AN HISTORICAL SYNOPSIS OF THE CONCEPT OF LITERACY

by

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B.A., University of British Columbia, 1938

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We accept this thesis as conforming to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

December, 1969
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Date **December 15, 1969**
ABSTRACT

This study analyzes the concepts of literacy that have prevailed at different periods of history. These concepts must be seen in terms of the content and distribution of education that was considered adequate at any given period. The art of writing, consequently the notion of literacy, developed with the appearance of cities. Literacy is essential for the maintenance and continued functioning of the interdependent social and economic relationships that form the basis of city life. An historical survey shows that concepts of literacy change as the socio-economic needs of society change. Over the centuries literacy has been seen principally in terms of its usefulness in furthering the economic system and/or maintaining the social structure of the times. Changes of an economic nature, usually the result of technical or scientific innovation, have been the main factor in bringing about changes in educational needs.

Over time, the concept of literacy has been work-oriented in that literacy has been a tool essential to daily commerce. At certain periods, to help maintain social stability, literacy has been perceived as serving religious or moral purposes. The most significant changes regarding the concept of literacy have occurred during the twentieth century, reflecting the intensity of industrialization and urbanization in a world in which two outstanding characteristics are mass literacy and increasingly higher levels of literacy. The appearance of these phenomena is due to the change from an agricultural to an urban, industrial way of life.
# TABLE OF CONTENTS

## ABSTRACT

PAGE ii

## LIST OF TABLES

PAGE v

## CHAPTER

### I INTRODUCTION

1. Purpose and Scope  
2. Procedure  
3. The Concept of Literacy
   - Literacy: a means of communication  
   - Literacy: the conflict as to its distribution  
   - Socio-economic factors bring about changes in literacy  
   - Literacy and its unexpected benefits  
4. Plan of the Study  

### II CONTEMPORARY THOUGHT ABOUT LITERACY

1. Early Uses of the Phrase Functional Literacy  
2. Various Aspects of Literacy
   - The Seven Idea Categories  
3. Census Definitions of Literacy  

### III THE ORIGINS AND EARLY USES OF LITERACY

1. Pre-literate Hunting Society  
2. The Neolithic Revolution  
3. Non-Oral Communication in Pre-literate Times  
4. The Rise of Literate Urban Cultures  
5. The Scribal School or Tablet-House  
6. The Urban Revolution Effect; Acceleration of Change  

### IV THE SPREAD OF LITERACY

1. Some Consequences of the Discovery and Use of Iron  
2. Attitudes Toward Literacy in Classical Times  
3. The Rise of Christianity  

PAGE 34

PAGE 37

PAGE 40
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV. Feudalism and the Technical Innovations of the Middle Ages</td>
<td>42</td>
</tr>
<tr>
<td>V PERIOD OF TRANSITION</td>
<td>48</td>
</tr>
<tr>
<td>I. The Importance of the Scientific Revolution of the 17th Century</td>
<td>50</td>
</tr>
<tr>
<td>II. Changes in Economic and Social Structure</td>
<td>51</td>
</tr>
<tr>
<td>III. Factors that Created the Need for Science</td>
<td>52</td>
</tr>
<tr>
<td>IV. Aids and Hindrances to the Development of the New Experimental Science</td>
<td>53</td>
</tr>
<tr>
<td>V. Literacy and Use of the Vernacular</td>
<td>56</td>
</tr>
<tr>
<td>VI. Scientific Education and the Limitations of the Scientific Revolution</td>
<td>60</td>
</tr>
<tr>
<td>VI LITERACY IN THE EIGHTEENTH AND NINETEENTH CENTURIES</td>
<td>63</td>
</tr>
<tr>
<td>I. Attitudes Toward Literacy</td>
<td>64</td>
</tr>
<tr>
<td>II. Economic Facts and Social Theories</td>
<td>66</td>
</tr>
<tr>
<td>III. Literacy: A Two-Edged Weapon</td>
<td>68</td>
</tr>
<tr>
<td>IV. Industrialization and Changing Concepts of Literacy</td>
<td>72</td>
</tr>
<tr>
<td>VII THE TWENTIETH CENTURY: LITERACY AND ECONOMIC DEVELOPMENT</td>
<td>80</td>
</tr>
<tr>
<td>I. Changes in the Socio-Economic Sphere</td>
<td>83</td>
</tr>
<tr>
<td>II. Education and Economic Growth</td>
<td>88</td>
</tr>
<tr>
<td>III. Some Problems and Implications</td>
<td>98</td>
</tr>
<tr>
<td>VIII CONCLUSIONS</td>
<td>103</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>106</td>
</tr>
<tr>
<td>APPENDIX I</td>
<td>114</td>
</tr>
<tr>
<td>APPENDIX II</td>
<td>116</td>
</tr>
<tr>
<td>TABLE</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>I</td>
<td>Principal Terms Classified by Constituent Ideas</td>
</tr>
<tr>
<td>II</td>
<td>Ideas About Literacy Classified by Principal Terms</td>
</tr>
<tr>
<td>III</td>
<td>Percentage of World's Population Living in Cities</td>
</tr>
<tr>
<td>IV</td>
<td>Percentage of World's Population in Cities, by Regions</td>
</tr>
<tr>
<td>V</td>
<td>Median Years of Schooling, Males, Canada 1911-61 and United States 1910-62</td>
</tr>
<tr>
<td>VI</td>
<td>Median Years of Schooling, Male Labour Force Canada 1961 and United States 1962</td>
</tr>
<tr>
<td>VII</td>
<td>Educational Attainment of the Male Labour Force by Age Groups, Canada 1961 and United States 1960</td>
</tr>
<tr>
<td>VIII</td>
<td>Minimum Years of Educational Attainment of Male Labour Force, Aged 25-34 and 55-64, Canada 1961 and United States 1960</td>
</tr>
<tr>
<td>IX</td>
<td>Average Annual Income from Employment by Levels of Education, Male Nonfarm Labour Force, 1960</td>
</tr>
<tr>
<td>X</td>
<td>Average Levels Under Selected Economic and Social Indicators of Countries Grouped by National Income</td>
</tr>
<tr>
<td>XI</td>
<td>Coefficients of Rank Correlation Among Selected Social and Economic Indicators</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

The concern with literacy and literacy education so often expressed in the present day has a long tenure in human social thought. At different epochs in human history there have been differing perceptions of the concept of literacy that have produced various approaches to the problem of literacy education. The most significant characteristic of this concern with literacy over time has been its episodic nature. At times, literacy education has almost been a social movement as literate groups extolled the virtues of literacy and sought to make all men literate. But such episodes were short-lived for the most part because of the enormity of the task of trying to make literate a largely illiterate national population and by the lack of universal agreement as to what constituted literacy and for what purposes individuals should be literate.

I. PURPOSE AND SCOPE

The purpose of this thesis is to analyze the various concepts of literacy that have prevailed at different periods of human history and to
examine them in terms of the proposition that the extent and level of literacy at any given period is determined primarily by the socio-economic conditions of that period. Thus, as social conditions change the educational needs of adults change. Consequently the concept of literacy undergoes modification.

II. PROCEDURE

The procedure adopted for the analysis of the concept of literacy is to consider the subject by means of selected illustrations from history for the following reasons:

1) The way in which literacy arose as an issue is of relevance to today's educational problems.
2) The motivating forces that lead to the spread of literacy and that determine its nature and uses must be understood in terms of cultural relativity, and this demands a broad perspective.
3) Changes in the concept of literacy are of considerable significance when this comparative approach is explored, and these changes have occurred very slowly.

III. THE CONCEPT OF LITERACY

Two features are basic to any given concept of literacy. The first is the extent to which it is deemed desirable, that is, what proportion of the population should be literate. The second concerns the content of that particular concept of literacy, that is, the skills and knowledge that are considered to constitute literacy.

In discussing the concept of literacy it should be kept in mind that two characteristics are inherent in the meaning of the word concept. The first characteristic is that any concept, being "an idea that includes all that is
characteristically associated with or suggested by" (115) a term, is, in fact, impossible to define with precision. Secondly, such agreement or definition as does exist is likely to change markedly as conditions in society change and people's views of themselves and the world change. While the concept of literacy may not have been extensively discussed in preceding centuries, a survey of historical data shows that such concepts of literacy as have existed at any period have always been geared to the apparent educational needs of that period. The phrase apparent needs is used here in contradistinction to what may have been the real needs or idealistic needs: the kind of literacy apparently needed has practically always been determined by the vision, often limited, of those in control of the society. Within this context, however, the prevailing concept of literacy has tended to be equated with the educational needs of the times.

In tracing the development of various concepts of literacy certain themes recur time and time again so that they become topics of major consideration in the chapters that follow.

**Literacy: a means of communication**

Human beings are given to living in social groups, and one of their unique characteristics is the need and desire to communicate with each other. In prehistoric preliterate times the main forms of communication were verbal and visual. Through rock inscriptions and cave drawings of elk and bison for example, the hunter expressed his feelings and revealed the importance of the hunt in obtaining food for the group. Ritual dances and ceremonies were also an important part of group communication as they helped to reinforce the culture patterns and beliefs of the group and instructed the young in those beliefs.

A new and very special means of communication became necessary when the size of the social unit became large. With the appearance of cities and the development of trade and commerce came the invention of writing and the notion of literacy. Whether ancient or modern, an urban society requires some means for the transmission and recording of matters relating to business, trade,
commerce, and for the handling of legal affairs or for the very distribution of food. All of these require communication among individuals on such a large scale that literacy becomes an essential tool of organized community life.

**Literacy: the conflict as to its distribution**

Although every civilized society requires a certain proportion of literate people, there is and has always been a conflict as to how widely literacy should spread among the population. In broad terms this conflict has usually amounted to a dichotomy between the rulers and the ruled, that is, between the privileged, a small group who possessed most of the wealth, power, and culture of the society, and the labouring masses who possessed very little. As the social structure has gradually become more and more democratic the dichotomy has widened into a many-sided conflict between the various social groups. In any case, whether the conflict has been between two factions or several, it appears that throughout history there have always been some who have expressed anxiety lest there be too much literacy, particularly if it is considered to enhance the power and influence of the masses.

**Socio-economic factors bring about changes in literacy**

Over the centuries the value of literacy has been seen primarily in terms of the economic development of society. The development and extension of literacy has nearly always arisen out of the practical economic needs of the state; needs having to do with business and industrial affairs, or with problems of defense and conquest. The main stimulus to any change in the concept of literacy has been concern to keep the economy functioning, but the desire to maintain social stability has also been an important factor. Glass (50:394) has illustrated this point in discussing education and social change in nineteenth century England:
Public concern with elementary education was in large measure concern to meet certain minimum requirements in a changing society—the need to ensure discipline, and to obtain respect for private property and the social order, as well as to provide that kind of instruction which was indispensable in an expanding industrial and commercial nation.

It must also be acknowledged, however, that at various times certain individuals or groups have advocated a more widespread literacy for reasons not necessarily related to economic development, such as personal enjoyment of life, or the greater development of human potential. Of particular importance in this connection were the various popular movements led by such groups as the Chartists, the Fabians, and others who were actively seeking social reforms. While political groups, reading clubs, coffee houses, and self-improvement societies were sources of intellectual stimulation the major force for free public education and the reduction of illiteracy has been the demands of the economy and the state. As Glass (50:397) notes:

Foreign industrial competition was one such stimulus, and particularly competition by industries based upon the new chemical technology. The need for science teaching and for the training of technicians was acknowledged. Shortages of other kinds of trained manpower were also visible. The Boer War, which showed up physical defects in the working classes also revealed deficiencies in the education of the officers. Comparable education deficiencies lower in the social scale were such that, it was said, "city offices were forced to employ so many thousands of German clerks for want of a home-grown substitute." When he was introducing the 1870 Bill, Forster spoke of the relation between education and national power, and he argued that "we must make up for the smallness of our numbers by increasing the intellectual force of the individual." Now the slogan became "sea power and school power" as the essential basis of the Empire.

**Literacy and its unexpected benefits**

Given a sufficiently large number of literate persons, at least some will use literacy for purposes far beyond those for which literacy was originally
intended. Although purely functional in origin, literacy has made a contribution that is far more important to humanity in the long run. Once a person is literate he can read the works of others, express his own thoughts, or communicate with those in far-off lands. Out of such possibilities for communication comes the exchange of ideas, the formulation of philosophies, the creation of literature, the establishment of written systems of law, the development of scientific study, and the evolution of reform movements. Out of the new ideas and the new knowledge come the changes that in due course not only alter the economy but also the whole structure of society.

IV. PLAN OF THE STUDY

The study begins by considering some of the descriptions and definitions of literacy that have appeared in the educational literature of the past fifty years. The discussion then turns to early times to find out how and why the need for literacy arose. Its gradual distribution and development is then traced, and an attempt is made to show the impact on it of certain major historical events. For the most part, the study is confined to the river-valley civilizations of the Tigris-Euphrates and the Nile, the Mediterranean regions, Europe, and the Western world. A relatively small number of historical events has been chosen to highlight the changing concepts of literacy.

