

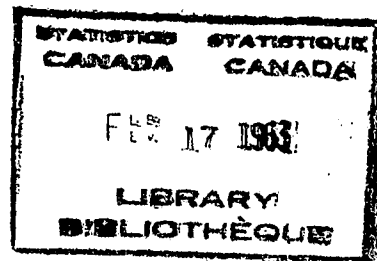
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CANADA



EARNINGS AND EDUCATION

by

J. R. PODOLUK

(Advance release from Census Monograph,
"Incomes of Canadians")

DOMINION BUREAU OF STATISTICS

Central Research and Development Staff

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FOREWORD

Increasing demands for statistics have been accompanied by requests for more analysis of the statistical data available at the Dominion Bureau of Statistics. The reports which are released as a regular feature of D.B.S. activities usually contain a general analysis of the contents of the reports. They are not, in themselves, research studies which attempt an intensive examination of an area.

As a result of this interest in more specialized analytical studies the Dominion Bureau of Statistics plans to initiate and publish research reports on subjects such as the labour force, population and income. Some of these studies may result from the work of D.B.S. staff members while others may be commissioned by D.B.S. to be prepared by persons not on staff at D.B.S.

A major example of such studies are the census monographs now in preparation. These are studies which will be based primarily on census data collected in the 1961 Census of Canada but which will draw upon other sources of data as well. Because of wide interest in the subject matter of these studies, requests have been received for the advance publication of some of the contents of these studies. The present report is an advance release of two chapters of the monograph on Canadian incomes. Although these monographs have been prepared at the request of D.B.S. and will be published by D.B.S. the responsibility for the analysis and the conclusions reached will be that of the individual authors and will not necessarily reflect the views of the Dominion Bureau of Statistics.

Walter E. Duffett,
Dominion Statistician.

PREFACE

The two chapters contained in this report are an advance release of some analytical data from a forthcoming census monograph on incomes scheduled for completion in 1966. Some of the material may undergo further revision before incorporation into the final text of the monograph.

In addition to the examination of earnings and private returns to education the monograph will consider other aspects of the income distribution such as the incomes of the adult population, structure of family income, regional income differentials and the income characteristics of families of the aged and those in low income groups. Other subjects which will be included are income changes over time, inequality in the Canadian income distribution and some international comparisons of incomes.

Although responsibility for the analysis and conclusions are those of the author, acknowledgment is due to the Central Programming Staff for the tabulation and compilation of tables for the study and to the staffs of the Population Section of the Census Division and the Consumer Finance Section of the Central Research and Development Staff for the preparation of tables and for other assistance on these chapters. Mr. Boriss Mazikins of the Central Research and Development Staff assisted by preparing the estimates of the rates of return to investment in education.

J.R. Podoluk
Central Research and Development Staff.

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EARNINGS BY LABOUR FORCE CHARACTERISTICS

Analysts of income distributions are concerned with two important aspects of income distributions -- first the origin of income and the determinants of its size and composition, and second its disposition through spending and saving. That is, income can be viewed as the end result of the process of distribution or as a causal factor influencing consumer decisions.(1) Income accrues through a number of channels -- for example, through the sale of goods or services, the ownership of income yielding assets, or as a result of government policies to redistribute incomes. The major categories of money income receipts are: income from employment earned by working for others as an employee on a wage or salary, through the operation of a business owned by the worker, through the carrying on of a professional practice, or through some other form of self employment; investment income which may be received from the ownership of stocks, bonds or mortgages, rental income from real estate or income from estates or trust funds; income from government transfer payments such as family allowances, old age pensions and unemployment insurance benefits.

These receipts usually flow to individuals in their capacities as members of the labour force, owners of assets or as persons belonging to special categories -- the aged, mothers of young children and so forth. The disposition of income is usually determined by a group of individuals, the family or spending unit. The study of the origin of income, then, must begin with the analysis of individual incomes; the examination of welfare problems, consumption and savings must be related to the family income distribution.

This study will be restricted to an examination of some aspects of income received from employment. The basic determinants of the size of income or the causes of inequality of income must be studied through the distribution of what has been termed economic income(2) or income arising from participation in current economic activity. Most transfer income in Canada is derived from various government social security and welfare plans and the size of transfer payment receipts is normally regulated by the relevant government legislation with ceilings set automatically, often at relatively low limits.(3)

The 1961 Census of Canada collected data on the total money income received by the adult population resident in a twenty per cent sample of private non-farm households. Data were obtained on the following sources of income: wages and

- (1) A discussion of the data requirements for studying origin of income as well as the disposition of income may be found in George Garvy, A Report on Income Size Distribution in the United States, an unpublished report submitted to the National Bureau of Economic Research, New York, September 1955.
- (2) Ibid p. 19-25.
- (3) Because income recipients may receive different types of transfer payments it is not possible to determine the maximum amount which could be paid to individuals although an examination of the ceilings payable under different welfare plans suggests that, exclusive of pensions to retired government employees, the maximum would appear to be around \$5,000. In the year preceding the Census, old age pensions including supplementary payments in some provinces had a ceiling of \$900, maximum family allowance payments per family approximately \$1,300, unemployment insurance \$1,900. The largest transfer payments are probably payments of workmen's compensation and pensions to totally disabled veterans. The annual payment to a totally disabled veteran with a wife was \$2,880 with additional payments for dependent children.

salaries, net income from self-employment, investment income, government transfer payments and miscellaneous sources such as private pensions. The most significant component of income reported was income earned from employment as a wage or salary earner or as a self-employed person; the amount of labour income earned was the most important determinant of the size of total income received. Income from assets was usually a secondary rather than a primary source of income. In aggregate, approximately 90 per cent of total income received by male income recipients was income from employment while, for 87 per cent of males, this was the most important income source. Employment income was somewhat less significant for female income recipients; approximately 77 per cent of total income was from this source while it was the major source of income for only 66 per cent of the female income receiving population.

Table 1 summarizes the distribution of total income of individuals under three categories -- the income distribution of persons in the current labour force; the income distribution of persons with labour force experience during the twelve months before the census date, but outside the labour force at the census date; and the income distribution of persons reporting no labour force attachment during the year. For males, income levels are highest for those in the current labour force and lowest for those with no labour force experience; those who worked even part of the year were in a better relative position than those outside the labour force. Among women not in the current labour force, incomes of those with some labour force participation during the year are very similar to the incomes of labour force non-participants, although the characteristics of the two groups differ. The women with some labour force experience during the year were concentrated in the youngest age groups and largely consisted of students working only part of the year and married women in the labour force on a part-time basis, while the labour force non-participants were concentrated in the older age groups. Male income recipients who had been in the labour force in the year preceding the Census, but who had left the labour force by June 1st, were also predominantly in the younger age groups, although a significant proportion were over 55 years of age. The data are inadequate for carrying out any thorough analysis of the earnings of part year participants because they tend to be drawn from segments of the population who are only interested in occasional or irregular employment -- the young, the old and the married female population. Among the younger age groups, for example, the occupation reported may not be the intended permanent occupation of the worker while little information exists that would allow any classification of the reasons behind withdrawal from the labour force.

The analysis in this report will be restricted to persons in the current labour force and their receipts of income from employment. The current labour force consists of persons in the labour force as of June 1st, 1961, while income from employment is the total amount received as gross cash wages and salaries or as net income from self employment either from operating a business, carrying on a professional practice or for working as an own account worker during the previous twelve months.(4)

Determinants of Earnings

Inequality of income exists not only between labour force participants and non-participants but also among labour force participants themselves. An examination

(4) The questionnaire asked for income received during twelve months preceding the census date June 1, 1961 but if respondents were unable to supply this it was suggested that they report income for the calendar year 1960.

TABLE 1. Distribution of Individuals by Sex, by Labour Force Participation(1)
and by Size of Total Income for Year Ending May 31, 1961

Size group	Males			Females		
	In labour force		Not in labour force	In labour force		Not in labour force
	Current	Other		Current	Other	
per cent						
Under \$500	3.5	23.5	15.1	12.6	42.6	32.4
\$ 500 - \$ 999	3.7	15.9	38.7	11.9	21.2	41.1
1,000 - 1,499	4.4	12.4	14.8	12.4	13.2	10.0
1,500 - 1,999	4.7	9.5	10.2	12.5	8.0	5.1
2,000 - 2,499	6.7	8.8	5.9	14.5	5.8	3.2
2,500 - 2,999	7.4	6.8	3.9	11.0	3.4	1.8
3,000 - 3,499	10.8	6.6	2.8	10.3	2.7	1.5
3,500 - 3,999	10.2	4.1	1.9	5.7	1.2	.9
4,000 - 4,499	10.8	3.3	1.3	3.4	.7	.8
4,500 - 4,999	8.0	2.1	.9	1.8	.3	.6
5,000 - 5,999	12.1	2.8	1.5	1.9	.3	.8
6,000 - 9,999	13.1	2.8	2.0	1.7	.4	1.1
10,000 and over	4.4	1.3	1.2	.3	.1	.7
Totals	100.0	100.0	100.0	100.0	100.0	100.0
Average income	\$ 4,444	2,064	1,611	2,143	1,013	1,100
Median income	\$ 3,931	1,427	950	2,020	674	714
Number of persons	3,854,582	188,761	564,701	1,449,726	227,423	1,026,644

(1) Labour force participation refers to labour force participation on June 1, 1961, or during the preceding twelve months. The "current" labour force is the labour force as of June 1, 1961 while "other" consists of persons in the labour force during the year preceding June 1. The category "not in labour force" consists of all other income recipients.

Source: Table A.1. Census Report 98-501 Incomes of Individuals, 1961 Census of Canada and Tables B.8 and B.9
Census Report 98-502 Incomes of Individuals, 1961 Census of Canada.

of the distribution of earnings by size makes it evident that labour force participation in itself will not provide an income recipient with some guaranteed minimum income; very low incomes may occur even among members of the labour force. The distribution of income from employment by size and by sex of income recipient for the current non-farm labour force is summarized in Table 2. Median earnings for males were approximately \$3,800 and for women \$2,000; nearly one-fifth of males reported income from employment of less than \$2,000 while one-quarter of women earned less than \$1,000.

TABLE 2. Distribution of Current Non-Farm Labour Force by Sex and by Size of Income from Employment for Year Ending May 31, 1961

Size group	Males		Females	
	Number	Per cent	Number	Per cent
Under \$500	153,874	4.0	196,683	13.7
\$ 500 - \$ 999	163,888	4.3	176,274	12.3
1,000 - 1,499	186,128	4.9	177,513	12.3
1,500 - 1,999	187,413	4.9	178,434	12.4
2,000 - 2,499	277,401	7.3	211,424	14.7
2,500 - 2,999	283,125	7.4	155,393	10.8
3,000 - 3,499	450,921	11.8	149,885	10.4
3,500 - 3,999	390,517	10.2	79,253	5.5
4,000 - 4,499	417,829	10.9	45,089	3.1
4,500 - 4,999	290,543	7.6	22,012	1.5
5,000 - 5,999	420,823	11.0	23,164	1.6
6,000 - 9,999	450,068	11.8	18,960	1.3
10,000 and over	151,917	4.0	3,587	.2
Totals	3,824,447	100.0	1,437,671	100.0
Average employment income ... \$		4,178		2,051
Median employment income \$		3,765		1,972

Source: Table B.1, Census Report 98-502, Incomes of Individuals, 1961 Census of Canada.

These are total earnings received by the current labour force during the one year period preceding the Census, not annual rates of pay. The size of these earnings is affected by both long run and short run factors. Among the long run factors which influence the level the most significant are probably sex of worker, age, occupation, education, class of worker and place of residence -- province, rural, urban and so forth. Among short run factors are current economic conditions and their effect on the amount of employment available and on wage rates, illness, or other forces which may affect labour force participation patterns by affecting the number of weeks worked or the hours worked per week. Some of these influences are examined in these chapters, although the data are not comprehensive enough to

explain away completely variations in earnings. In addition to the economic and demographic features mentioned above, differences in the size of earnings may also be attributable to less tangible characteristics not as susceptible to statistical measurement such as differences in levels of intelligence among individuals, restriction of entry to some occupations, the impact of trade unionism, or the existence of discrimination because of the age, sex or race of the worker. For self-employed persons whose earnings are included in these statistics, earnings may represent a mixture of a return to the investment in the business as well as compensation for the labour of the proprietor. In fact, in some instances, earnings may be largely a return to capital rather than to labour so that a comparison of the earned income of wage-earners with the earned income of the self-employed may not be entirely valid. Imputations of returns to labour and returns to capital for the self-employed present conceptual difficulties and, if attempted, are usually arbitrary.

The analysis which follows will be largely restricted to an examination of some of the permanent rather than the transitory factors influencing earnings -- sex, age, schooling, occupation and class of worker and level of education.(5) Since most of the data to be examined are annual earnings realized rather than rates of payment the size of earnings reported will also reflect short run factors which may depress annual earnings below normal levels. Ideally, for the study of permanent factors, statistics are needed on the earnings which accrue or would accrue if employment were not interrupted. Census data do not permit breakdowns which would allow for an adequate segregation of the part-time and part-year workers from those who worked full-time the year round. Persons working for wages and salaries were asked to report in how many weeks they worked for wages and salaries while no information was secured on the duration of employment of the self-employed, number of weeks of unemployment or the number of weeks an individual was not in the labour force. This method of reporting weeks of employment does not permit a differentiation between full-time and part-time work during the year for wage-earners reporting some weeks of employment. For example, wage-earners working one day per week for the year and wage-earners working five days per week for the year would both be classified as having worked in 52 weeks. Although, in addition to the question of weeks of employment, wage-earners were asked to report the number of hours usually worked per week, the number of hours reported may not be applicable to all of the weeks worked, but may only be representative of current employment. As a result, only an imprecise classification is possible of paid workers as between full-time and part-time workers. Persons who worked only part year as wage or salary earners are identifiable but some of these may have been in the labour force as self-employed during the rest of the year rather than outside the labour force.

Earnings by Sex

The differentials in earned income of men and women workers reported for the labour force are almost as pronounced as the total income differentials for all male and female income recipients.(6). Average income of female income recipients was 41 per cent of the male average, while average earned income per female in the current labour force was only 49 per cent of the equivalent average for the male labour force.

(5) Regional patterns are not discussed in these chapters but will be examined in another chapter of the income monograph.

(6) These differentials will be analyzed by the author in Chapter 4, Incomes of Canadians, 1961 Census Monograph now in preparation.

There are marked differences in the participation rates and working patterns of the male and female populations of working age.(7) Primarily because of marriage and the responsibilities associated with marriage, women have much lower labour force participation rates. Further, of those who do seek employment, a much higher proportion works only part of the year than does the male labour force. Male entry into the labour force after the completion of schooling is usually a permanent entry until retirement starts to occur in the older age groups, usually beyond the age of 55. Women, to a considerable extent, move in and out of the labour force during their lifetimes. The duration of employment during the year, therefore, is an important explanation of differences in levels of annual earnings by sex of worker and the unavailability of such data in detail by labour force characteristics makes it impossible to segregate the amount of time worked as an explanatory factor of differences in annual earnings.

Approximately 89 per cent of women and 80 per cent of men in the current labour force were employees so that such data as exist cover the majority of the labour force. Among all wage-earners, 71 per cent of males reported working in 40 to 52 weeks for a usual work week of 35 hours or more while only 57 per cent of women employees reported a similar degree of participation.

Cross-classifications of wages and salaries earned are only available by weeks reported and age, and by weeks reported and broad occupational group.(8) If an examination of earnings differentials is restricted to earnings of full-year workers, defined as those working in 49 to 52 weeks and usually working 35 hours per week or more, there is some narrowing of the differences between the earnings of the two sexes. Table 3 summarizes the distribution of wages and salaries earned by all wage and salary earners in the current labour force and the wages and salaries earned by those working the full year full-time.

Average wages and salaries of full-year women workers were \$2,620 or 59 per cent of the male average of \$4,446 in contrast to 54 per cent for overall average female earnings as a ratio of male earnings.

Earnings by Sex and Age

As these statistics indicate, confining the comparison of earnings to two groups with homogeneous characteristics as to weeks and hours of employment and class of worker status eliminates only a small fraction of earnings differentials. Other attributes which may exert a greater influence on the level of earnings are age, level of schooling and occupation. Age can be considered as an imperfect proxy for the experience which may develop on the job in the years after commencement of continuing employment. As the Census did not collect data on the number of years worked no information exists as to the actual work history of the labour force. Age can only be considered as a partial indicator of experience because the age of permanent entry into the labour force would be closely related to the age at which formal schooling is completed. For males, in unskilled occupations where little schooling is required entry may be at the age of 15 or 16

(7) Labour force behaviour of men and women is discussed in more detail in Chapter 4 of the income monograph and in the Labour Force Monograph now in preparation by Sylvia Ostry and Frank Denton. An analysis may also be found in a study by the Department of Labour, Women at Work in Canada, Ottawa, 1964.

(8) At the time this was being written detailed occupational information for Canada was not yet available.

TABLE 3. Distribution of Wage-Earners in Current Labour Force by Sex and by Size of Wages and Salaries for the Year Ending May 31, 1961

Size group	All wage-earners		Full year workers(1)	
	Male	Female	Male	Female
	per cent			
Under \$1,000	9.6	25.2	.8	4.6
\$ 1,000 - \$1,999	11.0	25.1	3.9	22.5
2,000 - 2,999	15.6	26.4	13.4	37.5
3,000 - 3,999	22.1	15.9	26.2	24.3
4,000 - 4,999	18.7	4.8	24.4	7.3
5,000 - 5,999	10.6	1.5	14.3	2.2
6,000 - 6,999	5.3	.6	7.2	.9
7,000 - 9,999	5.0	.5	6.9	.7
10,000 and over	5.0	.5	2.9	.1
Totals	100.0	100.0	100.0	100.0
Average wages and salaries .. \$	3,679	1,995	4,446	2,620
Median wages and salaries ... \$	3,624	1,988	4,234	2,610

(1) Working in 49 to 52 weeks during the previous year and usually working 35 hours or more per week.

Source: Columns 1 and 2 from Table 15, Census Report 94-536, Earnings of Wage-Earners by Marital Status and Age, 1961 Census of Canada. Columns 3 and 4 are unpublished data.

while for occupations requiring long and intensive training, such entry may not occur until the age of 25 or 26. For males, different occupations would embody different periods of experience for the persons constituting the same age group.

Because of the tendency of the female labour force to move into the labour force after completion of schooling and to leave again for some years after marriage there may be little correlation between age and job experience. The married woman returning to work at 35 or 40 after a 10 or 15 year withdrawal from the labour force may find that re-entry into the labour force is only possible at salary or wage levels offered to inexperienced workers with no previous work history. This would be especially the case in occupations where on-job experience is important.

Much smaller variations are evident in earnings by age groups among female wage-earners as compared with male wage-earners in the labour force during the full year. Average and median wages and salaries of male and female employees in the current labour force are summarized on the following page.

TABLE 4. Average and Median Wages and Salaries by Age and Sex of Wage and Salary Earners in Current Labour Force Employed in 49 to 52 Weeks(1) during the Year Ended May 31, 1961

Age	Males		Females		Ratio	
	Average	Median	Average	Median	Female to male	
					Average	Median
	\$		\$			
15 - 19	2,091	2,155	1,831	1,906	.88	.88
20 - 24	3,216	3,264	2,409	2,507	.75	.77
25 - 34	4,396	4,333	2,814	2,859	.64	.66
35 - 44	4,926	4,648	2,813	2,786	.57	.60
45 - 54	4,891	4,512	2,849	2,754	.58	.61
55 - 64	4,542	4,140	2,738	2,621	.60	.63

(1) These are average earnings of employees in the current labour force who reported usually working 35 hours a week or more.

Source: Unpublished data from the 1961 Census of Canada.

Male wage-earners show a rising earnings curve from the youngest age groups until the ages of 35 to 44 when peak earnings were reported, although earnings for the next age group were only slightly lower. If average earnings of males and females aged 35 to 44 are taken as 100, average earnings of the other age groups show the following relationship:

TABLE 5. Ratio of Average Wages and Salaries by Age Groups to Average Wages and Salaries of Age Group 35 to 44

Age	Males	Females
15 - 19 .....	.42	.65
20 - 24 .....	.65	.86
25 - 34 .....	.89	1.00
35 - 44	1.00	1.00
45 - 54 .....	.99	1.01
55 - 64 .....	.92	.97

Source: Calculated from Table 4.

