950–60 decade was one of relative labor stringency for the youngest age cohorts, whose numbers had been reduced by the low birth rates of the late 1930's and the disruption of family life during the war years. Thus jobs filled by somewhat older boys in earlier decades now became available to their younger brothers. A growing interest in combining schooling with part-time work was also a probable influence on the shift in the age pattern.

When changes in the relative shares of new entries are analyzed over the three decades in terms of both the age variable and time, the general

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Table 9. Percentage Age Distribution of Survived New Entries, by Occupation, 1950–1960
(*Age at beginning of decade*)

Occupation	Total 5–24	Age 5–9	Age 10–14	Age 15–19	Age 20–24	Total 5–24	Median Age	Mean Age
				(in percent)				
Professional, technical & kindred workers	1,014.3	7.2	34.3	36.9	21.6	100.0	16.1	15.6
Farmers & farm managers	277.2	16.8	26.5	31.3	25.3	99.9	16.1	15.2
Managers, officials & proprietors	432.5	7.1	30.4	36.7	25.7	99.9	16.7	16.0
Clerical & kindred workers	933.8	24.7	40.6	26.2	8.6	100.1	13.1	12.9
Sales workers	826.3	47.9	33.2	11.1	7.8	100.0	13.2	10.9
Craftsmen, foremen & kindred workers	1,639.5	13.5	34.9	34.1	17.4	99.9	15.2	14.8
Operatives & kindred workers	2,519.4	22.6	40.6	28.0	8.9	100.1	13.4	13.2
Service workers	611.6	45.4	36.8	11.5	6.3	100.0	10.6	10.9
Farm laborers & foremen	1,007.6	42.6	49.2	6.5	1.7	100.0	10.7	10.4
Laborers except farm & mine	1,079.8	42.1	38.6	16.5	2.8	100.0	11.0	11.0
All Occupations	10,342.0	26.4	38.1	24.5	11.0	100.0	13.1	13.0

patterns described above tend to disintegrate. Each occupational group seems to have its own distinctive pattern of change in the age distribution of new entries independent of interdecade changes in the relative share of the occupation in the distribution of new entries. Four occupations show a distinct association between age and changes in the share of new entries between the decades. Professional, technical and kindred workers, and the craftsmen and kindred group both exhibit a positive association between age and the amount of change in the relative share of new entries in the two periods, 1930–40 to 1940–50 and 1940–50 to 1950–60. For the craftsmen, however, this association is more noticeable in the earlier period, while the association is more pronounced for the professional and technical workers in the later period. Both of the agricultural occupations, farmers and farm managers and farm laborers, also show a consistent pattern between age and change in the share of new entries in both periods. While these occupations experienced a decline in their respective shares of new entrants in both decades, their age patterns are mirror images: the managerial group sustained its largest losses of new entrants in the older age cohorts, while farm laborers and foremen lost more heavily in the very youngest age cohorts. Since the rates of decline in employment opportunities in these two occupational groups do not differ substantially between the various intercensal periods,[20] another factor — probably the level of educational attainment — may account for differences in the age pattern of new entries. Sales workers also show a consistent interdecade pattern of change in the age distribution of entries, but with differences between the younger and the older age cohorts. The ages 5–9 and 10–14 at the beginning of each decade increased their relative share of new entries in each of the interdecade periods, while the ages 15–19 and 20–24 either lost new entrants or recorded no change.

The remaining five occupational groups have a mixed pattern in terms of age and interdecade changes. In all of these groups — nonfarm managers, clerical workers, the service trades, and the semiskilled and unskilled manual workers — the pattern among the age cohorts is erratic in both periods and varies in direction of change between periods. For example, all age cohorts who entered the semiskilled operative group in the 1940's increased their relative share of the cohort's distribution of new entries, but with no apparent age trend. Similarly, the pattern was erratic in the 1950's but most of the age cohorts lost their relative share of new entries in this occupational group.

Although these findings on the relationship between age and new entries invite more extensive analysis, perhaps two conclusions emerge from the

[20] An exception is the 1940–50 period, when the rate of decline among farm laborers and foremen was twice that of farmers and farm managers. See Appendix Table II.

present analysis. First, the *age pattern* of new entries into an occupation is largely a function of the technical and educational requirements involved. Each of the four occupational groups with distinctive age patterns of entry in each of the three decades is relatively homogeneous in level of educational attainment or formal training required for entry, although the groups differ widely from each other in this respect. The occupations with mixed age patterns of entry tend to be more heterogeneous in their technical requirements, and rates of entry vary more markedly between decades. This interdecade variation suggests that entry into such occupations may also be more sensitive to short-term demand conditions in the labor market.[21] Second, the *occupational distribution* of new entries depends mainly on long-term trends in labor demand. Growing occupations tend to increase their share of new entries from decade to decade and in each age cohort, irrespective of the relative size of the age cohort in any decade. In declining occupations the share of each age cohort is smaller than in the earlier decade. Thus, it would seem that the labor supply since the 1930's has been adapting itself somewhat more readily to changes in demand. This conclusion must remain tentative, however, because of the interrelationship between entry into the labor force and the behavior of other components of occupational change. Between the two other components, retirement and net mobility, the latter may be more important and deserving of study of its age pattern.

Interoccupational Mobility and Age

As long as workers remain in the labor force, their occupational status depends on the decisions they make about how they will earn their livelihood. For some, such decisions result from more or less systematic career planning and take the form of direct entry into a lifetime occupation or, perhaps more often, an orderly sequence of occupational movements between the occupation of initial entry and the occupation with which they become identified for most of their working lives. Occupational choice for most workers, however, is probably more accidental, or at least more opportunistic. The underlying method of the model employed in this study cannot distinguish the various motives and determinants of mobility among occupations, but analysis of the age patterns of interoccupational mobility may establish some insight into the decision making process. In this section the age patterns of mobility in the 1950–60 decade are examined and compared with the patterns for earlier decades.

It is important to recall briefly one general and several particular prob-

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[21] This explanation appears to be consistent with the findings on the effects of earnings and industry growth discussed earlier, see above pp. 18–22.

lems in the measurement of mobility before presenting the analysis and find-ings. The general problem faced by all studies of mobility, including this one, is the lack of one correct measure of the rate for any given type of mo-bility. All such measures are related to the way the investigator chooses to classify the relevant population or the changes in status which the workers make in the specified period of time. For example, in this portion of our study, we are limited to ten broad occupational groups as well as to five-year age classes because of the need to provide comparability over several dec-ades. In a later section, we measure net mobility against the changes occur-ring in 119 detailed occupations during the 1950–60 decade; *a priori* this level of disaggregation of the data should give higher mobility rates and dif-ferent age patterns than those obtained from only ten very broad, occupa-tionally more heterogeneous groups.

Occupational mobility as measured in this model has two unique prop-erties; both stem from the concept of net mobility. Net mobility, in con-trast with gross mobility, is the difference between the volume of movements into an occupation and the number of movements out of the occupation. The first peculiarity is that this difference is an estimate of the number of persons who changed jobs rather than the number of job or occupational changes made. This measure probably understates the intercensal levels of mobility because any mobile member of the labor force would be recorded as making only one occupational shift during a decade, and because, by defi-nition, some portion of movements into an occupation are cancelled by an equal number of movements out of the occupation (for the labor force as a whole, as noted earlier, mobility is zero because of this property). The second unique property inherent in the model is the dependence of net mo-bility, for certain age cohorts, on the behavior of new entries and retire-ments, as the case may be. Generally, unless these cohorts lose or gain more members through net mobility than they gain or lose through new entries or retirements,[22] they will not be recorded as having net mobility. Net mo-bility for those age cohorts classified as exposed to new entries, or to retire-ments, occurs because the remaining difference between the numbers ex-pected and the numbers observed at the end of a decade in an age cohort, *after* accounting for new entries or retirements, has been redistributed. In other words, net mobility is derived from estimates of the uncounted or "negative" entries or retirements. Only for those age cohorts never younger than 25 or older than 49 during the decade, net mobility has the more con-ventional meaning of the difference between the gross movements among oc-cupations, since these age cohorts are not exposed to either new entries or

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[22] In the case of new entries, this property applies to those age cohorts age 24 or less at the end of a decade; in the case of retirements, it applies to those age cohorts age 41 and over at the end of a decade.

retirements.[23] As the result of the inability to distinguish the components of occupational change for all age cohorts through this model, the volume and rates of mobility are not observed in the conventional sense, but are measured estimates of the model's assumptions about the behavior of labor force participation rates. Therefore, one should not attempt to compare the mobility *rates* discussed here with those derived by other methods of study and investigation; only the patterns and direction of mobility may be properly compared.

We present first the age pattern of mobility for all occupations for 1950–60, and compare it with those of the two prior census periods. Since for the labor force as a whole the algebraic sum of in-mobility and out-mobility is zero, either may be used to measure the age-specific mobility rates. In Table 10, the total mobility rate for each age group is the ratio of the sum of in-movements to the numbers in the age cohort at the *end* of the decade.[24] The age pattern of mobility for 1950–60 is entirely consistent with the age pattern of the two earlier decades: mobility rates increase as workers reach the

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[23] For a fuller explanation and illustrations of the problem of measuring net mobility through the use of linear interpolation of occupational participation rates, see Jaffe and Carleton, *op. cit.*, pp. 89–90.

[24] For example, for the age cohort 10–14 in 1950, the mobility rate is the sum of the in-movements in all occupations made by that age cohort during the intercensal period, divided by the number of males, ages 20–24 in 1960.

Table 10.   Total Mobility Rates* for All Occupational Groups Combined,
1930–1940, 1940–1950, 1950–1960
(Age at beginning of decade)

Age	Male Working Force		
	1930–40	*1940–50*	*1950–60*
5– 9 years	.010	.011	.042
10–14 years	.067	.113	.085
15–19 years	.160	.212	.148
20–24 years	.157	.211	.164
25–29 years	.084	.162	.124
30–34 years	.051	.113	.086
35–39 years	.031	.079	.070
40–44 years	.028	.059	.040
45–49 years	.021	.050	.032
50–54 years	.021	.029	.022
55–59 years	.027	.025	.018
60–64 years	.048	.010	.051

Source: 1930–40 and 1940–50 data from Jaffe and Carleton, Table 9, p. 37.
* In-mobility as ratio of numbers in age-group at end of decade.

prime working ages and decline thereafter to very low mobility rates near the end of their working lifetimes. That the 1950–60 rates are somewhat lower than the rates for the super-full employment war decade, but higher than the age-specific rates for the depression years of the 1930's, indicates the varying influence of the level of economic activity on the level of mobility.[25]

Since, by definition, total in-mobility must equal total out-mobility, the direction of movement must vary among the occupational groups. As indicated earlier, there has been a substantial change in the interdecade pattern in this respect, with increasing occupational concentration of in-mobility. Further elaboration of this point may be helpful as background to the discussion of age patterns of occupational mobility. Whereas in the 1930–40 decade, seven occupations were net importers of male workers from other occupational groups, there were only four such groups in the 1950–60 decade.[26] In the later decade, these occupations included the professional and technical workers, nonfarm managers, craftsmen and foremen, and the service occupations. Three other occupations — clerical and kindred workers, farm laborers and foremen, and nonfarm laborers — have consistently been net export occupations over the entire 30-year period. Of the remaining three occupational groups, two — sales workers and operatives and kindred workers — shifted from being import to being export occupations between the 1930–40 and 1940–50 decades. Only farmers and farm managers became an export occupation, although a major one, in the 1950–60 decade. Thus, the structure of interoccupational mobility has changed relatively slowly and more in response to long-term trends in labor demand than to short-term phenomena such as war or depression.

Age patterns of interoccupational mobility varied markedly during the 1950–60 decade both in level and direction of change. Modal and peak rates of net mobility,[27] not surprisingly, tend to be reached at different ages for the various occupational groups, although each occupational group exhibits the general pattern of high mobility in the younger age groups and declin-

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[25] For the findings of other studies on this point, see Herbert S. Parnes, *Research on Labor Mobility* (Social Science Research Council, 1954), pp. 135–138.

[26] See Table 3, pp. 12–13.

[27] Age-specific mobility rates are estimated differently from total mobility, depending on the direction of change. For the in-mobility occupations, the rate is found by dividing the number of mobile workers for the age-occupation group by the sum of the expected numbers at the end of the decade of all of the out-mobility occupations in the specified age cohort, i.e., all those who could have moved into the given in-mobility occupation. For the out-mobility occupations, the rate is the ratio of those who moved out of the occupation during the decade to the expected numbers in the particular age-occupation group at the end of the decade. The expected end-of-decade numbers for both rates are those that would have occurred on the assumption of no net mobility. For an explanation of the rationale underlying these rates, see Jaffe and Carleton, *op. cit.*, pp. 96–99.

ing mobility with advancing age. Mobility appears to reach its peak level at later ages among the white-collar occupations than among the blue-collar occupations, but the latter maintain somewhat higher levels of mobility in most age cohorts. Whether an occupation is declining or expanding appears from the data (see Appendix Table III) to govern the direction of change. If the extremes of the age distribution are ignored, only three occupational groups — clerical and kindred workers, sales workers, and semiskilled operatives — show a varied age pattern of mobility; a fourth group, managers, officials, and proprietors, during the 1950–60 decade was an import occupation up to age 45–49, when a reversal of direction occurred.

Age-Occupation Patterns of Retirement

Earlier findings have provided a general picture of the role of retirement in occupational change. As a component of change in the occupational distribution of the labor force, retirements were shown to play an increasing role over the three decades. Occupational retirement rates were also shown to be negatively associated with rates of occupational change and, by implication, with the status and pay differences among the broad occupational groups.[28] Earnings for *all* members of an occupation and the occupational retirement rate, however, were not found to be significantly related, although there is evidence in other studies that low income or earnings or a decline in earnings may induce retirement among workers in the retirement-age classes.[29]

In this section we are concerned with the timing of the retirement decision, to the extent that it can be estimated with the data provided by the cohort-component model. We wish to ascertain whether or not the various occupational groups exhibit differences in the age at which workers retire, irrespective of occupational differences in the volume or level of retirements. Also we wish to learn whether or not typical retirement ages have changed over time, perhaps reflecting the influence of the growth of real income and the development of public and private retirement programs since the 1930's. In *both* the interoccupational and the temporal aspects, we disregard the in-

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[28] See also Lenore A. Epstein and Janet H. Murray, *The Aged Population of the United States* (Washington, 1967), pp. 102–103 and Table 8.2, p. 344; Bureau of Labor Statistics, *Private Pension Plans and Manpower Policy,* Bulletin No. 1359 (1963) pp. 30–32.