Certain periods in history have been discussed with brevity, but this approach has been considered necessary and appropriate because of the slowness with which the concepts of literacy have altered. For example, the twelve or fourteen centuries covering the rise of Christianity and the development of feudalism are of enormous importance in the context of theology and philosophy. During this time, however, the concept of literacy changed very little if at all.

In choosing what are considered to be some of the more significant historical events affecting literacy, some omissions are inevitable. For
example, the very important links between the concept of democracy, literacy, and the various reform movements receive relatively little attention in this study. An attempt is made, however, to show that the nature and value of literacy have been constantly under debate.

In conclusion, some thought is given to the effects that non-printed mass media will allegedly have on future developments in the field of literacy education, and some suggestions are made for future study and research.
CHAPTER II

CONTEMPORARY THOUGHT ABOUT LITERACY

I. EARLY USES OF THE PHRASE FUNCTIONAL LITERACY

Literacy is one of the major subjects of concern in the field of Adult Education. The traditional reply to the question "What is meant by literacy?" has usually been "Ability to read and write." To the adult educator this is an all but meaningless answer because it gives no indication of the relationship of such ability to the needs of contemporary society. In more recent decades the descriptions of literacy show a growing tendency to limit the concept to the level of ability that a person must have in a number of skills if he is to function adequately in his society. While there is no absolute agreement as to what kind or level of literacy is needed for "adequacy", the word functional is one of the key words used by those who are concerned about literacy.

The concern as to what level of ability constitutes adequate literacy stems from the first World War. In the United States it was found that about twenty-five per cent of the men examined at that time for the armed services could not read ordinary English or write a simple letter. Such men were obviously ill-equipped for efficient military service and in describing them in an article written in 1932, Hill used the phrase "functionally illiterate" (63).
McKenny, writing in 1925, described an illiterate as "one who, from a practical, social point of view, has not mastered the arts of reading and writing sufficiently to use them in daily life" (80).

One of the first specific steps taken by the United States government in an effort to find a solution to the illiteracy problem was the appointment in 1929 of the National Advisory Committee on Illiteracy. At its first meeting in December, 1929, under the chairmanship of Secretary of the Interior, Ray Lyman Wilbur, it was proposed that each state should set up a State Advisory Committee on Illiteracy. In due course, in cooperation with the National Committee, the work of these various State Committees began with a campaign to reduce illiteracy before the enumeration of the census of April, 1930. The first Bulletin issued by a special Sub-Committee on Techniques served as a guide to officials and teachers in inaugurating and conducting this campaign. The second Bulletin appeared in October, 1930, and describes literacy as the ability of adults to make independent use of reading, writing, and the other language arts to meet successfully the problems that arise in daily life. In referring to this level of ability, Gray used the phrase "functioning literacy", and he makes it clear that this stage has been reached only when students "of their own initiative" engage "in such activities as reading newspapers, magazines, simple books, and bulletins relating to special interests" (56).

11. VARIOUS ASPECTS OF LITERACY

While the various aspects of literacy are almost inextricably interrelated, it is possible to identify some of the main strands found in twenty representative statements that illustrate the "scatter" of opinion as to what is meant by the term literacy at the present time. There are four principal terms currently in vogue: a) Functional Literacy; b) Fundamental Education; c) Adult Basic Education; d) Literacy. Table I identifies the statements which use each of these terms. In discussing any one of these four basic terms a number of divergent ideas are
### TABLE I
PRINCIPAL TERMS CLASSIFIED BY CONSTITUENT IDEAS

<table>
<thead>
<tr>
<th>Principal Term</th>
<th>Name</th>
<th>Idea Category Number</th>
<th>Date</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Functional literacy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gray</td>
<td></td>
<td>1, 3</td>
<td>1956</td>
<td>(55)</td>
</tr>
<tr>
<td>Brice</td>
<td></td>
<td>2, 3, 4, 4a, 4b, 5a</td>
<td>1963</td>
<td>(15)</td>
</tr>
<tr>
<td>Knox</td>
<td></td>
<td>4a, 4b</td>
<td>1967</td>
<td>(74)</td>
</tr>
<tr>
<td>Unesco</td>
<td></td>
<td>4, 5, 5a</td>
<td>1968</td>
<td>(101)</td>
</tr>
<tr>
<td>Kidd</td>
<td></td>
<td>4, 4b</td>
<td>1968</td>
<td>(73)</td>
</tr>
<tr>
<td>Robinson</td>
<td></td>
<td>4a, 4c, 4d</td>
<td>1967</td>
<td>(67:486)</td>
</tr>
<tr>
<td>Fox</td>
<td></td>
<td>1, 4</td>
<td>1964</td>
<td>(47)</td>
</tr>
<tr>
<td>Torrence</td>
<td></td>
<td>3, 5a, 7</td>
<td>1962</td>
<td>(98)</td>
</tr>
<tr>
<td><strong>B. Fundamental education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verner</td>
<td></td>
<td>1, 3</td>
<td>1964</td>
<td>(112:64)</td>
</tr>
<tr>
<td>Unesco</td>
<td></td>
<td>3, 5, 7a</td>
<td>1949</td>
<td>(102)</td>
</tr>
<tr>
<td>Caliver</td>
<td></td>
<td>3, 4, 5, 5a, 7, 7a</td>
<td>1961</td>
<td>(23)</td>
</tr>
<tr>
<td><strong>C. Adult basic education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Florida State Plan</td>
<td></td>
<td>2, 3, 4b, 5, 5a, 6</td>
<td>1965</td>
<td>(46)</td>
</tr>
<tr>
<td>Luke</td>
<td></td>
<td>4, 4b, 4c</td>
<td>1965</td>
<td>(78)</td>
</tr>
<tr>
<td><strong>D. Literacy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arnstein</td>
<td></td>
<td>3, 4, 7, 7a, 7b</td>
<td>1966</td>
<td>(4)</td>
</tr>
<tr>
<td>Wrenn</td>
<td></td>
<td>4, 4a, 4b</td>
<td>1966</td>
<td>(118)</td>
</tr>
<tr>
<td>Haggstrom</td>
<td></td>
<td>4, 7, 7a, 7b, 7c</td>
<td>1965</td>
<td>(58)</td>
</tr>
<tr>
<td>Freeman-Kassebaum</td>
<td></td>
<td>4, 5, 7, 7c</td>
<td>1956</td>
<td>(48)</td>
</tr>
<tr>
<td>Jeffries</td>
<td></td>
<td>3</td>
<td>1968</td>
<td>(66)</td>
</tr>
<tr>
<td>Orata</td>
<td></td>
<td>3, 6</td>
<td>1950</td>
<td>(83)</td>
</tr>
<tr>
<td>Berg</td>
<td></td>
<td>3, 4, 4b, 4c, 5, 5a,</td>
<td>1950</td>
<td>(10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6, 7, 7a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


expressed in the statements analyzed. These ideas have been classified into seven main categories which in some instances have subcategories which identify specific items. The seven categories are listed in Table II in terms of the number of times a given idea is used, and the various ideas are defined as follows:

The Seven Idea Categories

1) **Reading and writing**  
Any reference to these abilities without further reference to grade level. The only authors chosen who happened to use the phrase "reading and writing" were Gray, Verner, and Fox. It should be noted that Gray and Fox were speaking of functional illiteracy, Verner of fundamental education. In all three cases the authors were indicating that a certain minimum education is essential if an individual is to function adequately in his particular culture (Gray and Verner, idea category 3) or in order to hold a job (Fox, category 4).

2) **The 3 R's**  
Specific use of this phrase, or any reference to reading, writing and arithmetical ability.

3) **Fit into culture**  
Ideas that referred to the basic practical uses of literacy in dealing with the daily problems of life as, for example, matters pertaining to health or family relationships. In some cases these ideas were expressed in terms of an individual's need to fit into the culture pattern of his group (Gray, Unesco 1949), or of his need to function adequately in his society (Verner). In other cases the need for literacy was expressed in terms of the needs of the home-maker, the buyer and consumer of goods, the head of the family (Brice, Caliver). While the need to work is clearly implied, the statements assigned to this particular category were those that did not specifically mention either work or a grade level of schooling.

4) **Work; profession; unemployment**  
All references to work, occupation, specialization or employment are included in this category. Such
**TABLE II**  
**IDEAS ABOUT LITERACY CLASSIFIED BY PRINCIPAL TERMS**

<table>
<thead>
<tr>
<th>Category No.</th>
<th>Ideas Expressed</th>
<th>Functional Literacy</th>
<th>Fundamental Education</th>
<th>Adult Basic Education</th>
<th>Literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Reading and writing</td>
<td>II</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>The 3 R's</td>
<td>I</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Fit into culture; use in daily life; adequacy</td>
<td>III</td>
<td>IIII</td>
<td>1</td>
<td>IIIII</td>
</tr>
<tr>
<td>4.</td>
<td>Work; profession; unemployment</td>
<td>IIIII</td>
<td>1</td>
<td>1</td>
<td>IIIII</td>
</tr>
<tr>
<td></td>
<td>a) 5 years of schooling</td>
<td>IIII</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) 8 years of schooling</td>
<td>IIII</td>
<td>II</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) 12 years of schooling</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d) 14 years of schooling</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Community development; participation</td>
<td>1</td>
<td>II</td>
<td>1</td>
<td>II</td>
</tr>
<tr>
<td></td>
<td>a) Citizenship, politics</td>
<td>IIII</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>Communication: speaking and listening</td>
<td>1</td>
<td></td>
<td>1</td>
<td>II</td>
</tr>
<tr>
<td>7.</td>
<td>Socialization</td>
<td>1</td>
<td>1</td>
<td></td>
<td>IIII</td>
</tr>
<tr>
<td></td>
<td>a) Personal, individual</td>
<td>II</td>
<td></td>
<td></td>
<td>III</td>
</tr>
<tr>
<td></td>
<td>b) Lower-class/middle-class problems</td>
<td></td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Exploitation</td>
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references usually specified minimal education requirements. These are indicated by the following sub-categories:

a) The official census definition of literacy which classes as functionally literate only those individuals with five years of school completed.

b) A minimum of 8 years of school completed.

c) A minimum of 12 years of school completed.

d) A minimum of 14 years of school completed.

5) **Community development; participation** Included here are specific remarks that acknowledge the importance of the community. In some cases the references were to community on a relatively small, local scale, such as the individual's need for literacy if he is to participate effectively in the affairs of his community (Caliver, Florida). In other cases, the importance of literacy for community development on a national or even international level was the target of the author's discussion (Unesco 1968, Berg). Where an author referred to a person's ability to function in civic and political affairs, or to his role as a citizen (apart from specific reference to "community") the designation 5a has been given (Brice, Unesco 1968, Caliver, Torrence).

6) **Communication** In only three of the twenty statements was there reference to the need for literacy in connection with communication. The Florida Plan made specific reference to communication and to the need for speaking and listening skills. In a somewhat different context Orata, referring to the uses to which literacy can be put, also points out the significance of speech:

> Nothing is a more effective instrument of demagoguery than the ability to speak and write convincingly. The more literate a person is, if he is without character and moral principles, the more dangerous he is to society.

7) **Socialization** Opinions having to do with an individual's role and relationship in his social group have been included in this category. The required sub-categories are as follows:
a) References to personal literacy, to "the need for a minimum program of education ... that will enable people to lead healthy, active lives ..." (Unesco, 1949) or to the individual's need for self-realization, self-confidence, or feelings of competence (Arnstein).

b) Opinions regarding the basic sociological problems that exist between the (often) ill-educated lower-class worker and his (usually) better-educated middle-class employer.

c) References to the exploitation of the ill-educated. Freeman and Kassebaum, for example, refer to the fact that:

The existence of persons who do not comply with the higher values of the society is accommodated by a particularistic orientation toward these persons, motivated at least in part by the material advantages accruing from their possibilities as an exploitable market.

Haggstrom too is talking of exploitation when he states that:

...There is little concern to educate the poor, but the emphasis is rather to enable persons to acquire skills enough to secure jobs on the underside of the economy.

Haggstrom also stresses the point that ours is a work-oriented society—that:

...The courses of action which define the lives of people now come about through their relations to a work economy.

He further states that as the "normal economy" of modern society, seen "as a system of jobs", declines, the need is to create social structures that make possible "activity which can result in a higher level of self-realization." Haggstrom's overall point is that the present anti-poverty educational programs ... "the products of good intentions, political needs, and a great distance from the lives of the poor" ... are hopelessly inadequate.
An idea of category 3 or category 4 is to be found in all of the statements selected for analysis. In five instances (15, 23, 46, 4, 10) both categories occur. It is also of interest to note that of the eight statements about functional literacy only three acknowledge the official five years of schooling as spelled out by the national Census agencies of the United States and Canada. Several authors make it clear that in their view even eight years of schooling is inadequate for life in a modern highly-developed society. Brice refers to those with less than eight years of schooling as "badly handicapped as workers, as heads of families, and as citizens." Kidd warns that "even those with seven or eight years of schooling will (soon) be cut off from employment." Robinson suggests that a high school or junior college level of education is needed "if all are to participate and partake of the fruits of society."

By way of further amplification, ideas that referred in any way to the uses of literacy were classed as belonging to category 3. In a statement similar to the one by Orata, Jeffries makes it clear that:

Universal literacy in itself cannot make the world better, richer or more peaceful: that depends upon people. Literacy is a tool.