The highest average earnings, by age groups, among males between 15 and 65 are nearly two and one half times the lowest average earned, while among women the highest earnings are only some 50 per cent greater than the lowest average reported.

For women, average earnings show remarkable stability after the age of 25. As has been indicated, there are no data available on discontinuities in employment during the working lifetime of women to examine the influence of such interruptions on earnings by age. Many of the women in their thirties and forties may be recent re-entries into the labour force.

Interestingly, average earnings among the youngest age groups shown indicate the differentials between male and female earnings are relatively small for the young; the male average was only 14 per cent higher than female average earnings. Studies of the transition from school to labour force participation suggest that schools, at least at the secondary level, prepare girls for immediate careers after graduation more readily than boys.(9) The age group 15 to 19 in the labour force would consist primarily of secondary and elementary school graduates. Girls can obtain permanent employment more easily after leaving school in what are considered to be the traditional feminine careers such as the clerical occupations. Other occupations favoured by women require relatively little additional training beyond secondary school, as for example, teaching or stenography. Boys, on the other hand, often face a long apprenticeship or go on to obtain a more advanced training in technical institutes or at universities. Secondary or technical school graduation qualifies girls for immediate employment in white collar and service occupations while boys, except for those who may have completed vocational training, usually have to obtain further training. Boys appear to experience greater difficulty in finding employment in the first years after completing elementary or secondary school and, in recent years, the age group 15 to 19 has had high rates of unemployment.(10) Further, of those working, many may be in occupations which involve some years of on-job apprentice training with accompanying low wages during the initial years of apprenticeship. These factors may have less effect on the earnings of girls in the youngest age groups so that for the earliest years, annual earnings of the young of both sexes are nearly equal.

It is possible that, in addition to the differences in the earnings profiles by age groups of the two sexes, differences in the age structure of the male-female labour force could account for some of the earnings differentials. For the group of full-year employees average female earnings were standardized by the male age distribution. Average earnings of all female workers standardized on age were \$2,726 or 61.3 per cent of the male average as compared with a ratio of 58.9 per cent for the unstandardized average. Little of the differential is removed by standardizing by age, which is not an unsurprising result in view of the similarity of average earnings for all female age groups between 25 and 65.

Earnings by Sex, Age and Education

One qualification is necessary to the above comments on age and earnings reported by women workers. When level of education is added as a variable age-earnings profiles of women do indicate differences between age groups. Women in the labour force who were university graduates showed greater variability of earnings by age than did women with only elementary or secondary school educations.

(9) See, for example, Transition from School to Work, Oswald Hall and Bruce McFarlane, Department of Labour, The Interdepartmental Skilled Manpower Training Research Committee, Report No. 10, 1962.

(10) In 1961, unpublished data show that male unemployment rates for the age group 15 to 19 were more than twice as high as the female unemployment rates for the same age group.

The earnings of women with a secondary school education were higher than the earnings of women with only elementary schooling and also exhibited more variability.

However the differentials in average earnings between age groups for the female labour force with university training are substantially less than the differential for males with university training. Table 6 summarizes average earnings reported by sex and age for selected levels of schooling of the non-farm labour force.

These statistics are for all workers including part-time workers. If data were available for the full-time labour force only, by age and level of schooling, more distinct age-earnings profiles might be evident for women. When duration of employment is examined for individual occupations the female labour force in more highly paid occupations shows more stable employment patterns than in lower paying occupations. The more highly paid occupations would demand more education as a pre-requisite while higher earnings might in themselves induce women to work on a year round basis.(11)

The female labour force, as a whole, tends to be better educated than the male labour force. Although the median years of schooling of the female labour force are not much higher than for the male labour force the proportion with only elementary schooling is substantially less and the proportion with 4 to 5 years of secondary school education is higher.

Median schooling for males is approximately one year of secondary school while for women it is two years of secondary school. However, 44 per cent of males have only elementary schooling, while this ratio is only 30 per cent for the female labour force. Somewhat over one-third of women workers have four years or more of secondary schooling while only one-quarter of men have this level of education, although the male labour force has a higher proportion with university graduation than does the female labour force. These observations about the calibre of female education vis-a-vis male education must be qualified somewhat by the fact that the Census only measured the amount of education received in elementary and secondary schools and universities. The Census did not measure training obtained through means such as trade schools, teachers' colleges, or through apprenticeship programs. Education received through normal educational channels in elementary, secondary schools or universities may only account for part of the background needed to enter many occupations. Such supplementary training may be more significant for men than women and, if taken into consideration, may lessen the apparent differences between the amount of schooling each sex has completed.

Despite these reservations, it can reasonably be said that educational differences are not a factor in accounting for lower female earnings; on the contrary, the direction of the differences is such that education should be expected to have some equalizing effect. The statistics shown in Table 6 suggest that when comparisons are restricted only to employees, education does diminish the size of the gaps between male and female earnings by age groups but no such effect is evident when the total labour force is examined. For wage and salary earners the higher the level of education, the smaller the difference in earnings of males and females in the same age group and with the same level of education. But it must still be noted that average wages and salaries of women with a secondary school graduation are lower than the average earnings of males with only elementary schooling, while women with some university or university degrees reported lower averages than males with only a secondary school education.

(11) For evidence see Census Report 94-539, Earnings, Hours and Weeks of Employment of Wage-Earners by Occupations, 1961 Census of Canada.

TABLE 6. Average Earnings(1) by Sex, Age and Selected Levels of Schooling -
Wage and Salary Earners and Total Non-Farm Labour Force
Year Ending May 31, 1961

Schooling and age	Wage and salary earners			Non-farm labour force		
	Male	Female	Ratio F/M	Male	Female	Ratio F/M
	average \$	average \$		average \$	average \$	
Elementary schooling:						
Under 25	1,784	1,171	.66	1,928	1,227	.64
25 - 34	3,035	1,550	.51	3,311	1,521	.46
35 - 44	3,312	1,560	.47	3,653	1,627	.45
45 - 54	3,285	1,575	.48	3,648	1,664	.46
55 - 64	3,168	1,518	.48	3,480	1,617	.46
Totals	2,990	1,458	.49	3,345	1,537	.46
Secondary school 4 - 5 years:						
Under 25	2,435	1,960	.81	2,497	2,000	.80
25 - 34	4,536	2,595	.57	4,760	2,437	.51
35 - 44	5,349	2,565	.48	5,779	2,577	.45
45 - 54	5,547	2,760	.50	6,130	2,548	.42
55 - 64	5,286	2,878	.54	5,944	2,920	.49
Totals	4,450	2,393	.54	4,813	2,438	.51
University degree:						
Under 25	2,994	2,721	.91	3,406	2,699	.79
25 - 34	5,923	3,802	.64	6,909	3,873	.56
35 - 44	7,928	4,343	.55	9,966	4,256	.43
45 - 54	8,336	4,798	.58	10,821	4,866	.45
55 - 64	8,066	5,080	.63	10,609	5,055	.48
Totals	6,968	4,061	.58	8,866	4,067	.46

(1) For wage and salary earners the averages are average wages and salaries earned while for the total labour force the averages represent average earnings from all employment -- either as an employee or in a self-employed capacity.

Source: For wage-earners data from Table 17, Census Report 94-537, Earnings of Wage-Earners by Schooling and Age, 1961 Census of Canada. For male non-farm labour force aged 25 to 64 data obtained from Table B.6, Census Report 98-502, Incomes of Individuals. Other data are unpublished.

TABLE 7. Distribution of the Total Current Labour Force by
Levels of Schooling June 1, 1961

	Males	Females
	per cent	
Elementary:		
Less than 5 years	7.1	3.7
5 years and over	37.3	26.3
Secondary:		
1 - 3 years	31.1	36.0
4 - 5 years	15.3	26.3
University:		
Some university	4.3	5.0
Degree	4.9	2.8
Totals	100.0	100.0

Source: Census Bulletin 94-509, Table 17, Occupations by Sex Showing Age, Marital Status and Schooling, 1961 Census of Canada.

When the comparisons are extended to the non-farm labour force as a whole, including the self-employed and employers as well as employees, the differentials in earnings by age and schooling are as great for higher levels of schooling as for the less educated. The relationship between the average earnings of male and female university graduates was approximately the same as the relationship between the average earnings of the segments of the labour force with only elementary schooling while differences were somewhat narrower for those who completed four to five years of secondary schooling. This may be attributed to different patterns of earnings by class of worker for the two sexes. Among the male labour force males who are self-employed or employers, on average, have higher earnings than do males who are employees; on the other hand, average earnings of self-employed women differ little from average earnings of those on a wage or salary. Many of the occupations with high earnings such as medicine and law have a high proportion of self-employed and consist largely of university graduates. Women with university degrees are usually found in salaried occupations.

Sex, Earnings and Occupation

A partial explanation as to why, for higher levels of education, the level of schooling appears to have such limited effect in narrowing the earnings gap between the male and female labour force may be the occupational structure of the two groups

within various levels of schooling. It is obvious in an examination of the occupational distribution of each that their occupational choices are not the same.(12) A limited number of occupational categories are completely closed to women because, for example, the work may be physically too demanding. The occupational classes of logging, fishing, trapping, hunting and mining are comprised almost entirely of males. To the extent that a woman is found in agricultural occupations, it is usually as an unpaid family worker on the farm of a husband or father rather than as a paid worker or a farm operator. With the possible exception of mining, these are occupations which demand little training or education for entry and in which earnings tend to be at very low levels. Exclusion of women from these occupations would not result in lower earnings for women.

Table 8 shows the distribution of the male and female labour force with selected levels of schooling by broad occupational groups. For males with only elementary schooling the largest proportion, approximately one-third, worked as craftsmen and production process workers. This occupational group includes production workers in manufacturing, tailors, carpenters, machinists and mechanics and construction occupations such as painters, electricians and bricklayers. Nearly one-fifth of the group with elementary schooling were farmers and farm workers. The remainder were found scattered through other occupational groups; some 6 per cent, for example, were in managerial and professional occupations.

With higher levels of education, as might be expected, the pattern of male employment shifts markedly. Of those who completed four to five years of secondary school, some 30 per cent were in managerial and professional occupations, approximately one-quarter were in clerical or sales occupations while only slightly over one-fifth were craftsmen and production workers. Among those with university degrees 17 per cent were in managerial positions while 69 per cent followed professional and technical careers.

For all levels of schooling the female labour force shows a greater concentration of employment in particular occupational categories than does the male labour force. Approximately 40 per cent of women workers with only elementary schooling were in service occupations while nearly one-quarter were in the category of production workers. The service occupations are characterized by low wage rates and, for the female labour force, by a high degree of part-time and part-year employment. Less than one-half of women employed in service occupations worked in 40 weeks or more for periods of 35 hours or more per week. For a large segment of the male labour force in service occupations, earnings are also at very low levels and it is probable that wage rate differentials for men and women may be less in these occupations than in occupations requiring greater skills. Service occupations include two quite different categories of occupations -- one category called protective occupations includes the armed forces of all ranks, police forces and firemen. Earnings in these service occupations are comparable to earnings in some of the skilled craft occupations. These occupations consist almost entirely of males. The second category includes occupations such as waiters or waitresses, cooks, barbers, hairdressers, janitors and charwomen. In this second category the number of women engaged in these occupations is substantially greater than the number of men. Male earnings in these occupations are also at very low levels and it is possible that the preponderance of women workers in such service occupations may influence the

(12) For a discussion of the occupational composition of the labour force and of changes through time see Noah M. Meltz, Changes in the Occupational Composition of the Canadian Labour Force 1931-1961, Occasional Paper No. 2, Economics and Research Branch, Department of Labour, Ottawa, March 1965.

TABLE 8. Distribution of Current Labour Force with Selected Levels of Schooling
by Broad Occupation, June 1, 1961

Occupational group	Males				Females			
	Elementary schooling	Secondary 4 - 5 years	University degree	Total labour force	Elementary schooling	Secondary 4 - 5 years	University degree	Total labour force
	per cent							
Managerial	5.7	18.4	17.1	10.2	3.3	3.1	3.5	3.3
Professional and technical .....	.8	11.0	68.5	7.6	2.0	28.1	78.1	15.4
Clerical	3.1	14.4	2.8	6.9	8.3	45.4	11.8	28.8
Sales	2.8	10.1	3.7	5.6	7.8	6.1	1.7	8.4
Service and recreation	8.3	7.9	2.9	8.5	39.5	8.7	2.9	22.4
Transport and communication	8.8	4.8	.5	7.5	1.2	1.9	.3	2.2
Farmers and farm workers	18.7	4.6	.9	12.2	9.6	1.2	.3	4.3
Loggers	3.0	.4	.1	1.7	--	--	--	--
Fishermen, trappers and hunters	1.4	.1	--	.8	--	--	--	--
Miners and quarrymen	1.9	.7	.1	1.4	--	--	--	--
Craftsmen and production workers	34.1	21.6	2.2	28.8	23.7	2.9	.6	11.6
Labourers	9.4	2.6	.3	6.3	2.4	.3	.1	1.2
Not stated	2.2	3.3	1.0	2.6	2.3	2.4	.8	2.5
Totals	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table 17, Census Report 94-509, Occupations by Sex, Showing Age, Marital Status and Schooling, 1961 Census of Canada.

wage rates of men. Although, as in all other occupational groups, average male earnings are higher, this may be due to the greater incidence of full year employment among male service workers rather than to higher wage rates.(13)

Service occupations may be attractive to women workers because these have been expanding areas of employment, little skill or training is required for entry and part-time or casual employment is readily found by those who do not want to become attached to the labour force on a full-time basis. In the crafts and production occupations women workers also tend to concentrate in certain traditionally feminine occupations. Nearly half of such women workers are in occupations associated with the textile and clothing industries -- some 38 per cent work as tailoresses, dress-makers, sewers and related occupations, while 7 per cent work as spinners, knitters and weavers. In these occupational categories the number of women workers almost equals or exceeds the number of male workers. Another production occupation employing a substantial proportion of female workers is bottling, wrapping and labeling. Here again there are more female than male workers. The textile, clothing and packaging occupations account for approximately 60 per cent of women workers in the crafts and production occupations, in contrast to only 5 per cent of males in this occupational category. Again these are occupations where male earnings are also relatively low.

Male workers with four to five years of secondary schooling have possibly the most varied employment patterns among the male labour force and are more widely distributed among the various occupational groups than those with more or less education. The majority of women workers with this level of education are concentrated in two broad occupational groups -- clerical occupations which account for almost one-half of all employment of women and professional and technical occupations which absorb 30 per cent. Again, because of this concentration of women in the clerical categories, the number of women workers exceeds the number of male workers. In the professional category two occupations include the great majority of women secondary school graduates in the labour force -- approximately 45 per cent were teachers while 49 per cent were graduate nurses or nurses in training. The teaching classes at the elementary and secondary school level are again heavily weighted with women workers while nursing is an almost exclusively feminine occupation. A comparison of average salaries in the clerical and teaching occupations indicates that, for secondary school graduates, male-female earning differentials are less than for other combinations of occupation and schooling. For the same age categories female earnings range around 60 to 70 per cent of the equivalent male average.(14) Again it is only possible to speculate as to why, in these occupations, in contrast to other occupations, salary gaps are narrower.

The availability of a large supply of well educated women workers for clerical occupations may be a factor in depressing the level of male salaries.(15) In

- (13) At the time this was being written statistics were not available for individual occupations to examine service occupations excluding the protective service occupations. An examination will be carried out when data become available.
- (14) Average earnings of women in clerical occupations in the current labour force working in 49 to 52 weeks in the year preceding the Census and usually working 35 hours or more were 74 per cent of those of male workers in clerical occupations with the same amount of employment.
- (15) Department of Labour data on salary rates by sex and occupation for selected clerical occupations suggest that, although salaries are higher for male office workers, differentials may be as low as 10 per cent with the lowest differentials existing in the more junior occupations. For data on wage and salary rates by occupation and locality see the annual reports of the Department of Labour, Ottawa, Wage Rates, Salaries and Hours of Labour.

teaching, most provinces have no sex differentials in their salary scales and earnings differences, therefore, may result from differences in levels of experience, differences in the extent to which women teachers work full time or differences in the proportion occupying supervisory or senior positions in the school system. For example, in reporting weeks of employment, approximately 87 per cent of male teachers worked in 40 weeks or more in the year preceding the Census, while only 77 per cent of women teachers were in this category.

Approximately 78 per cent of women workers with university degrees are in professional or technical occupations and, of these teaching and nursing absorb almost two-thirds of graduates, while 9 per cent are social welfare workers or librarians. Surprisingly, 12 per cent of women with university degrees are employed in clerical occupations, a category of employment where a university degree is of little financial advantage.(16) This is substantiated by the statistics in Table 9 on average earnings by occupation, age and level of schooling. Women teachers with university training had average earnings substantially higher than those with only secondary schooling but nurses with higher levels of education had only moderately higher earnings than those with less education.(17) The managerial and professional groups of occupations are the occupations offering the highest potential earnings to labour force participants. Employment in managerial occupations is important for the male labour force with secondary school graduation or better, while even for women with university degrees such employment is of negligible importance. In the professional pursuits women have concentrated in those occupations where the potential earnings ceiling may be relatively low while the male professional labour force consists of a very diverse range of occupations, such as engineering and other scientific pursuits, medicine and law. Although some women do train for these careers, they form only a very minor segment of these professional occupations.

One can only speculate as to why few women train for the more highly paid occupations. The majority of women marry and, in the past, have usually left the labour force after marriage. This may have resulted in an unwillingness on the part of women students and their parents to invest in acquiring a lengthy and expensive training. The changing attitude towards the employment of married women and the expectation of many of these women that paid employment will be a continuing part of their lives may, in future, result in some shifts in the occupational composition.(18)

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- (16) In a study on Some Economic Aspects of Education in Canada by Bruce W. Wilkinson to be published by the Department of Labour, the author estimates the educational requirements for the different occupational categories and the extent to which the labour force in 1961 in these occupations was under or over educated. His estimates indicate that in some categories, especially the clerical occupations, the female labour force has a higher level of schooling than the jobs require.
- (17) These observations are based upon an examination of unpublished data.
- (18) The study by Meltz, Changes in The Occupational Composition of the Canadian Labour Force 1931-1961 concludes that there has been less change in the occupational composition of the female labour force between 1931 and 1961 than in the male labour force. The major changes in the female labour force have been an increase in percentage employed in clerical occupations and a decline in the percentage employed in service occupations. Despite the fact that the 1961 labour force would be a more highly educated one the percentage employed in professional occupations was lower than in 1931.

TABLE 9. Average Income from Employment of Current Non-Farm Labour Force for Year Ending May 31, 1961 - Selected Occupational Groups by Sex, Age and Selected Levels of Schooling.

Occupation and age	Males			Females		
	Elementary (1) schooling	Secondary 4 - 5 years	University (2) degree	Elementary (1) schooling	Secondary 4 - 5 years	University (2) degree
	dollars					
Managerial:						
15 - 24	3,015	3,935	4,436		2,457	
25 - 34	4,981	6,078	8,527	1,886	3,081	3,981
35 - 44	5,490	7,690	11,140	2,072	3,747	4,764
45 - 54	5,635	8,375	13,028	2,324	3,811	5,811
55 - 64	5,558	8,586	13,242	2,094	3,699	
Professional and technical:						
15 - 24	2,291	3,116	3,924	1,952	2,315	2,984
25 - 34	4,212	5,071	6,890	2,440	2,873	4,083
35 - 44	4,840	6,053	10,135	2,327	2,908	4,748
45 - 54	4,864	6,511	10,745	2,560	3,369	5,300
55 - 64	4,522	6,589	10,581	2,618	3,646	5,726
Clerical:						
15 - 24	2,245	2,442	2,156	1,809	2,134	1,789
25 - 34	3,427	4,116	4,214	2,178	2,687	2,839
35 - 44	3,720	4,514	5,232	2,124	2,687	2,851
45 - 54	3,716	4,425	4,846	2,252	2,832	2,910
55 - 64	3,635	4,202	4,268	2,343	2,903	2,793
Sales:						
15 - 24	1,730	2,156	3,400	1,136	849	
25 - 34	3,615	5,072	6,514	1,378	1,633	
35 - 44	4,071	5,973	7,499	1,410	1,592	
45 - 54	4,081	5,763	6,818	1,475	1,619	
55 - 64	3,537	5,759	6,649	1,624	1,852	
Service and recreation:						
15 - 24	1,737	2,411	2,645	884	1,114	
25 - 34	2,989	4,294	6,069	1,241	1,722	
35 - 44	3,217	5,155	7,665	1,235	1,641	2,224
45 - 54	3,073	4,792	7,968	1,268	1,724	
55 - 64	2,820	3,282		1,194	1,522	
Craftsmen and production workers:						
15 - 24	2,242	2,740	2,112	1,401	1,555	
25 - 34	3,526	4,482	5,210	1,832	2,048	
35 - 44	3,769	4,779	5,685	1,909	2,105	
45 - 54	3,723	4,658	5,138	1,918	2,164	
55 - 64	3,578	4,411	4,800	1,868	2,053	

(1) Excludes workers reporting no schooling.