[29] The argument here would be that the retirement income available under public and/or private pension programs is a relatively higher proportion of pre-retirement income, so that the opportunity cost of retirement is small taking into account the physical effort and disutility of the jobs open to older workers in low-skilled, low-paying jobs. For evidence on this point, see M. J. Brennan, P. Taft, and M. B. Schupack, *The Economics of Age* (New York, 1967), pp. 175–178; also Lenore A. Epstein, "Early Retirement and Work-Life Experience," *Social Security Bulletin,* vol. 29 (March 1966), pp. 6–7.

fluence of changes in the age distribution of occupations on the overall occupational retirement rates considered in the previous analysis.[30]

We consider first the age pattern of retirement from the male labor force during the 1950–60 decade. For this purpose, only those members of the labor force who both survived to the end of the decade and retired are relevant, although this measure of retirement understates the estimated total number of retirements during the decade by about 12 percent.[31] For the labor force as a whole, retirement is heavily concentrated in the age cohorts 55–59 and 60–64 at the beginning of the decade, which together accounted for a little more than 70 percent of all retirements; the median cohort retirement age was 59. In short, by age 70 all but about 10 percent of those retiring during the decade had left the labor force.

Perhaps the most interesting aspect of the age pattern of retirement is that there is little occupational variation. The median age of retirement varied only fractionally among the occupations; farm laborers and foremen were the "youngest" retirees with a median cohort retirement age[32] of 58.5 while the highest median retirement age, 61.0, was in the service worker group. Mean ages of retirement differed from the medians in each of the occupations only by a fraction of one year, indicating that the age dispersion of retirement among the occupations was also very similar. This pattern is neither expected nor is there any ready explanation for the observed similarity in the age profile of retirement among occupations. Given known or purported differences in lifetime earnings, work satisfaction, unemployment rates, and coverages under public and private retirement programs, one would have expected greater differences among the occupations in the timing of the retirement decision. This finding implies, however, that these and other such factors have relatively little influence on *when* individuals retire, although they may greatly influence the retirement decision per se. Very possibly the answer to the puzzle will be found in the institutional norms affecting retirement practices and in the influences that shape the life-cycle of the individual.

Although the age-profile of retirement in the 1950–60 decade closely corresponds to that observed by Jaffe and Carleton for the two previous decades, the age-specific rates generally are much higher in the latest period.

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[30] For the male labor force as a whole in 1950–60, we calculated the rate per 1000 males as 236; for the two earlier decades, Jaffe and Carleton found rates of 222 and 188 for the periods, 1930–40 and 1940–50, respectively. *op. cit.,* Table 11, p. 43.

[31] The estimated number of retirements during the 1950–60 decade is 3,893,600; of this number, an estimated 3,440,800 men, or 88 percent, survived through the decade.

[32] The term "cohort retirement age" refers to age at the beginning of the decade; thus a cohort age of 60 means that those of that age in 1950 retired sometime between age 60 and age 69.

If one disregards age cohorts 40–44 and 45–49 in which both the rates and volume of retirement tend to be quite small, comparison of age-specific rates for the 1950–60 decade with those calculated for the 1930–40 and 1940–50[33] decades show an increased retirement propensity in all but a few of the 50 age-occupation groups in the 1950–60 decade. Rates during the 1930–40 decade were higher than in the most recent decade in the retirement age cohort 50–54 for managers, officials, and proprietors; clerical and kindred workers; sales workers; craftsmen, foremen and kindred workers; and operatives. For sales workers rates were higher in age cohort 55–59; and in age cohort 60–64, for clerical workers, farm laborers and foremen, and nonfarm laborers. In the wartime decade, only sales workers and nonfarm laborers in age cohort 50–54 had somewhat higher retirement rates than their counterparts in the 1950–60 decade. It may be inferred from these relationships between the decades that the trend is toward higher rates of retirement in most of the eligible age groups.

In contrast to the relative uniformity of the median age of retirement between occupations, there was considerable variation in rates of retirement among the age cohorts and between the decades. For all three decades, service workers had the lowest rate in all age cohorts. The occupational location of the highest rate, however, varied between age cohorts as well as between decades. The spread between the highest and lowest retirement rates among the occupations clearly increases with age in each of the decades, but this pattern is relatively stable for each age cohort between the decades. If the rank-ordering of the age-specific occupational rates is expressed as a ratio of the highest to the lowest rate, the results show that over time there has been some convergence in retirement rates among the occupations. This observation is most marked between the 1940–50 and 1950–60 decades and for those age cohorts that have the heaviest concentrations of retirement; namely, ages 50–54, 55–59, and 60–64. Retirement rates probably will continue to vary among the occupations both because of differences in occupational age distributions and retirement propensities, but the emergence of a more common occupational retirement pattern also seems indicated.

Work-life Span and Working Life Patterns

In this section, estimated changes in work-life span in 1950–60 are compared with those in earlier decades, and interdecade changes in the extent of mobility over a working lifetime are analyzed. The basic procedure for

[33] Age-specific rates were computed as the ratio of those who survived and retired through a decade to the numbers in an age cohort estimated to have survived through the decade. Rates were computed for every age-occupation group, ages 40–64 in 1950. For the 1930–40 and 1940–50 age-specific retirement rates, see Jaffe and Carleton, Appendix Table 3.

estimating changes in working lifetimes by occupation is to calculate a synthetic estimate from the differences between average entry and average retirement ages for a particular decade. Mobility patterns over a working lifetime are analyzed by tracing the decade-to-decade changes in the occupational distribution of an age cohort, beginning with its entry into the labor force.[34]

As to the average span of time in the working force, our results in Table 11 show a decline of about 1.7 years in all occupations between 1950 and 1960. In 1950 the difference between the average age of entry into the labor force and the average age of retirement was found to be 47.7 years, while by 1960 this difference was reduced to 46.0 years for all occupations.[35]

Contrary to the experience of earlier decades, most of this decline resulted from a reduction in the average age of retirement between 1950 and 1960. If the average age differences between the two decades are examined for entries and retirements, the latter is clearly the dominant factor in the decline of the work-life span. Between 1950 and 1960 the average age of entry by occupation changed minimally, but there was a marked decline in the average age of retirement of nearly 2 years (−1.95 years). And, although the interdecade changes in entry and retirement ages vary among the occupations, only the changes in average retirement ages exhibit a marked occupational pattern. Retirement age differences between the two decades ranged from an increase of 0.5 years for clerical and kindred workers to a decrease of 9 years in the average retirement age of farm laborers. The bulk of the decline occurred in the blue-collar and, especially, the lower-paying or lower-skilled occupations. In a few white-collar occupations the average retirement age actually increased. As a result, the occupational range in average retirement age was reduced from 9.2 years in 1950 to only 4.9 years in 1960, indicating a decline in both the variability of occupational retirement ages and occupational work-life spans. Interoccupational variation in work-life span in 1950 is indicated by a range of 13.5 years, from 41.7 years for professional and technical workers to 55.2 years for farm

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[34] For a discussion of these procedures, see Jaffe and Carleton, pp. 48–51.

[35] *ibid.*, p. 51. It should be noted that our estimate for 1950 is somewhat higher than that given by Jaffe and Carleton, who report a mean work-life span of only 46 years. This difference is due in part to the fact that they rounded their estimates to the nearest whole year, and the remainder may be due to differences in adjustments made in the data. For the two census years reported here, however, the adjustment factors were applied consistently, so that our own estimates are internally comparable. The calculated decline is also consistent with estimates shown in tables of working life. According to the tables developed by the U.S. Department of Labor, a 14-year-old boy entering the labor force in 1950 could expect to remain in the working force for 48.7 years; if he entered the labor force in 1960, he could expect 48.3 years of working life. U.S. Department of Labor, Manpower Administration, "The Length of Working Life for Males, 1900–60," *Manpower Report* No. 8, July 1963, Tables A and B.

Occupation	1950			1960		
	Entry	*Retire-ment*	*Years of Work Life*	*Entry*	*Retire-ment*	*Years of Work Life*
Professional, technical & kindred workers	20.7	62.4	41.7	20.3	61.9	41.6
Farmers & farm managers	19.3	68.4	49.1	19.5	66.8	47.3
Managers, officials & proprietors	20.9	63.9	43.0	20.2	64.1	43.9
Clerical & kindred workers	17.8	64.1	46.3	18.0	64.6	46.6
Sales workers	18.0	66.4	48.4	16.7	65.2	48.5
Craftsmen, foremen & kindred workers	19.5	65.3	45.8	19.2	63.6	44.4
Operatives & kindred workers	17.9	63.6	45.7	18.2	62.0	43.8
Service workers	17.2	68.2	51.0	16.8	66.5	49.7
Farm laborers & foremen	16.4	71.6	55.2	16.4	62.6	46.2
Laborers except farm & mine	16.7	67.9	51.2	16.9	65.0	48.1

laborers. In 1960 this range had been reduced to 8.1 years, with professional and technical workers virtually unchanged from the previous decade at 41.6 years and service workers at the other end of the scale with an estimated work-life span of 49.7 years. Assuming a common life expectancy and that a reduction in work-life span represents a gain in leisure, blue-collar workers have been the principal beneficiaries of this development.

Two general factors may have been at work to produce the decline in the average work-life span of the male labor force and the tendency toward greater interoccupational uniformity in time spent in the labor force between 1950 and 1960. One of these factors may have been the further development in coverage and benefit adequacy under private and public retirement income programs,[36] which expanded the opportunities for retirement over a broader range of occupations. This possibility is suggested by the marked reduction in average retirement age in the blue-collar occupations; however, in the absence of data on occupational differences in coverage under public and private retirement programs, the hypothesis must re-

[36] The effect of pension availabilities on labor force participation of older workers remains cloudy. See Fred Slavick and Seymour L. Wolfbein, "The Evolving Work-Life Pattern," in C. Tibbitts, Ed., *Aging and Society: A Handbook of Social Gerontology* (Chicago, 1960), pp. 303–306.

main a surmise. The other possible explanation is that movement among the occupational groups increased during the 1950's as compared with earlier decades. Such an increase in mobility would reduce the probability that a man entering a given occupation at a specified age would remain in that occupation until retirement.

The data ideally necessary to test such a hypothesis are not available from census records. We should be able, however, to follow the changes in occupational distribution of two different age cohorts, for two widely separated time periods, from the time they enter the labor force until retirement. Even linking our data to those prepared by Jaffe and Carleton, however, would at best permit observation of only one age cohort over a 30-year period.[37] In the absence of such real cohorts, we may adopt the device of a synthetic cohort, arguing on the analogy of the standard life-table that the occupational distributions of different age classes in a given year reflect the influence of the mobility rates of that year or the recent past. If we then compare the differences in the occupational distribution of two given age classes, one representing the entry pattern and the other representing the retirement pattern, for a succession of census years, we may be able to infer changes in the extent and direction of interoccupational mobility.[38]

Since our data for the past two decades indicate an average working life of between 45–50 years, terminating at about age 65, we chose ages 15–19 and 60–64 to represent, respectively, the entry and retirement ages. For each of these age classes we calculated the occupational distributions for each of the four census years, 1930, 1940, 1950, and 1960. The age differences in the distributions for each of these years represent the degree of occupational attachment, or its inverse, the degree of occupational mobility, in the particular year.

The results shown in Tables 12A and 12B represent a more or less clear pattern of upward mobility during the average working lifetime, but with a general tendency toward decline in the rate of movement over the three decades. In Table 12A the proportions of workers ages 60–64 in the higher paying, high status occupations clearly exceed the proportions in those occupations of workers in the entrance ages of 15–19 in each of the four census years from 1930–1960. If the propensities for movement and the underlying factors accounting for the pattern of movement remained stable, a cohort entering the labor force in 1960 at ages 15–19 and in the occupa-

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[37] That is, those ages 15–19 in 1930 were only 45–49 in 1960.

[38] This procedure differs from that used to calculate the total mobility rates discussed earlier at pp. 30–32. There we estimated the amount of occupational changing for an entire decade occurring to a given real age cohort. In the present discussion, the mobility inferred from the occupational distributions refers only to the specified census year and we adopt the convention that occupational distributions of two age classes in that year represent the experience of a single cohort.

Table 12A. Occupational Distribution, Male Labor Force, Ages 15–19 and 60–64, by Census Year, 1930–1960* (*in percent*)

	15–19				60–64			
	1930	1940	1950	1960	1930	1940	1950	1960
All Occupations	2,733.7	2,176.3	2,169.0	2,730.1	1,684.5	1,899.2	2,399.2	2,628.1
Professional, technical & kindred workers	1.04	.90	1.72	2.21	4.53	5.20	5.78	7.41
Farmers & farm managers	1.77	2.41	3.02	.86	26.03	23.32	15.23	13.52
Managers, officials & proprietors	.87	.52	.94	1.80	12.38	11.93	12.43	9.36
Clerical & kindred workers	9.10	5.83	7.24	9.16	3.62	4.28	5.39	6.70
Sales workers	5.44	6.95	9.63	14.33	4.70	4.72	5.32	6.60
Craftsmen, foremen & kindred workers	5.27	4.34	6.36	7.29	16.18	16.87	20.03	21.51
Operatives & kindred workers	19.01	17.17	21.42	22.30	9.13	10.68	14.58	16.17
Service workers	3.76	6.22	7.98	10.88	5.91	7.53	9.21	9.38
Farm laborers & foremen	37.64	38.31	27.13	13.27	5.81	4.62	3.26	2.22
Laborers except farm & mine	15.88	17.21	14.56	17.82	11.61	10.75	8.57	7.00

Source: 1930–1950, Jaffe and Carleton, Appendix Table 1; 1960 supplied by A. J. Jaffe.
* Adjusted for occupation not reported.