Enlistment in the armed services was considered as work, an occupation, a way of earning a living, idea category 4. Berg has stated that it is no longer possible for a person to "...enter the armed services without the equivalent of an eighth-grade education." (Idea category 4b) Berg also states that non-commissioned personnel with eight but not twelve years of formal education are strongly urged to attend classes. "Pressure to do so is applied by freezing all noncommissioned ranks for personnel without a high school diploma or equivalent." (Idea category 4c)

Another quotation from Berg merits attention because of its breadth of coverage. The various categories of ideas that are encompassed in this statement are indicated by the numbers in parentheses:
We are realizing more and more that illiteracy reduces national wealth (5), results in social (7) and cultural (3) lag, weakens national security, and slows technological progress (5). It breeds suspicions and tensions (7), endangers democracy (5a), and retards world understanding and cooperation (6). Illiteracy is closely associated with the major human ills, such as poverty, disease, infant mortality (3 and/or 7), and superstition (7a).

In surveying the North American literature concerning literacy and educational levels, at least three main points emerge. First, there is considerable lack of agreement as to the meaning of certain commonly-used terms, particularly when it comes to associating those terms with a specified grade level of schooling. Second, where there is an attempt to define the concept of literacy by grade levels, the more recent the pronouncement the higher the recommended grade level. The third point is that the dominant feature of the prevailing concept of literacy is its usefulness to adults in a work-oriented society: the idea of work appears in 14 of the 20 selected statements.

That there is a growing trend to conceive of higher and higher levels of literacy, and indeed of a plurality of literacies, has already been indicated. This point was specifically mentioned by Torrence, who noted:

... a plurality of literacies, i.e. literacies with respect to things about which certain persons are functionally illiterate, such as health, food, family privileges, obligations, etc. ...

In addition to these basic kinds of illiteracy it is not uncommon to note such expressions as "scientific illiteracy", or "musical illiteracy". A CBC news broadcast, in November, 1968, quoted an item from Russia that referred to the sexual illiteracy of the youth of Russia; the Chemical & Engineering Journal of February, 1968, implied that soon engineers would be considered professionally illiterate if they lacked a Master's degree. The connotation of the word "illiteracy" in instances such as these is that the person or group referred to falls below a certain level of knowledgeability with respect to science or sex or whatever the topic is— at least in the eyes of the person who uses the phrase.
III. CENSUS DEFINITIONS OF LITERACY

No discussion of literacy would be complete without reference to the official definition used by the United States Bureau of the Census or the Canadian Dominion Bureau of Statistics. The United States Census of 1930 (109) classed as illiterate anyone 10 years of age or over who was not able to read and write in English or some other language. This was based on a negative answer to the question on the interview schedule as to whether the respondent was able to read and write. While no specific test of ability was prescribed, the enumerators were instructed not to return the answer "Yes" (which would classify the person as literate) simply because the person was able to write his or her name. The Census advisers in 1930 said that "a person may know the alphabet and a small number of printed words, and yet not be able to read in a true sense; or he may be able to write his name and a few words and yet be wholly unable to express his thoughts in writing in any satisfactory fashion."

Expressions of this kind show a growing awareness of the need to define literacy in more precise terms.

In the 1940 U.S. Census (108) there appeared a question which recorded the last full grade of school completed. Night schools, extension schools, and vocational schools were not included unless they were part of the regular school system, and the word regular was not defined. Although the word functional does not appear, a table in the published census provides information as to the per cent distribution, by years of school completed for persons 25 years old and over. The last column of this table reports the per cent with less than 5 years of school completed, a fact that is important because it is the first official indication by the Census of a new definition and a new concept of literacy.

The word regular as used in the 1940 Census was defined for the 1950 Census (107) as any school which leads to elementary or high school diploma or any college or university degree. The questions differ from one census to another, and it may be of value to record some of the details of the 1960 Census here (106).
With respect to school enrolment the question is: "Has he attended regular school or college at any time since Feb. 1, 1960? If he has attended only nursery school, business or trade school, or adult education classes, check no." It should be noted that kindergarten is included in this Census. There is also a question as to whether the school is public or private, parochial schools being included along with private schools. In 1960 this information was obtained for persons 5 - 34 years of age, whereas the 1950 Census considered the 5 - 29 age group, and the censuses of 1910 - 1940 recorded all ages at school.

The definition of the word regular for the 1960 Census included day or night or professional schools leading to elementary certificate or high school diploma or college or university degree, including any professional degree. Schooling from a tutor, or correspondence courses, were "regular" only if credits so gained were transferable. Classed as not regular are nursery schools; specialized vocational, trade or business schools; and on-the-job training and correspondence courses. Both 1950 and 1960 censuses used February 1 for the question on school attendance, instead of March 1 as on most earlier censuses: the reason for the change being that the later date may find some of the schools closed for a variety of reasons such as time out required for crop sowing, or for contending with floods (107).

For the 1940 Census, there was just one question on years of school completed, and this led to some error because some people reported the year of school they were in rather than the year completed. Therefore, for both 1950 and 1960, there were two questions: "What is highest grade or year of regular school ever attended?" and "Did he finish the highest grade or year?"

The word functional does appear in the 1960 Census: there is a table with the heading: Functional Illiterates: the per cent of the population 25 years and over with less than 5 years elementary school completed. It also reports what is called retardation—e.g., age 12 pupils should be in grade 6—they are called retarded if they are in only grade 5. For 1960 the retardation figure for 12-year-olds was 11 per cent, a considerable decrease from the 22 per cent reported in 1950.
Since 1940, then, the basis of functional literacy insofar as the U.S. Bureau of the Census is concerned, has been set as five years of school completed. As is evident, the Census data have become increasingly detailed, reflecting the increasing importance of literacy to society. The questions have become more precise, and the term "functional illiterates" now appears in table headings, whereas in 1940 the concept was merely implied by having a column for those with less than five years of schooling completed. The new term "retardation" also reflects the increasing importance of literacy in the minds of those who make the decisions as to what information shall be included in the Census. The whole trend in data-gathering parallels the increasing complexity of the socio-economic structure of society. Both social and economic reasons have operated to widen the scope of Census documents. On the one hand, the economy requires an ever increasing proportion of well-educated people, and people with too little education are finding it increasingly difficult to find jobs. On the other hand, people who are unable to find and hold employment constitute a serious social burden on the resources of a nation.

The 1941 Census of Canada (26) made similar changes: whereas literacy had previously been determined by a question as to the ability of those 10 years of age and over to read and write, it was now based on a question as to number of years attendance at any school, primary, secondary, technical or university. In discussing the matter, the statistician stated that the change was made partly because the extent of illiteracy in Canada was small, but mainly because "number of years in school" yields more valuable information.

For the Census of 1951 (25) the question was expressed in terms of number of years of attendance at any kind of educational institution such as elementary school, secondary school, college or university. Kindergarten and nursery school were not included. Private study and part-time attendance counted as the number of years of formal study to which they were equivalent. Again, the "Number of years at school" was considered "more meaningful" than "grade reached". While it was admitted that this does not give the grade achieved, still it was considered a good approximate measure of educational attainment.
In 1961 (24) the same questions were used. A note as to what constitutes attendance was added: a person was considered "attending" if his main daytime activity between September 1960 to June 1961 was elementary or high school or university or an institution providing an equivalent type of education. The wording of the question on educational attainment was "What was the highest grade or year of schooling you ever attended?" It is on this point that the Canadian and U.S. Censuses differ, inasmuch as the highest grade attended may not necessarily be the highest grade completed.

The Canada Year Book, 1968, issued by the Dominion Bureau of Statistics, indicates the attitude toward education as expressed by the official statistician (28:354-5):

The Canadian education scene in the mid-1960s continues to be dominated by the need for the development of ever greater knowledge, skills, understanding and appreciation among the nation's youth in order to prepare them, individually and as a community, for the challenges they are expected to face in the future. It is widely recognized that this need should be met not only by developing still further the élite at the top of the academic pyramid but also by extending the base to include all young persons, whatever their abilities and aptitudes and whatever their social circumstances and financial resources.

The findings of systematic research as well as the sometimes bitter experiences of schoolmen have brought about an increased realization of the great diversity in aptitude patterns among young people. If all are to be educated so that individual potential may be fully realized, it follows that there must be an equal diversity in the programs of study or training. Facilities for those of academic and scholarly inclination have existed for many years so that recent emphasis has been placed upon the provision of programs suited to those of more practical bent and to the introduction of other measures designed to hold students within the formal education systems to ever-increasing levels of age and attainment. The modern-day labour force has little use for the untrained and poorly educated young person but is greatly in need of qualified tradesmen, technicians and professionals. For this reason
there has been an upsurge in the building of vocational and composite schools, the establishment of community colleges and the introduction of policies and practices to cope more adequately with individual differences, such as non-graded systems, subject-promotion schemes and the extension of guidance facilities.

Efforts are also being made to overcome the financial barriers to continuing education. The investigations of demographers and sociologists are confirming and quantifying the long-held suspicions that financial constraints are operating to deny education to many Canadians who could profit from it. Various methods are therefore being sought to lighten the financial burden upon the individual and to equalize the rapidly increasing load being carried by the taxpayer. It is now evident that the Federal Government has a key role to play in this matter, particularly in adult technical and vocational training and in university education—both matters of prime concern to the nation as a whole. Acknowledgment of this fact is to be seen in the increasing activities of the federal Department of Manpower and Immigration, the formation of a federal office to deal with higher education, the founding of a nation-wide Service for Admission to Colleges and Universities, the holding of an interprovincial Ministers' conference on education and manpower, and renewed attempts to introduce uniform methods of statistical reporting.

Thus it appears that ethical considerations concerning the duties of society in the satisfaction of the personal needs of the individual and economic considerations concerning the kinds of individuals required to satisfy the manpower needs of society are combining to encourage the extension and equalization of educational opportunity.

Contemporary views about literacy clearly show that the current complex, multi-faceted concept of literacy can be related to the complex, multi-faceted social, cultural and economic environment in which the people of highly industrialized nations live. Has there always been a relationship between the prevailing concept and uses of literacy and the social, cultural and economic state of affairs of any given period of history? Or is today's situation unique in being the direct result of the overwhelming scientific and technological changes of the twentieth century? These are the big questions that lie behind the historical analysis of this study.
CHAPTER III

THE ORIGINS AND EARLY USES OF LITERACY

Certain kinds of written symbolism, such as the markings on objects that indicate ownership, or designs denoting sacred significance, have long been used to convey information. Nor is such use of symbols characteristic solely of primitive societies, for symbols are an integral part of modern culture too. Symbols appear on highways, in airports, and everywhere that people congregate because they bypass language barriers. Such symbols which, by custom and familiarity, signify facts or concepts, do not, however, constitute true writing, for true writing involves the use of a set of systematized symbols which are related to the linguistic elements of language.

Writing, an obvious criterion of civilization, seems to have arisen naturally and inevitably with the growth of the first cities. By its very derivation the word civilization is associated with the condition of urbanization, and it is said that writing has never been introduced in any other than an urban society (117:631). According to most authorities, the archaeological evidence seems to prove that true writing was first developed during the Bronze Age by the Sumerians, in Lower Mesopotamia, around 3500 B.C. To understand how writing arose it is necessary to consider the factors that led to the origin and growth of cities, and to analyze the distinguishing characteristics of a city as compared to earlier or other forms of social organization.
I. PRE-LITERATE HUNTING SOCIETY

In early pre-literate paleolithic times man was a hunting and food-fathering animal: he relied on catching game, and on finding edible roots, nuts, and fruits. There were no techniques for preserving food, and this put a limitation of time and distance on the operations of any hunting party. In such a culture, where, according to one estimate (18:14), it takes about two square miles of good fertile land in its natural state to feed a single individual, the size of the social unit was never very large. The character of any given group was essentially communal: all persons shared the work, and all shared the food after it was collected. While some of the work included such activities as making primitive tools and weapons, preparing skins and clothing or fashioning ropes and baskets out of plant fibres, most of man's energy was spent on procuring food.

Inasmuch as obtaining food was the main concern of the group, there was little need or opportunity for any division of labour, and consequently there was no marked class structure based on economic status. There were of course tribal chiefs and elders under whose direction the stability and cohesiveness of the group was maintained. There were also medicine men who led rituals and performed certain cabalistic ceremonies, and there were artists who created petroglyphs of animals, but this would not exclude them from participation in the other necessary activities of the group.

In such a hunting economy man was parasitic on his environment, and had little control over it. Periods of abundance alternated with periods of scarcity, and at no time was there a sure and regular supply of food. From time to time, under the combined pressures of population increase and food shortage, fragments would break off from the original group and move to more distant lands in search of a more adequate food supply. Life was simple, meagre and uncertain.

Gradually, as man devised more cunning tools and weapons, he became increasingly efficient in hunting. But even this improvement did not solve the food problem for very long as it led to the disappearance, or at least the scarcity, of
various kinds of game. Thus it was that, somewhat ironically, man's very skill in hunting was one of the factors that forced him into the practice of an incipient agriculture.