(2) Where no statistics are shown the estimated number was less than 250.

Source: For males aged 25 to 64 data are published in Table B.6, Census Report 98-502, Incomes of Individuals, 1961 Census of Canada. Other data are from unpublished census tables. The number of workers and average earnings are shown in Appendix B to this report.

An adequate examination of male-female earnings differentials requires much more data than the Census provides. Ideally, along with occupation, age and level of schooling, rates of pay, or alternately, annual earnings for full-year, full-time workers, are required as a minimum. Data only exist for a few of these variables in conjunction with each other so that differentials can be considered only in the context of limited homogeneity.

A comparison of average annual earnings of all wage-earners in the current labour force with average annual earnings of wage-earners working in 50 to 52 weeks and normally working 35 hours per week or more shows that some narrowing of the occupational differences occurs for broad occupations when part year workers are excluded. The averages are shown in Table 10 below. As might be expected the greatest changes occur in the sales, service and recreation occupations.

TABLE 10. Average Wages and Salaries -- All Wage-Earners in Current Labour Force and All Wage-Earners Employed in Full Year, Year Ending May 31, 1961

Occupation	All wage-earners			Employed full year(1)		
	Male	Female	Ratio F/M	Male	Female	Ratio F/M
	average \$	average \$		average \$	average \$	
Managerial	6,673	3,207	.48	6,848	3,531	.52
Professional and technical	5,448	2,996	.55	5,909	3,531	.60
Clerical	3,409	2,340	.69	3,818	2,826	.74
Sales	3,908	1,367	.35	4,608	2,066	.45
Service and recreation	3,161	1,158	.37	3,690	1,722	.47
Transport and communication	3,415	2,123	.62	4,006	2,617	.65
Farm workers	1,401	607	.43	2,081	1,240	.60
Craftsmen and production workers	3,566	1,788	.50	4,170	2,295	.55
Labourers	2,157	1,449	.67	3,253	2,168	.67
Totals	3,679	1,995	.54	4,444	2,619	.59

(1) Wage-earners working in 49 to 52 weeks and usually working 35 hours or more per week.

Source: For all wage-earners Table 21, Census Report 94-539 Earnings, Hours and Weeks of Employment of Wage-Earners by Occupation, 1961 Census of Canada.
All wage-earners employed full year from unpublished data.

The statistics in this table are for broad occupational categories which include occupations with widely different skill and educational requirements. The differences in occupational concentrations of men and women workers within these broad groups has already been commented upon. However, an examination of unpublished data on earnings by sex, age and schooling for specific occupations indicates that the differences evident for broad occupations are equally evident for individual occupations.

As a test of the possible effect of the internal occupational mix on broad occupational averages, female earnings in managerial and professional occupations for the non-farm labour force were standardized by the male occupational distributions. In the professional classes the unstandardized average female earnings were \$3,099 or 46.4 per cent of male earnings while standardized average earnings rose to \$3,569 or 53.4 per cent of the male averages. Standardizing in the managerial classes raised the female average from \$2,914 or 42.0 per cent of the male average to \$3,462 or 49.9 per cent of the male average. Thus, although standardizing for internal occupational differences within occupational groups removes some of the differentials, in themselves structural differences within broad occupational groups explain differences in average earnings only to a limited degree.

In summary, age and schooling in themselves appear to be of no significance in explaining differences in levels of earnings between men and women. The data suggest that number of weeks or months worked and occupation together are much more significant in explaining the level of earnings of each sex. However, these two factors, in themselves are likely to explain away less than half of the gap which exists.

A number of studies of determinants of earnings have stressed the importance of experience, especially among the more highly educated segments of the labour force, as an important factor.(19) Discontinuous work experience may prevent women from moving into positions of more senior responsibility and, as a result, experience may affect male earnings to a greater degree than female earnings. Discrimination may also explain some of the variations in earnings. Department of Labour data indicate that for equivalent occupations in the same labour market women invariably are paid at lower rates than men in the same occupations.(20) A full explanation of differentials requires much more data than are now available.

The remaining sections of this chapter will discuss in somewhat more detail other characteristics of the male earnings distribution.

Earnings of Male Labour Force by Occupation Characteristics

Class of Worker

In addition to age and level of schooling, class of worker is also significant in explaining the structure of male earnings. The data presented in Table 11 show the earnings distribution of the non-farm labour force by size of earnings and by class of worker -- worked for others (including unpaid family workers) and self-employed (with or without employees) for broad occupational groups. The statistics for the agricultural labour force are restricted to persons in agricultural

(19) See for example, Gideon Rosenbluth, "Salaries of Engineers and Scientists 1951", Canadian Political Science Association, Conference on Statistics, 1960, edited by E.F. Beach and J.C. Weldon, University of Toronto Press, 1962. This study, which used data almost entirely restricted to male engineers and scientists, concluded that one-fifth to one-third of salary variance was due to experience, function, industry and region, with experience of most significance. The study suggested that other factors not examined may account for the greater part of the salary variation -- size of employing firm, size of place of residence, differences in ability, market opportunities and bargaining power.

See also Jacob Mincer, "Investment in Human Capital and Personal Income distribution", Journal of Political Economy, August, 1958.

(20) See Department of Labour annual reports in Wage Rates, Salaries and Hours of Labour.

TABLE 11. Distribution of Current Non-Farm Male Labour Force by Class of Worker, by Broad Occupation and by Size of Income from Employment for Year Ending May 31, 1961

Class of worker and occupation	Size group										Total income	Average income	Median income
	Under \$1,000	\$1,000- 1,999	\$2,000- 2,999	\$3,000- 3,999	\$4,000- 4,999	\$5,000- 5,999	\$6,000- 9,999	\$10,000 and over	\$	\$			
per cent													
Worked for others:													
All occupations	8.5	9.6	14.6	22.8	19.4	11.2	11.2	2.6	100.0	3,952	3,743		
Managerial	1.0	1.6	3.4	9.5	15.0	16.2	36.1	17.1	100.0	7,248	6,366		
Professional and technical	3.7	4.7	5.9	12.4	15.6	16.2	33.2	8.5	100.0	5,794	5,475		
Clerical	6.7	8.1	17.1	29.6	24.1	9.8	4.3	.3	100.0	3,508	3,625		
Sales	11.1	8.7	13.8	18.8	15.8	12.6	15.8	3.4	100.0	4,104	3,862		
Service and recreation	10.7	11.8	19.6	24.8	18.9	7.8	5.7	.7	100.0	3,295	3,292		
Transport and communication	7.8	10.2	17.0	25.1	21.2	9.7	8.1	1.0	100.0	3,613	3,582		
Farm workers	36.1	27.3	19.3	11.5	3.8	.8	.7	.3	100.0	1,715	1,466		
Loggers	24.5	29.8	19.0	12.0	7.4	3.3	3.4	.6	100.0	2,205	1,831		
Fishermen, trappers and hunters	36.8	25.6	16.4	8.8	6.3	3.0	2.5	.5	100.0	1,906	1,420		
Miners, quarrymen	3.8	6.3	11.9	23.2	25.6	16.3	12.3	.7	100.0	4,207	4,178		
Craftsmen and production workers	5.6	8.5	15.0	25.7	24.2	13.3	7.4	.4	100.0	3,735	3,811		
Labourers	22.2	20.7	21.9	22.9	9.7	2.0	.7	.2	100.0	2,300	2,301		
Self-employed:													
All occupations	7.4	10.6	15.1	15.7	11.2	9.2	16.0	14.8	100.0	5,929	4,085		
Managerial	3.6	7.0	13.0	15.3	13.0	11.5	20.4	16.2	100.0	6,567	4,798		
Professional and technical	2.2	3.3	4.0	5.4	5.7	6.8	23.2	49.5	100.0	12,286	9,896		
Clerical	6.7	10.6	12.8	17.9	13.8	13.3	18.0	6.9	100.0	4,798	4,152		
Sales	6.3	9.3	13.4	13.8	11.2	10.9	20.8	14.2	100.0	5,577	4,493		
Service and recreation	6.3	13.3	22.7	23.4	13.9	6.4	9.4	4.5	100.0	4,026	3,302		
Transport and communication	4.9	12.7	22.9	20.8	11.6	8.7	11.9	6.5	100.0	4,363	3,383		
Farm workers	20.6	16.5	23.9	15.3	11.0	5.4	5.2	2.3	100.0	2,763	2,464		
Loggers	32.8	25.5	15.9	10.3	3.9	4.3	5.4	2.0	100.0	2,301	1,619		
Fishermen, trappers and hunters	38.9	27.0	17.2	7.7	2.9	2.0	3.4	.8	100.0	1,809	1,336		
Miners, quarrymen	11.3	12.1	33.0	12.1	10.9	10.0	7.4	3.4	100.0	3,320	2,838		
Craftsmen and production workers	8.1	14.9	21.2	22.5	13.0	8.3	8.5	3.5	100.0	3,704	3,210		
Labourers	26.3	28.1	18.6	12.9	4.1	4.9	3.0	2.3	100.0	2,384	1,833		

Source: Table B.4. Census Report 98-502, Incomes of Individuals, 1961 Census of Canada.

occupations resident off-farm and not working as farm operators. The majority of this occupational category are farm labourers.

The self-employed constitute somewhat over 11 per cent of the non-farm labour force with earnings. Nearly one-half of these are in managerial occupations, some 10 per cent are professionals while 17 per cent are craftsmen or production workers such as operators of service stations, shoe repairmen, tailors and so forth. The remainder were dispersed through other occupations.

In most occupational groups, earnings of the self-employed are higher than earnings of persons who are in the employ of others. There are two exceptions to this -- in the managerial classes the salaried labour force had higher average earnings than own account workers, while in mining occupations, miners on wages reported higher earnings than the self-employed. However, the number of self-employed in mining occupations is exceedingly small. In two occupational categories, craftsmen and production workers and labourers, while average earnings differed little for both categories of workers, median earnings were lower for the self-employed.

It should be pointed out that there is considerable ambiguity in statistical data by class of worker. For legal purposes, such as income tax administration, a person is considered to be self-employed only if he is operating an unincorporated business; persons actively engaged in the operation of a privately incorporated business of which they may be majority shareholders are treated as salaried managers. Technically, then, class of worker status changes when the legal form of a business changes. This is the classification which underlies national accounts estimates of the earned income components of personal income.

There is much evidence to suggest that, in reporting on censuses and surveys, business proprietors who have incorporated their businesses are ambivalent in their views as to their status. Many appear to report themselves as self-employed while others will classify themselves as salaried managers. Census statistics of the self-employed cannot therefore be unequivocally considered as representing only self-employed persons working on a free-lance basis, or operating an unincorporated business. Owners of incorporated businesses who are categorized as working for others and who are majority shareholders in their own business may exercise the same degree of control over the operations of the business as persons who own unincorporated businesses. It is usual to incorporate privately owned business enterprises of substantial sizes for taxation and other reasons while incorporation of professional practices, on the other hand, is not legally permissible. Because of this classification problem comparisons of the level of earnings of business proprietors and other classes of self-employed must be made with some caution -- it is possible, for example, that business proprietors as a group earn more than self-employed professionals. However, because the statistics do not distinguish between salaried proprietors of private companies and managers in public corporations such a comparison cannot be made.

Although average earnings of the self-employed tend to be higher, greater inequality exists in their earnings distribution. While average earnings were approximately 50 per cent higher than those of employees median earnings were only 9 per cent higher. The proportion of self-employed in the lowest income brackets was equivalent to the proportion with low incomes among those working for others. However, at the upper end of the distribution, earnings of \$10,000 or more, some 15 per cent of the self-employed had earnings of this size while less than 3 per cent of employees attained this level of earnings.

Self-employed as a category encompass the whole range of occupations, from the highly skilled doctor or architect with a professional practice, or the business proprietor with a construction business or a retail store, to the itinerant labourer or the carpenter taking on odd job assignments. The position of the latter category of self-employed differs little from that of a wage-earner as these workers earn their income by accepting employment from others. The main distinction may be that they work for a series of employers rather than one employer. The statistics suggest that, in many occupations, potential earnings are much greater for the self-employed than for those who opt for working on a salary basis. This is the case in professions such as law, medicine or engineering. However, skill and training are not the only prerequisites as the self-employed person must often invest considerable capital as well into his practice or business before earnings become possible. It has already been pointed out that, in many cases, earnings, therefore, contain an element of returns to capital invested as well as returns to labour. Along with the need for capital is the risk and uncertainty involved in working on one's own account. In many instances, when confronted with the necessity of making a choice, the preference may be for the security of a guaranteed fixed annual salary rather than the hazards involved in developing a business or practice.

Not all occupations offer the prospect of a high income for the self-employed person and the decision to work as an own account may be influenced by other reasons, such as a desire for independence, or the freedom of setting one's own hours or conditions of work. In some cases this may be considered more important than the assurance of a regular pay cheque. For example, approximately 17 per cent of the self-employed were craftsmen or production workers. Average and median earnings were lower than for employees in these occupations; 44 per cent reported earnings of less than \$3,000, as compared with 29 per cent of employees. In a few of the crafts and production occupations the self-employed averaged more than wage-earners in similar jobs but the differences were not very large. Further, the self-employed person usually had to invest in equipment, business premises, and so forth, to work on own account. Where differentials existed in favour of the self-employed, the differentials themselves may have represented relatively low returns on the capital invested and the risks involved in entrepreneurship.

Although the ranking of average earnings differed by broad occupational groups for employees and for self-employed, in general, there was some similarity in the rankings.(21) The occupations with higher wages and salaries tended to be the occupations with the highest earnings among the self-employed and those with lowest wage earnings were also among the lowest for income from self-employment.

Ranking of Specific Occupations

The ranking of individual occupations by size of average income from employment is closely correlated with the ranking of the occupational group in which each occupation belongs. Table 12 presents statistics on the individual occupations

- (21) For employees the ranking of occupational groups from highest to lowest earnings was as follows: managers, professionals, miners and quarrymen, sales occupations, craftsmen and production workers, transportation and communication workers, clerical occupations, service occupations, labourers, loggers, fishermen, trappers and hunters and farm workers.

The ranking of the self-employed was: professionals, managers, sales occupations, clerical occupations, transportation and communication occupations, service occupations, craftsmen, farm workers, labourers, loggers and fishermen, hunters and trappers.

composing the two lowest deciles and the two highest deciles of occupations when occupations are ranked by size of average earnings reported. These rankings are for the non-farm labour force in total -- that is both classes of workers combined. Statistics for the third to eighth deciles are not shown.

The occupations listed in each of these four deciles represent 10 per cent of the total non-farm labour force. Within each decile the occupations are ranked by size of average earnings. The two lowest deciles comprise those occupations where average annual earnings fell below \$2,974, while the average incomes from employment of the occupations in the two top deciles were in the range of \$5,571 to \$15,083. This means that for the 60 per cent of workers in the remaining occupations average earnings ranged from approximately \$3,000 to \$5,500. In addition, statistics are presented on median earnings, the proportion of workers with above average schooling and the coefficient of dispersion is calculated. For purposes of this analysis above average schooling is defined as the percentage in the occupation having attained 4 to 5 years of secondary schooling, or having some university training or a university degree. As has already been indicated, the median years of schooling for the male labour force in total was one year of secondary schooling; only one-quarter of the male labour force had 4 to 5 years of secondary schooling or more.

Inequality of earnings exists not only between occupations but also within occupations. The average or arithmetic mean, the median, and the coefficient of dispersion are indicators of inequality. In a normal distribution the average or arithmetic mean and the median will tend to coincide; the greater the difference between the mean and median the greater the skewness of earnings within the occupation and the more unequal the distribution. The median is that income in the distribution which divides the distribution in half; that is, one-half of workers earn less than this amount and one-half earn more.

The coefficient of dispersion is calculated by dividing the inter-quartile range (Q3-Q1) by the median. The first quartile is the point below which the lowest one-quarter of earners fall and the third quartile is the limit above which the highest quarter of earners are found. For example, if the median is \$5,000, the first quartile \$4,000 and the third quartile \$6,000 the coefficient of dispersion is .400 or \$2,000 divided by \$5,000. The greater the coefficient of dispersion the greater the gap between the lower and higher incomes and the median income in a size distribution of income for an occupation. A high coefficient of dispersion, then, is another indicator of inequality of earnings within an occupation.

It has already been noted that the dispersion of earnings is greater among the self-employed than among those employed by others. As Table 11 indicates, in many of the occupational categories, the differentials between average and median earnings for employees are relatively small. There are no occupational groups in which there is any close agreement between median and average earnings reported by the self-employed. For two occupational categories of employees the average and median incomes are almost identical while for another eight out of the twelve categories the median is at least 90 per cent of the mean. For the self-employed all medians are less than 90 per cent of the mean.

It is also evident from Table 12 that much greater inequality of earnings characterizes those occupations comprising the lowest and highest deciles of the occupational distribution than the majority of occupations which account for the middle of the range. There is less spread in average earnings between the third and eighth deciles than between the first and second and between the ninth and tenth. As might be expected the specific occupations which are found in the lowest

TABLE 12. Specific Occupations of Non-Farm Male Labour Force Ranked by Average Income from Employment, Lowest and Highest Deciles for Year Ending May 31, 1961

	Average income \$	Median income \$	Per cent with above average schooling	Coefficient of dispersion(1)
<u>First decile</u>				
Baby sitters	453	308	15.5	1.000
Newsvendors	648	312	8.5	1.003
Trappers and hunters	963	583	0.7	1.444
Attendants, recreation and amusement	1,141	725	15.3	2.073
Guides	1,586	1,377	7.6	1.015
Kitchen helpers and related workers n.e.s.	1,602	1,585	9.5	.993
Fish cannery, curers and packers	1,606	1,354	3.2	1.061
Farm labourers, groundskeepers and other agricultural occupations	1,695	1,453	8.9	1.240
Labourers in trade	1,814	1,563	14.9	1.430
Messengers	1,822	1,475	12.0	1.522
Fishermen	1,904	1,426	3.6	1.278
Labourers in: All other industries	1,908	1,697	10.6	1.239
Construction	1,947	1,910	6.6	.957
Transportation, except railway	1,965	1,840	7.6	1.128
Teamsters	2,064	1,716	3.3	.871
Lumbermen, including labourers in logging	2,083	1,712	3.3	1.114
Waiters and waitresses	2,148	2,174	15.8	.718
Labourers in wood industries	2,161	2,046	7.8	1.050
Service station attendants	2,210	2,242	15.5	1.001
Labourers in: Textile and clothing industries	2,221	2,333	5.1	.676
Food and beverage	2,408	2,422	8.7	.973
Forest rangers and cruisers	2,415	2,203	16.9	1.135
Labourers in public administration and defence	2,434	2,646	6.9	.795
<u>Second decile</u>				
Labourers in local administration	2,439	2,649	5.4	.823
Winders, reelers	2,470	2,622	4.1	.446
Nurses-in-training	2,527	2,590	71.4	.536
Shoemakers and repairers, factory, n.e.s.	2,531	2,578	4.2	.609
Shoemakers and repairers, not in factory n.e.s.	2,540	2,405	5.1	.793
Porters, baggage and pullmen	2,600	2,689	18.0	.718
Elevator tenders, building	2,620	2,737	8.5	.449
Janitors and cleaners, building	2,621	2,779	8.6	.650
Service workers, n.e.s.	2,636	3,062	20.0	.754
Cooks	2,659	2,668	11.3	.636
Bottlers, wrappers, labellers	2,666	2,972	12.3	.827
Warehousemen and freight handlers n.e.s.	2,675	2,849	10.6	.819

See footnote at end of table.