Table 12B. Indexes of Relative Lifetime Occupational Mobility, 1930–1960

$$\left(\frac{\%\ \text{Ages}\ 60\text{–}64}{\%\ \text{Ages}\ 15\text{–}19} \times 100\right)$$

Occupations	1930	1940	1950	1960
Professional, technical & kindred workers	436	578	336	353
Farmers & farm managers	1,471	968	504	1,572
Managers, officials & proprietors	1,423	2,294	1,322	520
Clerical & kindred workers	40	73	74	73
Sales workers	86	68	55	46
Craftsmen, foremen & kindred workers	307	389	315	295
Operatives & kindred workers	48	62	68	73
Service workers	157	121	115	86
Farm laborers & foremen	15	12	12	17
Laborers except farm & mine	73	62	59	39

Source: See Table 12A

tional distribution shown for that age class would be expected to have an occupational distribution 45 years later like that of the age class 60–64 in 1960. But propensities for movement and the factors that determine particular patterns of movement, as represented by these age differences in occupational distribution, do not remain stable. Part of the changes shown in the distributions over the three decades results from shifts in the relative importance of the various occupations. For example, the proportions of younger as well as older workers in the professional and technical occupations increased during the 30-year period, while farm laborers decreased proportionately in both age-classes. To factor out the influence of occupational growth on the behavior of the synthetic cohorts, an index of relative occupational mobility was constructed for each occupational group and each of the four census dates. This index is simply the ratio of the proportion of those ages 60–64 to those ages 15–19 in each of the occupations, multiplied by 100. The changes of these ratios over time and their levels at different times are both of interest. The indexes displayed in Table 12B show a decline in lifetime occupational mobility in all but two of the eight nonfarm occupational groups over the 30-year period.

These declines, however, do not necessarily mean that lifetime occupational mobility is in absolute decline, but only that the relative chance that a worker will terminate his work life in these particular occupations is decreasing. Indeed, for those occupations with an index less than 100 and declining over the period, the implication is that by 1960 relatively fewer workers had remained in the occupation throughout their working life than had remained in the occupation in earlier census years. For many workers

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such occupations are clearly increasing in relative importance as entry rather than terminal occupations. Occupations with index values greater than 100 but also declining may, on the other hand, be those occupations in which there is a tendency toward increased lifetime occupational attachment. The index values in these occupations are clearly produced by a secular rise in the proportion of new entrants rather than by a decline in the proportions nearing the retirement ages. Only clerical and kindred workers and farm laborers seem to exhibit stability over time in their respective indexes, but both are obviously entrance rather than terminal occupations.

PART II

The Detailed Occupations, 1950-1960

In this section of our study we present the results obtained from an analysis of the components of occupational change for 119 detailed occupations, for the period 1950–60. Most of the descriptive and analytical operations performed on the data for the broad social-economic groupings were repeated on the data representing the detailed occupations, and appropriate comparisons of the results are made between the two groupings for that period. The absence of data on detailed occupations for earlier decades prevents the historical or trend comparisons which were so useful in interpreting the results for the broad occupational groupings. The loss of such comparisons is partially offset by comparisons made among all 119 occupations and between the broad occupational groupings, i.e., intragroup occupational change and mobility. In addition, the increase in the number of observations permits some analysis with variables such as education, color, and annual earnings.

The Structure of Change

In general, the findings reveal occupational change to be consistent with but much more complex than that pictured by the analysis of the broad occupational groups. Generalizations based on the ten-group scheme of occupational classification often tend to be weakened, or break down altogether, when re-examined in terms of the behavior of the finer occupational categories. Although the analytical possibilities afforded by the census data in general are limited, the results of studying more detailed groups reveal large gaps in our understanding of the processes of occupational change and the consequent need for improvement in methods of study.

The broadest summary of the results obtained with the detailed occupations is presented in Table 13. The largest single component of net change in the size of an occupation is shown here for the 119 occupations grouped according to the broad occupational classes to which the census assigns them. The outstanding result is the clear dominance of movement among occupations, that is net mobility, in accounting for the decade change in the size

of occupations. Although net mobility shared honors evenly with new entries in 1950–60, as the largest component of change in the ten-group analysis, among the detailed occupations, mobility displaced new entries to second rank as a source of occupational change. The composite character of occupational change, when measured within the broader categories, is also illustrated. For example, in the earlier analysis, in-mobility is shown as the dominant change component [39] among craftsmen, foremen and kindred workers, whereas it ranks first in less than half of the detailed occupations in that category. Again, new entries dominated the growth of sales occupations in the earlier analysis, but ranked first in only 2 of the 6 detailed sales occupations.

The overall importance of mobility for occupational change is also under-

[39] Table 2, p. 10.

Table 13. Largest Single Components of Occupational Change, 119 Detailed Occupations, Male Labor Force, 1950–1960

Major Occupational Group	Total Number of Detailed Occupations	Number of Occupations in Which Largest Single Component of Change Was:				
		New Entries	Deaths	Retirements	In-Mobility	Out-Mobility
Professional, technical & kindred workers	18	6	—	—	12	—
Farmers & farm managers	2	—	—	1	—	1
Managers, officials & proprietors	15	—	—	3	12	—
Clerical & kindred workers	8	5	—	—	3	—
Sales workers	6	2	—	—	4	—
Craftsmen, foremen & kindred workers	27	11	—	5	11	—
Operatives & kindred workers	19	12	—	2	2	3
Service workers	12	5	1	1	4	1
Farm laborers & foremen	3	—	—	—	1	2
Laborers except farm & mine	9	5	—	—	—	4
All Occupations	119	46	1	12	49	11

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scored by rank correlation analysis. The coefficient obtained by ranking the 119 detailed occupations in terms of relative growth and net mobility as a percentage of the numbers in the occupation at the beginning of the decade is .772 (significant at the .01 level), a somewhat larger value than the coefficient obtained from a similar analysis of the ten broad groups. It was also possible to examine the out-mobility and the in-mobility occupations separately, with mobility rates as the dependent variable. For the 73 in-mobility occupations, the value of r_s was .317 (significant at .01 level), indicating the pulling power of growing occupations. For the 46 out-mobility occupations, the rate of growth of the occupations was inverted, with the fastest growing occupations ranked lowest. The result is practically identical with that obtained for the in-mobility occupations, with a coefficient of .295 (significant at the .01 level). It is not surprising that there is little apparent difference among the occupations with regard to the responsiveness to changes in employment opportunities.

A closer look at the patterns of change in particular occupations provides some further clues to the relative importance of the different components. It is apparent, first, that new entries play a relatively minor role in changes in the size of white-collar occupations compared with in-mobility, deaths or retirement; in-mobility alone is the largest single component of change in more than three-fifths of these occupations. Among the blue-collar occupations, the pattern is nearly the reverse. No single factor can explain this difference, but closer examination of the actual occupations suggests that it is mainly determined by the occupational requirements and the typical mode of acquiring or developing the requisite skills. Among the 18 professional and technical occupations, in-mobility is almost exclusively a property of the well-established professions which require more or less standardized programs of formal education, often of relatively long duration. In this group are found clergymen, dentists, designers, engineers, lawyers, professors, pharmacists, personnel administrators, physicians and teachers. The one possible exception to this categorization is the chemists, the only professional occupation which exhibited out-mobility or relatively weak occupational attachment during the decade. In addition to this occupation, new entries were relatively more important for accountants, artists, draftsmen, editors, and medical and other types of technicians. These are occupations where the educational requirements for entry tend to be less restricted by formalized standards of demonstrated competence, such as a diploma or license, or where until recently skill often is acquired by some form of on-the-job or in-service training.

No comparable generalization is possible for the remaining white-collar occupations. Transfer from other occupations is clearly the dominant component of change in both the managerial and the clerical and sales occupa-

tions, but new entries also play a substantial role in the latter two categories. Upgrading through on-the-job training and experience may very likely be the operative factor explaining the importance of mobility in the managerial group. Among the clerical and sales occupations in which mobility played the major role, one finds such varied occupations as agents, dispatchers, mail carriers, real estate and insurance agents, and salesmen in the manufacturing and wholesaling industries where technical skill acquired by formal training programs is not uncommon.

New entries in the craftsmen, foremen group are more important among those detailed occupations widely recognized as the traditional crafts, and which often have some kind of institutionalized mode of entry and training. These occupations include bakers, cabinet makers, compositors, electricians, machinists, mechanics, construction painters, tinsmiths, and upholsterers. On the other hand, new entries were less important than mobility for such similar occupations as plumbers, stationary engineers, structural metal workers, and toolmakers. Cranemen, excavators, and a variety of foremen and inspectors were also more likely to have entered the labor force through other occupations.

For the remaining blue-collar occupations, as Table 13 indicates, the dominant components of change are new entries and out-mobility. These occupations are principal "ports of entry" for many of the new entrants into the male labor force, but are rarely terminal jobs. Of the 43 occupations involved, new entries are the single largest component of change in 22 of them. This group of occupations, however, accounts for 10 of the 11 occupations in which out-mobility was the most important component of change in the 1950–60 period. In fact, Table 13 may understate the role of some of these lower skilled occupations in the development of the labor force. Each of the nonfarm-labor occupations recorded net out-mobility during the decade, and in 5 of the 9 occupations the volume of out-mobility equalled or exceeded the volume of new entrants.

Some blue-collar occupations are probably terminal for workers who, for a variety of reasons, are no longer able to meet the physical or mental requirements of their earlier employment. The widespread industrial practice of assigning older workers, for example, to less demanding, often lower-paying work is consistent with the composition of the four in-mobility occupations in the service group. In detail, these are firemen, guards, janitors, and policemen.

Correlates of Occupational Change

In Part I certain tests of relationship were performed to evaluate the influence of the components on decade changes in the size of an occupation.

With 119 rather than 10 occupations, it is possible not only to perform the same tests but also to provide additional analysis of intragroup relationships. As in Part I, accessions (new entries and net in-mobility) and separations (deaths, retirements and net out-mobility) are treated successively.

The results obtained from detailed occupational analysis of the association between occupational growth or decline and labor force entry confirm even more emphatically than our earlier results that entry is not a simple function of the relative rate of growth of occupations. For all 119 occupations, the rank-order correlation between the percent change in the size of occupations during the decade and the percentage distribution of new entries among the occupations is only .019, which is even lower than the coefficient given for the broad occupational groups. Underlying this absence of association, however, is a complex behavior reflected in the varying coefficients obtained when the occupations in each of the broad groups are subjected to the same analysis. The values of r_s are as follows for seven nonfarm occupational groupings:

Laborers except farm & mine (9)	.883*
Service workers (12)	.559**
Operatives & kindred workers (19)	.342***
Professional, technical & kindred workers (18)	.333***
Managers, officials & proprietors (15)	.161***
Craftsmen, foremen & kindred workers (27)	.121***
Clerical and sales workers (14)♯	−.358***

* Significant at .05 level.
** Significant at .10 level.
*** Not significant.
♯ Combined.

Although not statistically significant, except in two categories, these results are roughly consistent with common sense expectation; namely, the ease of entry into an occupation is an important determinant of the role of labor force entries in the growth of an occupation. Only the clerical and sales occupations are an exception, for which a possible explanation may be that increases in earning levels relative to the requirements for entry, modest as they may be, lag those of many other occupations, thus diverting new entrants away from the clerical and sales occupations. Data to be discussed shortly, however, cast doubt on this explanation.

An analysis of the relationship between net mobility and the rate of occu-

pational growth, based on the 119 detailed occupations,[40] indicates a marked association just as it did with the broad occupational groups. When one measures net mobility rates as the proportion of workers in the occupation at the beginning of the decade who moved to or from another occupation during the decade, the coefficient of rank correlation between mobility and net growth in the occupations is .791 (significant at .01 level). In short, interoccupational movement definitely appears to be a market-oriented phenomenon, with the faster-growing occupations exerting the largest and the slower-growing the smallest pull.

By implication the foregoing observation further suggests that the direction of mobility is a function of whether the occupation is growing or declining. With 119 observations available, it becomes possible to confirm this hypothesis with greater certainty. In this instance, out-mobility occupations were treated separately from in-mobility occupations, but using a mobility rate based on the expected number of potential movers at the end of the 1950–60 decade.[41] The results of the rank correlations performed on the two mobility groups are as follows:

Percent Change in Occupation and:

In-Mobility (73 occupations)	.317*
Out-Mobility (46 occupations)	−.252**

* Significant at .01 level.
** Significant at .10 level.

The size of these correlations belies the degree to which they are respectively associated with occupational growth or decline. Among the 73 in-mobility occupations only 4 were occupations which declined in size during the 1950–60 decade; the percentage decline in employment was of significant size in only one of these, locomotive engineers.[42] Conversely, the majority of out-mobility occupations were occupations whose numbers declined during the decade. Of the 43 out-mobility occupations, 32 were occupations that suffered losses in numbers. The remaining 11 occupations, those in which there was net out-mobility in the face of overall occupational growth during the decade, appear to be port-of-entry types of occupations from which

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[40] Net mobility rates for the detailed occupations will be found in Appendix Table VI.

[41] As explained in greater detail earlier, for the in-mobility occupations the base is the sum of the numbers expected at the end of the decade in all out-mobility occupations. For the out-mobility occupations the expected number at the end of the decade in each of these occupations provides the base for the mobility rate. See above, p. 31, footnote 27.

[42] Very likely this case reflects seniority practices in the railroad industry, under which locomotive firemen are promoted to engineer.

workers migrate as they gain experience in the labor market. They include residual categories of unskilled labor, service and clerical occupations, and such specific occupations as auto attendant and messenger — all occupations in which many boys or young men typically find their first jobs. A few occupations — editors, chemists, compositors, and meat cutters — do not fit this pattern; however, the mobility rates for these occupations are relatively small.

Marked differences in mobility rates appeared among the individual detailed occupations, but there was no apparent pattern reflecting differences in the socio-economic status of the occupations. Both the level and the range of mobility rates, whether measured in terms of the expected 1960 numbers in the occupation or as a percentage of the numbers in the occupation in 1950, varied almost randomly among the broad occupational groupings. Levels of mobility were about as high among blue-collar occupations as among white-collar occupations.