II. THE NEOLITHIC REVOLUTION

At one time it was thought that a small group of people settled and developed an agricultural way of life all on their own, as it were (39, 93). However, it is now believed that farming originated not at some single location but over whole regions and that many small groups had begun to harvest the wild forerunners of wheat and barley, and to realize the value of sowing seeds by about 9,000 B.C. According to the archaeological evidence, the earliest of the prehistoric farming villages appeared soon after 8,000 B.C. (39). These farming villages were widely scattered around the Mediterranean and south-west Asia; the most favourable locations being in the river valleys of the Tigris, the Euphrates, and the Nile. During the millennia that followed a change of great importance known as the agricultural or neolithic revolution occurred. Man's essentially nomadic hunting economy was replaced by a full-scale agricultural economy. Many new techniques evolved from the new agricultural way of life. In due course the hoe replaced the old stone age digging stick, the domestication of animals was aided by the fact that grain could be stored and used as fodder over the winter, the ox was harnessed to the plough. Man learned how to sow and harvest his crops, how to grind the grain and prepare food, how to weave the wool obtained from his sheep, and how to build the huts that were necessary and desirable in his more settled way of life.

Throughout the neolithic period the social unit remained rather small for, in an age when walking was still the primary means of transport, the distance a worker could travel from his home to his fields was limited. There is now definite evidence, largely based on the study of obsidian artifacts, that although many of these villages were separated by hundreds of miles, and often by mountains and seas as well, there were quite considerable lines of
communication between the peoples of various settlements. (Appendix I). In addition to trade in obsidian and other even more important goods it is believed that there was a tremendous flow of ideas as well (39, 117:614). This opportunity to share their discoveries of agricultural techniques and skills is thought to have been a major factor in the development of the agricultural revolution. By the end of the neolithic age agricultural workers could produce more food than they alone required, and with a surplus of food the building of cities and civilizations became possible (93).

III. NON-ORAL COMMUNICATION IN PRE-LITERATE TIMES

Trade routes were in existence well over 3,000 years before the invention of writing, but it is known that primitive peoples used signs, symbols, and pictures, the materials out of which writing evolved (117:631), in order to communicate certain kinds of information. For example, a man might inscribe on some rock-face the emblem of his clan, to let future passers-by know that a man of that clan had been there; or he might draw a circle with a vertical stroke above it, representing a leather bucket hanging from its rope, to show that he had dug there and found water, and that others might do the same (117:631). A pictogram such as a hanging bucket becomes an ideogram when, by some general convention, it no longer represents the concrete object depicted, but, as in this case, an idea associated with that object. As another example, a circle surrounded by rays can imply not just the sun itself but the idea of heat or warmth as well (40:22).

Other methods of non-verbal communication are known to have included the use of notched sticks as tallies of numerically important matters such as numbers of days or weeks, or as records of debts. There were also the sticks engraved with groups of signs, and often with notches as well, that were carried in Europe, Australia, and ancient China by messengers, known as "messenger's baton's"(40:17). Another memory-aiding device for communicating messages was
the knotted cord such as the quipu of the Incas. Devices of this sort are in fact still used in several places in the world, the Solomon Islands for example (40:16).

A quipu consists of a thick main cord to which are attached a number of finer cords or threads. The message is determined by the colour of the threads, by the form and number of the knots, and by their distance from the main cord. Such mnemotechnic writing has been described as "the first step towards actual writing" (40:16). Using the many possible combinations of knots, colours, and positions, it is believed that in addition to numerical indications it was possible to communicate messages, royal decrees, and magic formulae. Modern authorities doubt very much the claims of an earlier Swiss traveller and investigator who maintained that the quipus of the Incas contained not only laws and chronicles but also poems (40:18). Such writing is clearly of limited scope, and is not considered to be true writing. Thus the Incas cannot be considered to have been a literate people.

The essential limitation of mnemotechnic writing, whether pictographic or ideographic, is that it cannot be used to make statements or to convey thought beyond any but the most elementary level. Pictorial representation ends and true writing begins at the moment when the written sign loses its representational character and comes to have a phonetic value, signifying a particular sound. Many authorities contend that the Sumerians were the first to evolve such a system of writing. They also contend that the idea was not invented independently by various other peoples, such as the Egyptians or the Chinese, but was rather taken over from the Sumerians by these peoples and adapted or moulded to suit their own languages (117:643). In any case, the earliest examples of writing are to be found in the literary materials such as business documents, royal inscriptions, and religious texts taken from the ruins of the first Sumerian cities.
IV. THE RISE OF LITERATE URBAN CULTURES

A city has at least three outstanding characteristics: 1) a majority of its inhabitants do not gather or grow their own food; 2) there is a high degree of specialization in a variety of occupations, and this division of labour, because it makes the members of the city interdependent, gives rise to the need for cooperation and organization; and 3) the continued functioning, organization and direction of the complex socio-economic mechanism of a city requires at least a certain proportion of literate citizens. It may be noted here that a predominantly agricultural, rural, non-industrialized society needs only a small proportion of literate persons, and the kind of literacy (knowledge and skills) required of them is relatively minimal, consisting of little more than ability to read, write and do simple arithmetic.

The rise of cities in the Bronze Age was made possible by the agricultural revolution of the neolithic age. Now, for the first time, nine men working in the fields could produce enough to feed themselves plus one other—the city dweller (18:19). With the rise of this new large social unit a whole new socio-economic structure developed.

In a small social unit, where a clan or tribe was more or less self-sufficient and socially independent, a member could well be a jack-of-all-trades. In an urban society, however, it is more efficient to have workers who can be counted on to do certain kinds of work reliably well. For this reason a high degree of specialization developed in cities. This division of labour into various categories, ranging from servants, common labourers, and many kinds of artisan (potters, glassblowers, bakers, etc.) to merchants, government officials and priests, caused a big change in the manner of men's lives. A means of exchange of goods and services had to be worked out; importation of raw materials had to be arranged; city walls had to be maintained; irrigation systems had to be planned and built; ownership of property became important, bringing with it problems of legality, and hence the need for a comprehensive legal system, and so on.
The management of such practical economic matters as those described above required leadership. It is therefore not surprising to find that the socio-economic structure was dominated by a controlling elite with political power—power that was usually reinforced with a religious ideology. In the oldest cities, which are believed to have evolved out of the village settlements of Sumer around 3,500 B.C., the dominant pattern of government was theocracy, where King and high priest were one (93). Food and other materials that were needed to maintain the city were obtained in the form of taxes. These taxes were imposed in the name of the city's god, and a complex administrative machinery was required to handle the various goods that were brought to the god's temple as tax payments. It was primarily the need to record, count and distribute this wealth that led to the invention of writing: the priests who were in charge had to keep accounts, and on the earliest clay tablets found in Mesopotamia at Erech and Jamdat Nasr can be read the economic records of the business affairs of the temples (117:633).

The early temple accounts are, strictly speaking, records, not writing: they are tallies of various articles such as sheep, cattle and measures of grain, accompanied by pictorial representation. One cannot define the stage at which the written sign ceased to be pictorial and came to be recognized as phonetic and syllabic—this must have been a very gradual process. It might be of interest here to give one example of the process of simplification that occurs as a writing system evolves. In the oldest tablets from Erech which are primarily lists of temple-offerings, the word for "sheep" occurs frequently, and there are no fewer than thirty-one variations of the sign for that word. In a later archaeological level there are only three different signs for the word "sheep"; and in the top stratum, only two. The number of variants in the older tablets was probably due to the efforts of different scribes to represent a sheep, not to the actual variety of such animals (117:636-7). Eventually the pictorial origin was completely lost, as the ordinary scribe, overburdened with accounts, adopted or arrived at a cursive script, something in the nature of a shorthand.

Thus it was that writing began in the temples and in the service of the gods. It evolved in response to the complex economic and material developments
of city life, and was indeed essential not only for the maintenance and adequate functioning of the city mechanism but also for the continuing power and control of the ruling king or high-priest. In the words of Professor Gordon Childe (117:359), writing "not only represents a new instrument for the transmission of human experience and the accumulation of knowledge, but is also symptomatic of a quite novel socio-economic structure—the city."

Indeed, most authorities agree that no society has ever achieved much stature or permanence without the use of writing, and writing has never been developed in any other than an urban setting (117, 32). Of relevance here is a recent remark made by Willard F. Libby (77), an expert on the uses of carbon-14 for dating archaeological specimens. Referring to prehistoric man he says: "Why these men, of such ability, did not write is an amazing enigma. It is hard to imagine that they were not intelligent enough...perhaps they did write, and we cannot find the evidence." This is certainly a possibility, but surely the explanation lies in the fact that, given his socio-economic conditions, prehistoric man had no need of writing and therefore no incentive for developing it. The number of individuals in the group was usually small, and there was no marked specialization with respect to obtaining the material necessities of life. The types of interaction between members of the group, though often very complicated where blood and marriage relationships were concerned, could be handled by rules that were orally taught, and the group could be controlled by oral communication, with the assistance of drum signals, smoke signals, "signs", and a suitable mixture of awe and fear of the various gods and devils. The body of tribal lore, though impressive, could be memorized. There is a limit, however, to the amount of material that can be conveniently memorized. In the complex socio-economic conditions of city living writing is an urgent necessity, and, by and large, it is the spur of necessity that leads to action and invention.
V. THE SCRIBAL SCHOOL OR TABLET-HOUSE

It would appear that the literate élite came to number many thousands in the days when Sumerian civilization was flourishing (117:659). People who could write were needed in many different spheres of activity. Of prime importance was the use of writing for the organization and command of the affairs of state. Professor J. Leclant (117:664) for example, states that the use of writing in Egypt was contemporaneous with the creation of the single state, and with the need for a systematic organization of the problems of irrigation. Reference has already been made to the records of material wealth that were kept by the temple priests. Lists were also kept of persons and their possessions for tax purposes, the name of the person being followed by such phrases as "having no ox or cattle" or "possesses no chariot" (117:479-80). On military operations the king was accompanied by scribes whose job it was to record the details of battle: the number of captives taken, the booty, the soldiers killed, and so on (87:B). In addition to the literate officials and administrators needed for such government affairs the extensive business of foreign and domestic trade required the services of people who could write. The legal system required documentary evidence for any civil court case; from time to time illiterate citizens required assistance from notaries public; and even for ordinary personal letters the illiterate public had to rely on those who had had the opportunity to acquire the magic art of writing. And so it was that in addition to the literate temple priests a class of secular scribes came into existence.

The scribal school or tablet-house was usually attached to a temple, an arrangement of convenience and utility because it was there that the material wealth was stored, counted, and recorded. One of the most interesting and detailed records is that of a school in a private house at No. 1 Broad Street, Ur, of about 1,780 B.C. (117:659). About two thousand tablets were found at this site, many of them of the "school exercise" sort, with the teacher's copy on one side and the student's attempts at reproduction on the other. Some were mathematical tablets having to do with multiplication tables and problems in practical land-surveying geometry; some contained descriptions of school life.
The Sumerian syllabic script of an early date, about 3,500 B.C., contained about two thousand different signs; about four hundred years later this number was down to about eight hundred, and by about 2,900 B.C. the number of signs seems to have been about six hundred or so (117:637-9). Even although the number of signs probably continued to decrease it was an infinitely more difficult thing to learn than a system of writing based on an alphabet. Schooling lasted from early childhood well on into maturity. Only boys attended the schools. There were women scribes, but girls must have acquired their education within the home.

That the country's future scribes were recruited from the upper classes is evident from such things as records of the names and professions of their fathers (117:662). There were occasions when a poor child might be taken into a scribal school, but these were rare. In general the poor could not afford the long period of schooling, and as most of the schools seem to have been boarding schools, the cost of this added to the schoolmaster's tuition fees would have been prohibitive for any but the wealthiest citizens (117:659).

It soon became obvious that the ability to write carried with it many advantages (11:88-90, 117:467). This awareness intensified the class differences between the literate elite and the illiterate, dependent, "common herd" by adding to the contempt for the manual labourer that was general among the better-educated. An early Egyptian work of perhaps the Eleventh Dynasty in which a father admonishes his son to study hard and become a scribe is an interesting example of how quickly the ability to write was seen as a means to personal advancement and a pleasant life (Appendix II).

VI. THE URBAN REVOLUTION EFFECT: ACCELERATION OF CHANGE

In Sumerian society, which was essentially industrial and commercial, and in other early societies too, writing arose out of the need to record the wealth that was stored in the temples, and its main function continued to be the
furtherance of business. But there is another important consequence that follows from the development of writing and the growth of cities: the very emergence of urban culture brings about an acceleration in social and cultural change. So significant is this acceleration that it has been described by one archaeologist as amounting to "urban revolution" (117:360). This is so because writing soon comes to be more than just an economic and administrative convenience: it gradually becomes a tool of learning and a medium for the dissemination of ideas. Even the old Sumerian school, originally attached to a temple, and giving no more really than what might be called a professional or vocational course in writing, became secularized and its curriculum branched out to answer the needs of a more complex society. "Within its walls flourished the scholar-scientist, the man who studied whatever theological, botanical, zoological, mineralogical, geographical, mathematical, grammatical and linguistic knowledge was current in his day, and who in some cases added to this knowledge." (75:4).