TABLE 12. Specific Occupations of Non-Farm Male Labour Force Ranked by Average Income from Employment,
Lowest and Highest Deciles for Year Ending May 31, 1961 - Continued

	Average income	Median income	Per cent with above average schooling	Coefficient of dispersion(1)
	\$	\$		
<u>Second decile - Concluded</u>				
Labourers in:				
Manufacturing	2,683	2,820	8.4	.807
Communication and storage	2,686	3,026	12.0	.740
Electric power, gas and water utilities	2,694	2,800	10.6	.873
Religious workers, n.o.r.	2,695	2,388	44.2	.830
Dressmakers and seamstresses n.i.f.	2,713	2,929	10.8	.602
Knitters	2,724	2,789	9.3	.480
Laundrerers and dry cleaners	2,745	2,748	9.8	.578
Bartenders	2,762	2,885	14.6	.488
Other leather product makers	2,767	2,994	6.4	.475
Sawyers	2,779	2,658	5.6	.889
Carders, combers and other fibre preparers	2,786	2,806	5.9	.322
Spinners and twisters	2,788	2,816	5.2	.417
Taxi drivers and chauffeurs	2,792	2,670	10.9	.635
Fruit and vegetable canners and packers	2,813	2,943	10.9	.823
Sewers and sewing machine operators n.e.s.	2,816	2,890	7.1	.550
Leather cutters	2,820	2,983	5.6	.448
Nursing assistants and aides	2,821	2,971	19.7	.408
Other textile occupations	2,845	2,919	6.9	.421
Woodworking occupations n.e.s.	2,851	3,043	9.4	.621
Hawkers and pedlars	2,854	2,362	10.8	.999
Apparel and related product makers n.e.s.	2,867	2,921	7.1	.558
Construction workers, n.e.s.	2,934	2,912	7.9	.927
Painters, paperhangers and glaziers (construction and maintenance)	2,943	2,995	10.7	.725
Labourers in:				
Transportation equipment industries	2,957	3,267	6.3	.499
Other manufacturing industries	2,963	2,702	8.5	.762
Prospectors	2,973	2,374	29.0	1.170
<u>Ninth decile</u>				
Owners and managers in retail trade	5,571	4,459	30.1	.834
Commercial travellers	5,576	5,260	48.6	.665
Insurance salesmen and agents	5,674	5,270	55.9	.703
Credit managers	5,716	5,520	68.3	.569
Professional occupations, n.e.s.	5,723	5,589	68.4	.636
Foremen, transportation equipment	5,776	5,836	27.7	.492
Foremen, paper and allied industries	5,778	5,648	19.6	.519
Photoengravers	5,794	6,332	29.4	.666
Foremen, mine, quarry and oil well	5,832	5,687	18.4	.564

See footnote at end of table.

TABLE 12. Specific Occupations of Non-Farm Male Labour Force Ranked by Average Income from Employment,
Lowest and Highest Deciles for Year Ending May 31, 1961 - Continued

	Average income	Median income	Per cent with above average schooling	Coefficient of dispersion(1)
<u>Ninth decile - Concluded</u>				
Purchasing agents and buyers	5,863	5,417	53.9	.613
School teachers	5,885	5,695	95.9	.706
Other health professionals	5,935	4,970	68.1	.817
Locomotive engineers	6,088	6,718	15.1	.465
Funeral directors and embalmers	6,155	4,484	46.8	.858
Owners and managers in all other industries	6,181	5,085	36.2	.940
Office managers	6,188	5,874	63.6	.956
Foremen, primary metal industries	6,214	6,423	22.6	.484
Owners and managers in federal administration	6,250	5,628	64.6	.638
Authors, editors and journalists	6,263	5,881	77.3	.765
Owners and managers in:				
Miscellaneous services	6,267	5,687	45.5	.784
Wood industries	6,379	5,154	30.3	1.038
Security salesmen and brokers	6,382	5,569	67.7	.842
<u>Tenth decile</u>				
Inspectors and foremen, communications	6,389	6,511	49.0	.479
Chemists	6,442	6,441	91.1	.597
Owners and managers in provincial administration ..	6,567	5,882	63.3	.750
Actuaries and statisticians	6,597	6,042	81.9	.618
Biological scientists	6,627	6,916	96.1	.566
Accountants and auditors	6,961	6,638	83.5	.584
Physical scientists, n.e.s.	7,001	7,117	93.4	.591
Owners and managers in:				
Health and welfare services	7,012	6,086	64.3	.796
Construction industries	7,089	5,710	29.9	.918
Pharmacists	7,127	6,718	95.9	.632
Owners and managers in forestry, logging	7,167	5,624	22.8	1.044
Economists	7,271	7,098	89.8	.570
Owners and managers in furniture and fixture industries	7,321	5,958	42.1	.868
Electrical engineers	7,476	7,674	93.8	.459
Industrial engineers	7,498	7,368	81.6	.485
Mechanical engineers	7,517	7,496	89.1	.473
Owners and managers in:				
Transportation, communication and other utilities	7,541	6,513	42.3	.683
Education and related services	7,598	6,918	84.1	.765
Professional engineers, n.e.s.	7,629	7,615	92.3	.475
Civil engineers	7,634	7,655	95.8	.476
Geologists	7,699	7,936	98.1	.476

See footnote at end of table.

TABLE 12. Specific Occupations of Non-Farm Male Labour Force Ranked by Average Income from Employment, Lowest and Highest Deciles for Year Ending May 31, 1961 - Concluded

	Average income	Median income	Per cent with above average schooling	Coefficient of dispersion(1)
	\$	\$		
<u>Tenth decile - Concluded</u>				
Owners and managers in:				
Food and beverage	7,770	5,928	41.0	.860
Wholesale trade	7,798	6,207	46.2	.874
Sales managers	7,890	7,505	61.3	.605
Chemical engineers	8,043	7,803	97.5	.475
Owners and managers in:				
Miscellaneous manufacturing	8,093	7,098	54.4	.730
Non-metallic mineral products	8,258	6,938	47.6	.779
Osteopaths and chiropractors	8,285	6,567	94.7	1.117
Mining engineers	8,487	8,127	91.4	.433
Owners and managers in rubber industries	8,515	7,608	65.6	.589
Veterinarians	8,577	7,996	95.9	.480
Owners and managers in:				
Metal fabricating industries	8,653	7,543	50.6	.715
Clothing industries	8,689	7,013	43.9	.849
Professors and college principals	8,806	8,530	98.8	.664
Architects	8,880	7,850	95.6	.580
Owners and managers in finance, insurance, real estate	8,908	7,750	67.9	.651
Air pilots, navigators and flight engineers	9,038	8,549	71.6	.783
Optometrists	9,150	8,407	93.4	.793
Owners and managers in:				
Printing, publishing and allied industries	9,195	7,775	55.7	.806
Transportation equipment	9,411	8,132	59.8	.767
Leather industries	9,464	7,729	51.7	1.038
Petroleum and coal products	9,516	8,700	59.9	.738
Machinery industries	9,564	8,404	63.6	.724
Knitting mills	9,760	8,050	53.6	.881
Electrical products industries	9,914	8,251	69.2	.753
Service to business management	10,080	8,454	77.0	.892
Textile industries	10,178	8,130	59.8	.922
Chemical and chemical products	10,303	8,448	72.2	.836
Mines, quarries and oil wells	10,467	8,580	60.4	.821
Paper and allied industries	10,547	8,993	62.4	.753
Lawyers and notaries	11,310	9,416	98.9	.921
Judges and magistrates	11,555	11,085	90.5	1.368
Dentists	12,690	11,724	99.1	.818
Physicians and surgeons	15,083	13,019	99.3	1.034

(1) Q3 - Q1
Median

Source: Earnings rankings based on data in Table B.4 Census Report 98-502, Incomes of Individuals, 1961 Census of Canada. Data on educational attainment from Table 17, Census Report 94-509 Occupations by Sex Showing Age, Marital Status and Schooling, 1961 Census of Canada.

and highest deciles largely come from those broad occupational groups which show the lowest or highest earnings. In the lowest decile one-half of the occupations listed are either categories of labourers or of service occupations, such as waiters, guides or attendants at amusement centres. The lowest decile consists basically of unskilled occupations with very low average annual earnings and, as the coefficient of dispersion indicates, very unequal earnings. For this group employment is likely to be irregular and the degree of unemployment during the year well above average. Only 51 per cent of labourers worked in a minimum of 40 weeks while only 75 per cent of the service workers, exclusive of the protective service occupations, had 40 or more weeks of employment.

The lower paid production process occupations such as bottlers and wrappers, leather cutters, and shoemakers account for one-half of the occupations in the second decile. The remainder of this category consists largely of labourers and service occupations such as janitors, porters and elevator operators. Annual earnings are characterized by much less dispersion than was evident in the lowest decile. Some of the occupations in this category require a certain degree of skill or training.

Where unskilled occupations dominate the two lowest deciles the two top deciles consist almost exclusively of professionals and the managerial categories. In fact, the top or tenth decile includes only two occupations which are not professional or managerial -- airline pilots, and inspectors and foremen in communication. Over half of the occupations in the ninth decile consist of professional or managerial occupations; in addition, this decile includes a number of other white collar occupations in the sales category such as insurance salesmen, commercial travellers, purchasing agents and security salesmen and brokers. Only five of the twenty-two occupations consist of skilled craftsmen in blue collar occupations -- mine foremen and foremen in some of the manufacturing industries. When specific occupations are ranked by size of average earnings, nearly all of the managerial occupations rank in the two top deciles while somewhat over half of professional occupations rank here.

As the table indicates, the level of schooling for the majority of occupations in these upper deciles is high although the extent of above average schooling tends to be higher among those in the professional occupations than among those in the managerial classes. In three quarters of the occupations in the upper deciles more than half of the labour force had above average schooling. The statistics suggest that a good education may be as relevant to higher earnings in entrepreneurial activities as in the professions.

It should also be noted that earnings in the upper deciles in many instances show substantial dispersion (.800 or more) and, in this respect tend to resemble the lowest deciles rather than the intermediate ones. Dispersion is greatest in those occupations with a significant proportion of self-employed; the various categories of owners and managers, lawyers and doctors. Nearly one-half of owners and managers reported themselves as self-employed. Occupations which consist largely of persons on salary, for example, economists, engineers and scientific occupations are characterized by more normal distributions and less divergence of earnings.

Market forces usually tend to put a floor under the earnings of highly trained salaried professional personnel who may also look forward to receiving increments in earnings with developing experience. The self-employed have no guaranteed minima and earnings are subject to fluctuations for many reasons, as for example, changing economic conditions.

Age - Earnings Profiles by Occupation and Level of Schooling

The relationship between age, occupation and earnings provides some indication of the degree to which experience acquired on the job during a working career may be reflected in higher levels of earnings. In some occupations, salary or wage scales are tied to the number of years of experience in that occupation and, thus, the longer the working span the higher the level of earnings.

Table 13 presents data on average earnings by age for selected occupations representative of occupations with low, medium and high average income from employment -- included are some of the unskilled occupations, blue and white collar occupations and professional and managerial occupations. In all occupations, earnings of those aged 15 to 24 are substantially lower than earnings of the age groups 25 and over. The youngest age group would include new entrants into the labour force and others such as students who may only have worked part of the year. The youngest age groups have also had higher than average unemployment rates.(22)

It is not surprising that, for workers between 25 and 64 who are engaged in unskilled occupations, such as labourers, the earnings curve tends to be rather flat across the different age groups. What is perhaps surprising is that the same relative levelness of earnings seems to be characteristic of many of the semi-skilled and skilled occupations and, only in the managerial and professional occupations is there a consistent picture of rising earnings with age. A number of crafts occupations are exceptions -- for example, railroad operators, a category which includes locomotive engineers, firemen and brakemen, show rising earnings from the youngest to the oldest age group. These are occupations in which seniority is a very important factor in the movement from lower paid to higher paid occupations -- from brakeman to conductor or from fireman to locomotive engineer. In a few of the skilled occupations such as the printing and bookbinding trade, and the occupations in the steel and metal manufacturing industries and the rubber industry, age-earnings differentials are more evident. Thus, although earnings are higher in the semi-skilled and skilled occupations than in the unskilled the earnings experiences of these groups are much alike -- that once workers are established in an occupation, earnings appear to level out and to be maintained around a constant level across all age groups. Earnings may only rise with general movements in wage levels and not through increasing experience.

One qualification should perhaps be made to the observation that for a substantial proportion of occupations the earnings curve tends to be flat between the ages of 25 and 55, and that workers aged 55 to 64 usually have lower average earnings than the younger age groups. Persons in this age group are likely to experience more unemployment and perhaps may engage in more part-time work. However, for the majority of the occupations shown, where average earnings are lower among the older age groups, the differences are usually less than 10 per cent of the earnings of the preceding age group. The gap between earnings of those on the verge of retirement and the younger members of the occupational category are rarely very large. It should be noted too, that although earnings of older workers may be lower relative to persons in the younger age groups they are not necessarily lower relative to income earned by the individual in his previous years of employment. Differences may mean that when current earnings are rising the oldest workers lose

(22) In the year preceding the Census the labour force under 25 years of age had the highest unemployment rates among the different age groups. Statistics are not calculated separately by sex but since unemployment rates for women are usually low the data suggest a very high incidence of unemployment among young males.

TABLE 13. Average Income from Employment by Age: Selected Occupations,
for the Year Ending May 31, 1961

Males					
	Age				
	Under 25	25 - 34	35 - 44	45 - 54	55 - 64
dollars					
Managerial occupations (totals)	3,631	5,973	7,203	7,562	7,449
Owners and managers:					
Manufacturing	3,818	6,711	8,859	9,457	9,804
Construction	4,176	6,762	7,575	7,379	6,427
Wholesale trade	4,413	6,293	7,839	8,756	8,269
Retail trade	3,586	5,243	6,037	5,907	5,501
Finance and insurance	3,769	6,939	9,158	9,759	10,406
Community, business and personal service	2,849	5,289	6,390	6,433	6,248
Public administration	2,790	5,200	6,005	6,661	6,804
Professionals (totals)	2,919	5,800	7,980	8,251	8,171
Engineers	3,432	6,688	8,475	9,038	9,280
Physical scientists	2,863	6,366	8,384	8,749	7,978
Biologists and agricultural scientists	2,300	6,213	7,669	7,434	6,555
Professors and college principals ...	3,172	6,578	9,402	11,108	10,881
School teachers	3,249	5,237	6,767	7,601	7,790
Doctors		9,319	18,246	19,626	15,433
Dentists	4,214	13,714	14,727	14,284	10,849
Lawyers	1,830	7,856	13,187	13,597	15,636
Architects	2,372	6,499	10,218	11,190	14,300
Actuaries, statisticians and economists	3,351	6,045	7,577	8,272	9,557
Accountants and auditors	3,423	6,095	7,591	7,976	8,334
Clerical	2,322	3,894	4,187	4,109	3,932
Sales	1,880	4,634	5,272	5,114	4,551
Service occupations:					
Waiters and Cooks	1,473	2,550	2,853	2,842	2,653
Other service occupations (barbers, janitors, guides, etc.)	1,461	2,992	3,267	3,148	2,832

TABLE 13. Average Income from Employment by Age: Selected Occupations,
for the Year Ending May 31, 1961 - Concluded

Males					
	Age				
	Under 25	25 - 34	35 - 44	45 - 54	55 - 64
dollars					
Transport and communication operators, railroad	3,155	4,708	5,355	5,524	5,771
Loggers and related workers	1,415	2,502	2,687	2,482	2,108
Fishermen, trappers and hunters	1,214	1,947	2,197	2,025	1,828
Craftsmen, production process and related workers:					
Tire builders, vulcanizers and other rubber workers	2,510	3,684	4,090	4,034	3,943
Leather cutters, lasters, sewers and other leather workers	1,859	2,988	3,011	2,932	2,630
Spinners, weavers, knitters	2,139	3,062	3,158	3,215	3,280
Tailors, furriers, upholsterers	2,006	3,267	3,571	3,522	3,289
Paper makers, still operators, chemical and related workers	3,121	4,589	4,661	4,675	4,649
Printers, bookbinders and related workers	2,813	4,959	5,287	5,407	5,059
Furnacemen, moulders, blacksmiths and related metal workers	2,844	4,094	4,452	4,396	4,111
Jewellers, watchmakers and engravers	2,193	4,103	4,128	3,948	3,370
Machinists, plumbers, sheet metal workers	2,759	4,067	4,320	4,211	4,053
Mechanics and repairmen	2,540	4,022	4,187	3,991	3,766
Electricians and related electrical workers	2,934	4,486	4,739	4,556	4,440
Painters, paperhangers and glaziers	2,139	3,133	3,283	3,346	2,942
Bricklayers, plasterers and construction workers, n.e.s.	2,445	3,697	3,921	3,750	3,458
Labourers	1,480	2,634	2,781	2,652	2,561

Source: For the majority of occupations, statistics for the age groups 25 to 64 were published in Table B.6, Census Report, 98-502 Incomes of Individuals, 1961 Census of Canada. The remainder of the table consists of unpublished data.

ground relative to younger workers but not that they themselves experience declines in their own earnings.(23)

As has already been stated above the age-earnings profiles of the managerial and professional occupations do not conform to those of other occupational groups. Earnings usually peak later, either at the ages of 45 to 54 or the 55 to 64 age groups, and the differentials between the earnings of those in the early stages of their careers and those in the middle or older age groups are greater than in the unskilled or skilled occupation. The latter attain their highest earnings levels in younger age groups. Among the occupations where average earnings do not reach their maximum until the age group 55 to 64 are the managerial classes in manufacturing, finance and insurance, and public administration and professionals such as engineers, school teachers, lawyers, architects, statisticians, economists and accountants. Professional occupations are more likely to show steadily rising earnings until the 55 to 64 age groups while for the managerial classes the peak in average earnings seems to occur rather in the 45 to 54 age group.(24)

Implicitly, differences in the career earnings distributions may be a reflection of variations in the degrees of education and training embodied in the labour force in those occupations. One analysis of age-earnings differentials concludes that "inter-occupational differentials are . . . a function of differences in training".(25) It suggests that training is not simply a matter of the formal training acquired before entry into an occupation but also on the job training or experience derived from working which in turn is a function of age, and that "clearly, as more skill and experience are acquired with passage of time, earnings rise".(26) However, the likelihood that experience or training acquired while working may influence earnings is greater, the greater the amount of the initial formal training acquired. The tentative findings suggested that:

"(a) growth in productive performance is more pronounced and prolonged in jobs of higher levels of skill and complexity;

(23) The importance of the distinction between time series profiles of age-earnings and cross-sectional profiles is discussed by Gary S. Becker, Human Capital, National Bureau of Economic Research, Columbia University Press, 1964, pages 138-144.

(24) Because census statistics show the actual average earnings reported by age groups, rather than salary received, lower earnings among those aged 55 to 64 may reflect lower labour participation during the year rather than lower salaries as such. Studies by the Department of Labour on annual professional income of engineers and scientists working full-time show that when these professionals are classified by years since university graduation median earnings are highest for those with 36 to 40 years from graduation and that the greater the number of years since graduation the higher the median salaries. For data see, for example: Engineering and Scientific Manpower Resources in Canada, Department of Labour, Economics and Research Branch, Bulletin No. 10, June, 1961 or Employment and Earnings in the Scientific and Technical Professions, 1958-1961, Department of Labour, Economics and Research Branch, Report No. 12, September 1962.

(25) Jacob Mincer, "Investment in Human Capital and Personal Income Distribution", Journal of Political Economy, August 1958, p. 301.

(26) Ibid., p. 287.

- (b) growth is less pronounced and decline sets in earlier in manual work than in other pursuits; and
- (c) the more capable and the more educated individuals tend to grow faster and longer than others in the performance of the same task".(27)

The conclusion that the amount of education of the individual is the most important explanation of earnings differentials by occupations is now generally accepted.(28) Although differences in ability may partially explain differences in earnings this factor may be a more important explanation of intra-occupational differences in earnings than of inter-occupational differentials.