Our analysis of the relationship of retirement and occupational change based on the detailed occupations indicates the inverse relationship expected on the basis of the earlier analysis. The "rate" used in this analysis is the percentage of total retirements represented by any given occupation, and is not completely satisfactory because of the absence of a control for differences in the age structure of occupations. Nevertheless, the results are in the expected direction, with an overall association between occupational growth and retirement of $-.336$, significant at .01 level. When the same association is tested by rank correlation for each of the broad occupational groups for which there is a sufficient number of detailed occupations, there is marked intergroup variation. The correlation coefficients — only one of which is statistically significant — for eight of the groups are as follows:

Professional, technical and kindred workers (18 occupations)	$-.253$**
Managers, officials and proprietors (15 occupations)	$-.493$*
Clerical and sales + (14 occupations)	$-.332$**
Craftsmen, foremen and kindred workers (27 occupations)	$-.213$**
Operatives and kindred workers (19 occupations)	$-.045$**
Service workers (12 occupations)	$.322$**
Laborers except farm and mine (9 occupations)	$.367$**

* Significant at .10 level.
** Not significant.
+ Combined census groups.

Despite the lack of statistical significance, these occupational differences in retirement patterns deserve some explanation. In part, perhaps in larger

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part, they are simply a matter of relative opportunity. In the occupations that grow most rapidly, the pressure for retirement is least. Occupational growth cannot be completely satisfied from new additions to the labor force or by recruitment from other occupations, perhaps because of the constraints imposed by skill requirements, experience and so on. Thus the older worker has an enhanced opportunity to prolong employment in a given occupation and to defer retirement. In the occupations that grew more slowly or, in a majority of cases, actually declined during the decade, retirement may have been involuntary to a greater degree and virtually indistinguishable from unemployment. In these occupations it may be noted, also, that skill and educational requirements are relatively low in some sense. But, even in such occupations, employers may still favor younger rather than older workers because of the physical vigor and probably higher levels of educational attainment of the younger workers. In this connection, the occupational pattern of the retirement-growth coefficients is nearly the inverse of the pattern of new entry-growth coefficients, thus strengthening the suspicion that in those occupations in which retirement and relative changes in occupational size are positively associated, older workers are being displaced.

If there is interdependence between accessions and separations from occupations, the most direct connection arises from the need to replace those members of an occupation who leave the occupation because of death, retirement, or change of occupation. Replacement need for the occupations that experience net in-mobility, of course, arises only because of deaths and retirements, while these two components and the numbers who leave the out-mobility occupations constitute the replacement need for the latter. For each of these two groups of occupations, replacement need was expressed as a ratio of the sum of the components of separation to the numbers in each occupation at the beginning of the 1950–60 decade. Comparison was then made between the levels of these ratios and their respective behavior vis-a-vis change in the size of occupations during the decade.

Two related findings emerge from these comparisons. First, the level of the replacement ratios among the out-mobility occupations is substantially and almost uniformly higher than among the in-mobility occupations. Some indication is given by the ranges of these ratios; respectively, they are .005 (self-employed bank managers) to .469 (locomotive engineers) for the in-mobility occupations, and .091 (chemists) to 1.430 (unpaid farm laborers) among the out-mobility occupations. The difference is almost wholly accounted for by occupational mobility; that is, replacement needs due to deaths and retirements alone are practically indistinguishable between the in-mobility and the out-mobility occupations.[43] When the ratios are ranked

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[43] It is doubtful that this result would be altered by the introduction of true occupational survival probabilities. The model calculates death rates strictly as a function of age without regard to occupation.

within each of the mobility groups, no marked occupational pattern is discernible among the in-mobility occupations. Among the out-mobility occupations, however, high ratios are more heavily concentrated among the lesser-skilled, blue-collar occupations. Ranking the replacement ratios against the rate of occupational growth provides the second finding; namely, there is a substantial inverse relationship between the rate of growth and the level of replacement need. In effect, this only confirms that growth of an occupation, over and above the need to replace separations due to death and retirements, is the principal stimulus to occupational mobility.

Determinants of Occupational Change

We turn now to consider some possible determinants of the behavior of the components of occupational change. Unfortunately, the amount of comparable census data by occupation for 1950–60 limits the analytic possibilities to only a few factors. In the discussion that follows, we consider the impact on new entries, retirements, and net mobility of three factors: (1) median years of schooling in 1960; (2) median income in 1959 for those members of an occupation who worked 50–52 weeks in that year and (3) median income regardless of weeks worked in 1959. It would have been desirable, to use wage and salary earnings for the latter two analyses, but the 1950 census did not isolate earnings from other income for the detailed occupations. Some tentative findings on the occupational behavior of nonwhites are also presented.

Variations in levels of educational attainment, according to the results obtained from our analysis, have more to do with tenure in the labor force than with labor force entrance and its occupational distribution. The initial expectation, that the occupations requiring relatively high levels of education would receive a disproportionately small share of new entrants into the labor force, was not met. The correlation between new entries as a percentage of beginning-of-decade employment in the occupation and median years of schooling, by occupation in 1960, is rather small; the value of r_s is only –0.0486. On the other hand, there appears to be a more marked inverse relationship between occupational shares in retirements and the level of schooling, with r_s equal to –0.3702 (significant at .01 level). This may be interpreted variously as meaning either that education provides the incentive and opportunity for older workers to remain in the labor force in particular occupations, or that retirements will be slow in the faster growing occupations which also have relatively high educational needs. These findings also suggest an intergenerational difference in the influence of education on occupational distribution. Their higher levels of education may provide the younger age cohorts with a wider range of responses to occupational change. The older age cohorts are much more subject to occupational

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obsolescence; as educational requirements rise, they have only two options: out-movement to another occupation whose educational requirements match their capabilities, or retirement from the labor force. As will be shown later,[44] the mobility patterns of older workers strengthen this conjecture.

When the detailed occupations were separated into their respective major occupational groupings, the rank-order correlations between schooling and labor force entry and exit presented a much more mixed pattern. Table 14 contains fourteen correlation coefficients — only five of which are significant — for seven nonfarm occupational groups between median years of schooling and rates of labor force entry and retirement.

The results shown in the above table suggest that limited education is a barrier to entry principally in the professional and technical, and the clerical and sales occupations. In the remaining occupations, it would appear that education has some attractive effect on new entries, but the correlations are weak and not significant. The retirement coefficients, on the other hand, while indicating somewhat more interoccupational uniformity in the influence of schooling on retirement rates, cast doubt on the proposition that education increases the chances that an individual will remain in the active labor force.

Labor market theory posits that, other things constant, workers change jobs in response to wage differences. We would therefore expect occupational movement to be from low to high wage occupations, as has been demonstrated in studies of interindustry and geographic mobility.[45] In this instance,

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[44] See below, pp. 56–58.

[45] For example, see OECD, *Wages and Labour Mobility* (OECD, July 1965), pp. 95–104, for a summary of interindustry studies in various countries; Raimon, *op. cit.*, for a leading study of geographic mobility.

Table 14. Coefficients of Rank-Order Correlation Between Median Years of Schooling and Rates of New Entry and Retirement, Male Labor Force, 1950–1960

Occupations	New Entries	Retirements
Professional and technical (17)	— .592*	— .380***
Managers, officials and proprietors (14)	.448***	— .270***
Clerical and sales workers (14)†	— .535**	— .483**
Craftsmen, foremen & kindred (27)	.055***	— .234***
Operatives & kindred (19)	.443**	— .189***
Service workers (12)†	.045***	— .536**
Laborers except farm (9)	.476***	.381***

   * Significant at .05 level.
  ** Significant at .10 level.
*** Not significant.
   † Combined census groups.

however, the mobility values generated by the model for the 1950–60 decade represent accessions as well as separations. Thus the hypothesis is necessarily modified to predict that in-mobility will be concentrated among the relatively high-earning occupations while out-mobility occupations will be those with relatively low earnings.

To test this hypothesis, two different rank-order correlations were performed. One of these ranked net mobility during the decade as a percentage of the numbers in each occupation at the beginning of the decade against median full-time earnings in the occupation in the terminal year of the decade, 1959.[46] The coefficient of correlation yielded by this analysis is, as expected, positive and with a significant value for r_s of .663 (significant at .01 level). A second variant test of the hypothesis consisted of ranking full-time median earnings for 1959 against net mobility measured as a percentage or ratio of the numbers expected in the occupation in 1960 had there been no net mobility. In this instance, account is taken of changes in the size of occupations during the decade, so that rankings in terms of net mobility are somewhat affected by the net balance between new entries and deaths and retirements as well as by the beginning-of-decade size of the occupation. Compared with a ranking based only on the latter, the effect is to shift rankings either toward or away from the middle range, depending on whether the net balance of the other components is positive or negative. It is not clear that these effects have any economic interpretation, but in any event the correlation coefficient of this measure with median earnings in the terminal year of the decade is .598 (significant at the .01 level), which again confirms that occupational mobility obeys the rule that movement is from low to high wage occupations. When the full-time restriction is removed, these two correlations, respectively, are .693 and .622 (both significant at .01). The higher values suggest that wage differences per se outweigh the influence of steady employment on interoccupational mobility.

One further aspect of occupational change remains for brief discussion; namely, the comparative behavior of the white and nonwhite male labor forces. If resources had been available, it would have been possible to examine the entire process of occupational change separately for these two subsets of the male labor force as well as the labor force as a whole. Lacking these resources, we are limited for the present to a few observations. It will

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[46] In this analysis, the highest in-mobility rate was assigned first place in the ranking, and the highest rate of out-mobility was given the lowest rank. The 1960 census provides median earnings data by occupation both for all members of a given occupation and for those who were employed 50–52 weeks in the occupation during 1959. The latter measure of earnings was chosen on the argument that it more clearly represents the price of labor. Nevertheless, it must be acknowledged that the occupational participation rates which basically generate the estimates of the components of change, including net mobility, may be influenced by the effect of annual fluctuations in employment on earnings levels.

be recalled that our analysis showed little correlation between new entries and rates of change in occupational size. In relating each of these, by rank-order correlation, to the percentage of nonwhite males in each of the 119 occupations in 1960, the following was found: for new entries in each occupation as a percentage of total new entries, the correlation is .301 (significant at the .01 level), showing that Negroes account for a disproportionately large share of the entry occupations. The correlation between the ratio of nonwhites and change in the size of occupations was found to be inverse, with a coefficient (significant at .01), of −.457. Taken together these two findings tend to confirm that Negroes benefit largely from the growth of the entry occupations rather than from the growth of total employment.[47] Since the correlation between median earnings and the share of new entries is also inverse ($r_s = -.488$, significant at .01), it is a reasonable inference that nonwhite males enter the labor force on much less favorable terms than their white counterparts.

Age Variations in Occupational Change

In Part I, age patterns of entry, retirement and interoccupational mobility were extensively analyzed both for the 1950–60 decade and comparatively between that decade and earlier years. Analysis of the results obtained from the detailed occupations for the 1950–60 decade permits further elaboration of the findings presented earlier. In general, it will be seen that the age patterns of occupational change are more varied and richer in complexity than was apparent from the study of the broad occupational groups alone. Those findings that center on the work-life span between entry and retirement from the labor force are first presented, followed by analysis of age variation in occupational mobility.

Table 15 summarizes the results of the analysis of occupational variations in the ages of entry and retirement and in work-life span. These results were obtained by calculating an average age of entry and an average age of retirement for each of the 119 occupations. The average work-life span for each of the occupations, of course, is a derivative of those two components of change. Inspection of the panels in the table reveals considerable variation among the occupations in entry and retirement ages and in work-life span, although the rather small differences between the means and the medians in each instance indicate a normal distribution. Between the distributions, however, there is a marked difference in the dispersion of the means. Differences in the work-life span among occupations, in contrast to

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[47] For a more elaborate analysis and treatment of this conclusion, see Dale E. Hiestand, *Economic Growth and Employment Opportunities for Minorities* (Columbia, 1964), esp. chap. III.

Table 15. Entry, Retirement, and Work-life Span, Male Labor Force, 1950–1960
(Age at beginning of decade)

A. *Distribution of 119 Detailed Occupations by Average Age of Entry, 1950–1960*

Average Entry Age	Number of Occupations	Percent
14.5–16.4	15	12.6
16.5–18.4	24	20.1
18.5–20.4	43	36.1
20.5–22.4	34	28.5
22.5–24.4	3	2.5

Mean of average entry age = 19.2
Median average entry age = 19.7
Coefficient of variation = .109

B. *Distribution of 119 Detailed Occupations by Average Age of Retirement, 1950–1960*

Average Retirement Age	Number of Occupations	Percent
61.0–62.9	7	5.9
63.0–64.9	48	40.2
65.0–66.9	45	37.9
67.0–68.9	18	15.0
69.0–70.9	6	5.1

Mean of average retirement age = 65.3
Median average retirement age = 65.2
Coefficient of variation = .028

C. *Work-Life Span, 119 Detailed Occupations, 1950–1960*

Years of Average Work-Life	Number of Occupations	Percent
39.0–42.9	11	9.3
43.0–45.9	48	40.6
46.0–48.9	40	33.7
49.0–51.9	12	10.2
52.0–54.9	8	6.6

Mean average work-life = 46.2
Median work-life = 46.0
Coefficient of variation = .066

the findings based on ten broad groups,[48] now more clearly result from variation in the age of entry than from variation in the age of retirement. As shown by the coefficients of variation, the average dispersion in age of entry

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[48] See above, pp. 35–37.

is nearly four times greater than the occupational dispersion of the age of retirement. The resulting dispersion of the mean work-life spans lies between the values for entry and retirement.

The variations in age of entry present little problem of interpretation. Inspection of the detailed occupations suggests the obvious explanation that entry is directly related to the length of the period of pre-entry training. To the extent that length of education and training is reflected in age differences in entry rates, indirect confirmation of such a relationship is provided by a high inverse correlation between the average age of entry into an occupation and the rate of new entries measured by the number of new entries during the decade expressed as a percentage of the numbers in the occupation at the beginning of the 1950–60 decade. The coefficient for this correlation is –.610, and is significant.