Now, with the slight margin of leisure which a food surplus had made possible, a few men, free of the labour of farm work, had time for thought and reflection. In a relatively crowded city there was plenty of chance for the cross-fertilization of ideas; legal systems were developed; histories and records of tradition were written; religious beliefs were elaborated; and more rigorous systems of thought became possible. Of the various intellectual activities perhaps the one of greatest importance was the beginning of the development of science. The techniques which man had acquired over the past centuries, which had, in an empirical way, led to the establishment of cities and the invention of writing, were now exposed to man's curiosity and investigation. Thus, although there were disadvantages and restrictions in city life, it now became possible for society to profit by the opportunities that a city could offer.
CHAPTER IV

THE SPREAD OF LITERACY

The invention of writing and the primary uses of literacy were intimately related to the social and economic complexities of city life. Once established, urban organization demands a degree of literacy, and literacy in turn plays a key role in the process of further urban evolution. This process, which forms a major part of the story of the development of civilization, cannot be comprehensively studied without taking into account two other related factors. One of these is the parallel evolution of technology and science. The other is the expansion of certain urban social units into larger and larger social organizations. Beginning with city-states and principalities, these expanded at various epochs into nations or empires. Changes in the distribution and content of literacy, changes in urbanization, developments in science and technology, and the growth of large national social units are thus four of the major themes in the story of man's development in the centuries following the appearance of the first cities.

The purpose of this chapter is not to present a chronological sequence of these epochs:—the development and sway of the Egyptian and Sumerian civilizations, the rise and fall of the Greek and Roman slave-based empires, the struggles between religious ideologies, the rise of Christianity, the so-called
Dark Ages, the emergence and decline of feudalism, and so on. Rather the purpose here is to focus on some examples and historical situations that are relevant to some of the various aspects of literacy.

A point of over-riding importance that becomes very apparent from the long view in history is that, from a very practical working point of view, the abilities that constituted literacy remained much the same throughout the Bronze Age, the age that saw the rise of cities and the expansion and development of such civilizations as the Sumerian and Egyptian, and for centuries thereafter. For the majority of those who were literate, it was enough to be able to read, write, and count with sufficient skill to handle the business and administrative affairs of state. For the most part, changes in the quality or content of what was considered to constitute literacy evolved only as technology evolved.

In the present chapter attention is directed to a period of time that ranges from the centuries following the Bronze Age to those just preceding the scientific revolution of the seventeenth century. A few examples that illustrate the role of literacy during this period, its distribution geographically, its value and uses to different groups in society, and some of the conflicts in which it figured, are given.

I. SOME CONSEQUENCES OF THE DISCOVERY AND USE OF IRON

Although many inventions and accomplishments marked the centuries of the Bronze Age (from about 3,500 to 1,500 B.C.)—the development of glass, pottery and ceramics industries, the building of the pyramids, the organization of irrigation systems, the study of astronomy and of medicine, and the general accumulation of knowledge—nevertheless the river-valley way of life continued on essentially unchanged. Such changes in techniques and knowledge as occurred were not of the sort to bring about radical changes in either the social or the economic pattern of life; none of them could compared with the dramatic
35

impact of the agricultural revolution that had made cities possible in the first place.

The next major change came with the widespread use of iron. Iron from meteorites had long been known in many parts of the world, but meteorites were too rare a source for it to be anything other than a precious metal. Iron beads and necklaces dating back before 3400 B.C. have been found in Egypt, and iron tools were found in the great pyramid of Cheops, 2900 B.C. (85:7). Where and how iron was first made in quantity is still a mystery but there are indications that it was first obtained on a large scale, by smelting it from its ores, in a region south of the Caucasus in the fifteenth century B.C. (11:100-106). However, by about the twelfth century B.C. iron was in use on a significant scale in the eastern Mediterranean regions. Being widely distributed, easy to work, and relatively cheap, iron had a tremendous impact on the further development of civilization (11:100-106).

The use of iron affected the spread and distribution of literacy in a variety of ways. For one thing, as the secret of iron-smelting spread, the monopoly of civilization that had been held for so long by the river-valley empires of Egypt and Sumeria came to an end. Now any village could equip itself with a number of items made in part or in whole of iron: more efficient agricultural implements, better weapons, and larger and sturdier ships. One result was that land that had been hitherto unusable for agriculture, such as forests and swamplands, could now be cultivated with the use of iron tools. It was this in fact, more than anything else, that opened Europe to the migrations of new peoples, and these migrations carried with them a certain degree of literacy.

Another factor that greatly increased the geographic spread of literacy was the connected interactions of urbanization and trading activity that the use of iron made possible. According to various authorities, urbanization developed more rapidly during the first five centuries of the Iron Age than it had in all the centuries of the Bronze Age that preceded it (93, 31). Hundreds of new towns sprang up, particularly around the coasts of the Black Sea and the Mediterranean where sea-going trading activities were an increasingly important part of the
socio-economic side of life. While some of the towns of the Phoenician coast such as Sidon, Tyre, Byblos and Beirut had long been centres of shipping and commerce, their trade had in the past been mainly with Egypt. By the end of the second millennium, however, aided not only by the stronger and more reliable ships but also by the very fact of the ease and relative cheapness of transporting goods by sea, trade connections had been established as far afield as the north coast of Africa, Spain, and the British Isles (93).

In the wake of all this trading activity came commercial outposts, military garrisons, exploitation of the resources of new regions, and slave-based empires. An administrative apparatus and a means of communication between the home base and the new outposts was required in order to defend, develop and extend further the new commercial enterprises. The new economic pattern of life could not have been maintained without a number of literate persons. Frequently, as empires expanded, and as outposts or garrisons grew into towns, those in control were not able to staff all their bureaucratic posts with their own citizens, and education had to be provided for some of the pre-literate subject peoples, the "barbarians" as they were called. In any case the diffusion of knowledge and the extension of literacy was an important accompaniment to the trading developments and growth of towns that the use of iron had made possible.

As far as literacy is concerned, a particularly important outcome of this period of iron age trade expansion was the Phoenician invention of an alphabetic script (117:653-8). Even before this time different peoples had been trying to work out new forms of writing; various documents of about 1500 B.C. show that the idea and utility of writing was already evident to most peoples. The Phoenician alphabet, which was beginning to come into use around 1200 B.C., was a marked improvement over the cuneiform script of former times. With its easy-to-learn and unambiguous signs, it was the ideal thing for the many different peoples who were actively engaged in trade, dealing for the most part with the same commodities, but having different languages. The new writing system could be applied to all tongues, and this opened the means of
communication to a far wider circle than had ever been possible before. In addition, because of the relative ease with which it could be learned, a man could now quickly become literate, and this was of great advantage to the travelling merchant who could then keep his own business records instead of having to employ an expensive scribe. In this way literacy gradually became a little more widely distributed socially, that is, it became more easily available to a somewhat larger fraction of the population. Indeed, it has been said that the alphabetic script exercised a decisive effect on civilization just by being simple and easy to learn. In terms of the time and talent required, virtually all people can, if given the opportunity, learn to read and write. In essence, the invention of the alphabet made literacy not just the preserve of a privileged group but a possibility for all (45:18).

II. ATTITUDES TOWARD LITERACY IN CLASSICAL TIMES

In the early centuries of the Iron Age, when the new towns were just beginning to appear and the new lines of trade and commerce were just beginning to be formed, wars and invasions were a dominant feature of life. In the various competing eastern Mediterranean groups that struggled for control of land and resources the ruling aristocracy was composed mainly of great land-owning warrior-nobles. In keeping with this way of life, such education as existed was primarily military in character. The aim was to foster a noble-warrior culture wherein noblemen and knights were the heroes who excelled in athletics, music, oratory, good manners and the arts of warfare. For the most part their instruction was in the hands of two tutors, one for gymnastics and one for music. In these pre-classical times verbal and physical skills rather than literacy played the main roles in the training of the "Ideal Man".

By about the fifth century B.C., however, Athenian culture and education had changed considerably. A change from a military to a civilian way of life had come about, and Athenians no longer went about armed in the streets.
It was a time of relative stability and prosperity: consolidation of the benefits of the uses of iron, a flourishing trade, and the extension of Athens into a city-state led to the appearance of a class of newly-rich prosperous citizens. Aware of the value of literacy in conducting their profitable trading and business activities, they saw to it that schools were established for the education of their children.

Although it had not been considered of much use to the noble-warrior class as a whole, writing had been introduced some centuries earlier. Farrington among others states that the Greek alphabet, adapted from the Phoenician, probably came into existence during the ninth century B.C. (45:18). By the time of the classical era, schools where the three R's were taught were well-established institutions, and a third teacher, the "teacher of letters", had been added to provide literacy instruction. This new pattern of education gradually led to a great period of intellectual activity: the emphasis was now on literature, philosophy and scientific endeavour rather than on the oral recitation of poetry, songs, dancing, and the athletic prowess of former times (79:70-72).

Men of the nobility, who had been brought up in the old traditional ways, and who were at the outset wary and suspicious of the large numbers of the newly-rich class, had, of course, nothing but scorn and contempt for the new kind of education. As Pindar, for example, put it, education only makes sense if it is given to a nobleman, to one who is wise in the first place because he knows many things "by nature", that is, by inheritance, or intuitively. Pindar expressed nothing but contempt for those who know things only because they have had lessons (79:68).

The new schooling prevailed, however, and the group of literate persons was expanded considerably to include far more than just a few nobles and top-ranking officials. Indeed, the very fact that the institution of ostracism, a voting procedure that was included in the new constitution of 508-507 B.C., required an elementary ability to write implies that literacy education, in theory at least, was to be available to all citizens (79:72). That there were still some
illiterates among the citizenry is indicated by the fact that, on some of the pottery fragments that were used as ballots, misspelled names have been crossed out and written in correctly in a new hand.

This example illustrates the differing views that often do exist within a given society concerning the value of literacy. On the one hand, in the eyes of the merchants, it had an obvious practical utility. Furthermore, as their businesses flourished they stood to gain not only more wealth but also more importance and power in the community. On the other hand, to the nobles who were already in power, many of them literate officials and administrators, the extension of literacy was seen as, first, unnecessary, and second, a possible enhancement of the power and importance of the merchant class, and therefore a threat.

During this period there appeared one of the earliest examples of conflict between the "classical" versus the "practical" approach to education. Although the ordinary schoolteacher was poorly paid, and teaching was looked down on by many as a trade in the servile commercial sense, nevertheless a group of teachers known as the Sophists did very well during a large part of the fifth century B.C.

While the Sophists have generally been held in low esteem down through the ages, it has been stated that their ill repute has in large part been due to the fact that our knowledge of them is chiefly from their opponents, two of whom were Plato and Aristophanes (115). Several factors contributed to the scorn and dislike with which the Sophists were regarded by their enemies, some of the latter being the old-line aristocrats who resented the intrusion of any new kind of education because it posed a threat to their status. For one thing, in violation of the then prevailing code of the gentleman, the Sophists received pay for their instruction. For another, their aim in teaching was to enable a man to achieve success in politics, or in other practical areas of life (54:49). To this end they taught the arts of discourse and debate, not only in speech but in writing as well. A third factor was that some of them tended to be "iconoclastic in temper" (115). In contrast to many of the respected philosophers and teachers
of their day, they spent little or no time speculating as to the nature of the world or its gods. As Protagoras is reported to have said: "I do not know whether they exist or not; it is a difficult question, and life is too short." (79:82).

Their detractors, men of aristocratic leanings or backgrounds such as Plato and Aristotle, were apt to be critical of any teaching that aimed at commercial or material success. They favoured instead the teaching of such abstractions as virtue, truth, and morals. However, according to one source, although some of the Sophists were adroit and specious in their reasoning, and on occasion boasted of their ability "to make the worst appear the better reason", still, as a group "they were the first to offer anything approaching systematic education beyond the elementary branches; and the best of them were undoubtedly among the most learned men of their period" (115). According to another source, for the Sophists "teaching was an occupation whose commercial success bore witness to its intrinsic value and its social utility" (79:80).

In any case, while the pros and cons regarding the Sophists are far from clear, it is nevertheless true that many of the things taught by them were carried on into the "humanist" education of succeeding centuries: such studies as poetry, rhetoric, etymology, precision of language, indeed, the very science of grammar (79).

III. THE RISE OF CHRISTIANITY

In spite of the widening of literacy to include more than just the rulers and top officials, education remained essentially something for the "free" man who, relieved by the labour of others from doing any degrading work himself, had the leisure to pursue his own development. The classical teaching was certainly not designed for equipping technicians for specialized jobs; that was left to oral instruction in apprenticeships. The only bit of instruction that might
be called vocational was the shorthand script learned by some of the scribes, particularly those who were later to serve as secretaries. In fact, much of what is known about the early Christian church comes from notes taken during the services by a secretary sitting at the feet of the bishop or priest. In all of this it must be remembered that any sort of intellectual development still depended on the food surplus provided by the eight or nine out of ten who tilled the fields. And the very fact that these were slave-based societies worked against the increase of scientific and technical knowledge, because manual work was considered degrading, something done only by slaves. Aristotle and others made observations and collected specimens, but they did almost nothing in the way of experimentation.