Statistics on the relationship between earnings, age and the level of schooling appear to support the conclusions cited above. Not only are absolute earnings higher the higher the amount of schooling but the distribution of earnings by age indicates that the higher the level of schooling the greater the earnings differentials between the older and younger age groups in the labour force. The following table summarizes average earnings of the current labour force by age and level of schooling.

TABLE 14. Average Income from Employment by Age and Level of Schooling for Year Ending May 31, 1961: Male Non-Farm Labour Force

Age	Elementary only	Secondary 1 - 3 years	Secondary 4 - 5 years	Some university	University degree
15 - 24	\$1,928	\$2,206	\$2,497	\$1,868	\$3,408
25 - 34	3,311	4,147	4,760	5,108	6,909
35 - 44	3,653	4,629	5,779	6,608	9,966
45 - 54	3,648	4,756	6,130	6,882	10,821
55 - 64	3,480	4,588	5,944	6,731	10,609

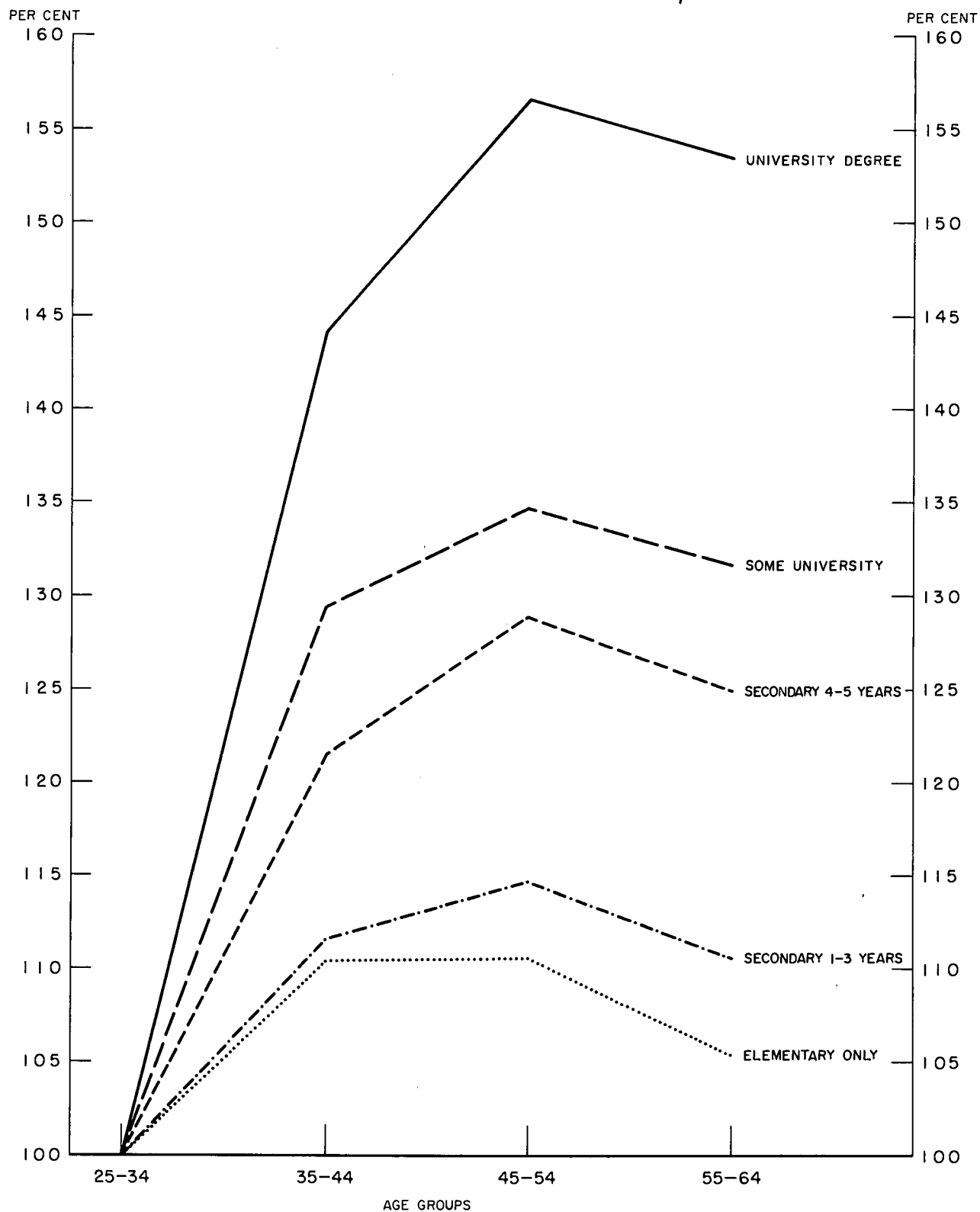
Source: Table B.6 Census Report 98-502, Incomes of Individuals, 1961 Census of Canada.

The ratio of average income from employment for the age groups 35 to 64 to average income from employment of those aged 25 to 34 by the above levels of schooling is plotted in the chart. The relationships of the earnings of the 15 to 24 age group are not shown but for all, except those with some university training, the average earnings were between 50 and 60 per cent of earnings for those aged 25

(27) Ibid., p. 287.

(28) Aside from Mincer, "Investment in Human Capital and Personal Income Distribution" among other studies on the significance of education to earnings are those by Morgan, David, Cohen and Brazier, Income and Welfare in the United States, McGraw-Hill, 1962; Gary Becker, Human Capital, National Bureau of Economic Research, Columbia University Press, New York and London, 1964. For a discussion of the importance of education to the economic and bureaucratic elites in Canada see John Porter, The Vertical Mosaic, University of Toronto Press, Toronto, 1965.

RATIO OF AVERAGE INCOME FROM EMPLOYMENT BY AGE GROUPS TO AVERAGE
INCOME FROM EMPLOYMENT FOR AGE GROUP 25-34 BY LEVEL OF SCHOOLING
MALES IN CURRENT LABOUR FORCE, 1961



to 34. The low average earnings of those aged 15 to 24 with some university training are probably due to the inclusion of substantial numbers of university students who would only work during holiday periods. The chart illustrates, quite strikingly that, as one moves from lower to higher levels of schooling, at each level of schooling expectations as to probable lifetime earnings change. Consistently, the higher the level of schooling, the greater the differential between the earnings of those between 35 and 64 and those aged 25 to 34 with equivalent levels of schooling. The relationship between schooling, occupation and lifetime earnings will be explored further in the next chapter.

As Table 12 indicated, occupations in the lowest deciles have a very small proportion of workers with above average levels of schooling while occupations in the highest deciles consist primarily of occupations with a very high degree of education. Average earnings by age and occupation may therefore be simply indirect reflections of the average level of education of each occupation.

Summary of Conclusions

1. Labour force participation and the amount of income which can be earned from employment as a wage or salary earner or in operating a business or profession are the most important determinants of the income levels of the adult income receiving population.

2. The average income from employment of the current female labour force is less than half of the average earnings reported by current male labour force. The data suggest that the two most important factors which can be found in census data to explain these disparities are the differences in the number of weeks worked during the year and the differences in the occupational structure of the two groups. The female labour force is largely concentrated in a limited number of occupations. (29) Further, earnings by age show little variation for the female labour force but are significant for the male labour force. In occupations requiring education and training, experience acquired with age helps to raise earnings; the discontinuous work history of much of the female labour force may be such that, for equivalent age groups, the female labour force is less experienced than the male labour force and so experience does not operate to raise female earnings to the same extent as for males. Although some age-earnings variations are evident between age groups for the female labour force when earnings are examined by level of schooling, these are less pronounced than for the male labour force.

3. A ranking of male occupations by size of average annual earnings shows that occupations in the lowest deciles are characterized by limited education and substantial inequality probably resulting from insecurity of employment in these occupations and erratic employment patterns. These occupations consist primarily of labourers, occupations in the service trades and unskilled craftsmen. Above average levels of schooling were attained in the occupations which constitute the top deciles; most of those occupations were in the professional or managerial categories. The occupations which show the most marked differentials in earnings by age are the occupations which require higher levels of schooling. Education appears to be the most important explanation of inter-occupation and inter-age earnings differences.

(29) Meltz in Changes in the Occupational Composition of the Canadian Labour Force, 1931-1961, page 31 points out that 89 per cent of the female labour force was in five occupations.

PRIVATE RETURNS TO EDUCATION

The previous chapter commented on the importance of education as an explanation of variations in earnings among occupations. Economists from the earliest days of the development of economic theory have been aware that relationships existed between the level of education of the labour force, the level of earnings, and the degree of income inequality and between the level of education and economic growth. Adam Smith, (1) for example, in analyzing the factors which account for differences in wage rates discussed the role of education and stated that education had to be regarded as investment in human capital in the same way as the purchase of a machine is regarded as an investment in physical capital. As an investment it should be expected to yield a return which would compensate for the cost of acquiring the education as well as a profit which would be at least equivalent to the profits which might be expected if the money had been invested in an alternative fashion. Marshall stressed the importance of improving the educational level of the labour force as a means of promoting economic growth. (2) He also suggested that a levelling of educational differentials, with a resulting levelling of earnings differentials, would reduce income inequality to a greater extent than would a redistribution of existing wealth. However, the concept of capital developed tended to be restricted to reproducible physical goods and was not expanded to include human capital. Little theoretical or empirical work was attempted before the second world war on incorporating the role of education into economic studies. (3) To a considerable extent this may have been due to a lack of data with which to work but it may also have reflected a reluctance on the part of economists to attempt to put human beings on the same basis as physical assets in studies of wealth, capital, or economic growth. The labour force was measured in terms of number of persons, number of man years worked or number of hours worked with no attempt to incorporate differentiations for variations in the quality of the labour force.

The first systematic studies of the significance of education to income levels and to economic growth began after the war and in the last decade many theoretical and empirical studies have appeared. (4) These studies have been concerned with the role of "human capital" in the economy and "human capital" has been considered to be the amount of education embodied in the labour force. One writer has summarized the problems being studied as the following:

- "1. What has been the total human-capital inputs into the productive system, and how have these affected national outputs, that is, gross national product, over a period of time?

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- (1) Adam Smith, The Wealth of Nations, Book I, Chapter 10, Part I.
 - (2) Alfred Marshall, Principles of Economics. See, for example, Book IV, Chapter 6, and Book VI, Chapters 12 and 13.
 - (3) One exception to this was the study by J. Walsh, "Capital Concept Applied to Man", Quarterly Journal of Economics (Cambridge) XLIX (February 1935). This study made estimates of the discounted values of lifetime earnings by level of education.
 - (4) As was noted before, the Walsh study was the main prewar discussion on the treatment of human capital. The study by Milton Friedman and Simon Kuznets, Income from Independent Professional Practice, National Bureau of Economic Research, New York, 1945, set out an analytic framework followed by many subsequent studies and was the first major postwar study.

2. How large a part of society's productive resources has been put into formation of human capital over the past, and how has this compared with what has gone into investment in physical capital?
3. What rates of return have been realized from investments in human capital (in college education, high school education and so forth)?
4. Looking ahead, how may past, present, and prospective aggregate investments in formation of human capital be expected to affect the stream of national product in the future?"(5)

All of these questions have become the subject of considerable empirical research. Modern governments have accepted the responsibility for policies which will not only prevent sharp fluctuation in economic activity but also for policies which will promote sustained economic growth. A natural concomitant of such policy aims is the investigation and isolation of factors promoting economic growth and their relative significance. Economists have recognized that the growth of the stock of physical capital and the growth in the size of the labour force have not, together, provided a complete explanation of the growth of aggregate national product. One of the most important studies attempted for the United States quantified the contributions of different factors such as the stock of physical capital and the labour force to the increase in output since the beginning of the century.(6) The conclusion reached was that over the period 1929 to 1957 nearly one-quarter of the growth rate of the national product could be attributed in recent decades to the upgrading of the educational attainments of the labour force at an accelerating rate. The same study considered the fourth question above -- the role greater investments in education may play in future economic growth.

Empirical studies to find answers to the second question have included attempts to estimate the gross value of the existing stock of human resources.(7) The costs of providing specified levels of schooling, such as eight grades of elementary schooling, in terms of direct costs (such as teachers' salaries) and indirect costs (such as the earnings foregone by students because of school attendance) have been calculated. These estimates have been multiplied by the level of education of the labour force to derive the total value of the stock of education embodied in the labour force. Such estimates have provided data for comparisons with the gross value of the stock of non-human capital to assess the

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- (5) See Mary Jean Bowman, "Human Capital: Concepts and Measures", Economics of Higher Education, ed. Selma J. Mushkin, U.S. Department of Health, Education, and Welfare, U.S. Government Printing Office, Washington, 1966, pages 69-70. This article discusses the different possible approaches to the measurement of the impact of education. Another discussion of approaches to the treatment of education in economic research may be found in the report by Theodore W. Schultz, The Economic Value of Education, Columbia University Press, New York and London, 1963.
 - (6) Edward F. Denison, The Sources of Economic Growth in the United States, Supplementary Paper No. 13, Committee for Economic Development, New York, January 1962.
 - (7) For example, see Theodore W. Schultz "Education and Economic Growth", Social Forces Influencing American Education, ed. Nelson B. Henry, National Society for the Study of Education, The Sixtieth Yearbook, University of Chicago Press, Chicago, 1961.

relative importance of each. The conclusion reached for United States was that the stock of capital represented by human capital resources has increased much more than the stock of reproducible non-human over this century.(8) For example, Schultz has estimated that the total value of the educational stock of the labour force was eight and one-half times as great in 1957 as in 1900; the value of the stock of reproducible non-human capital was only six and a half times as much.

In Canada, to the present, no set of studies parallel to American research exists so that conclusions are not yet possible as to the role of education in Canadian economic growth.(9) One can perhaps assume that because of the many similarities between the two economies findings respecting the American situation would be duplicated here. Although the educational attainments of the Canadian labour force are substantially below the levels of the labour force in the United States, the importance of education has gained increasing recognition in Canada and, as in the United States, younger generations entering the labour force are more highly educated than their elders. Investment in educational facilities has received increasing priority in the post-war decades.

It is not within the terms of reference of this study to explore the changing emphasis on education in Canada or to analyze the shifts in the educational attainments of the population. This will be studied in one of the other monographs to be published as part of the census monograph series. It may be useful, however, to cite a few statistics to illustrate some of the Canadian trends. The table below summarizes the schooling levels of males in the current labour force age 25 to 34 and 55 to 64.

(8) Ibid., p. 73.

(9) A study similar to the Denison one is being carried out by Gordon Bertram for the Economic Council of Canada. The study will be published in 1966 by the Economic Council.

The Department of Labour will shortly publish a thesis completed by Bruce W. Wilkinson on Some Economic Aspects of Education in Canada. This will be published as Occasional Paper No. 4. This study discusses in more detail the different techniques of estimating the contribution of education to economic growth and evaluates the usefulness of such data for policy purposes. Professor Wilkinson also estimates the replacement costs of the education embodied in emigrants from Canada and immigrants to Canada in recent years.

TABLE 15. Schooling of Males in Current Labour Force, June, 1961

	Age	
	25 - 34	55 - 64
	per cent	
No schooling or elementary only	38.0	62.7
Secondary - 1 - 3 years	33.9	20.3
Secondary - 4 - 5 years	17.6	9.8
Some university or university degree	10.6	7.2
Totals	100.0	100.0

Source: Table 19, Census Report 94-513 Occupations by Sex Showing (a) Marital Status and (b) Schooling, by Age, 1961 Census of Canada.

Although, even in 1961 a very substantial proportion of the younger age group had only elementary schooling there was a marked improvement in the schooling of this age group in contrast to the older age group -- somewhat over one-half received some secondary school education while only 30 per cent of the older workers had any secondary schooling.

Census statistics on school attendance among those under 25 in 1951 and in 1961 give further evidence of the changes which are occurring. The following were the percentages of the male population between the ages of 10 and 24 attending school in 1951 and 1961:

TABLE 16. Per Cent of Total Male Population Attending School by Age Group

Age	June 1, 1951	June 1, 1961
10 - 14	93.1	97.0
15 - 19	40.8	61.2
20 - 24	6.4	11.3

Source: Table 99. Census Report 92-557, Schooling by Age Groups, 1961 Census of Canada and Table 24, Volume II, Population, 1951 Census of Canada.

This represents a significant change in the school attendance patterns of the male population between the ages of 15 and 24, the group usually enrolled in secondary schools or universities. The proportion of fifteen to nineteen year olds at school increased by some fifty per cent while the proportion of twenty to twenty-four year olds at school nearly doubled.

Empirical research in Canada on the economic contribution of education has been frustrated by an even greater scarcity of data than in the United States. Although Canadian censuses have collected data on the level of schooling and the earnings of the wage and salaried segment of the labour force for decades, no analysis was made of the interrelationships among occupation, schooling, age and earnings of paid workers. Some extremely limited information is available from the 1951 Census; distributions were published of the size of earnings by years of schooling but not by schooling and age.(10) The 1951 Census, unlike earlier censuses, did not collect statistics on the actual earnings during the year but only on the relative size, that is, under \$500, \$500 to \$999 and so forth. As a result, although medians can be calculated from the data, average earnings are unavailable. Some statistics were collected on age, education and earnings in the 1960 Survey of Consumer Finances but the data were based upon a relatively small sample of approximately 13,500 persons aged 14 and over.(11) The 1961 Census, therefore,

(10) These tables were released in Statistical Review of Canadian Education, Census 1951, Ref. Paper No. 84 (Catalogue No. 81-503), Dominion Bureau of Statistics, Ottawa, 1958.

(11) These data were published in Distribution of Non-Farm Incomes in Canada, by Size, 1959, (Catalogue No. 13-517), Dominion Bureau of Statistics, 1962.

provides the first detailed data on the relationships between labour force characteristics and earnings for Canada, although the data have a number of limitations. One of the most serious defects of the statistics is the exclusion from the estimates of the labour force resident on farms. Another limitation of the statistics results from the fact that the questions on educational attainment were restricted to schooling received through the more conventional channels -- elementary or secondary schools and universities. No information was collected on other types of training such as vocational training, apprenticeship, attendance at teachers' colleges and so forth. The absence of information on all categories of formal training and on job training may result in attributing too much of earnings to those schooling attributes for which data exist.

Despite these qualifications, the 1961 Census data now offer the raw material for the investigation, within the Canadian framework, of the questions posed above. This chapter will attempt to carry out some tentative analysis of these data. Most of the possible studies discussed above fall outside the terms of reference of this monograph -- research into the areas suggested by the first, second and fourth topics. This chapter will be restricted to considering the third question: What rates of return are realized from investments in human capital?

Some economists are still not prepared to accept the view that expenditures on education, either on the part of society through different levels of government, or on the part of students and their families are a form of investment but rather argue that expenditures on education represent consumption. For example, a substantial proportion of educational resources are devoted to the education of women who, to a considerable extent, remain outside the labour force during their adult lives or, if they enter the labour force, make lower contributions to national production than the male labour force with equivalent levels of schooling.(12) Education therefore may equip women to be better wives or mothers, may develop their intellects so that they may provide a more stimulating environment in their homes to their husbands and children but it may not make a direct contribution to national productivity. The proportion of men who remain outside the labour force after completion of schooling is negligible.

- (12) The female labour force presents special problems in studies of the contribution of education to economic growth or in estimates of the stock of human capital. One solution in growth studies has been to weight women workers as the equivalent of some fraction of male workers; the weights assigned are based on the relationship of female to male earnings. Women workers have been a rising proportion of the total labour force and their inclusion in estimates of the gross value of the stock of human capital may present problems of interpretation of such data. As mentioned earlier the valuation of human stock is in terms of the costs involved in educating persons to various schooling levels. These costs consist of public plus private costs. The public costs are basically the same for each sex. Private costs consist largely of earnings foregone and as the statistics in Chapter 1 indicated, these would not differ too greatly for men and women with similar schooling levels in the younger age groups. This method of valuation therefore would tend to place similar values on both men and women workers at selected schooling levels although the contribution of each to productivity, if the contribution is valued in terms of earnings, differs substantially.