A more direct measure of the association between educational level and age of entry would have been desirable. Unfortunately, census data by occupation do not provide information on the levels of education attained at the time of labor force entry, but give only the occupational medians for all ages. Nevertheless, typical entry ages for the various occupations permit a surmise supporting such an inference. Thus, among the occupations with relatively late ages of entry, say age 20 and older at the beginning of the decade, are found such occupations as dentists (23.7), lawyers (23.1), and physicians (22.9) ; average entry ages for all but one of 14 managerial occupations were also above that age. On the other hand, average entry ages tend to be much lower in the blue-collar occupations and in clerical and sales occupations. Among 27 skilled occupations, the average age of entry was age 20 or older in only 12 occupations; among 19 semiskilled occupations, entry at that age level occurred in only two occupations, while among unskilled laborers none entered later than age 20. In the 14 clerical and sales occupations, five were late-entry occupations. There were also some anomalies in the general pattern, especially among the catch-all service occupations. For example, both firemen (21.5) and policemen (21.6) were in the late-entry ages, perhaps because of legal or civil service regulations.[49]

The greater uniformity in interoccupational retirement ages presents a somewhat more difficult problem of interpretation. As the coefficient of variation cited earlier suggests, no distinctive occupational pattern of retirement emerges from the data. Occupations in which the individual, because of self-employment or because of job satisfaction, presumably either chooses or is induced to continue working beyond the average age of retirement,

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[49] It is well to keep in mind, however, that the estimates of entry ages discussed here represent only those who entered the particular occupation from outside the labor force during the decade. New entries may represent only a minor fraction of total accessions to the occupation. In the case of policemen and firemen, new entries were 2.0 percent and 1.0 percent of total accessions, respectively.

are represented in the late-retirement age classes. That professors, lawyers, dentists, and physicians, many of whom are self-employed, are found here is expected, but other factors must account for messengers, auto attendants, bookkeepers, or janitors, who also retired at above average ages. The implicit argument, that only occupations requiring relatively long and costly investment periods will be disproportionately represented in the late-retirement age groups, is not supported by the lack of correlation between entry and retirement ages, as shown by the differences in the occupational dispersion of the respective age distributions. By default more than logic, therefore, we are driven again toward an institutional explanation of retirement age uniformity, with the probability that the development of public and private retirement security programs have tended to establish a norm for retirement age whether the retirement decision is voluntary or mandated by a particular retirement program.

If variations in work-life span depend more on occupational differences in the age of entry than in the age of retirement, then the variables that may account for occupational differences in the length of the working life indirectly explain variations in the average age of entry as well. Since work-life span covers all labor force ages, as do the reported occupational medians for education and 1959 earnings — the two analytic variables used here — we may place more confidence in these results as compared with an effort to relate these variables only to variations in average entry or retirement ages. For the relationship between median years of schooling and average work-life span, a rank-order correlation coefficient of −.337 was obtained. For the association between the latter variable and median earnings in 1959, the correlation coefficient is −.610. Both of these are significant at the .01 level.

These two related findings throw further light on occupational variations in work-life span or lifetime labor-force participation. The inverse association between work-life span and both educational level and earnings level may be interpreted to mean that the investment in education and the results of that investment have negative effects on the average length of participation in the labor force. Increases in the length of the investment period, as represented by the number of years of schooling, apparently reduce the time that will be spent in the labor force by deferring entry to later-than-average ages. Occupational differences in median earnings in 1959, to the extent that they reflect differences in lifetime earnings, have a similar and apparently stronger effect than educational differences.[50]

[50] Of course, it must be acknowledged that for a number of skilled occupations, net mobility ought to be counted as entry since relatively few persons enter the labor force as fully qualified members of the occupation. Interns and graduate students in the professions would be counted in other occupations, for example.

The analysis of age and mobility for the 119 detailed occupations also reveals a much more complex pattern of relationships than that obtained with only the major occupational groupings. The analysis to follow is based largely on calculations of the age mobility rates computed, as before, on the potential number of movers as measured by the numbers expected in the occupation(s) in 1960.[51] To facilitate certain analyses, however, it was also necessary to calculate mobility rates based on the numbers in the occupation at the beginning of the 1950–60 decade.

Age variation in occupational mobility rates follows the pattern already expected on the basis of a variety of other labor market and mobility studies. As Table 16 shows, both in and out movements during the decade, expressed as median rates, occur more frequently in the younger age classes but diminish with advancing age.

The age variations in the occupational distribution of out- as compared with in-mobility are possibly of greater interest. Table 16 shows that the number of occupations contributing to out-mobility increases with age, while the reverse age pattern occurs with respect to the in-mobility occupations. The inference from this observance of the two age patterns of mobility rates

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[51] For a brief explanation of the concepts and methods involved, see n. 27, p. 31, above.

Table 16. Median Rates of Occupational Mobility, by Age at Beginning of Decade, Male Labor Force, 1950–1960

Age at Beginning of Decade	Out-Mobility		In-Mobility	
	Number of Occupations	Rate*	Number of Occupations	Rate‡
5– 9	—	—	21	.001
10–14	15	.216	93	.003
15–19	31	.223	77	.003
20–24	40	.3705	69	.003
25–29	50	.209	59	.003
30–34	49	.189	58	.002
35–39	50	.1515	49	.002
40–44	59	.126	42	.002
45–49	55	.115	44	.002
50–54	63	.089	36	.001
55–59	67	.081	23	.001
60–64	77	.034	15	.001

* Percent of number expected in the occupation in 1960.
‡ Percent of number expected in all out-mobility occupations in 1960.

is that movement into an occupation becomes more difficult with increasing age, an observation which is strengthened by considering the difference between the sum of the numbers of out- and in-mobility occupations and the total number (119) in each age group. This difference, which represents the number of occupations in which mobility rates are virtually zero,[52] increases with age after age 5–9. An even clearer picture of this pattern is displayed in Table 17, which shows the distribution of the out-mobility age-occupation groups based on the volume and direction of mobility rather than on the calculated rates.

Further insight into this age pattern of mobility is provided by examining the distribution of the *volume* of interoccupational movement during the decade. In each age group the model requires that the total volume of in-mobility equal the volume of out-mobility, but the occupational distribution by which this balance is achieved varies by age-group. Analysis of the occu-

[52] With only very few exceptions, the absolute number representing mobility in each of the 1428 age-occupation groups was not zero; however, in 286 of the cells the *rate* to at least three decimal places calculated to zero.

Table 17. Age and Out-Mobility, 1950–1960

Age at Beginning of Decade	Out–Mobility Age-Occupation Groups*		Out-Mobility Occupations as Percent of Total Occupations in Each Age Group (N = 119)
	Number	Percent	
All Ages	574	100.0	40.2
5– 9	16	2.8	13.4
10–14	15	2.6	12.6
15–19	31	5.4	26.1
20–24	40	7.0	33.6
25–29	50	8.7	42.0
30–34	49	8.7	41.9
35–39	50	8.7	42.0
40–44	59	10.3	49.5
45–49	56	9.7	47.1
50–54	64	11.1	53.8
55–59	67	11.7	56.3
60–64	77	13.4	64.7

Median Age of Out-Mobility = 41
* Occupational frequencies based on actual volume rather than calculated age-rates.

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pational distribution reveals that out-mobility is concentrated in the younger age classes, but becomes more dispersed as age increases. The reverse pattern describes the distribution of in-mobility, which is more widely dispersed in the younger age classes and more concentrated in the older age groups. Thus, at cohort ages 10–14 and 15–19, two occupations accounted for at least 50 percent of the total volume of out-mobility in each age class. Near the other end of the age spectrum, at ages 50–54 and 55–59, six occupations accounted for more than half of the volume of outward movement. The contrast with the occupational distribution of in-mobility is apparent from examination of two representative age classes, 15–19 and 55–59. In the former, 88 occupations accounted for total in-mobility of 1072.2 thousands; approximately half of this volume of in-mobility was accounted for by 13 occupations. In the older age group, 73.1 thousands of men moved into 52 occupations during the 1950–60 decade, but 4 occupations accounted for at least half of this volume of movement. Although it is apparent that the volume of in-mobility is occupationally more widely dispersed than the volume of out-mobility for most age groups, both the opportunity and implicit attractiveness of occupational mobility decline sharply with advancing age.

The particular occupational content of these age patterns of mobility may be of further interest. When one takes the five largest occupations in each age group, measured in terms of the volume of out-mobility, there is a fair degree of similarity. With few exceptions, in every age group out-mobility is concentrated among those occupations that require relatively little investment in skill and training. In the younger age groups, for example, three out of five out-mobility occupations are in the laborer class, while the other two are the residual categories of sales and service occupations. Farmers, mine operatives, factory operatives and self-employed managers in (probably small) retail establishments are the major groups in the central and older age classes. There is very little age-to-age similarity, however, in the occupational pattern of in-mobility. In the younger age classes the largest intake is in the professional and managerial occupations; for example, four of the five largest in-mobility occupations were professional and technical occupations, including engineers, teachers and skilled mechanics. Guards, janitors, and miscellaneous semiskilled occupations, on the other hand, were the leading in-mobility occupations in the age group 55–59.

PART III

Findings and Conclusions

The overall aim of this study was to extract from census data for 1950 and 1960 inferences of substantive or analytic interest with respect to change in the occupational composition of the male civilian labor force. Computations and analysis of the components of occupational change for that period were undertaken with a demographic model devised by Jaffe and Carleton to improve labor force projection, and applied in this instance both to the major census occupational groupings and to 119 three-digit occupations for the period studied. Since there has been no previous application of the model to detailed occupations, the possibility of measuring the components of labor force change with a substantially larger number of observations added a methodological interest to this study of labor mobility. This section summarizes the principal findings of the study, both substantive and methodological, and presents some broad conclusions about the nature of labor force change.

Substantive Findings

The substantive findings of the study are presented below in four divisions: (1) the structural or relative importance of the various components of occupational change; (2) the relationship of differences in the rate and direction of occupational change to the various components; (3) the interoccupational age patterns of the components and work-life patterns; and (4) some determinants of occupational change.

1. *The Structure of Occupational Change.*

a) Changes in both the size of the male labor force and in the size of individual occupations for any given period of time are governed by the interplay of accessions and separations. In the model used in this study, accessions to an occupation consist of new entrants to the labor force and transfers from other occupations. Separations from an occupation consist of deaths, labor force withdrawals designated as retirements, and transfers to

other occupations. For the entire labor force, the net sum of interoccupational transfers is zero.

b) For the labor force as a whole during the 1950–60 decade, it was estimated that about 70 percent of the accessions accounted for by new entrants was needed to replace those who had left the labor force because of retirement or death; the remainder was absorbed into net additions to the labor force. During the same period, about 7.5 million men changed their occupations. This figure is more than twice the net increase in the size of the male labor force.

c) There is substantial variation among individual occupations in the relative importance of any given change component. Both within a decade and between decades, however, net mobility exhibits the largest degree of interoccupational variation. Somewhat less interoccupational variation exists in the relative importance of new entries, deaths, or retirements. The structure of occupational change appears to be largely a function of the age structure of the occupation, and changes in the relative importance of the various components, except for deaths, therefore depend on age differences in the response to underlying economic, technological or social-cultural influences on the size and occupational composition of the labor force.

d) Over time and measured by the dominant component of occupational change, the structure of occupational change is relatively stable. Decade-to-decade differences in the dominant component of change for any given occupation or occupational group are not substantial for the whole period, 1930–1960. The patterns of the 1940–50 and 1950–60 decades, however, are more alike than the patterns of either of the two decades and the depression decade, 1930–40.

e) Although the basic structure of occupational change maintained itself over the three decades, some changes in that structure were observed. The most important of these was the increase in retirements in accounting for both labor force separations and net changes in the size of the labor force.

2. *Correlates of Occupational Change.*

a) Changes in the size of occupations over a decade are a function of the behavior of the components, but the degree and nature of association between a component and the growth or decline of an occupation vary. Virtually no association was found between new entry rates and rate of change in occupational size. Retirement and mobility rates, on the other hand, have a definite relationship to relative changes in the size of occupations. Retirement rates were found to be inversely related to occupational growth, while mobility rates exhibited a strong positive correlation.

b) The relationships indicated above generally persist throughout the

three decades studied. Measured in terms of the strength of the correlations, net mobility shows an increasingly closer association with occupational growth over the three decades. The meaning of this development is not clear, however, in view of the fact that the relative volume of net mobility in the 1950–60 decade is less than in either of the two previous decades. The general level of economic activity may be the critical factor.

c) The direction of mobility is clearly a function of whether occupations are growing or declining. Analysis of the detailed occupations for the decade 1950–60 shows that out-mobility is almost invariably associated with declining occupations, while in-mobility is a function of occupational expansion.

d) Rates and volume of occupational change may also influence the structure of change. Analysis of the occupational distribution of each of the three major components — new entries, retirements, and net mobility — suggests that the size of an occupation and its rate of growth partially influence the relative importance of any particular component of occupational change.

3. *Age Patterns and Work-life Span.*

Analysis of the occupational distribution of the various age cohorts and of the age distribution of the occupations and occupational groups afforded additional insight into the process of occupational change both in a given decade and in the course of a work-life span.

a) Age breakdowns of the components of change reveal a more varied or complex pattern of occupational change than is revealed by estimates and analysis of the components without regard to age. This conclusion is pertinent particularly to net mobility, but also applies in substantial degree to new entries and retirements.

b) The age pattern of mobility found in this study conforms closely to the findings of other mobility studies, with mobility concentrated in the younger age cohorts and mobility rates declining with age. Among the detailed occupations there is virtually no difference in this pattern. Nevertheless, a difference was found in the dispersion of the age pattern of mobility between the in-mobility and the out-mobility occupations. Occupational dispersion of mobility by age is somewhat narrower among the in-mobility occupations than among the out-mobility occupations.

c) Entry and retirement rates were both found to increase with age, though with a diminishing rate of increase in these rates.

d) Over time there appears to have been more change in the age distributions of the occupational categories than in the occupational distributions of any given age cohort.

e) Among occupations there appeared to be greater variability in the

average age of entry than in the average age of retirement in each of the three decades. For the decade 1950–60 this difference occurs both in the broad occupational groups and among the detailed occupations.

f) Interoccupational uniformity in average retirement ages appears to have increased over time along with an increase in the relative importance of retirement as a component of occupational change.

g) Although work-life span varies among the occupations, the extent of variation is unexpectedly small, possibly because of the tendency toward interoccupational uniformity in average retirement ages. Interoccupational variation in work-life spans appears to be dependent mainly on occupational differences in average ages of entry.

h) Over the three-decade period, 1930–1960, work-life span for most occupations has shortened; however, most of the decline took place in the 1950–60 decade. It is estimated that the average reduction for all occupations during this period was about two years.

i) Comparison of the experience of synthetic cohorts over the three decades suggests that interoccupational mobility during a working lifetime has tended to increase. It was conjectured that this tendency may be a factor that has produced interoccupational convergence in average retirement ages.