For the majority of mankind these were times of oppression and exploitation, and at recurring intervals all peoples were beset by catastrophes such as plagues and famines. While for the wealthy the cultural life "came to be looked upon as a reflection and a foretaste of the happy life enjoyed by the souls blessed with immortality" (79:145), the slaves and the poor artisans had no such hopes or comforts. In such social conditions the poor and the hopeless were open and receptive to the teachings of Christianity. These teachings helped to make the prevailing social order generally endurable, with visions of a future life providing distractions from and compensation for the injustices of this world.

Christianity, however, did not long remain confined to the lower classes. Gradually it came to include many of the better-educated who inevitably brought with them some aspects of their own classical teaching and before long it had acquired a certain political influence (36). A good part of its strength lay in the tightness of its organization. With a hierarchic priesthood, fixed rituals, a creed, and, through these, a system of keeping in personal touch with its adherents, it was possible to achieve its aim of uniformity of belief. As the new religion spread from one community to another writing became of significance as a means of formally establishing and preserving a unity of doctrine. This use of writing had nothing to do with literacy for the masses, nor with the
problems of socio-economic development; it was aimed solely at unifying and strengthening the new movement. In spite of intense persecution their numbers grew and new churches appeared in many regions. By the third century the Christian Church was a small but extremely widespread and powerful organization. Faced with this threat, Constantine, in an effort to maintain the power of the Empire, and long before he himself became a Christian, took over the Church in 312 A.D. (11:185).

Before long the church was the sole source of formal education in the regions that had at one time or another formed the main part of the Greek, Roman, or Byzantine empires; Europe and the Mediterranean regions for example. As it gradually came to dominate all education a new element entered into the teaching process: the prime aim of instruction was to inculcate the child or the adult with the system of religious beliefs, the dogmas, the morals, the whole "treasury of the faith of the Christian church". In the early days of Christian influence learning to read gradually became more and more a matter of rote memory, and by the fifth century there had been a marked decline in literacy. Indeed, the schools were closed by Justinian in 529 A.D. By this time many people were signing documents with a cross, signifying that they were Christians who could not write. Symbolism, ritual, the drama depicted in sculpture and church windows, preaching, and oral recitation were the means used for purposes of instruction and indoctrination (53:54-8).

IV. FEUDALISM AND THE TECHNICAL INNOVATIONS OF THE MIDDLE AGES

The rise of Christianity, the decline of literacy, the collapse of the slave-based plutocracies, and the beginnings of feudalism all occurred at about the same time. The change from slavery to feudalism was not due to any idealistic notions of the church. Rather it was primarily due to the general state of crisis and decline of the old classical society; not only the slaves and the
 artisans, but the owners of the land, and the land itself, were impoverished. The excessive imposition of taxes and tributes, accompanied by the neglect of trade, handicrafts, and the manufacturing of items for commerce, caused many of the wealthy to return to their estates in order to escape the heavy taxation of the cities (11:182).

Many of the run-down estates were sub-divided, with sections of land being either sold outright or, more commonly, leased to tenants. Gradually a complex system of loyalties, obligations and responsibilities developed whereby the tenant was allowed to keep some small fraction of the produce in return for his labour. In this new form of social organization, which has come to be known as feudal society, the common labourer became a serf rather than an out-and-out slave.

This return of the wealthy to the land, together with a series of invasions and wars, caused a marked decrease in the importance of cities, and for the whole of the feudalistic medieval period, a period of about a thousand years from 450-1450 A.D., the dominant pattern of society was once more a rural one (11:185).

The church, in addition to its spiritual functions, controlled all matters pertaining to education and administration, including, in the early Middle Ages, even the law and medicine. In effect, the church was the state. To an extent unparalleled since the days of ancient Sumer and Egypt, culture and even literacy became confined to the clergy. One of the main uses of literacy, of course, was the training of future clergymen so that they could assert and defend the claims of the church. Some of the literate used their talents for the copying of classical manuscripts and the Bible. In addition there was need for a number of literate assistants who could keep the calendar of holy days, do the farm accounting, and write letters and other documents for those who could not do so themselves.

The schools in which they received their instruction were attached to monasteries, churches, or other ecclesiastical establishments. Although the system favoured the rich, formal education of this type was available to children.
of the poor and to orphans. Even for a peasant's son, if he had unusual ability and determination, the road to a position of eminence in church or state was open. The main prerequisites were a reasonable amount of intelligence, and ambition. In the words of one historian, the schools "served an intellectual rather than a social class" (99:181).

The great majority of the serfs and villeins, bound as they were to the soil, were below thought of education. In general the knights and barons, on the other hand, considered themselves above it (99:178-183). While their accomplishments included such things as the ability to fight, sing and recite verse, many of them were illiterate. Even in the later medieval period when universities such as Oxford and Cambridge came into existence, they made little use of these institutions (62).

Of interest because it is one of the earliest pronouncements, taken at its face value, endorsing education for all is the official church policy statement, issued in 826 A.D., making it the responsibility of the bishops to provide education for all who ask for it, and stipulating that such education should include grammar and the liberal arts, because "...in them are God's commands made clear" (9:III). It is not known to what extent this policy was put into effect. The clergy formed almost the whole of the educated portion of the population, but their numbers were never very large. Certain authors have estimated that in thirteenth century England, for example, the clergy made up about one percent of the population (72:3).

As for science and technology, the philosophy of the new religion, with its emphasis on inspiration and revelation, did little to encourage the development of either. Science was looked on with favour only when it did not threaten theological beliefs, and, looming large in these beliefs was the idea that the world was a place of order and rank. Everything and everyone had its proper place: not only the holy fathers of the church in their hierarchy, and the planets in their respective assigned spheres, but, most significantly, men in their preordained stations in society. This attitude, in combination with other characteristics of the Christian outlook, made for a stifling intellectual atmosphere.
Feudal economy, however, did not remain static. While it is true that the pattern of life was agricultural, and the social unit was again the village, there were certain major points of difference as compared to earlier times. For one thing, between the fifth and ninth centuries many towns and cities suffered a sharp decline as a result of the many wars and barbarian invasions. This meant that, for a time at least, the vigour of large-scale trade and the centralized power of the cities was lacking. The socio-economic life of the village, which in earlier times had been related to some (possibly) remote town or city, now revolved around the manor or castle. The towns did not disappear, but they were slow to regain their previous stature. Some measure of trading activity continued, but the agriculturally-based feudal barons and the clergy held the balance of power.

Another point of difference was that the methods of agricultural production were on a much higher technical level. Iron was in widespread use, and implements such as ploughs, harnesses, looms, etc., were better than they had ever been before. It was now relatively easy to clear the forests and plough the heavy soils, and in western and northern Europe there was no need for elaborate irrigation systems such as had been essential in the Nile river valley. Even although the nobility and the clergy were more or less parasitic on the land, (it has been estimated that with their retainers they accounted for about ten per cent of the population) (11:211), the agricultural methods in use were sufficiently productive to provide a fairly evenly-distributed food surplus. This fact, together with the generally self-sufficient economic character of each village, meant there was a base from which further progress could be made.

At first the existing technology was used to extend the lands under cultivation, which meant a geographic expansion of the feudal type of economy. But gradually, from about the tenth century on, a host of technical innovations appeared which changed the economy from one of local village self-sufficiency to one that profitted more and more from commodity production and trade. Some of the inventions that came into use, though few of them were actually developed in feudal Europe (11:229), were the horse-collar, the clock, the compass, the sternpost rudder, gunpowder, paper and printing.
Just to elaborate a little on the significance of some of these inventions, it has, for example, been estimated that the use of a horse-collar, instead of just a breast band that constricted the wind-pipe, increased by five times the work-load that a horse could pull. This innovation, coming from seventh century China, reached Europe early in the eleventh century. At about the same time the production of nailed horse-shoes made it possible to use the horse for pack and wagon transport. The use of water-mills and wind-mills also became of great importance as sources of non-human power during the Middle Ages. There were so many mills in use that a new type of trade developed, that of the millwrights, the first mechanics in the modern sense of the word. These men travelled about the country building and repairing mills. Nor were mills limited to grinding corn; they opened the way to a more general use of power for such activities as fulling cloth, operating bellows, forging iron, and even for sawing wood (11:230-3).

Two of the technical innovations that were to have enormous effects on all aspects of life, social, cultural, economic and scientific, were the linked inventions of paper and printing. Paper-making came to Europe via the Arabs in the twelfth century. As literacy spread and the demand for writing material grew, relatively cheap paper, made from linen rags, had a decided economic advantage over the very expensive parchment used in earlier times.

Printing was introduced into Europe around the middle of the fifteenth century. Printing with movable wooden type was a Chinese invention of the eleventh century, and movable metal type was first used by the Koreans in the fourteenth century. The invention of printing stems from the desire to have many cheap copies of a given text. According to Bernal, it arose in the East for the reproduction of Taoist or Buddhist prayers, and later, for the printing of paper money. In Europe "...it was another use, the development of playing-cards, originally a form of divinatory magic, that gave rise to the need for large-scale block printing, with papal indulgences, prayers, and sacred images not far behind." (11:242). However, as is well known, the particular need that brings a technique into existence is not necessarily the main one that is ultimately served by that technique.
Together, use of these and various other technical innovations gave rise to a technical revolution which set in motion a series of changes in the economic, social, political and religious spheres of life. The most important change of all, however, was that some of the problems raised by the technical revolution demanded scientific solutions. The complex interaction between technical advances and socio-economic changes culminated in the slow but eventually triumphant scientific revolution of the seventeenth century.
CHAPTER V

PERIOD OF TRANSITION

One fairly common way of designating various periods in history is to label them in terms of the materials on which their economic and defense structures rested. Thus we have the Stone Age with its use of stone tools and weapons for hunting and fighting. Implements of wood and bone were also used, but stone was the material on which the hunting society relied for its power and its economic functioning. Similarly it is common to speak of the Bronze Age, the Iron Age, the Age of Steam, the Industrial Age, and, more recently, the Atomic Age and the Computer Age. In each period at least some individuals have had to possess what today would be described as a certain level of literacy, that is, the knowledge and skills without which the economy of that period could not progress and without which the defense system could not be maintained.

Each period has had its own particular requirements. Today for example, with the increasing use of computers in so many aspects of industrial and military life, it is essential that personnel be trained to handle computer programs and this includes, among other things, knowledge of computer languages such as Fortran.

There are, however, certain pitfalls and difficulties in labelling periods or naming dates, and a word or two about these would seem to be in order at

48
this point. In forming a mental picture of a period it is all too easy to seize hold of the new features and forget the old. But in point of fact in any given period the old overlaps the new, whether it be in religious beliefs, family customs, different kinds of education, different standards of literacy for different segments of the population, or different kinds of economic organization such as the overlap of feudalism with capitalism. "Periods" are not facts: they are, to quote G.M. Trevelyan (100:92), "retrospective conceptions" that have been formed about past events, and they are used mainly because they help to focus discussion. To quote Trevelyan again (100:95-7):

It is indeed useless to look for any date, or even for any period, when the Middle Ages "ended" in England. All that one can say is that, in the Thirteenth Century, English thought and society were mediaeval, and in the Nineteenth Century they were not. Yet even now we retain the mediaeval institutions of the Monarchy, the Peerage, the Commons in Parliament assembled, the English Common Law, the Courts of Justice interpreting the rule of law, the hierarchy of the established Church, the parish system, the Universities, the Public Schools and Grammar Schools.

Where then shall we place the end of mediaeval society and economics—in the Fourteenth, the Sixteenth or the Eighteenth Centuries? Perhaps it matters little: what does matter is that we should understand what really happened. It is probable that ere long a new perspective of periods in the past will replace the old. Owing to the mechanization of life, man has changed more in the last hundred years than in the previous thousand. It is not unlikely therefore that the real beginning of "modern times"—if "modern times" are to include our own—will be allocated to the growth of the Industrial Revolution rather than to the Renaissance and Reformation. And even in the realm of thought and religion, the impact of Science and Darwin may come to seem as memorable as the impact of Erasmus and Luther.

In speaking then of the scientific revolution of the seventeenth century, it must be understood that the change began long before the year 1600, and continued on long after 1700. However, the most important fact of the seventeenth century was the growth and eventually the firm establishment of the new scientific mode of thought, now commonly known and labelled as the Scientific Method.
This evolution of the scientific method arose out of the questions and challenges posed by the technical advances of the preceding centuries. Some of the factors that helped bring it about, and its subsequent importance with respect to education and literacy, are discussed in the following pages.

I. THE IMPORTANCE OF THE SCIENTIFIC REVOLUTION
OF THE SEVENTEENTH CENTURY

The new science which arose out of the technical advances of the Middle Ages was to lead in turn to new and more rapid changes in techniques. Viewed in combination with the technical and economic changes which were part of it, the scientific revolution can be considered a unique social phenomenon in the history of mankind. Indeed, it was the scientific revolution that laid the very foundations for the stream of scientific and technological changes that so altered the economic, social, and cultural aspects of life in the centuries that followed. Intimately associated with these changes and with the process of urbanization were the changes that occurred as to the nature and uses of literacy: with the ever-increasing accumulation of knowledge and the growing complexity of the socio-economic pattern of life there was need for a more sophisticated kind of literacy, and literacy gradually became more and more useful to a wider and wider segment of the population.