It may be argued that to live with the complexities of our civilization, education is an absolute necessity even if it is not utilized in employment. In the United States, for example, many states have required literacy as a qualification for voting; the assumption underlying this stipulation is that a voter who cannot read or write cannot be an intelligent voter. Certainly some education is a necessity for communication between an individual and other members of his society. All governments in Canada have accepted the view that every child should have some minimum amount of education and made school attendance compulsory until at least the age of 14 and schooling itself free. Parents are not allowed any freedom of decision as to whether or not children should go to school during these age groups. As a result only a small fraction of the adult population in Canada has less than five years of elementary schooling.(13)

It is recognized in all studies of returns to education that education at all levels has an element of consumption in it. A university education may primarily equip a student to pursue a specific occupation but, as a by-product of the education, the student may have a greater appreciation of art or literature or a better understanding of the values of his society. Suggestions have been made that schooling be ranked as to whether it is primarily for consumption or primarily an investment. In such a ranking, elementary school education might be considered as entirely a consumption expenditure, secondary school education as a mixture of both and university education as primarily an investment.(14)

The returns to education can be considered from two points of view: the return to the community for the public resources allocated to education and the return to the individual for the personal costs incurred by himself and his family. The benefits to the nation are the increased productivity of the labour force while the benefits to the individual are the higher earnings which are likely to accrue to the individual as a result of the higher education. Rates of return on public expenditures may be higher or lower than private rates of return. The relationship depends upon whether the public or private sector bears the greater share of the costs of education and whether, in measuring private returns, additional earnings are measured gross or net of direct income taxes. If gross earnings are used to measure rates of return, then higher rate of return will be realized on the lower of the two expenditures. That is, if public expenditures are less than private expenditures, public rates of return will be higher. If private rates of return are measured in terms of earnings net of taxes then the relationship of private versus public rates of return will depend, not only on the respective costs, but also on the effect of taxes on income earned.

It is usually assumed that if students can attend an educational institution without payment of fees or other levies that education is free and can be acquired without expense to the student. Studies suggest that only elementary schooling can be treated as representing schooling which has little or no private costs attached to it, with the possible exception of expenditure on books and school supplies. In the relevant age groups children remain dependent upon their parents who must support them whether or not they attend school; in our society laws against child labour prohibit the child from seeking employment in the labour market. Thus the alternatives to school attendance are idleness or work around the home and few families in a primarily industrial society require the labour of children at home.

(13) Approximately 10 per cent of males and 8 per cent of females aged 15 and over and not attending school had less than five years of elementary schooling.

(14) Schultz "Education and Economic Growth", Social Forces Influencing American Education, page 52.

The private returns to elementary education are, therefore, usually very large, and, in fact close to infinity, because there is no initial cost to such education. For this reason measurement of private rates of return to elementary schooling is meaningless.

While elementary schooling may be considered as costless to families and students this is not so in respect to attending high school or acquiring a university education. By the time a student qualifies for secondary school entrance he has usually reached the age when he is able to enter the labour force. Even though no fee is charged for attendance at high school, the student and his family, in effect, incur a cost if the student remains in school. This cost, which in economic terms is called an opportunity cost, is the loss of the wages or salaries which could be earned if the individual entered the labour force instead of continuing his education. The high school graduate faced with the choice of employment or continuing on to university, not only has to take into consideration earnings foregone, but also the expenses of university fees, books, equipment, etc., as additional costs. The higher the level of education which the student has completed the greater the amount of earnings which he gives up in order to continue his education. Where families are in straightened economic circumstances they may not be able to forfeit the earnings which could be added to family resources by the employment of the child. Estimates prepared for the United States, as well as for a number of other countries, show that for secondary schooling and university training opportunity costs, as represented by earnings foregone, exceed other public resource costs and other private costs.(15) The inability of families to undertake such costs may be a significant factor in the termination of education of children. For example, Canadian and American studies on the family characteristics of university students have shown that the students tend to come from families with above average incomes.(16)

No estimates have been attempted of public costs in Canada but it is probable that, for schooling beyond the elementary school level, opportunity costs in the form of earnings foregone are also the largest element of cost. For purposes of the subsequent analysis in this chapter estimates were prepared of private costs by age groups for students attending secondary schools and universities.(17) The analysis will be restricted to private costs of schooling and returns from schooling only for males. The assumptions made were that high school attendance, for males, occurs during the ages 15 to 18 inclusive, that university attendance is also for a four year period and, that the average male student is at university for the ages 19 to 22 inclusive. Statistics on school attendance suggest that male students tend to be older than female students at equivalent levels of schooling so that these appear to be reasonable assumptions as to the ages at which male students attend high schools and universities.

(15) See Schultz, Education and Economic Growth, pages 62-63, Schultz, The Economic Value of Education, page 29, and W. Lee Hansen, "Total and Private Rates of Return to Investment in Schooling", Journal of Political Economy, LXXI (April 1963), pages 130 - 131.

(16) For example, see University Student Expenditure and Income in Canada, 1961-62, Part II, Canadian Undergraduate Students (Catalogue No. 81-520), Dominion Bureau of Statistics, Ottawa 1963 and Factors Related to College Attendance of Farm and Non-Farm High School Graduates, 1960, U.S. Bureau of the Census, Series Census - ERS (P.27) No. 32, June 1962.

(17) Detailed explanations on methods of estimation and sources of data may be found in the notes at the end of the chapter.

High school costs were assumed to consist only of expenditure on books plus earnings foregone. Estimated costs by age were as follows:

TABLE 17. Private Annual Costs of Secondary Schooling -- Males, 1961

Age	Books	Earnings foregone	Total
dollars			
15	25	700	725
16	25	899	924
17	25	1,098	1,123
18	25	1,321	1,346

Source: See notes at end of chapter.

For university students costs were calculated as earnings foregone minus monies received through bursaries and scholarships plus selected costs of school attendance -- fees, tuition, books and equipment and transportation (other than local). The estimated costs are shown below:

TABLE 18. Private Annual Costs of University -- Males, 1961

Age	Earnings foregone(1)	Less scholarships	Tuition	Books	Transportation	Total
dollars						
19	1,042	- 125	409	97	70	1,493
20	1,075	- 125	409	97	70	1,526
21	1,571	- 125	409	97	70	2,022
22	1,915	- 125	409	97	70	2,366

(1) These statistics are derived from average annual earnings reported by members of the current labour force rather than rates of pay of the current labour force and thus these are realized earnings of the labour force. This implicitly allows for loss of earnings because of unemployment, illness or other factors which result in a loss of earnings during the year.

Source: See notes at end of chapter.

These two series are the estimates of private costs incurred by high school students and university students in obtaining an education. Not only are the costs quite substantial, even in the youngest age groups, but they rise with age. These estimates assume four years of schooling at both the high school and the university

level. For those occupations requiring more than four years university training as for example, medicine, where the training of a specialist may last as long as nine or ten years, costs would be higher still.

Measurement of Income Returns

Although there is general agreement as to the appropriate measurement of costs, there is more divergence in the approaches to the measurement of private returns. The studies which have been carried out recently fall into two broad categories -- studies which measure "lifetime" incomes by levels of education and studies which calculate rates of return on investment in education.(18) Some studies of lifetime incomes have ignored the problems of costs and have been confined to estimating the value of lifetime income (or earnings) streams for individuals with different levels of schooling.(19) Other studies have estimated the present value of such income streams by discounting the streams, using a number of different interest rates. If income streams are discounted to calculate present value at the age at which a particular level of schooling commences, as, for example, the age of entry into secondary school, then this method implicitly allows for opportunity costs since earnings may be close to zero during the years of school attendance. However, no allowance is made for other costs. If the age to which the income stream is discounted is one after the completion of schooling then no allowance is made for any costs.(20) Studies of rates of return have related costs of extra schooling to the increments to earnings which result from higher levels of schooling to estimate what might be termed, the profitability of additional schooling.

The remainder of this chapter will examine these various types of calculations and provide some preliminary data for Canada based upon the census material.

Lifetime Earnings

All of the estimates derived by the methods mentioned above are based upon cross-sectional data collected through surveys or censuses but with further modifications. Some of the modifications are common to all estimates, both of lifetime earnings and rates of return.

For estimates of what are termed "lifetime" earnings the assumption is made that a cohort of persons of a certain age with certain educational characteristics or certain educational and occupational characteristics enters the labour force. Some of the studies mentioned earlier have further assumed that attrition of this group only occurs because of deaths of the original members and that survivors remain in the labour force and, as they age, receive the average earnings shown by

(18) Examples of studies of the first category are those by Herman P. Miller, "Income in Relation to Education", American Economic Review, Vol. L, December 1960, and H. S. Houthakker, "Education and Income", Review of Economics and Statistics, Vol. XLI, February 1959. Examples of the second type of study are W. Lee Hansen, "Total and Private Rates of Return to Investment in Schooling", Journal of Political Economy, LXXI, April 1963, and Gary Becker, Human Capital, National Bureau of Economic Research, Columbia University Press, New York and London, 1964.

(19) An example of such estimates are those by Herman Miller.

(20) The estimates in the Houthakker and Hansen studies show present value of additional income as viewed at the age of fourteen.

cross-sectional data for that age and education category. The aggregate earnings of the survivors are calculated by multiplying the number of survivors by the average earnings. (The method is described in more detail in the appendix.) The aggregate earnings are then summed for the life span used and divided by the original number of persons in the cohort to arrive at average lifetime earnings. Average lifetime earnings then are the probable average earnings over a specified time period per person entering employment at a specified age, not average lifetime earnings over a specified time period per person surviving for the complete length of the time period. Therefore, a person working the full period who received the average earnings of his particular group would have higher lifetime earnings than those of his total age cohort.

The "lifespan" can be defined in different ways -- for example, from age 15 until the oldest possible age of survival (100 or so), age 15 to 65, age 25 to 65 and so forth. While the whole possible life span may be suitable for the measurement of lifetime income it does not seem appropriate to the measurement of lifetime earnings where the time period used should bear some relation to the possible duration of the working career. Restricting estimates to the age groups 25 to 64 has the advantage of measuring career earnings during those years when formal training is complete and before withdrawals from the labour force begin to be important. Estimating earnings over longer time periods would alter the relationship between the earnings of those with lower levels of education and those with higher levels; measuring earnings from the age of 18 or 19 rather than the age of 25 would raise the aggregate earnings of the less educated to a greater extent than those of the more highly educated since the lower the level of education the lower the age at which full time labour force participation starts and at which regular earnings begin to accrue. If lifetime earnings are not discounted, and estimates of earnings beyond the age of 65 are included, more would be added to the earnings of the more highly educated as their earnings and labour force participation are less affected by aging than the earnings and participation rates of the less skilled. However, when discounting earnings to derive present values measuring earnings from 18 to retirement rather than from 25 to 64 would narrow the differences between the discounted earnings of those with little education and those with university degrees since earnings which will not be received until a period of nearly fifty years in the future would have a very low present value.

It has been suggested that a better approach to the measurement of lifetime earnings would be to make an adjustment for the probability of labour force participation as well as for mortality.(21) Participation rates show that labour force participation rises as the level of schooling rises.(22) The table below summarizes participation rates of the male labour force by age and schooling in 1961.

With such further adjustments for participation, lifetime income could be the measurement of earnings from the age at which full-time employment commences until the age of retirement. Lifetime earnings measured in this manner on an undiscounted basis would probably show greater differentials between the earnings of the more educated and the earnings of those with low levels of schooling. However, if lifetime earnings were to be estimated adjusting for participation rates as well as mortality, the participation rates which should be used are the participation rates

(21) Bowman, "Human Capital: Concepts and Measures", Economics of Higher Education, p. 85-88.

(22) In the younger age groups lower participation rates for the higher levels of education reflect the fact that some of these groups are still attending school.

of the population not at school rather than the participation rates by age groups.

TABLE 19. Participation Rates by Age and Schooling -- Males, 1961

Age	No schooling or elementary	Secondary 1 - 3	Secondary 4 - 5	Some university or degree
15 - 19	46.8	35.4	37.1	54.1
20 - 24	85.0	92.0	88.5	72.0
25 - 34	90.7	95.9	96.9	94.9
35 - 44	90.9	96.0	97.2	98.0
45 - 54	88.8	94.3	95.8	96.8
55 - 64	79.1	85.1	87.0	89.9
65 and over	25.8	32.6	34.5	43.7

Source: Based on Tables 99 and 102, Census Report 92-557, Schooling by Age Groups supplemented by unpublished data and Table 18, Census Report 94-513, Occupations by Sex Showing (a) Marital Status and (b) Schooling, by Age, 1961 Census of Canada.

Table 20 presents estimates of career (or lifetime) earnings of males aged 25 to 64 in the total non-farm labour force and in selected occupational categories adjusted for mortality but not for labour force participation. Estimates were restricted to these age groups because data were not available in sufficient detail for those aged 15 to 24 for individual occupations to allow using an age somewhat lower than 25. However, for all persons with 5 to 8 years of elementary schooling, 4 to 5 years of high school and a university degree earnings estimates are shown in Table 21 for earnings for the ages 15 to 64, 19 to 64 and 25 to 64. The statistics confirm that measurement of earnings from the age of 15 rather than the age of 25 reduces the differential between the earnings of the low and high schooling categories.

As might be expected from the differentials in earnings discussed in the previous chapter considerable variations occur between occupations even where persons have similar educations. Probable lifetime earnings for university graduates range from a low of \$133,311 for a clergymen or a priest to \$583,535 for a physician or surgeon. Similar variations are evident among those with only elementary schooling where lifetime earnings in managerial occupations are approximately \$200,000 but as low as \$67,000 among fishermen, trappers and hunters. The statistics provide some indication as to the differences in the average income flows to different occupational categories.

The criticism of this method of relating earnings and education is that it ignores the costs involved in obtaining the education and that it does not take into account the fact that age-earnings profiles differ for different groups. As a result, such unadjusted lifetime earnings show much greater differences between the earnings accruing to persons with higher levels of education and to those with lower levels of education than alternative methods of estimation. As the previous chapter

TABLE 20. Lifetime Earnings Based on Arithmetic Means for Males Aged 25 to 64 by Years of Schooling Completed, Year Ending June 1, 1961

	No schooling or elementary	Sec- ondary 1 - 3	Sec- ondary 4 - 5	Some university	University degree
	dollars				
All occupations	131,026	168,257	209,484	234,448	353,624
Managerial occupations	200,957	232,718	283,810	315,637	423,328
Managers, specified	198,306	229,703	266,760	282,355	355,868
Owners and managers n.e.s.	201,132	233,177	287,147	321,828	431,322
Manufacturing	223,516	273,880	341,497	382,798	490,671
Construction	222,149	246,363	296,846	339,942	472,533
Transportation, communication and other utilities	247,010	255,704	292,606	317,867	418,236
Wholesale trade	218,623	261,635	314,244	339,909	448,998
Retail trade	177,769	201,770	245,657	266,662	348,889
Finance, insurance, real estate	277,364	297,781	322,443	380,923	467,382
Community, business and personal service	172,267	193,287	248,195	291,024	414,757
Public administration	183,105	192,131	218,575	241,341	327,516
Professional and technical occupations	171,359	195,985	224,094	225,474	354,143
Professional engineers		227,803	260,786	280,328	336,566
Physical scientists					318,288
Biologists and agricultural professionals					281,466
Teachers	172,697	172,269	207,284	214,964	301,067
Professors and college principals					357,773
School teachers		178,636	206,971	214,825	286,314
Health professionals	171,740	172,803	187,778	254,532	497,846
Physicians and surgeons					583,535
Dentists					402,566
Law professionals					468,154
Lawyers and notaries					469,394
Religion professionals	92,081	105,639	107,367	113,779	133,311
Artists, writers and musicians	155,937	212,661	236,829	256,087	260,883
Other professionals	180,640	199,632	227,461	224,048	315,756
Architects					402,819
Accountants and auditors		229,623	258,684	259,078	349,823
Social welfare workers		156,758	181,036	168,146	215,752
Clerical occupations	134,674	149,782	160,573	159,867	172,995
Sales occupations	142,392	175,234	209,534	216,961	255,850
Service and recreation occupations	112,255	142,282	164,420	191,245	245,343
Protective service occupations	136,576	163,215	190,031	218,147	282,090
Civilian protective occupations	131,824	158,939	170,912	176,285	
Housekeepers, waiters, cooks and related workers	95,136	108,926	112,291		
Other service occupations	105,684	123,748	135,737		

TABLE 20. Lifetime Earnings Based on Arithmetic Means for Males Aged 25 to 64 by Years of Schooling Completed, Year Ending June 1, 1961 - Concluded

	No schooling or elementary	Sec- ondary 1 - 3	Sec- ondary 4 - 5	Some university	University degree
	dollars				
Transport and communication occupations	135,614	160,604	182,961	196,172	
Supervisors of transport operations	162,355	180,426	194,790		
Operators, railroad	192,118	200,747	203,164		
Operators, water transport	139,561	185,116	204,970		
Operators, road transport	126,774	141,757	145,476		
Other transport occupations	120,929	149,149	177,236		
Other communication occupations	125,223	152,385			
Farm workers (other than farm operators or managers)	69,498	92,601	101,122		
Loggers and related workers	82,937	122,719	141,836		
Fishermen, trappers and hunters	66,941	100,793			
Miners, quarrymen and related workers	150,288	171,731	185,164		
Craftsmen, production process and related workers	135,474	157,451	170,676	169,593	194,392
Millers, bakers, brewers and related food workers	125,716	138,117	144,798		
Tire builders, vulcanizers and other rubber workers	141,098	154,479			
Leather cutters, lasters, sewers and other leather workers	104,477	116,028			
Spinners, weavers, knitters and other related workers	113,159	124,811	139,020		
Tailors, furriers, upholsterers, and related workers	121,256	135,430	139,166		
Carpenters, cabinet makers, sawyers and related workers	111,363	131,914	195,619	131,189	
Paper makers, still operators, chemical and related workers	161,920	182,038	198,309		
Printers, bookbinders and related workers	181,088	196,041	172,739		
Furnacemen, moulders, blacksmiths and related metal workers	154,861	162,678			
Machinists, plumbers, sheet metal workers and related workers	147,797	160,937	167,578	166,043	
Mechanics and repairmen	140,045	155,715	162,737	165,415	
Electricians and related electrical and electronics workers	154,756	174,419	184,577	179,012	
Painters, paperhangers, and glaziers	114,031	123,942	124,507		
Bricklayers, plasterers and construction workers, n.e.s.	127,406	151,670	168,515		
Clay, glass and stone workers	133,108	149,553			
Stationary engine and excavating and lifting equipment operators and related workers	143,020	160,456	177,856		
Longshoremen and other freight handlers	114,340	130,423	143,457		
Sectionmen and trackmen	116,525	127,631			
Other production process and related occupations	156,736	179,260	197,199	190,704	220,374
Labourers, n.e.s.	114,175	111,657	118,079		

Source: Estimates based on statistics in Table B.6. Census Report 98-502, Incomes of Individuals, 1961 Census of Canada.

TABLE 21. Lifetime Earnings -- Males for Selected Ages and Selected Levels of Schooling, 1961

Schooling	Age		
	15 - 64	19 - 64	25 - 64
	dollars		
Elementary 5 - 8	151,820	148,449	137,230
Secondary 4 - 5	221,700	222,676	209,484
University degree	356,108	357,675	353,624

Source: Table 20 for ages 25 to 64. Additional calculations for ages 15 to 64 and 19 to 64 from data in appendix to chapter.

pointed out the lower the level of schooling the flatter the profile of average earnings by age. That is, a worker with a limited education can usually expect to attain his peak earnings within ten or fifteen years of entry into the labour force. University graduates, on the other hand, may work for thirty years before maximum earnings are reached. Thus relative differentials of earnings by age and education are not uniform for all levels of schooling and are much wider between age groups among the more highly educated than among the less skilled. The longer the waiting period involved before benefits return the lower the present value of such returns, and also the higher the probability of intervening events preventing the realization of higher returns.

Because of these differences in earnings experiences, if the value of lifetime earnings is discounted by some discount rate to provide estimates of the present value at some fixed age such as 19 or 25, the relative differences between the values of lifetime earnings for different education groups shrink. The higher the discount rate used the smaller the differences. The choice of rates to be used is usually arbitrary.

The table below shows the present value calculated using different discount rates at age 19 of the lifetime earnings earned between the ages 19 to 64 as shown in Table 21. Similar data are presented for present values for the ages of 15 to 64.