4. *Determinants of Occupational Change.*

Census data by occupation severely restrict the extent to which the determinants of occupational change, and especially of its components, can be analyzed. Nevertheless, a few exploratory tests were run on the association between the components and various factors that may have explanatory value. The following are the principal findings:

a) Levels of educational attainment by occupation were found to have little association with occupational differences in either the share or rates of new entries, but did have an expected, though not strong, association with the average age of entry into an occupation.

b) Levels of education seem to have substantial explanatory value in accounting for occupational differences in retirement rates and shares and, to some degree also, average retirement ages.

c) Various tests were made of the association between earning differences and the components of occupational change, each of which, excluding deaths, may be considered as a form of mobility. Only net mobility, i.e. interoccupational transfers, shows a consistent and statistically significant association with earnings differences. It may be noted that annual fluctuations in employment, as reflected in earnings, had little effect on this association.

d) An effort was made with the 1950–60 data for the major occupa-

tional groups to determine the influence of changes in the size of industry employment on the behavior of the components of occupational change. Only net mobility was found to be significantly associated and positive in direction. An occupationally specific career pattern of interoccupational mobility is implied in this finding.

e) The proportion of nonwhite workers in an occupation apparently affects the behavior of the components of occupational change. Unlike the male labor force as a whole, there is a positive correlation between this proportion and the share of the occupation in new entries. On the other hand, the proportion of nonwhites varies inversely with the rate of occupational growth. This finding may well be a key factor in understanding the repeatedly demonstrated facts of substandard earnings and excessive unemployment in the Negro labor force.

Methodological Findings

In this study, two general methodological objectives were proposed. One of these was to determine whether the application of the model to detailed occupations would produce results strongly divergent from those obtained when the male labor force was classified by only a handful of broad, heterogeneous groups, or whether the findings from such an application would have only greater analytical utility and substantive interest than those obtained from the broader occupational groupings. The second methodological question was whether or not the model was more useful in studying the process of occupational change than other approaches that have been used or which might be devised. Since the possibilities for answering both of these questions have not been exhausted in this study, the answers must remain somewhat tentative and, to a large degree, a matter of judgment.

As to the first question, on a broad level conformity of findings is more marked than diversity. The findings derived from treating data for 119 detailed occupations diverged very little from those obtained from the broader occupational groupings.[53] Although the increase in detail afforded by the increased number of observations was found to be an advantage especially in the analysis of the age factor, it should be noted that the model seems to work better for determining aggregate relationships than as a basis for differentiating between occupational groups. Where differences between occupational groups were examined, tests of relationship more often than not showed that the results were not statistically significant.

The approaches represented by most other studies of labor mobility and

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[53] For an analogous methodological finding, see Robert L. Raimon and Vladimir Stoikov, "The Quality of the Labor Force," *Industrial and Labor Relations Review,* vol. 20 (April 1967), pp. 402–403.

occupational change differ from the one employed in this study. The majority of such studies are based on survey techniques, sometimes by mail questionnaire but more often by direct interview in the field.[54] A substantial amount of data on past or present work experience and on attitudes toward work and mobility are gathered in addition to demographic and social background data. Many of these studies are based either on relatively small samples of workers or on groups that have had special experiences such as displacement because of a plant shutdown.[55] In addition to limited coverage and peculiarities of time and circumstance affecting the behavior under study, these studies differ among themselves in the concepts and measures of change employed, occupational and industrial classifications used, and so on.[56] Only a few studies have been based on large, comprehensive samples of the labor force,[57] although some recent and valuable studies have based their findings on data generated as by-products of administrative systems or operating programs in the field of social security.[58]

The approach used in the present study possesses some methodological advantages over other approaches. The data base is broad and relatively superior in terms of such problems as sampling error. Definitions of terms are presumed to be consistently applied, and the observed behavior of individuals in the sample population is relatively free of both respondent and interviewer bias since the questions that establish the basis for the construction of the model are matters of fact involving little or no problem of contamination.[59] The behavior of scientific interest — entrance or exit from the

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[54] For a recent example, see John B. Lansing, Eva Mueller, William Ladd and Nancy Barth, *The Geographic Mobility of Labor: A First Report* (Survey Research Center, Institute for Social Research, Ann Arbor, Michigan, April 1963).

[55] For example, see Leonard P. Adams and Robert L. Aronson, *Workers and Industrial Change* (Cornell University, 1957); William H. Miernyk, *Inter-Industry Labor Mobility* (Bureau of Business and Economic Research, Northeastern University, 1955).

[56] For a clear and most useful discussion of the conceptual and methodological problems in the study of labor mobility, see Herbert S. Parnes, *Research on Labor Mobility* (Social Science Research Council, 1954).

[57] The most notable is Gladys L. Palmer, *Labor Mobility in Six Cities* (Social Science Research Council, 1954). A recent example, although limited to one year of experience, is Samuel Saben, "Occupational Mobility of Employed Workers," *Monthly Labor Review* (June 1967), pp. 31–38.

[58] For example, Donald J. Bogue, *A Methodological Study of Migration and Labor Mobility in Michigan and Ohio in 1947* (Scripps Foundation for Research in Population Problems, June 1952). This study was based on a sample of the wage and work records of workers covered under the Old-Age and Survivors Insurance program. Of more recent date, and of interest because of its methodological ingenuity, is Lowell E. Gallaway. *Interindustry Labor Mobility in the United States, 1957 to 1960*, Research Report No. 18, U.S. Department of Health, Education and Welfare, Social Security Administration (Washington, 1967).

[59] This should not be interpreted as a panegyric for census occupational statistics. More than a third of employed workers in both the 1950 and 1960 censuses were in

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labor force or change of occupation — is, indeed, inferred from the individual's current demographic and socio-economic status rather than from responses dependent on memory or on the respondent's understanding of the purposes of the study, his reaction to the interviewer or understanding of a self-administered survey instrument.

These advantages, however, are probably more than offset by the limitations of the approach, at least for the study of labor mobility. Generally, the concept of mobility produced by the model is really a turnover rather than a mobility concept as understood by economists.[60] Labor mobility in this approach focuses on changes in aggregates rather than on the behavior of identifiable individuals or groups of individuals. Specifically, "mobility" is the residual or unexplained difference between the expected and the actual values for decade changes in the size of particular occupations after estimates have been made for other types of accessions or separations from the occupation. Since these latter two components are themselves inferred from age and occupational differences in labor force participation, rather heroic assumptions must be made to conclude that the estimated values for any of the three major components truly represent those that would be found from direct observation and measurement.

Other problems of concept and measurement were found which inhibited inference and interpretation of results. One of these is the acknowledged assumption that the behavior of an age cohort over the course of a decade is linear[61] in the sense that its labor force participation rates by occupation change at a constant annual rate, i.e., at one-tenth of the observed difference between the beginning and end-of-decade labor force rates. Indeed, entries, retirements, and ultimately net mobility are calculated by measuring the deviations of "observed" labor force participation from the linear values, both of which, however, have been derived by smoothing procedures that estimate the values for single years from data for the terminal years of the census decade. Only if this assumption of linearity is acceptable can it be argued that the values for the components of change closely approximate the true values. Very likely a method employing direct observation of an age cohort over a comparable period would show that the year-to-year changes in labor force participation vary markedly, depending on the age

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the category "not elsewhere classified," and serious questions have been raised about the usefulness of these data for a variety of manpower and labor market problems. James Scoville, "The Development and Relevance of U.S. Occupational Data," *Industrial and Labor Relations Review*, vol. 19 (October 1965), pp. 70–79.

[60] See Parnes, *op. cit.*, pp. 11–24, for a discussion of the concept of labor mobility.

[61] For a discussion and defense of this assumption, see Jaffe and Carleton, *op. cit.*, pp. 80–81.

cohort as well as the periods studied.[62] A closely related conceptual difficulty is the assumption that the individual in any age cohort who changes his occupation in the course of a census decade has made only one such change. For the younger age cohorts especially, this assumption is patently in error; moreover, because of the assumption of linearity, the probability that the individual changed his occupation at the end of the first year of a particular decade is assumed to be just as likely as the probability that the change in occupational or labor force status occurred between the ninth and tenth years.

There are also severe analytical limitations in the approach used in this study, most of which flow from the source and nature of the data. A major limitation of this type is that the concept of occupational mobility tends to conceal analytically interesting kinds of worker behavior. The path by which an occupational change is achieved undoubtedly conceals the extent to which employer, industrial or geographic changes were involved.[63] Although the model does provide estimates of the direction as well as the rate of mobility, the more interesting question of the pairing of export and import occupations cannot be revealed by the approach used.[64] As noted before, a second limitation is that the occupational data provided by the census permit only limited analysis of the characteristics of mobile and nonmobile workers. In addition to age, education, color and annual earnings, which have been employed to a limited extent in this study, there are census data on urban-rural residence, place of birth, marital status, and hours of work.[65] Given the resources available for their study, none of these variables seemed worth the additional effort required to explore their respective influences on occupational change. Finally, this approach provides extremely limited means for obtaining directly the motivational and attitudinal information that has enriched other mobility studies, even though the interpretation given to such data has been hotly debated.[66]

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[62] Unfortunately, observation of a specified age cohort over a sufficiently long period of time is not possible on a scale approximating that of the census data. Consideration might be given to the data from the Current Population Survey and the Monthly Report on the Labor Force, were it possible to have data on occupation by age. Even though any given household in the sample may be observed for a maximum period of 16 months, annual average age-occupation rates might be constructed to provide a basis for estimates of entries, retirements and mobility similar to the model used in this study, but possibly with a greater degree of reliability.

[63] For comparison, see Saben, *op. cit.,* pp. 35–37.

[64] To the author's knowledge, only a few major mobility studies have provided such information. See Palmer, *op. cit.*; Saben, *op. cit.*

[65] See U.S. Bureau of the Census, *Census of Population: 1960, Occupation by Earnings and Education,* PC(2)–7B.

[66] See Simon Rottenberg, "On Choice in Labor Markets," *Industrial and Labor Relations Review* (January 1956); also replies by Robert F. Lampman, Richard A. Lester, *ibid.,* July 1956.

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General Conclusions

An important need in the fields of manpower and labor market research is a method of analyzing changes in the occupational distribution of the labor force based on knowledge of the components of occupational change and the factors that affect their behavior. A tool that meets this need should not only provide reliable measures of the components of change, but also be able to disentangle and assign appropriate weights to the factors that underly past changes or that will produce future changes in labor force size and occupational distribution. In our judgment this study indicates that cohort-component analysis provides only modest returns in both of these respects. Nevertheless, the following general conclusions may be of interest.

1. The behavior of mobile workers in the male labor force broadly conforms to that expected both from theory and from the findings of most other studies of labor mobility. The decline of mobility with age and the clear positive association between mobility rates and occupational wage differentials are leading examples.

2. Over relatively lengthy periods, the structure of occupational change appears to be stable. Although interdecade changes in occupational growth or decline vary substantially among occupations, the principal components of change associated with a given occupation or occupational group vary little from decade to decade.

3. Interoccupational diversity in the structure of change probably results from a variety of influences. Mobility appears to respond mainly to economic influences, primarily on the demand side, and to be more sensitive to short-run changes in the level of economic activity. Although economic factors play some role in the occupational distribution and behavior of labor force entry and retirement, demographic and social changes appear to be much more influential in effecting changes in the contribution of these components to changes in occupational size. The compressive effect of education on work-life span and the tendency toward convergence of average retirement ages among occupations both suggest such a conclusion.

4. A few findings appear to be unique to this study, but each of them would require further research to establish the causal relationships that may be involved. One of these is the convergence of retirement ages among occupations, just mentioned. Another avenue for further inquiry is suggested by the differences in the age patterns of occupational mobility so that in-mobility becomes less widely dispersed among occupations with increasing age, while out-mobility exhibits increasing occupational dispersion with age. It was suggested that this phenomenon could be attributed to age differences in the opportunity to change jobs, but the understanding of this facet of occupational mobility might be increased if it were possible to evaluate the

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influence of other factors such as level of education or prior job history.

5. The study of occupational change and mobility should certainly continue to attract scholarly attention and the resources necessary to push inquiry beyond the limits thus far attained. As manpower planning becomes manifestly more important for effectuating public policy in the development and utilization of human resources, analysis and understanding of the processes of occupational change and mobility will need to grow. The purely demographic approach, illustrated by this study, does not satisfy the need for tools of greater power. It imposes too large a burden on a single variable, age, in detecting the more complex and varied relationships that determine the individual's labor force and occupational status. A more sophisticated and, perhaps, more trustworthy approach might incorporate the following three elements: (1) An occupational classification scheme for census or other data on occupational change that meets economic criteria for an occupation;[67] (2) gross-flow data by occupation and by associated characteristics such as age, sex, marital status, education, and color; and (3) a sufficient amount of associated data on earnings, employment and labor force status, and the apparent reasons for change related to specific incidents of change. The value of the data described in the latter two categories would be enhanced by the ability to follow real labor force cohorts over at least a complete working lifetime.

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[67] Principally, a relatively high degree of elasticity of technical substitution among the members of an occupational class. For further discussion of the economic aspects of occupational classification, see Glen Cain, W. Lee Hansen, and Burton Weisbrod, "Classification of Occupations: Some Problems of Economic Interpretation," *Proceedings*, American Statistical Association, Social Statistics Section, 1966 (Washington, 1966), pp. 199–203. Also, Jacob Mincer, "On-the-job Training: Costs, Returns, and Some Implications," *Journal of Political Economy*, Supplement, *Investment in Human Beings* (October 1962).