The ultimate importance of this revolution in method lay in the fact that it contained the seeds of its own self-perpetuation. A continuous process of change and development was now possible. The choice of direction might often be open to criticism and argument, but the dynamic on-going nature of the scientific process is a fact beyond question. Various authors have suggested that, because of the potentialities of the built-in mechanism for change, the scientific revolution comes close to outshining even the discovery of agriculture which made civilization possible in the first place (11:252). Butterfield (22:7-8), writing about the scientific revolution, describes its importance thus:
Since that revolution overturned the authority in science not only of the middle ages but of the ancient world—since it ended not only in the eclipse of scholastic philosophy but in the destruction of Aristotelian physics—it outshines everything since the rise of Christianity and reduces the Renaissance and Reformation to the rank of mere episodes, mere internal displacements, within the system of medieval Christendom. Since it changed the character of men's habitual mental operations even in the conduct of the non-material sciences, while transforming the whole diagram of the physical universe and the very texture of human life itself, it looms so large as the real origin both of the modern world and of the modern mentality that our customary periodisation of European history has become an anachronism and an encumbrance.

II. CHANGES IN ECONOMIC AND SOCIAL STRUCTURE

Improved production and improved transportation were the first obvious results of the technical revolution that occurred during the last few centuries of the Middle Ages. Together these two factors led, in turn, to a marked increase in trade and industry, to the growth of the mercantile class, and to a resurgence of the importance of towns. Although the crafts and industries were still mainly cottage or village based, the very fact of surplus production, combined with the growing custom of holding fair days, lessened the economic, social, and cultural isolation of the individual village.

Gradually, with the wealth mainly acquired through production of surplus food and textiles, some of the peasants were able to free themselves from feudal service. In a growing number of cases, although it did not legally make him a freeman, a serf's labour was commuted in return for money payment of rent. Such changes, together with the growing size and importance of the merchant class, strengthened the efforts of both peasants and merchants to free themselves from the restrictions of church-dominated feudal society.

Toward the end of the Middle Ages the idea of the national state gradually emerged. In England this trend was paralleled by the growing use of English as
the language of the people, and by the significant idea that people should be able to read the Bible in the vernacular. Similar trends were occurring in Europe, and back of this gradual rise of nationalism lay the competition between countries in trade, exploration, and colonization. In all countries it was the growing merchant class that played an increasingly powerful role in these developments. Trade brought wealth and power; wealth and power gave rise to the need for mutual protection of interests. Out of this concern to protect the sources of wealth and maintain or increase the position of power, the national state evolved. It was a slow process: it was not, for example, until the reigns of Henry the Eighth and Elizabeth that England really appeared as a full-fledged national state.

III. FACTORS THAT CREATED THE NEED FOR SCIENCE

The voyages of discovery which were a significant feature of this transition period were made possible through the use of the compass and the stern-post rudder. These two inventions opened up the seas to navigation on a scale never before possible. A period of exploration, war, and trade began, with rapid political and economic results. The possibilities as to new sources of wealth were, of course, enormous, and there was great concern to make ocean voyages safer and more predictable. The result was a great upsurge of interest in the studies of navigation, astronomy, mathematics and geography. In spite of the danger of persecution by the church astronomy was now too much needed to be neglected. Astronomical tables were revised so as to make them both more accurate and simpler to use. In 1543 Copernicus published his book, "On the Revolution of the Celestial Orbs". In addition to its scientific value this work, which clashed with old traditional authority by placing a rotating and revolving earth around a central sun, was important for the fact that the views presented were amply supported by observations and tested by mathematical methods to a degree not customary in earlier scientific works.
The emerging national states and the powerful merchant-traders had urgent need for accurate navigational charts and maps, and this led to a more exact approach in the study of geography. Curiosity as to the nature of the compass led in time to studies in magnetism and electricity; the importance of gunpowder and interest in the exact trajectory of an object in flight led to increasingly accurate studies and observations in the fields of physics and chemistry. In sum, actual experience and observation were being recognized as having great value to the individual, or at least to those individuals who were most active in the gradual transition to a capitalist economy. Traditional beliefs and the old mumbo-jumbo approach to the physical world could no longer suffice; the economic interests of the merchants and adventurers could best be served by scientific study.

IV. AIDS AND HINDRANCES TO THE DEVELOPMENT OF THE NEW EXPERIMENTAL SCIENCE

The greatest hindrance to scientific development was the rigidity of prevailing religious beliefs, and the enormous importance attached to the "authorities" of the past such as Galen and Aristotle. The scholastics placed far more emphasis on attempts to establish the "truth" by means of "rational discourse" than they did on the practical testing of beliefs. The church had very strong prohibitions against any attempts on man's part to tamper with nature. Nor was man to accept the evidence of his senses if that evidence in any way contradicted Divine Revelation. So effective were the restrictions of the church that it was not until the 1540's, for example, that Vesalius published his work on human anatomy. The work of Harvey on the circulation of the blood, and the experimental physics of Galileo did not come until the early part of the seventeenth century.

There had of course been many significant discoveries in the past—there has, in fact, been an unfortunate tendency to neglect or underestimate the
contributions of the so-called Dark Ages and Middle Ages—but they had been for the most part the results of trial-and-error procedures. Gradually the old unsystematic approach was replaced by one wherein any given hypothesis was submitted to experimental testing and logical analysis. This change from a haphazard to a scientific method would not have been possible without writing. In the days when apprentices were taught by oral instruction and practical demonstration everything they learned had to be memorized. If the amount of material to be learned was not too large or too complex, and if they were thoughtful, lucky, and observant, some new idea or discovery might emerge. More often than not, however, ideas that have to be learned by rote memory tend to be perpetuated unchanged, simply because of the effort involved in memorizing them. It is only when ideas and information are written down that the mind, freed of the task of memorizing, has time for reflection, critical analysis, and creative thought or inspiration. For this reason an entirely audio-visual non-literate world might be inadequate. Vivid and stimulating as pictures and sound may be, where would be the opportunity for reflection and reconstruction?

In addition to the use of writing, which tends to be ignored or taken for granted, several other factors contributed to the development of a systematic, scientific mode of enquiry. That the economic interests of the merchant class were at stake has already been mentioned. Other less tangible factors were related to the general broadening of the class structure. With the growing dominance of a money-based capitalist economy there was a new emphasis (or at least the beginnings of an emphasis) on the importance of the individual. Men wanted freedom: freedom to satisfy their curiosity; to question; to investigate; to experiment; to talk; to explore. It was this spirit, unfettered by arbitrary ancient controls, that gave the main impetus to the development of the new experimental science.

The wide extension of European trade and exploration also aided the process of scientific growth by the very fact that it helped raise the standard of living of at least some portion of the Europeans themselves. This made possible
the support of more specialists in the cities. Some of the new occupational
groups included mathematicians, map-makers, navigators and instrument-
makers.

Also of importance in developing the new science were the mechanical
skills, practical knowledge, and ingenuity of the millwrights, the clock-makers,
and other craftsmen. Without these abilities it would not have been possible to
build the new and ever more precise tools and instruments that were needed not
only for navigation and manufacturing but for scientific investigation itself.
Indeed, whereas there had been for centuries an enormous gulf between the
educated élite and the lowly artisans there now appeared, at least as far as
science was concerned, a new pattern of association and cooperation. And, of
course, in more than one case scientist and artisan were one and the same
person.

The quantitative aspects of science were assisted considerably by the
development of mathematics that followed the introduction of Arabic numbers
into Europe early in the thirteenth century. Although used at first mainly for
commercial accounting, it was not long before there was a great increase of
interest in mathematics particularly as it applied to the problems of navigation.

Last but not least of the many factors that assisted the development of
the new experimental science was the introduction of printing. Printing came
to be (11:242)

...the medium for great technical and scientific changes by
its setting out at large, for all to read and see, descriptions
of the world of Nature, particularly of its newly discovered
regions, and also, for the first time, of the processes of the
arts and trades. Hitherto the techniques of the craftsmen
had been traditional and never written down. They were passed
on from master to apprentice by direct experience. Printed
books made it first possible and then necessary for craftsmen
to be literate. Their descriptions of technical processes, and
even more their illustrations, helped to bring about for the
first time close relations between the trades, the arts, and
the learned professions.
V. LITERACY AND USE OF THE VERNACULAR

Use and acceptance of the vernacular coincided with, and indeed was part of the very spirit of, the social and economic changes that were occurring toward the end of the Middle Ages. In England, for example, the very fact that Chaucer (1340 - 1400) wrote in English indicates the general acceptance and understanding of that language as the language of ordinary people in their everyday affairs.

Learning in Chaucer's day was still, as it had been for centuries, virtually a monopoly of the clergy. The ranks of the clergy, however, included many who would today be classed as laymen. Some served as clerks whose job was to write letters and keep accounts for merchants, landowners or officials. Others were secretaries, lawyers, teachers and physicians. Still others served as private chaplains, or as "chantry priests", that is, priests who were paid by laymen to say masses at stipulated intervals for the souls of the departed. Many were civil servants, some of whom, Cardinals Wolsey and Richelieu for example, rose to positions of power just short of the throne.

Some three or four hundred grammar schools existed in fourteenth century England to provide the clergy with instruction in reading, writing, and Latin (100:52). In spite of the growing use of the vernacular in ordinary life the main purpose of education throughout this period and for some time to come continued to be instruction in Latin. Latin was still the language used, certainly insofar as written documents were concerned, in matters of religion, business, government, and the professions (119).

The fifteenth century saw a great increase in educational facilities, a reflection of the interests of the new wealthy merchant class. With the evolving social structure there was increasing need to educate boys who could become future mayors, merchants, ministers of state, clerks, judges, lawyers, and so on. In other words, the complexity of the socio-economic structure was beginning to require a greater proportion of literate citizens. Many of the new schools were endowed grammar schools founded by individual wealthy merchants
or by merchant guilds. Some, such as the Merchant Taylors' School, survive today (41). Many of them provided free places for the poor: not the poor of the labouring class but the relatively poor, the lower end of the new middle class. From these schools came an increasing number of educated laymen. Indeed, whereas mention of "Literate laymen" in the church registers of the period 1390 to 1415 had been common, this custom died out as the fifteenth century progressed, reflecting the fact that literate laymen were no longer unusual (100:74-5).

Caxton brought his printing press to England in 1477. Before that time books were rather rare, and the copying, parchment, and bindings made them very expensive. Indeed, the academic title "Reader" which still survives in the older universities stems from the days when books were rare and a university staff member read the text aloud so that the students could copy it down. Around 1450 the price of a bound volume was the same as for two cows, twelve sheep, a horse, twenty gallons of wine, ten barrells of beer, or the services of an agricultural labourer for ten weeks (71:14). While many books cost less, the price of an elaborate Bible would be more.

As literacy spread with the education of the new middle class there was both increased demand for books and an increased supply of literate persons who could be hired as copyists. Gradually a small group of commercial booksellers arose who revolutionized the production of books by using teams of scribes, each of whom copied a particular section. The booksellers also sought to reach a wider public by concentrating on plain, cheap editions of those works that were most in demand. Thanks to Chaucer's influence in establishing English as a literary language there was now, in addition to the usual Latin texts, a wider range of reading material which included not only sermons and manuals of devotion but also ballads, romances, books on heraldry, etiquette, medicine, and translations of the classics.

Thus, by William Caxton's time, there was already a growing demand for manuscripts. Caxton himself was a product of the new middle class and its education. While living on the continent he had encountered the method of printing
with movable type, and in 1474 - 1475 he produced two of his own translations. One was a romance, the other a book about the game of chess, and these were the first books to be printed in English. In 1477 Caxton brought his printing press to England, and in the next fourteen years produced about a hundred works, most of them in the English tongue. From then on the spread of ideas and knowledge was to be immensely accelerated. By 1500 there were six printers in England, and by 1550, about twenty, producing roughly two hundred books a year in editions of five or six hundred (71:16-28).

Until the time of Caxton a very large number of dialects were in use in England. Three factors operated to mold the one that came to constitute the speech of literate Englishmen—the speech of London and the Court. First can be counted the popularity of the writings of Chaucer among the educated classes. Then there was the impact of the products of Caxton's printing press and of his choice of words and spelling, this in an age before there were dictionaries or rules about "literary" English. Last and most important of all was the appearance and widespread distribution of an English Bible and Prayer Book during the Tudor period of the Reformation.

In this era of anti-clericalism many of the newly-educated members of the middle class and even many of the clergy themselves were involved in the drive for social and intellectual reform. Of interest here is Trevelyan's remark to the effect that the grammar schools were the cause, not the result, of the English Reformation (100:75). To a very large extent the struggle between Church and State had its roots in economic causes: many, from the King on down, envied and resented the wealth and power of the Church. In addition there was much honest revulsion against the corruption, abuses, and exploitation of the Christian Church—behaviour that so markedly contradicted the teachings of the Church. Also, and this was related to the growing trend to individualism, there were many who wanted to read and interpret scripture for themselves.