TABLE 22. Discounted Lifetime Earnings

Schooling	Discount rate			
	0	3%	5%	8%
	dollars			
<u>Males aged 19 - 64</u>				
Elementary 5 - 8	148,449	74,275	54,524	35,330
Secondary 4 - 5	222,676	108,626	78,114	49,321
University degree	357,675	164,115	112,100	65,187
<u>Males aged 15 - 64</u>				
Elementary 5 - 8	152,473	72,720	48,424	29,301
Secondary 4 - 5	221,700	100,671	64,264	36,252
University degree	356,108	151,852	92,225	47,914

Source: Calculated from cross-sectional data in appendix to chapter.

The rates used are a low interest rate -- 3 per cent which is approximately the rate of return on bank deposits, 5 per cent which is approximately the current rate of return on Canada Savings Bonds and 8 per cent which is the rate of return which could be obtained on somewhat riskier investments such as mortgages.

As has been pointed out present values calculated at the commencement of schooling implicitly reflect opportunity costs by assigning zero earnings to the years of schooling. Discounting to age 19 then, has this cost element for university graduates but not for elementary and high school graduates. Discounting to age 15 implicitly includes these costs for high school graduates as well. Since the population under 15 cannot work and is compelled to attend school, discounting to any age below 15 is meaningless.

On a undiscounted basis lifetime earnings of university graduates are 141 per cent higher than those of persons with 5 to 8 years of elementary schooling if 19 is used as the starting age and 134 per cent higher if the age is lowered to 15. If an 8 per cent discount rate is applied, discounted earnings are only 85 and 63 per cent higher for ages 19 and 15 respectively. The use of rates higher than 8 per cent would narrow the differentials further. These estimates confirm that, because of the differences in earnings experiences, the extent of the earnings advantage of the highly trained can differ substantially if present value is examined rather than the undiscounted income stream. The degree of difference is affected by the interest rate used and the age span for which discounts are calculated.

Rates of Return

The second approach to the examination of earnings and education is to compare income benefits from education with the estimated costs incurred in obtaining the education. The benefits derived are the additional income flows which accrue from possessing more education. Some of the assumptions made for calculation purposes are similar to those used in calculating lifetime earnings. Average earnings are estimated for each age and education group, again on the assumption of a cohort of persons starting a career at some specific age. The anticipated average earnings estimated are the average earnings per initial entrant not the average earnings per survivor as shown by cross-sectional data. (The two averages are shown in the notes at the end of this chapter.) For some particular level of schooling, for example, completion of a university degree, the returns to extra education would be the difference between the average earnings per person with a university degree minus the average earnings per person with a high school diploma in each age group.

A number of methods have been used to calculate the internal rates of return to investment in schooling. The calculations below are, of course, rates of return to private investment in schooling. One method which has been used is to treat the costs of schooling as negative income during the years of school attendance.⁽²³⁾ The internal rate of return then is that discount rates which yields a present value of zero for the net income stream derived from the additional education. The figures in Table 23 show the estimated earnings differentials for cohorts of males who have completed high school and for cohorts of males who have completed university. For high school graduates the earnings differentials are those between high school graduates and males with only 5 to 8 years of elementary schooling, while for university graduates the differentials are those between university graduates and males with 4 to 5 years of high school.

(23) See Becker, Human Investment.

TABLE 23. Additional Income from Employment Received by Males
for Year Ended May 31, 1961 as a Result of Completing
Selected Levels of Schooling(1)

Age	Secondary 4 - 5 years	University degree
dollars		
15	- 725	
16	- 924	
17	- 1,122	
18	- 1,346	
19	50	- 1,493
20	198	- 1,526
21	497	- 2,022
22	595	- 2,366
23	668	447
24	839	694
25 - 34	1,310	2,117
35 - 44	1,887	4,040
45 - 54	2,092	4,323
55 - 64	1,816	3,798
Rate of return	16.3%	19.7%

(1) For the ages 25 to 64 the earnings figures are the additional earnings per year at each age resulting from additional schooling. For high school graduates these are the additional earnings received by graduates as compared with persons having only 5 to 8 years of elementary schooling. For university graduates it is the increment in earnings over the earnings of persons with 4 to 5 years of high school.

Source: See notes at end of chapter.

It will be recognized that the negative entries are the costs of schooling shown in the earlier sections of this chapter. Another study used basically similar methods of estimation but elaborated them somewhat.(24) This alternative method, instead of considering costs to be negative income, treated the costs as an investment. The rate of return then was calculated to be that rate of interest which made the present value of the investment equal to the present value of the income stream. This method yields the same results as the previous approach but eliminates the use of negative figures. Table 24 illustrates this method of calculation. The statistics show the cost to an elementary school graduate of securing both a high school graduation diploma and university degree and the net earnings differentials between a university degree and an elementary school education by age groups.

The estimates in Table 23 suggest that rates of return based on earnings before taxes are higher for an investment in a university education than for an investment in a high school education. For both levels of schooling the internal rates of return are substantial and alternative investments to education would only be more profitable if yields exceed rates shown in the two previous tables. These

(24) Hansen, Total and Private Rates of Return to Investment in Schooling.

TABLE 24. Costs and Returns to Elementary School Graduates from Completion of Elementary School to Completion of University

Age	Costs or investment	Additional income(1)
	dollars	
15	725	
16	924	
17	1,122	
18	1,346	
19	1,493	
20	1,526	
21	2,022	
22	2,366	
23		1,113
24		1,531
25 - 34		3,418
35 - 44		5,910
45 - 54		6,396
55 - 64		5,597
Rate of return	17.1%	

(1) For the age groups 25 to 64 the earnings figures represent the additional earnings per year at each age resulting from additional schooling.

Source: See notes at end of chapter.

findings as to the greater returns to a university education than to a secondary school education appear to be the reverse of the American experience where estimates prepared for a number of years using Census and other data suggest that higher rates of return occur for high school graduation than for university graduation.(25) An examination of United States census data from the 1950 and 1960 Censuses suggests that there are significant differences in the age-earnings profiles of the various education groups in the two countries. For example, in the age group 25 to 34 there are much greater relative differences between the average earnings of university graduates and the average earnings of those with secondary or elementary school diplomas in Canada than in the United States. A higher education is a scarcer

(25) See Hansen, Total and Private Rates of Return to Investment in Schooling, page 138 and Becker, Human Capital, page 128. The Becker estimates show substantially higher rates of returns to high school graduates than to university graduates in recent years.

Hansen points out that highest rates of returns are received by elementary school graduates who have no costs and then by persons leaving high school after one or two years as private costs are exceedingly low at this point. As has been pointed out, it is assumed that private costs of elementary schooling for Canada are zero, as well, so that private returns to elementary schooling would also be the highest of all since such returns are infinitely large.

attribute in Canada and as a result, younger entrants into the labour force with university degrees may have a greater immediate salary advantage relative to high school graduates and older university graduates than is the case in the United States. Competition among employers for the limited supply of university graduates coming into the labour market each year may have raised salaries offered to graduates more rapidly in recent years than the salaries of university graduates who have been in the labour force over a longer period of time. The average earnings by levels of schooling for those aged 25 to 34 from the recent censuses in the two countries show the following patterns:

TABLE 25. Average Earnings by Level of Schooling for Males(1) Aged 25 - 34

	U.S.A. 1959	Canada year ending June 1, 1961
	dollars	
Elementary schooling 5 - 8 years		3,418
Elementary schooling 8 years	4,357	
High school 4 - 5 years	5,480	4,760
University degree	7,146	6,909

(1) United States data are for white males only.

Source: For Canada Table B.6. Census Report 98-502, Incomes of Individuals, 1961 Census of Canada. For U.S. Table 1, Occupation by Earnings and Education, United States Census of Population 1960, Report No. PC(2)-7B.

The other significant difference evident between Canadian and American data are the shapes of the age-earnings curves. In the United States, for all levels of schooling, comparisons of earnings in the older age groups with earnings in the younger age groups show greater differences than is true in Canada. The significance of this to estimates of present value of lifetime income streams has already been mentioned. Table 26 shows the relationship of average earnings for the age groups between 35 and 64 to average earnings of the 25 to 34 year old group for various levels of schooling in each country.

The only education group showing similar age-earnings patterns in both countries are the high school graduates.(26) For levels of schooling lower or higher than this, earnings in older age groups relative to younger age groups rise more in the United States than in Canada. It should perhaps be noted that it is probable that a much higher proportion of the university trained labour force in the United States as

(26) Differences exist between Canadian provincial school systems and the American system at the secondary school level. Some Canadian provinces have five years of secondary schooling while others have four as in the United States. As a result some universities have accepted the fifth year of high school as the equivalent of one year of university. It has been suggested that high school graduates from five year courses should be considered to have some university and not simply high school graduation. This is the point of view which has been adopted in the study by Gordon Bertram on the contribution of education to economic growth in Canada which is to be published by the Economic Council of Canada.

TABLE 26. Ratio of Average Income from Employment by Age Group and Schooling
(Age Group 25 - 34 = 100) Males in Current Labour Force(1)

Age	Schooling				
	No schooling or elementary	Secondary 1 - 3	Secondary 4 - 5	Some university	University degree
Canada					
25 - 34	100.0	100.0	100.0	100.0	100.0
35 - 44	110.4	111.6	121.4	129.3	144.2
45 - 54	110.6	114.7	128.8	134.7	156.6
55 - 64	105.4	110.6	124.9	131.6	153.3

	Schooling					
	Elementary 0 - 7	Elementary 8	High school 1 - 3	High school 4	College 1 - 3	College 4 or more
United States						
25 - 34	100.0	100.0	100.0	100.0	100.0	100.0
35 - 44	113.5	111.6	113.5	118.7	134.3	154.3
45 - 54	115.6	114.8	117.1	124.0	146.7	189.4
55 - 64	115.6	112.6	117.5	126.6	146.9	186.1

(1) For Canada, employment income is for the year ending May 31, 1961 and for the United States the income is for the calendar year 1959. For Canada the statistics are for males in the current labour force on June 1, 1961 while for the United States the data are for white males in the current labour force on April 1, 1960.

Source: See Table 25.

compared with Canada would have post-graduate training and this may be a partial explanation for the difference in the earnings experiences of university graduates. There are no data to confirm this but education statistics indicate that a higher percentage of university graduates in the United States continue on to pursue graduate studies than is the case in Canada.

The other element in estimating returns are the costs. There are no published estimates for the United States for 1959 of private costs of schooling similar to above costs for Canada to provide some indication as to relative levels of private costs in the two countries. Until more current estimates of costs and returns become available for the United States it is impossible to explore further whether different relationships exist between costs and yields in the two countries and the reasons for differences.

Some concluding comments should be made as to some of the limitations of estimates of rates of return. The above estimates were made for gross earnings before taxes; the higher the level of earnings the higher the taxes payable and the higher the marginal tax rates applicable to additional income increments. Estimates on an after tax basis would show lower yield rates and might reverse the findings as to the profitability of investment in a university education vis-a-vis a high school education.

A more serious limitation of the above analysis is that it is based on cross-sectional data secured at one point of time. Substantial increases have occurred in earnings in recent decades, whether measured in current dollars or in real terms. Adjustment should possibly be made for the probable secular growth in earnings.(27) Such adjustments would result in estimates of higher rates of return than estimates based on the assumption of unchanging earnings over time. Where such adjustments have been attempted, the assumption has been made of equal benefits to all education groups.(28) This points to another weakness of these estimates -- the assumption that differentials existing between the earnings of different education groups will remain unchanged. The lack of Canadian data makes it impossible to examine Canadian trends but the narrowing of earnings between skilled and unskilled occupations between 1931 and 1951 suggests that a narrowing probably occurred between earnings of workers with higher and lower levels of education.(29) United States data indicate that changes have occurred in differentials from decade to decade.(30) For example, if in future, differentials between the higher and lower levels of schooling widen the returns to college graduates may prove to be larger than the above estimates indicate. On the other hand, if the increasing supply of university graduates in the future results in less of a salary premium on a university training, differentials could narrow. This might result in lower returns to private investments in higher levels of schooling. The estimates of rates of return above therefore must be interpreted as the rates of return based upon a static situation. The incorporation of assumptions about the direction of change in earnings might alter the results.

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- (27) Adjustments of this type have been incorporated in the estimates prepared by Becker in Human Investment. See also the comments by Herman Miller in "Lifetime Income and Economic Growth", American Economic Review, Vol. LV, September 1965, on the effects of economic growth on earnings by age cohorts.
- (28) Becker in his calculations in Human Capital has made estimates which include an adjustment to cross-sectional data for rising earnings.
- (29) For evidence see Sylvia Ostry, "Labour Economics in Canada", Chapter XV in H.D. Woods and Sylvia Ostry, Labour Policy and Labour Economics in Canada, MacMillan of Canada, Toronto, 1962.
- (30) Herman Miller in Rich Man, Poor Man shows that a narrowing occurred in the United States between 1940 and 1950 but that this trend was reversed between 1950 and 1960. Becker in Chapter VI, Human Capital shows that relationship between returns to a high school education and to a university education changed between 1939 and 1958 in the United States and suggests that rates of return on both high school and college education declined significantly during the first forty years of the century.

Appendix to Chapter

Notes on Methods

Estimates of Costs of Schooling

Estimates of earnings foregone for the age group 15 to 24 are based on data collected in the census sample questionnaire on incomes. Tabulations were available on income from employment by sex, by age and by schooling of the current labour force. Average employment income was only tabulated for the 15 to 24 age group in total. Data tabulated from the main census questionnaire on wages and salaries earned by wage-earners by age and schooling for those aged 15 to 19 and 20 to 24 were used to estimate earnings for the same age groups from the sample data. Estimates for individual years of age from 15 to 24 for each level of schooling studied were then obtained by interpolation. Estimated average earnings for males aged 15 to 19 and 20 to 24 were as follows:

	Males	
	15 - 19	20 - 24
	dollars	
Elementary 5 - 8 years	1,221	2,364
Secondary 4 - 5 years	1,223	2,984
University degree	1,413	3,423

The number of university graduates in the age group 15 - 19 is very small.

High School

The estimate used for the cost of books of high school students is an arbitrary one and was settled upon after some informal investigation of what normal expenditures might be. Some school systems have now begun to provide free books to high school students but no information exists as to how prevalent this practice is.

It should be noted that no adjustment was made to the earnings foregone estimates for high school students for possible part-time earnings or summer employment. Census statistics indicate that only a small fraction of the secondary school age groups attending school reported labour force participation during the previous twelve months.(31) The statistics used for earnings foregone for high school students were the estimated average earnings of males with five to eight

(31) See Table 42, Census Report 94-546, Characteristics of Persons Not in the Labour Force, 1961 Census of Canada.

years of elementary schooling. This group would include persons who did not complete elementary school but no data existed on them separately. The statistics on earnings of elementary school graduates would have been more appropriate but such tabulations are not possible from the Census. Further, for students in the senior years of high school earnings foregone or opportunity costs should perhaps be based upon the earnings of members of the labour force with some secondary schooling. If this series had been used, the earnings foregone estimates used for high school costs would have been somewhat higher.

University

For university students earnings foregone were estimated by taking average earnings of high school graduates in the relevant age groups and subtracting from these an estimate of the average earnings of university students from part-time and summer employment.(32) The statistics indicate that 90 per cent of male university students held summer jobs while another small fraction held part-time jobs during the school year. Average earnings from summer employment were assumed to equal median monthly earnings multiplied by four -- the probable duration of employment. This was estimated to be average earnings per student working. This average was adjusted downward to estimate average earnings per student at university. The earnings foregone estimates were then compiled as follows:

	Gross earnings foregone	Less earnings during holidays	Less part-time earnings	Net earnings foregone
	dollars			
19	1,600	500	58	1,042
20	1,997	864	58	1,075
21	2,493	864	58	1,571
22	2,837	864	58	1,915

For estimates of part-time earnings and other costs, the statistics used were the average costs of students registered in arts and science, engineering, medicine and dentistry. In addition to an adjustment for student earnings an adjustment was also made for average receipts of bursaries and scholarships.

Some students receive miscellaneous other types of grants but no adjustment was made for this. The estimated direct costs of schooling were assumed to be tuition, books, supplies and transportation costs of students whose normal residence was not in the same city. These are the costs that are usually accepted as the additional costs of securing a university education but there may be other costs which should be included. For example, one author has suggested the inclusion of

(32) Statistics on the income and earnings of university students were obtained from University Student Expenditure and Income in Canada, 1961-62, Part II - Canadian Undergraduate Students (Catalogue No. 81-520), Dominion Bureau of Statistics, Ottawa, 1963.

the possible return on savings which might have occurred from additional income which would be available to the family if children entered the labour force permanently instead of staying in school.(33)

Methods of Estimating Lifetime Earnings

The estimates of lifetime earnings are derived by the use of life tables combined with average earnings by age for the various education groups.(34) As an example, calculation of lifetime earnings of university graduates between the ages of 25 and 64 is given below:

1. Out of every 100,000 male children born in 1961, 94,577 could expect to survive to the age of 25. Assume that they are all university graduates and all enter the labour force and work until the age of 65.

2. Between the ages of 25 and 34 the survivors will live a total of 939,329 man years.(35) If these individuals were all university graduates, on average they could expect to earn \$6,909 per year. Aggregate earnings for the group for this time period would be \$6,489 million.

3. The number of man years lived between 35 and 44 would be 920,559. Average earnings of university graduates in this age group are \$9,966 so that aggregate earnings would be \$9,174 million.

4. For the age group 45 to 54, the number of man years lived is 879,770, the average earnings \$10,821 and aggregate earnings \$9,520 million.

5. For the age group 55 to 64, the number of man years lived is 778,644, the average earnings \$10,609 and aggregate earnings \$8,261 million.

Average lifetime earnings per initial graduate are simply the sum of the aggregate earnings for all the age groups (\$33,445 million) divided by the original numbers of males (94,577). This yields a figure of \$353,624 per person.

These estimates are also used for calculating differentials by age and education groups. For example, for the age group 45 to 54 the aggregate earnings for the original entrants average \$952 million in total per year in this age group and the average annual earnings, \$10,066 per person in contrast to the average earnings of \$10,821 reported by survivors.

The first of the following tables summarizes actual average earnings by sex, age and occupation as shown by cross-sectional data from the 1961 Census for males aged 19 to 64 with selected levels of schooling. The second table shows the hypothetical average earnings of a cohort of males aged 19 with the same age and schooling as estimated by the method described above. The statistics in the second table are the statistics used for earnings differentials in the calculation of the rates of return.

(33) Richard S. Eckaus, "Education and Economic Growth", Economics of Higher Education, ed. Selma J. Mushkin, P. 114.

(34) Life tables used are, Canadian Life Tables 1960-1962 (Catalogue No. 84-516), Dominion Bureau of Statistics, Ottawa, December 1963.

(35) A somewhat greater precision could be achieved by using the number of persons still alive at the MID-POINT rather than at the beginning of each age.

Average Earnings by Age and Selected Levels of Schooling -- Males
Cross-Sectional Data, 1961 Census of Canada

Schooling

Age	Elementary 5 - 8 years	Secondary 4 - 5 years	University degree
dollars			
19	1,550	1,600	
20	1,800	2,000	
21	2,000	2,500	
22	2,250	2,850	
23	2,425	3,100	3,550
24	2,550	3,400	4,100
25 - 34	3,418	4,760	6,909
35 - 44	3,807	5,779	9,966
45 - 54	3,844	6,130	10,821
55 - 64	3,701	5,944	10,609

The estimates of average earnings per person for a cohort of 95,483 males aged 19 for the ages 19 to 64 is as follows:

Hypothetical Earnings Estimated from Cross-Sectional Data,
1961 Census of Canada

Schooling

Age	Elementary 5 - 8 years	Secondary 4 - 5 years	University degree
dollars			
19	1,550	1,600	
20	1,797	1,997	
21	1,994	2,493	
22	2,240	2,837	
23	2,410	3,081	3,528
24	2,530	3,373	4,067
25 - 34	3,363	4,679	6,796
35 - 44	3,670	5,566	9,606
45 - 54	3,542	5,643	9,966
55 - 64	3,018	4,842	8,640

APPENDIX A

Definitions and Concepts

The 1961 Census of Canada collected data on labour force characteristics from all Canadian residents aged 15 and over with the exception of inmates of institutions who were always considered to be automatically outside the labour force. In addition, detailed income data were collected from a 20 per cent sample of private non-farm households. Households on farms and collective households (such as large lodging houses) were excluded from the sample as well as households in the Northwest Territories. Further, Canadian residents abroad or not found at a permanent address were not sampled.