Appendix Tables

COMPONENTS OF CHANGE IN MALE WORKING FORCE,
BY OCCUPATION,
1930–1940, 1940–1950, 1950–1960 (*in thousands*)

	1930–1940	1940–1950	1950–1960
	Professional, Technical & Kindred Workers		
Number at beginning of decade	1,709.5	2,242.8	3,076.1
Changes during decade			
New entries	372.6	488.1	790.3
Deaths	260.8	223.7	133.4
Net mobility	510.3	684.1	1,184.0
Retirements	88.8	110.9	196.9
Sum of net changes	533.3	837.6	1,643.9
Number at end of decade	2,242.8	3,080.4	4,720.0
	Farmers & Farm Managers		
Number at beginning of decade	5,627.0	5,092.1	4,222.1
Changes during decade			
New entries	624.1	509.7	203.7
Deaths	959.4	820.3	494.8
Net mobility	338.5	96.0	−861.9
Retirements	538.1	652.0	643.9
Sum of net changes	−534.9	−866.6	−1,796.9
Number at end of decade	5,092.1	4,225.5	2,425.2
	Managers, Officials & Proprietors except Farm		
Number at beginning of decade	3,570.6	3,411.1	4,374.3
Changes during decade			
New entries	271.5	297.6	327.2
Deaths	653.6	483.4	426.0
Net mobility	581.8	1,453.5	1,077.3
Retirements	359.2	304.4	510.7
Sum of net changes	−159.5	963.3	467.7
Number at end of decade	3,411.1	4,374.4	4,842.0
	Clerical and Kindred Workers		
Number at beginning of decade	2,092.0	2,268.4	2,749.5
Changes during decade			
New entries	666.1	819.5	859.1
Deaths	249.0	176.7	91.7
Net mobility	−124.8	−92.7	−48.5
Retirements	97.9	85.8	187.3
Sum of net changes	194.4	464.3	531.6
Number at end of decade	2,268.4	2,750.7	3,281.1

COMPONENTS OF CHANGE IN MALE WORKING FORCE

	1930–1940	1940–1950	1950–1960
		Sales Workers	
Number at beginning of decade	2,138.0	2,340.4	2,673.9
Changes during decade			
New entries	617.1	705.7	991.6
Deaths	299.9	212.6	114.9
Net mobility	23.1	−11.8	−220.1
Retirements	137.9	108.7	147.3
Sum of net changes	202.4	372.6	509.3
Number at end of decade	2,340.4	2,713.0	3,183.2
	Craftsmen, Foremen & Kindred Workers		
Number at beginning of decade	6,128.3	5,963.6	8,073.6
Changes during decade			
New entries	949.7	1,234.1	1,278.0
Deaths	959.2	697.7	503.4
Net mobility	315.2	2,010.2	1,364.1
Retirements	470.4	434.0	839.7
Sum of net changes	−164.7	2,112.6	1,299.1
Number at end of decade	5,963.6	8,076.2	9,371.7
	Operatives and Kindred Workers		
Number at beginning of decade	5,802.2	7,168.5	8,737.6
Changes during decade			
New entries	2,085.3	2,456.2	2,231.2
Deaths	719.6	524.3	227.0
Net mobility	300.6	−103.0	−322.3
Retirements	300.0	283.8	680.6
Sum of net changes	1,366.3	1,575.1	1,001.2
Number at end of decade	7,168.5	8,743.6	9,738.9
		Service Workers	
Number at beginning of decade	1,794.8	2,391.0	2,614.4
Changes during decade			
New entries	514.7	503.0	726.2
Deaths	299.9	279.1	293.3
Net mobility	477.9	111.3	147.9
Retirements	96.5	103.7	320.6
Sum of net changes	596.2	231.5	297.7
Number at end of decade	2,391.0	2,622.5	2,912.1
	Farm Laborers & Foremen		
Number at beginning of decade	3,604.3	3,281.7	2,064.0
Changes during decade			
New entries	2,046.7	1,616.7	985.1
Deaths	338.7	182.9	37.5
Net mobility	−1,859.9	−2,465.9	−1,532.5
Retirements	170.7	129.2	137.2
Sum of net changes	−322.6	−1,161.3	−722.0
Number at end of decade	3,281.7	2,120.4	1,341.9

COMPONENTS OF CHANGE IN MALE WORKING FORCE

	1930–1940	*1940–1950*	*1950–1960*
	Laborers except Farm & Mine		
Number at beginning of decade	4,981.6	4,906.3	3,681.6
Changes during decade			
New entries	1,589.8	1,283.7	1,175.1
Deaths	709.4	420.7	237.2
Net mobility	−562.7	−1,681.7	−788.0
Retirements	393.0	397.6	363.8
Sum of net changes	−75.3	−1,216.3	−147.6
Number at end of decade	4,906.3	3,690.0	3,534.1
	ALL OCCUPATIONS		
Number at beginning of decade	37,448.3	39,083.9	42,267.1
Changes during decade			
New entries	9,737.6	9,944.3	9,567.5
Deaths	5,449.5	4,021.4	2,559.2
Retirements	2,652.5	2,610.1	4,028.0
Sum of net changes	1,635.6	3,312.8	3,084.0
Number at end of decade	39,083.9	42,396.7	45,350.2

Source: 1930–1940, 1940–1950, Jaffe and Carleton, Table 6, pp. 24–25; 1950–1960 calculated.

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APPENDIX TABLE II

COMPONENTS OF CHANGE AND THE SUM OF
NET CHANGES AS A PERCENT OF THE NUMBERS
IN THE OCCUPATION AT THE BEGINNING OF DECADE

Occupation	Percent of New Entries number at beginning of decade			Percent of Deaths number at the beginning of decade			Percent of Retirements number at the beginning of decade		
	1930–40	1940–50	1950–60	1930–40	1940–50	1950–60	1930–40	1940–50	1950–60
Professional, technical & kindred workers	21.8%	21.8%	25.7%	15.3%	10.0%	4.3%	5.2%	4.9%	6.4%
Farmers & farm managers	11.1	10.0	4.8	17.0	16.1	11.7	9.6	12.8	15.3
Managers, officials & proprietors	7.6	8.7	7.5	18.3	14.2	9.7	10.1	8.9	11.7
Clerical & kindred workers	31.8	35.8	31.2	11.9	7.7	3.3	4.7	3.7	6.8
Sales workers	28.9	30.1	37.1	14.0	9.1	4.3	6.4	4.6	5.5
Craftsmen, foremen & kindred workers	15.5	20.7	15.8	13.6	11.7	6.2	7.7	7.3	10.4
Operatives & kindred workers	35.9	34.3	25.5	12.4	7.3	2.6	5.2	4.0	7.8
Service workers	28.7	21.0	27.8	16.7	11.7	11.2	5.4	4.3	12.3
Farm laborers & foremen	56.8	49.3	47.7	9.4	5.6	1.8	4.7	3.9	6.6
Laborers except farm & mine	31.9	26.2	31.9	14.2	8.6	6.4	7.9	8.1	9.9
All Occupations	26.0	25.4	22.6	14.5	10.3	6.1	7.1	6.7	9.5

APPENDIX TABLE II (continued)

COMPONENTS OF CHANGE AND THE SUM OF
NET CHANGES AS A PERCENT OF THE NUMBERS
IN THE OCCUPATION AT THE BEGINNING OF DECADE

Occupation	Percent Net Mobility to number at beginning of decade (Minus=Out-Mobility)			Percent of the Σ of Net change to number at beginning of decade		
	1930–40	1940–50	1950–60	1930–40	1940–50	1950–60
Professional, technical & kindred workers	29.9%	30.4%	38.5%	31.2%	37.3%	53.4%
Farmers & farm managers	6.0	1.9	−20.4	− 9.5	−17.0	−42.3
Managers, officials & proprietors	16.3	42.6	24.6	− 4.5	28.2	10.7
Clerical & kindred workers	−5.9	− 5.1	− 1.8	9.3	20.3	19.3
Sales workers	1.0	− 0.5	− 8.2	9.5	15.9	19.0
Craftsmen, foremen & kindred workers	5.1	33.7	16.9	− 2.7	35.4	16.1
Operatives & kindred workers	5.2	− 1.0	− 3.7	23.5	22.0	11.5
Service workers	26.6	4.7	5.7	33.2	9.7	11.4
Farm laborers & foremen	−51.6	−75.2	−74.2	− 8.9	−35.4	−35.0
Laborers except farm & mine	−11.3	−34.3	−21.4	− 1.5	−24.8	− 4.0
All Occupations	—	—	—	4.4	8.5	7.3

APPENDIX TABLE III

NET MOBILITY RATES* FOR MALE WORKING FORCE, BY AGE & OCCUPATION, 1950–1960

Occupation	Ages 5–9	Ages 10–14	Ages 15–19	Ages 20–24	Ages 25–29	Ages 30–34	Ages 35–39
Professional, technical & kindred workers	−.1735	.0586	.1018	.1059	.0516	.0306	.0253
Farmers & farm managers	.0023	.0081	−.0991	−.3469	−.3912	−.3854	−.3388
Managers, officials & proprietors	−.2427	.0238	.0447	.0902	.0867	.0627	.0512
Clerical & kindred workers	.0170	.0567	−.0169	−.1964	−.1411	−.0606	.0072
Sales workers	−.0114	−.0861	.0018	.0048	−.0893	−.0192	.0023
Craftsmen, foremen & kindred workers	−.1027	.1077	.0760	.0740	.0638	.0501	.0617
Operatives & kindred workers	.0355	.1499	−.0034	−.1442	−.1223	−.0913	−.0601
Service workers	.0168	.0133	−.0308	.0058	.0050	.0096	.0172
Farm laborers & foremen	−.1556	−.6306	−.8182	−.7388	−.6109	−.4189	−.4661
Laborers except farm & mine	.0276	.0188	−.2633	−.3558	−.2646	−.1839	−.1444
All Occupations	.0992	.4369	.2243	.2807	.2071	.1530	.1649

*For explanation of mobility rates, see text, pp. 29–32.

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APPENDIX TABLE III (continued)

NET MOBILITY RATES* FOR MALE WORKING FORCE, BY AGE & OCCUPATION, 1950–1960

Occupation	Ages 40–44	Ages 45–49	Ages 50–54	Ages 55–59	Ages 60–64
Professional, technical and kindred workers	−.0201	.0044	.0039	.0068	.0014
Farmers & farm managers	−.3025	−.2266	−.1008	−.0741	−.1780
Managers, officials & proprietors	.0120	−.0160	−.0420	−.0413	−.0083
Clerical & kindred workers	.0096	.0099	.0036	.0062	.0090
Sales workers	.0081	.0064	.0056	.0126	.0059
Craftsmen, foremen & kindred workers	.0338	.0119	−.0044	.0060	.0411
Operatives & kindred workers	−.0045	−.0061	.0027	.0015	.0310
Service workers	.0242	.0277	.0231	.0172	−.0092
Farm laborers & foremen	—	−.0164	−.0331	.0022	−.1723
Laborers except farm & mine	−.0907	−.0589	−.0480	−.0170	−.0614
All Occupations	.0877	.0603	.0389	.0695	.0884

*For explanation of mobility rates, see text, pp. 29–32.

APPENDIX TABLE IV

RETIREMENT RATES, MALE WORKING FORCE,
BY AGE & OCCUPATION, 1930–1940, 1940–50, 1950–1960

(Age at beginning of decade)

Occupation	Age 40-44			Age 45-49			Age 50-54		
	1930–40	1940–50	1950–60	1930–40	1940–50	1950–60	1930–40	1940–50	1950–60
Professional, technical & kindred workers	.0115	.0013	—	.0585	.0049	.0053	.0832	.0670	.0960
Farmers & farm managers	.0119	.0368	.0084	.0464	.0559	.0926	.1060	.1794	.2483
Managers, officials & proprietors	.0262	—	.0027	.1163	.0114	.0373	.2255	.1295	.1616
Clerical & kindred workers	.0226	—	.0016	.0986	—	.0146	.0995	.0387	.0568
Sales workers	.0284	.0116	.0008	.1009	.0409	.0042	.2116	.0761	.0505
Craftsmen, foremen & kindred workers	.0072	.0032	.0005	.0757	.0158	.0160	.1940	.0752	.1287
Operatives & kindred workers	.0182	.0173	.0010	.0886	.0055	.0414	.2130	.0719	.1747
Service workers	—	—	.0036	—	—	—	.0160	.0044	.0466
Farm laborers & foremen	.0199	.0466	.0026	.0530	.1106	.1621	.1885	.1802	.2478
Laborers except farm & mine	.0289	.0479	.0024	.0835	.0924	.0330	.2567	.2158	.1906
All Occupations	.0170	.0162	.0021	.0744	.0306	.0348	.1705	.1126	.1463

RETIREMENT RATES, MALE WORKING FORCE,
BY AGE & OCCUPATION, 1930–1940, 1940–1950, 1950–1960
(*Age at beginning of decade*)

Occupation	Age 55–59			Age 60–64		
	1930–40	1940–50	1950–60	1930–40	1940–50	1950–60
Professional, technical & kindred workers	.2544	.2682	.3738	.4026	.4130	.5159
Farmers & farm managers	.2313	.3132	.4726	.3648	.4747	.5467
Managers, officials & proprietors	.4201	.3197	.4752	.4830	.5042	.6343
Clerical & kindred workers	.4275	.3144	.4277	.6730	.5242	.6546
Sales workers	.4170	.2264	.3083	.5208	.4425	.4680
Craftsmen, foremen & kindred workers	.4435	.3559	.5869	.6828	.6149	.7992
Operatives & kindred workers	.4603	.3516	.6221	.6867	.6148	.8362
Service workers	.2091	.0900	.3774	.4362	.2950	.5514
Farm laborers & foremen	.3859	.2815	.4236	.6896	.4295	.5548
Laborers except farm & mine	.4590	.4675	.5918	.8464	.6757	.7437
All Occupations	.3632	.3219	.5029	.5533	.5202	.6680

Source: 1930–40 and 1940–50 rates from Jaffe and Carleton, Appendix Table III.