In the sample household, all occupants aged 15 and over were asked to complete individual income questionnaires. The data collected were linked to the main questionnaires and cross-classified by the characteristics reported on the main questionnaires. Unless otherwise specified, the data used in this study are basically the data collected from the 20 per cent sample of households.

For convenience, the term non-farm labour force has been used to designate the segment of the population in the labour force resident in the sample households. Strictly speaking the statistics cover the labour force resident in private non-farm households rather than the labour force associated with non-farm occupations, as households excluded from the sample contain persons in non-farm occupations. The table shows the size of the total labour force by broad occupation and the size of the labour force included in the sample by broad occupation. The differences represent the estimated numbers not sampled for income data by occupational category.

Total Labour Force and Labour Force Resident in Private Non-Farm Households
by Broad Occupation and Sex, June 1, 1961

	Males			Females		
	Total labour force(1)	Labour force in sample(2)	Difference(3)	Total labour force(1)	Labour force in sample(2)	Difference(3)
All occupations	4,705,518	3,875,377	830,141	1,766,332	1,495,620	270,712
Managerial	481,379	463,574	17,805	57,661	50,411	7,250
Professional and technical	356,578	328,987	27,591	272,333	200,348	71,985
Clerical	324,811	316,359	8,452	509,345	489,453	19,892
Sales	263,229	258,384	4,845	147,486	141,976	5,510
Service and recreation	400,399	329,115	71,284	395,948	335,874	60,074
Transport and communication ...	354,736	333,891	20,845	37,968	35,337	2,631
Farmers and farm workers	573,098	92,706	480,392	75,868	7,920	67,948
Loggers and related workers ...	78,826	56,690	22,136			
Fishermen, trappers and hunters	35,648	30,903	4,745			
Miners, quarrymen and related workers	65,119	56,018	9,101			
Craftsmen, production process and related workers	1,354,594	1,280,596	73,998	205,189	193,416	11,773
Labourers, n.e.s.	294,059	260,403	33,656	20,943	18,806	2,137
Occupation not stated	123,042	67,751	55,291	43,178	21,781	21,397

(1) All persons 15 and over in labour force on June 1st, 1961, exclusive of institutional population.

(2) Persons resident in private non-farm households in labour force on June 1st, 1961 and sampled for income data.

(3) Number of persons in total labour force for whom income data are not available.

The following are the questions which were asked on education, employment, and income from employment on the Census of the total population:

- (1) Highest grade or year of schooling ever attended.

Each person 15 years of age and over was asked:

- (2) Did they have a job the previous week?
- (3) If no, did they look for work the previous week?
- (4) If no, did they have a job at any time in the past twelve months?

Persons answering "yes" to questions 2 to 4 above were asked to report the following:

- (5) Number of hours usually worked each week.
- (6) Name of employer.
- (7) Kind of business or industry.
- (8) Kind of work performed in the industry.
- (9) Whether they operated their own business (with or without paid help) or whether they worked for others (as wage or salary earners or unpaid family workers).
- (10) In how many weeks they worked for wages or salaries in the past twelve months.
- (11) Gross wage and salary income earned in this period.

The occupants of the 20 per cent sample of non-farm households aged 15 and over were asked a series of questions on income:

- (1) Amount of gross earnings from wages, salaries, commissions or tips from all wage and salaried jobs.

Although this is a repetition of question 11 on the main questionnaire there was a difference in the way in which wages and salaries were reported on the two questionnaires. On the main questionnaire the amount of wages and salaries earned in excess of \$15,000 was not reported; the questionnaire only indicated that it was \$15,000 or more. On the sample questionnaire, the actual amount earned was entered.

- (2) Net income from a business or professional practice.
- (3) Transfer payments from governments - family allowances, old age pensions and other income such as veterans' pensions, unemployment insurance, etc.
- (4) Retirement pensions received as a result of previous employment.
- (5) Investment income - bond and bank interest and dividends and other income from investments such as net rents, mortgage interest, etc.
- (6) Other money income - annuities, alimony, etc.

Total income received is the total of all income items reported on the sample questionnaire.

Income from employment is the amount of income reported in questions 1 and 2 of the sample questionnaire. All tables on earned income based on the sample data tabulated wages and salaries from the sample questionnaire. Tables which refer to the complete population are based on tabulations of wages and salaries as reported on the main questionnaire.

Labour force - the "current labour force" consists of persons with a job in the week preceding the Census and the persons looking for work during the previous week. Those persons who were not working or looking for work in the week preceding the Census but who had a job during the previous twelve months are shown as "other" in the tables where statistics are given on income of labour force participants. Persons "not in the labour force" are those who reported "no" to the three questions on employment and job seeking.

Wage-earners are persons who were classified as wage and salary earners under the category "worked for others". Where the description "worked for others" is used in tables the statistics refer to persons who worked as either wage or salary earners or as unpaid family workers in a family operated business.

Full year workers are wage-earners in the current labour force who reported working in 49 to 52 weeks and who usually worked 35 hours or more per week.

The self-employed are persons in the labour force who operated their own business either on own-account or with paid help.

Class of worker refers to the status of individuals in the labour force, that is, whether they worked for others or whether they operated their own business.

Level of schooling is a classification by the highest grade of school attended as reported on the main census questionnaire. It should be noted that this refers to the highest grade attended and not necessarily the highest grade successfully completed.

Occupation - the occupation describes the kind of work performed in the industry. A description of the occupational classification system used to code occupations in the Census may be found in Occupational Classification Manual, Census of Canada, 1961, (Catalogue No. 12-506), Dominion Bureau of Statistics, 1961. The term "broad occupation" is used when the labour force is classified by occupation division rather than by specific occupations. The occupation divisions of the Census are: managerial occupations, professional and technical occupations, clerical occupations, sales occupations, service and recreation occupations, transport and communication occupations, farmers and farm workers, loggers and related workers, fishermen, trappers and hunters, miners, quarrymen and related workers, craftsmen, production process and related workers, labourers, n.e.s. and occupation not stated.

It should be noted that income from employment is the total of income earned from all jobs held in the previous year not necessarily from the current occupation or, for those not working, the last occupation held.

APPENDIX B

Average Income from Employment for Year Ending May 31, 1961
and Number of Persons by Broad Occupation, Sex, Age and
Level of Schooling -- Current Non-Farm Labour Force

Average Income from Employment for Year Ending May 31, 1961 and Number of Persons by Broad Occupation, Sex, Age,
and Level of Schooling -- Current Non-Farm Labour Force - Continued

Level of schooling

Occupation and age	Elementary			Secondary 1 - 3 years			Secondary 4 - 5 years			Some university			University degree		
	Number	Average		Number	Average		Number	Average		Number	Average		Number	Average	
			\$			\$			\$			\$			\$
<u>Males - Continued</u>															
Service and recreation:															
15 - 24	13,647	1,737		21,380	2,081		8,341	2,411		3,119	1,416		367	2,645	
25 - 34	28,098	2,974		35,959	3,891		13,574	4,294		2,418	4,765		1,632	6,069	
35 - 44	28,599	3,204		29,144	4,216		11,794	5,155		2,409	6,346		1,819	7,665	
45 - 54	31,237	3,057		17,065	3,863		6,555	4,792		1,322	5,431		772	7,968	
55 - 64	31,458	2,804		9,185	3,239		3,310	3,282		660	3,842				
Transport and communication:															
15 - 24	19,036	2,021		25,203	2,172		6,156	2,350		1,402	1,551				
25 - 34	52,192	3,382		40,763	3,945		10,622	4,422		1,447	4,898		344	5,554	
35 - 44	44,665	3,689		31,922	4,381		9,128	5,199		1,213	6,148		299	7,506	
45 - 54	32,116	3,626		18,352	4,481		4,970	4,897		652	5,062				
55 - 64	17,812	3,821		6,573	4,506		2,152	5,209		350	4,931				
Farm workers:															
15 - 24	7,563	967		6,354	994		1,581	1,144		801	792				
25 - 34	7,687	1,792		2,787	2,545		841	2,714							
35 - 44	6,244	2,053		1,825	2,640		526	2,944							
45 - 54	6,425	1,913		1,672	2,466		412	2,587							
55 - 64	6,315	1,691		916	2,270		285	2,605							
Loggers and related workers:															
15 - 24	9,775	1,273		3,533	1,749		711	1,814		334	1,297				
25 - 34	12,000	2,255		3,027	3,043		717	3,891							
35 - 44	9,295	2,360		1,771	3,730		440	4,502							
45 - 54	7,213	2,282		982	3,389		265	3,807							
55 - 64	4,080	1,985		459	2,996										
Fishermen, trappers, and hunters:															
15 - 24	3,345	1,125		1,601	1,318										
25 - 34	4,721	1,673		1,312	2,616										
35 - 44	5,209	1,928		1,154	3,194										
45 - 54	4,890	1,841		849	2,885										
55 - 64	3,118	1,751		352	2,051										

Average Income from Employment for Year Ending May 31, 1961 and Number of Persons by Broad Occupation, Sex, Age,
and Level of Schooling -- Current Non-Farm Labour Force - Continued

Occupation and age	Level of schooling									
	Elementary		Secondary 1 - 3 years		Secondary 4 - 5 years		Some university		University degree	
	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average
		\$		\$		\$		\$		\$
Males - Concluded										
Miners, quarrymen, and related workers:										
15 - 24	3,127	2,945	3,389	3,265	857	3,269	500	1,473		
25 - 34	9,820	4,149	5,321	4,649	1,357	4,986				
35 - 44	9,809	4,219	3,875	4,750	989	5,228				
45 - 54	6,926	4,068	2,590	4,881	531	5,143				
55 - 64	4,191	3,665	790	4,120	285	4,484				
Craftsmen, production process, and related workers:										
15 - 24	66,114	2,242	80,818	2,552	26,911	2,740	5,154	1,691	524	2,112
25 - 34	158,954	3,521	132,960	4,155	46,548	4,482	5,139	4,359	1,376	5,210
35 - 44	168,325	3,761	112,992	4,403	38,000	4,779	4,987	4,926	1,372	5,685
45 - 54	150,163	3,712	74,316	4,286	24,089	4,658	3,547	4,620	993	5,138
55 - 64	99,629	3,567	29,430	4,064	9,271	4,411	1,482	4,297	526	4,800
Labourers, n.e.s.:										
15 - 24	31,703	1,523	29,540	1,532	9,850	1,423	4,662	1,012	272	1,132
25 - 34	40,505	2,468	14,430	3,006	3,059	3,169	589	2,192		
35 - 44	37,139	2,643	10,019	3,187	1,965	3,313	278	2,817		
45 - 54	32,228	2,553	6,286	2,996	1,184	3,307				
55 - 64	23,726	2,517	3,049	2,783	689	2,866				
Occupation not stated:										
15 - 24	2,649	2,101	3,553	2,441	2,063	2,584	627	2,002		
25 - 34	4,275	2,991	5,897	3,619	5,769	3,817	1,066	3,881	580	6,618
35 - 44	4,794	3,272	6,299	3,869	3,142	4,368	644	4,839	521	8,712
45 - 54	5,019	3,440	2,875	4,121	1,564	4,497			425	9,488
55 - 64	3,545	3,246	1,576	3,581	544	4,801				
Females										
All occupations:										
15 - 24	86,505	1,221	187,712	1,570	134,505	2,013	22,404	1,930	7,310	2,687
25 - 34	73,397	1,628	114,273	2,018	86,995	2,614	15,169	3,116	10,403	3,886
35 - 44	88,256	1,616	112,499	2,008	79,289	2,574	13,040	3,330	8,708	4,417
45 - 54	83,594	1,656	86,349	2,122	56,628	2,791	12,054	3,682	8,519	4,866
55 - 64	50,973	1,612	35,167	2,203	22,547	2,920	5,480	3,812	3,784	5,055

**Average Income from Employment for Year Ending May 31, 1961 and Number of Persons by Broad Occupation, Sex, Age,
and Level of Schooling -- Current Non-Farm Labour Force - Continued**

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Occupation and age	Level of schooling									
	Elementary		Secondary 1 - 3 years		Secondary 4 - 5 years		Some university		University degree	
	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average
<u>Females - Continued</u>										
		\$		\$		\$		\$		\$
Managerial:										
15 - 24			592	2,371	405	2,457				
25 - 34			2,354	2,298	1,722	3,081	302	3,313		
35 - 44	1,067	1,886	4,777	2,754	3,706	3,747	619	4,023	401	5,908
45 - 54	3,057	2,072	5,160	2,859	3,492	3,811	601	4,219	369	5,811
55 - 64	3,820	2,324	2,468	2,750	1,497	3,699	308	5,685		
Professional and technical:										
15 - 24			7,357	1,825	30,319	2,315	11,974	2,525	5,631	2,954
25 - 34	1,097	1,952	5,488	2,382	22,654	2,873	9,706	3,351	8,364	4,083
35 - 44	1,137	2,440	5,327	2,374	15,069	2,908	7,327	3,756	6,495	4,748
45 - 54	1,437	2,327	6,803	2,648	14,354	3,369	7,516	4,157	6,474	5,300
55 - 64	1,526	2,560	3,501	2,713	7,203	3,646	3,242	4,392	2,851	5,726
Clerical:										
15 - 24			84,872	1,982	79,247	2,134	6,460	1,459	1,150	1,789
25 - 34	8,780	1,809	50,122	2,405	46,113	2,687	3,568	2,694	1,322	2,839
35 - 44	8,244	2,178	41,559	2,385	40,512	2,687	3,565	2,824	1,217	2,851
45 - 54	9,765	2,124	28,709	2,517	24,257	2,832	2,761	2,913	1,147	2,910
55 - 64	8,458	2,252	11,918	2,703	8,160	2,903	1,189	3,016	497	2,793
Sales:										
15 - 24			19,567	938	7,373	849	1,071	633		
25 - 34	5,870	1,136	10,578	1,339	3,639	1,633	316	2,198		
35 - 44	4,856	1,378	18,234	1,438	6,709	1,592	403	1,911		
45 - 54	9,259	1,410	13,906	1,555	5,488	1,781	436	1,952		
55 - 64	9,169	1,475	4,266	1,665	1,685	1,852				
Service and recreation:										
15 - 24			41,084	926	9,199	1,114	1,856	777		
25 - 34	33,795	884	19,995	1,428	5,906	1,722	531	2,322		
35 - 44	25,755	1,241	22,734	1,420	6,603	1,641	566	2,010		
45 - 54	33,726	1,235	18,123	1,465	5,060	1,724	435	2,149		
55 - 64	35,580	1,268	8,204	1,439	2,550	1,522	335	1,552		

Average Income from Employment for Year Ending May 31, 1961 and Number of Persons by Broad Occupation, Sex, Age,
and Level of Schooling -- Current Non-Farm Labour Force - Concluded

Occupation and age	Level of schooling							
	Elementary		Secondary 1 - 3 years		Secondary 4 - 5 years		Some university	
	Number	Average	Number	Average	Number	Average	Number	Average
		\$		\$		\$		\$
<u>Females - Concluded</u>								
Transport and communication:								
15 - 24	1,101	1,558	8,253	1,880	3,284	1,790	338	1,019
25 - 34	997	1,906	5,049	2,285	2,000	2,558		
35 - 44	1,105	2,053	3,074	2,314	1,488	2,599		
45 - 54	1,157	2,189	2,698	2,409	1,000	2,663		
55 - 64	1,119	2,242	1,102	2,438	407	2,673		
<u>Farm workers:</u>								
15 - 24	667	534	461	482				
25 - 34	801	607	441	545				
35 - 44	983	588	362	689				
45 - 54	631	719						
55 - 64	321	696						
<u>Craftsmen, production process and related workers:</u>								
15 - 24	30,990	1,401	20,673	1,519	2,797	1,555	260	991
25 - 34	27,490	1,832	13,936	2,068	2,756	2,048		
35 - 44	25,627	1,909	13,805	2,099	3,363	2,105		
45 - 54	20,120	1,918	8,755	2,127	2,322	2,164		
55 - 64	10,202	1,868	2,956	1,980	779	2,053		
<u>Labourers, n.e.s.:</u>								
15 - 24	3,080	1,247	2,816	1,218	567	1,237		
25 - 34	2,229	1,605	1,173	1,806				
35 - 44	2,299	1,509	1,097	1,783	329	1,792		
45 - 54	1,865	1,922	727	1,596				
55 - 64	901	1,691	261	1,650				
<u>Occupation not stated:</u>								
15 - 24	874	1,543	2,010	2,305	1,204	2,517	255	2,382
25 - 34	797	2,177	2,118	2,903	1,863	3,099	405	3,388
35 - 44	969	2,273	1,488	2,734	1,415	3,140		
45 - 54	1,244	2,266	1,295	2,783	450	2,618		
55 - 64	910	2,497	446	2,384				

BIBLIOGRAPHY

1. Becker, Gary. Human Capital. National Bureau of Economic Research, New York, 1964.
2. Bowman, Mary Jean. "Human Capital: Concepts and Measures," in The Economics of Higher Education, ed. Selma J. Mushkin, U.S. Department of Health, Education, and Welfare, Washington, 1962.
3. Denison, Edward F. The Sources of Economic Growth in the United States and the Alternatives Before Us. Committee for Economic Development, New York, 1962.
4. Eckaus, R.S. "Education and Economic Growth," in The Economics of Higher Education, ed. Selma J. Mushkin, U.S. Department of Health, Education, and Welfare, Washington, 1962.
5. Friedman, Milton and Simon Kuznets. Income from Independent Professional Practice. National Bureau of Economic Research, New York, 1945.
6. Hansen, W. Lee. "Total and Private Rates of Returns to Investment in Schooling," Journal of Political Economy, LXXI, April 1963.
7. Harbison, Frederick H. and Charles A. Myers. Education, Manpower and Economic Growth. McGraw-Hill, Toronto, 1964.
8. Houthakker, H.S. "Education and Income," Review of Economics and Statistics, XLI, February 1959.
9. Miller, Herman P. "Annual and Lifetime Income in Relation to Education, 1939-1959," American Economic Review, L, December 1960.
10. Miller, Herman P. "Lifetime Income and Economic Growth," American Economic Review, LV, September 1965.
11. Mincer, Jacob. "Investment in Human Capital and Personal Distribution of Income," Journal of Political Economy, LXVI, August 1958.
12. Morgan, James N., Martin H. David, Wilbur J. Cohen, and Harvey S. Brazier. Income and Welfare in the United States. McGraw-Hill, New York, 1962.
13. Mushkin, Selma J., ed. The Economics of Higher Education. U.S. Department of Health, Education, and Welfare, Washington, 1962.
14. Schultz, Theodore W. "Education and Economic Growth," in Social Forces Influencing American Education. ed. Nelson B. Henry, University of Chicago Press, Chicago, 1961.
15. Schultz, Theodore W. The Economic Value of Education. Columbia University Press, New York, 1963.
16. Walsh, J. "Capital Concept Applied to Man," Quarterly Journal of Economics, Cambridge, XLIX, February 1935.

17. Woods, H.D., and Sylvia Ostry. Labour Policy and Labour Economics in Canada. Macmillan of Canada, Toronto, 1962.

Government Publications

Hall, Oswald and Bruce McFarlane. Transition from School to Work, Department of Labour, Research Program on the Training of Skilled Manpower, Report No. 10, Ottawa, December 1962.

Meltz, Noah M. Changes in the Occupational Composition of the Canadian Labour Force, 1931-1961, Department of Labour, Occasional Paper No. 2, Ottawa, March 1965.

Canada, Department of Labour

Employment and Earnings in the Scientific and Technical Professions 1958-1961, Professional Manpower Report No. 12, September 1962.

Women at Work in Canada, 1964.

Wage Rates, Salaries and Hours of Labour, annual report.

Canada, Dominion Bureau of Statistics

1961 Census of Canada

Volume III (Part 1) - Labour Force: Occupations.

Volume III (Part 3) - Wage-Earners: Earnings and Employment.

Volume IV - Population Sample: Migration, Fertility, Income.

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