APPENDIX TABLE V

INDEXES OF OCCUPATIONAL VARIANCE, BY INDUSTRY, EMPLOYED MALES, 1950–1960

	Professional, technical and kindred workers	Managers, officials and proprietors	Farmers and farm managers	Clerical and kindred workers	Sales workers
All Industries	−17.934	−4.639	−0.101	−15.076	−26.601
Agriculture, forestry and fisheries	−1.662	−1.551	−0.101	−1.393	−2.495
Mining	−2.519	−1.144		−0.737	−1.654
Construction	−2.711	−1.842		−1.251	−2.528
Durable goods	−4.114	−0.502		−0.069	−0.344
Nondurable goods	−1.604	−0.335		0.401	−2.540
Transportation	−2.575	−0.793		−0.263	−11.305
Telecommunications	−2.713	−1.201		0.985	−10.255
Utilities and sanitary services	−0.397	−0.378		0.049	0.602
Wholesale trade	−2.059	0.640		0.569	0.887
Retail trade	0.663	2.417		−4.414	3.753
Finance, insurance and real estate	−0.352	−0.525		−0.247	0.074
Business and repair services	1.595	1.010		−7.764	−4.481
Personal services	0.269	−0.643		−1.304	1.604
Entertainment & recreation	1.477	0.425		0.117	1.448
Prof. and related services	−0.056	−0.149		0.024	0.241
Public administration	−1.176	−0.068		0.455	2.166

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APPENDIX TABLE V (continued)

INDEXES OF OCCUPATIONAL VARIANCE, BY INDUSTRY, EMPLOYED MALES, 1950–1960

	Craftsmen, foremen and kindred workers	Operatives and kindred workers	Service workers	Farm laborers	Laborers, ex. farm
All Industries	2.338	5.717	−27.816	0.004	1.963
Agriculture, forestry and fisheries	−2.101	−2.991	− 1.542	0.004	−0.799
Mining	−0.738	0.437	− 0.650		2.224
Construction	0.432	−1.756	0.411		1.302
Durable goods	0.029	0.234	0.681		1.733
Nondurable goods	−0.200	0.473	1.307		1.968
Transportation	0.602	−1.138	2.737		3.121
Telecommunications	0.382	1.457	0.653		1.256
Utilities and sanitary services	−0.284	0.002	1.322		1.660
Wholesale trade	−1.286	0.723	2.278		1.163
Retail trade	−5.294	−1.014	1.316		−7.289
Finance, insurance and real estate	0.497	1.073	1.339		0.689
Business and repair services	3.096	−6.344	−36.296		−2.716
Personal services	0.938	2.197	− 0.351		−1.738
Entertainment and recreation	−0.292	−1.002	0.894		−2.419
Prof. and related services	2.177	0.742	0.213		0.580
Public administration	−0.296	1.190	− 0.340		1.228

Sources: 1950 employment. U.S. Bureau of Census, *U.S. Census of Population: 1950* vol. IV, Special Reports, Part 4, Ch. C, *Occupation by Industry* (Washington, 1954), Table 1; 1960 employment. *U.S. Census of Population: 1960*, Subject Reports. Occupation by Industry, PC (2)–7C (Washington, 1963), Table 1.

NET MOBILITY RATES, DETAILED OCCUPATIONS, 1950–1960

(in thousands)

A
Out-Mobility Occupations

Occupation	Employment 1950	Net Mobility 1950–1960	Rate (per 1,000)
Professional, Technical & Kindred			
Chemists	72.22	− 1.6	− 19.8
Editors	64.33	− 2.6	− 36.8
Farmers & Farm Managers			
Farmers	4,187.39	−859.4	−263.6
Farm managers	34.67	− 2.5	− 94.4
Managers, Officials & Proprietors			
Manager, self-employed, manufacturing	222.62	− 3.7	− 22.4
Manager, self-employed, wholesale	173.35	− 1.3	− 9.8
Manager, self-employed, retail	1,158.04	− 66.3	− 72.4
Clerical & Kindred Workers			
Bookkeepers	169.68	− 39.6	−197.0
Messengers	49.08	− 40.9	−424.5
Shipping & receiving clerks	288.23	− 58.8	−172.9
Residual, clerical, etc.	1,910.85	− 21.5	− 9.3
Sales Workers			
Sales, retail	1,298.10	−292.3	−183.5
Residual, sales workers	265.94	−231.0	−344.8
Craftsmen, Foremen & Kindred			
Bakers	109.47	− 12.8	−115.9
Cabinet makers	75.43	− 0.1	− 1.8
Compositors	168.19	− 2.7	− 15.1
Molders, metal	61.72	− 3.1	− 54.7
Plasterers	66.48	− 6.7	−110.9
Upholsterers	59.23	− 7.7	−116.2
Operatives and Kindred Workers			
Apprentices	119.58	−115.4	−560.0
Auto attendants	247.35	− 77.5	−164.2
Brakemen, railroad	80.98	− 5.1	− 67.8
Laundry operators	149.47	− 41.1	−251.9
Meat cutters	175.03	− 2.2	− 11.6
Mine operators	611.40	−240.3	−409.2
Sawyers	97.17	− 7.4	− 72.7
Stationary firemen	128.19	− 3.3	− 33.6
Operator, manufacturing, durable goods	1,903.63	−332.9	−163.8
Operator, manufacturing, nondurable goods	1,507.21	−229.7	−142.3
Operator, nonmanufacturing	599.27	− 46.0	− 71.5
Service Workers			
Private household workers	71.09	− 16.0	−229.4
Bartenders	196.58	− 13.8	− 74.6
Porters	173.53	− 15.0	− 87.3
Waiters	132.43	− 45.8	−269.5
Residual, service workers	572.12	−116.8	−199.0

NET MOBILITY RATES, DETAILED OCCUPATIONS, 1950–1960

(*in thousands*)

Occupation	Employment 1950	Net Mobility 1950–1960	Rate (*per 1,000*)
Farm Laborers & Foremen			
Farm laborer, wage	1,434.69	−687.8	−375.8
Farm laborer, unpaid	602.97	−852.1	−835.2
Laborers, Except Farm & Mine			
Laborer, manufacturing, durable goods	720.57	−154.7	−200.8
Laborer, manufacturing, nondurable goods	396.34	−123.9	−279.7
Laborer, nonmanufacturing, construction	764.54	− 75.1	− 88.4
Laborer, nonmanufacturing, railroad	288.67	−117.6	−462.7
Laborer, nonmanufacturing, transportation	114.69	− 31.4	−250.0
Laborer, nonmanufacturing, communications	132.68	− 3.0	− 22.6
Laborer, nonmanufacturing, wholesale trade	321.09	−251.4	−403.1
Laborer, nonmanufacturing, public administration	102.60	− 16.6	−179.1
Residual, laborer, etc.	840.45	− 14.2	− 13.8

B

In-Mobility Occupations

Occupation	Employment 1950	Net Mobility 1950–1960	Rate (*per 1,000*)
Professional, Technical & Kindred Workers			
Accountants	339.68	49.27	1.9548
Artists	53.66	10.43	.4138
Clergymen	162.12	53.05	2.1048
Professors	99.66	34.49	1.3684
Dentists	67.95	28.61	1.1351
Designers	30.53	21.26	.8435
Draftsmen	117.99	22.75	.9026
Engineers	542.01	299.05	11.8649
Lawyers	168.24	56.86	2.2559
Personnel administration	39.34	31.65	1.2557
Pharmacists	80.38	12.76	.5063
Physicians	170.52	61.44	2.4376
Teachers	300.15	114.01	4.5234
Medical technicians	36.09	4.72	.1873
Technicians, other	86.98	139.39	5.5303
Residual, professional, etc.	644.22	248.42	9.8561
Managers, Officials, & Proprietors			
Buyers	111.69	70.96	2.8154
Inspector, public administration	56.61	27.30	1.0831
Official, public administration	128.51	60.56	2.4027
Purchasing agent	60.92	37.97	1.5065
Manager, salaried, construction	87.19	67.81	2.6904
Manager, salaried, manufacturing	393.11	279.84	11.1027
Manager, salaried, wholesale	149.31	57.72	2.2901
Manager, salaried, retail	438.09	82.54	3.2748
Manager, salaried, banking	100.75	81.19	3.2212
Manager, self-employed, construction	197.54	76.01	3.0157
Manager, self-employed, bank	19.80	6.72	.2666
Residual, managers, etc.	1,076.79	299.97	11.9014

NET MOBILITY RATES, DETAILED OCCUPATIONS, 1950–1960

(*in thousands*)

Occupation	Employment 1950	Net Mobility 1950–1960	Rate (*per 1,000*)
Clerical & Kindred Workers			
Agents	106.16	29.05	1.1526
Dispatchers	29.26	21.36	.8475
Mail carriers	168.49	43.49	1.7255
Office machine operators	27.75	18.43	.7312
Sales Workers			
Insurance agent	283.19	50.31	1.9961
Real estate agent	119.55	59.52	2.3615
Sales, manufacturing	306.00	111.53	4.4250
Sales, wholesale	401.09	81.83	3.2466
Craftsmen, Foremen & Kindred Workers			
Brickmasons	178.55	32.52	1.2902
Carpenters	997.42	71.25	2.8269
Crane men	109.69	28.34	1.1244
Electrician	326.99	36.78	1.4593
Excavating	113.47	93.88	3.7247
Foremen, construction	62.35	50.37	1.9984
Foremen, manufacturing	475.96	296.25	11.7538
Foremen, communications	42.86	26.81	1.0637
Inspectors	90.05	25.15	.9978
Linemen	215.13	12.11	.4805
Locomotive engineers	73.59	20.50	.8133
Machinists	531.77	22.73	.9018
Mechanics	1,784.52	352.50	13.9855
Painter, construction	436.31	27.63	1.0962
Plumbers	297.81	58.98	2.3400
Pressmen	50.68	19.23	.7630
Stationary engineers	223.37	90.29	3.5823
Structural metal	55.20	12.65	.5019
Tinsmith	129.43	10.69	.4241
Toolmakers	161.89	39.38	1.5624
Residual, craftsmen, etc.	1,176.01	69.22	2.7463
Operatives & Kindred Workers			
Bus drivers	155.44	12.20	.4840
Deliverymen	251.52	58.47	2.3198
Filers, metal	147.32	8.33	.3305
Furnace men	58.15	1.70	.0674
Painter except construction	110.48	14.43	.5725
Truck drivers	1,421.33	51.70	2.0512
Welders	271.34	77.06	3.0574
Residual, operatives, etc.	702.78	554.82	22.0127

NET MOBILITY RATES, DETAILED OCCUPATIONS, 1950–1960
(*in thousands*)

Occupation	Employment 1950	Net Mobility 1950–1960	Rate (*per 1,000*)
Service Workers			
Hospital attendants	86.03	6.68	.2650
Barbers	203.59	6.97	.2765
Cooks except private household	215.42	5.03	.1996
Firemen	110.49	34.49	1.3684
Guard, watchmen	243.27	96.14	3.8144
Janitors	417.94	192.94	7.6549
Policemen	191.88	62.97	2.4983
Farm Laborers & Foremen			
Residual, farm laborer & foremen	26.30	7.35	.2916

Note: Out-mobility rates are calculated as a ratio of the numbers who left the occupation during the decade to the number expected in 1960 on the assumption of zero mobility. For the in-mobility occupations, the denominator of the ratio is the sum of the numbers expected in 1960 in *all* occupations which experienced out-mobility, that is all that could have moved into the in-mobility occupations. Consequently, mobility rates cannot be compared directly between a pair of in- and out-mobility occupations. The explanation of this difference in treatment may be found in Jaffe and Carleton, *op. cit.,* pp. 96–99.

SELECTED DETAILED OCCUPATIONS, MALE LABOR FORCE, 1950 AND 1960

Accountants
Artists
Clergymen
Professors
Dentists
Designers
Draftsmen
Editors
Engineers
Lawyers
Chemists
Personnel and labor relations workers
Pharmacists
Physicians
Teachers
Technicians, medical
Technicians, others
Farmers
Farm managers
Buyers
Inspectors, public administration
Officials, public administration
Purchasing agents
Managers, salaried, construction
Managers, salaried, manufacturing
Managers, salaried, wholesale
Managers, salaried, retail
Managers, salaried, banking
Managers, self-employed, construction
Managers, self-employed, manufacturing
Managers, self-employed, wholesale
Managers, self-employed, retail
Managers, self-employed, banking
Agents
Bookkeepers
Dispatchers
Mail carriers
Messengers
Office machine operators
Shipping and receiving clerks
Insurance agents
Real estate agents

Salesmen, manufacturing
Salesmen, wholesale
Salesmen, retail
Bakers
Brickmasons
Cabinetmakers
Carpenters
Compositors
Cranemen
Electricians
Excavating
Foremen, construction
Foremen, manufacturing
Foremen, communication
Inspectors
Linemen
Locomotive engineers
Machinists
Mechanics
Moulders, metal
Painters, construction
Plasterers
Plumbers
Pressmen
Stationary engineers
Structural metal workers
Tinsmiths
Toolmakers
Upholsterers
Apprentices
Attendants, auto service
Brakemen, railroad
Bus drivers
Deliverymen
Filers, metal
Furnacemen
Laundry operatives
Meat cutters
Mine operatives
Painters except construction
Sawyers
Stationary firemen
Truck drivers

SELECTED DETAILED OCCUPATIONS, MALE LABOR FORCE,
1950 AND 1960

Welders
Operatives, manufacturing, durable goods
Operatives, manufacturing, nondurable goods
Operatives, nonmanufacturing
Private household workers
Attendants, hospital
Barbers
Bartenders
Cooks except private household
Janitors
Porters
Firemen
Guards, watchmen
Policemen
Waiters
Farm Laborers, wage workers
Farm Laborers, unpaid family workers
Laborers, manufacturing, durable goods
Laborers, manufacturing, nondurable goods
Laborers, nonmanufacturing, construction
Laborers, nonmanufacturing, railroad
Laborers, nonmanufacturing, transportation
Laborers, nonmanufacturing, communications
Laborers, nonmanufacturing, wholesale and retail trade
Laborers, nonmanufacturing, public administration