The various measures taken by Henry the Eighth are well known: the rejection of Papal authority, the assumption of supreme control of the Church, the dissolution of the monasteries, the seizure of their wealth, the suspension of
payments of first-fruits to Rome, the taking over of the ecclesiastical courts, and so on. More important from the point of view of literacy, however, were the injunctions, not only of Henry but, later, of Edward and Elizabeth, with respect to the Bible and religious instruction. Whatever the reasons for these injunctions—political expediency; response to public pressure to allow people to read the Bible for themselves; attainment of a wide range of public support for the reigning monarch as head of Church and State by decrees that aimed at uniformity of belief; use of a tongue that was not only understood by all but that also undercut the prestige and power associated with the Latin of the Roman Church—they did much to enhance the spread of literacy and they greatly accelerated the establishment of the dialect of London as the language of the literate. Specifically, the Creed, the Lord's Prayer and the Ten Commandments were made available in English, and it was ordered that they be taught by every schoolmaster and father of a family to his children and pupils (57:341). Those who were unable to read were to learn these things by rote memory, in the mother tongue. Henry also ordered a translation of the Bible and issued an authorized Primer. Later the Book of Common Prayer and, in due course, the King James version of the Bible made their appearance. The preface to the first Book of Common Prayer, published in 1549, urged the people to learn to read, stressing the point that the profit in knowledge so gained would well repay the labour involved (6:54-5).

These developments serve as an example of the encouragement of literacy by those in power, partly for its value for liberal purposes, (i.e. to instil religious beliefs and virtues), and partly as a means of gaining more support for a particular power structure. This era also serves as an example of one of the relatively few times when literacy was encouraged for reasons not obviously or directly connected with economic necessity.

As might be expected the overall result was an increased interest in reading that went far beyond the original royal wishes or intentions. From the first the press was recognized as a powerful weapon in all types of political or religious controversy. And from the first those in power took action to control
the books and pamphlets that were published, indicating very clearly the dichotomy with which the value of literacy was regarded. At first, permission to print any book or pamphlet required royal sanction. Later, when Parliament had gained control over the crown, permission to publish had to be obtained from those who were in charge of administering the Licensing Act of 1663. Not until after 1696, when this Act was allowed to lapse, could an Englishman print and publish whatever he chose without receiving permission first. The laws of libel and sedition had still to be reckoned with, of course (100:262).

VI. SCIENTIFIC EDUCATION AND THE LIMITATIONS OF THE SCIENTIFIC REVOLUTION

The main intellectual development of this period, the revolution in science, was of course greatly assisted by the extension of literacy, and the increasingly common use of the vernacular opened the mysteries of science to the curiosity of an ever-larger portion of the population. Both the old universities and the grammar schools ignored the scientific aspects of education, however; it was in cities such as London that the new intellectual life was to be found (17). There, in response to developments in geographic discovery and the arts of warfare, instruction in such practical subjects as astronomy, mathematics, navigation, surveying, horology and gunnery, were given by instrument-makers and the like. In 1588, for example, in anticipation of a clash with the forces of Spain, a series of lectures was sponsored by the City authorities... which illustrates that those in control realized the value of an up-graded literacy where matters of power and defense were concerned. On the continent too in the fifteenth and sixteenth centuries there were navigation schools in countries such as Spain, Portugal, Italy and France. For those who were involved in the new life the concept of literacy was considerably widened, both as compared to the literacy level of the average educated man of those times, and as compared to the levels of earlier times. The knowledge and technical development of the
times was much more complex than in preceding centuries, and the economic functioning of the countries concerned required a body of men who were well acquainted with the new learning.

For this reason, in England and in other countries too, various Colleges and Societies were set up to provide opportunity for scientific study. One was the Royal College of Physicians which, in the latter part of the sixteenth century, actually gave about one quarter of its lectures in English. Another was Gresham College where lectures were given in Latin in the mornings, and in English in the afternoons. This college, founded by a wealthy merchant of Queen Elizabeth's reign, is interesting for its emphasis on the useful aspects of instruction. Some authors regard it as the first major enterprise in the field of what is now called Adult Education (72:27). The fact that it stressed useful knowledge is a foreshadowing of the importance of the vocational training side of literacy education.

Also important in furthering scientific education were the dissenting schools and academies that arose out of the religious persecution of the sixteenth and seventeenth centuries (1, 12). With the exclusion of non-conforming groups from regular schools and universities parents who did not belong to the established Church set up their own schools for the instruction of their children. In these schools the prime aim was freedom to teach their own particular religious beliefs—a religious and moral literacy. In addition, however, provision was often made for instruction in practical and scientific studies. Some of the Academies even provided the equivalent of university education, and many of the famous men of those times were the product of the dissenting schools. Indeed, these schools were among the first to widen and secularize their curricula, a step not taken by the grammar schools and universities until some three centuries later (33).

Perhaps the most difficult thing to grasp about this whole period of transition from a medieval to a capitalist economy, and about the century of the scientific revolution, is the fact that only a very small segment of the population was actively involved in the intellectual excitement. If the benefits had been more
immediate and obvious there would no doubt have been much more support for scientific ventures and scientific study. As it was, however, although the developments in science were to be of far-reaching importance, they were at the time developments that mainly affected other scientists. Another limitation was that the number of persons who were fortunate enough to have access to some kind of education or intellectual stimulation in the first place was small. Change was in the air—economic, social, political and scientific change—but it was just barely beginning. For those who were caught up in the trading activity, the exploration, the building of ships, the making and using of tools, the schools of navigation, and the new geography there was a new kind and level of literacy, but they were but a small fraction of the people. England and the other countries of Europe, and even the new colonies in North America, were still primarily agricultural, as they were to remain for some centuries to come, and for people who toil on non-mechanized farms there is little time or incentive to acquire literacy and no apparent use to which it could be put even if it were made available.
CHAPTER VI

LITERACY IN THE EIGHTEENTH AND NINETEENTH CENTURIES

A vast number of changes inevitably arose out of the knowledge and discoveries of the seventeenth century, and the eighteenth and nineteenth centuries may be regarded as centuries that witnessed the consequent evolution and development of the social and economic structures of society. Admittedly the changes started slowly, almost imperceptibly. Indeed, the middle and upper classes of eighteenth century England regarded their country as the best possible, here to stay, and beyond thought or need of any reform. In their view England required "only to be left alone where Providence and the Revolution of 1688 had so fortunately placed her." (100:340). The well-to-do of England were not alone in their complacency; their counterparts in the countries of Western Europe, for example, were equally resistant to change.

In spite of those who would have had it otherwise, however, change did occur. Of prime importance insofar as the present discussion is concerned is the fact that by the end of the nineteenth century significant changes had occurred in peoples' attitudes and behaviour with respect to the subject of literacy. The dominant educational feature of the eighteenth century, namely an intense pre-occupation with the religious and moral uses of literacy, particularly where the labouring classes were concerned, gradually gave way to a work-oriented concept of literacy. The great changes in educational outlook paralleled the evolution of
industrialization, urbanization, social and political reform, and increased social mobility.

The Industrial Revolution occurred first in Britain, hence the emphasis on British history in this chapter. Although only a few examples of the basic trends are given it is clear that as the apparent educational needs of society came more and more to be shaped by industry, and by the social problems of urban living, the whole concept of literacy, that is, the various kinds of education, and their distribution or availability, changed accordingly.

I. ATTITUDES TOWARD LITERACY

At the beginning of the eighteenth century the common view, held by those who were well enough placed to have time for such views, was, as it had been in the days of the Greeks, the Egyptians and the Sumerians, that education and culture in general were matters of concern and interest to only the upper layers of society. The educational advice of John Locke, for example, was certainly not directed toward the common labourer: his concern was with the education of those destined to occupy positions of social prominence (5:51). While he acknowledged that each mind is different, and needs different methods of teaching, it was the differences as between a prince, a nobleman, and an ordinary gentleman's son of which he spoke. As for the children of the poor, Locke (2:19) recommended in 1697 that all pauper children between the ages of three and fourteen be sent to workhouse schools where they would receive religious instruction and learn spinning, knitting, or other useful, employable activities. Each child was to be given an allowance of bread, and "in winter, if it be deemed needful, a little warm water-gruel." As one of the advantages of this scheme Locke included the fact that a mother, freed of the care and responsibility of her child once it reached the age of three, could then go out and work herself. No allusion was made to the possibility that by then there might be another infant present or in the offing (5, 2).
Another person who expressed the attitude of many people of his century, and of the next too, was Soame Jenyns, a writer of some note in his own day. Jenyns, who, among other things, wrote on the nature and origin of evil, the nature of time, and the reasons in favour of having a militia, stated, in 1757, that ignorance was the appointed lot of all born to poverty and the drudgeries of life...the only opiate capable of infusing that insensibility, which can enable them to endure the miseries of the one and the fatigues of the other...a cordial, administered by the gracious hand of providence, of which they ought never to be deprived by an ill-judged and improper education.

There were, of course, a few who viewed the matter quite differently. Hoole, one of the great educators of the mid-seventeenth century, had urged that children should be benefited in reading orthodox catechisms and other books that may instruct them in the duties of a Christian...and ever afterward in other delightful books of English History,...or poetry,...and by this means they will gain such a habit and delight in reading as to make it their chief recreation when liberty is afforded them. And their acquaintance with good books will (by God's blessing) be a means to sweeten their (otherwise) sour natures, that they may live comfortably towards themselves, and amiably converse with other persons.

Suggestions of this sort struck horror into the hearts of the prosperous middle and upper classes. They emphatically denounced any such policy of popular education, with warnings that it would only lead to "sloth, debauchery, and the assumption of superior airs on the part of the people—followed, as the day the night, by irreligion and revolution" (3:33).
II. ECONOMIC FACTS AND SOCIAL THEORIES

Behind these dénoucements lay some of the economic facts and social theories of the times. Migration to the towns was gradually increasing, and there the lot of the common worker was poverty, filth, disease and uncertain employment. It had long been the custom for children to work as soon as they were able. Now, if they were not working on the farms or at the looms in their village homes, it was common for children to work in the mines or factories that were the mainstay and raison d'être of the new towns. For their part, poor parents were in general unwilling or unable to do without the possible earnings of their offspring. Attendance at school would have meant not only loss of wages but also payment of fees, and for most working families this was simply out of the question (30).

From the point of view of the employers, education would have been a waste, for there was no use to which it could be put insofar as the actual work was concerned. Their interests lay simply in having an abundant supply of cheap labour. The plain fact was that few jobs as yet specifically called for literacy. Although an industrial economy was gradually developing it was still in a very rudimentary state, and there was little call for any particular skill or knowledge. For the most part physical strength and fortitude of spirit were the essential requirements, for the hours were long and the work was tedious. The common opinion, not only in the eighteenth century but in later times as well, was the one expressed, well on in the nineteenth century, by Lord Stowell (90:120):

If you provide a larger amount of highly cultivated talent than there is a demand for, the surplus is very likely to turn sour.

With the gradual growth of the towns came new incentives for more efficient agricultural production, the object being the profitable one of supplying corn, meat and vegetables to satisfy the demands of the new town markets. This trend encouraged the policy of enclosure of open land, a process that proceeded
at an increased rate after the third decade of the eighteenth century. By the end of the century great numbers of private Acts of Parliament had been passed which forced individual owners to give up their lands in return for such money or land payments as the Commissioners saw fit. The means chosen were often very unfair: in the words of Trevelyan (100:376), these were Acts coming from Parliamentary assemblies "not otherwise famous for radical legislation. But this was the radicalism of the rich, often at the expense of the poor."

Although in an overall way the country as a whole benefited for a time from these changes, the economic gain was not by any means equitably distributed. Socially the major change was that as the wealthy landowners increased their already large holdings ever larger numbers of erstwhile farmers and farm labourers, most of them illiterate, migrated to the cities. Many made their way in the crowded, unfamiliar industrial conditions, but the majority did not, partly because the rapid rise in the size of the population kept the value of their services at a low level. In general, misery and poverty had always been the lot of the lower orders: now, however, in the poor and unplanned living conditions of the towns, it became much more obvious not only to themselves but to any who cared to open their eyes and look about them. The appalling social conditions gave rise to many of the reform movements of the nineteenth century. One consequence of the general agitation was a marked sharpening of class consciousness. As one author (3:84-5) has described it:

The working class, losing its old sense of place under the stress of hunger, bewilderment, and the exhortations of radical politicians, began to demand social, economic, and political rights unthought of only a generation or two earlier. The widening of economic opportunity afforded by the development of industrial capitalism permitted many thousands to climb in the social scale. They quickly acquired the social prejudices characteristic of the class in which they found themselves, among which was a powerful desire to protect their substance and privileges against the encroachments of the class they had lately left. Those above them, in turn, felt all the more strongly the need for defending their own position against the newly arrived.
III. LITERACY: A TWO-EDGED WEAPON

In the face of this socio-economic upheaval that so disrupted the tranquility of the social order, particularly where the working classes were concerned, gradual changes in education occurred which, unintentionally, were to have great consequences for the future. Several factors contributed to the growing spread of literacy (60, 69). One was that, following the political and religious unrest of the seventeenth century, there was a great desire on the part of the middle and upper classes to establish social stability and discipline among the poor, "who, in contemporary opinion, were peculiarly susceptible to the poisons of rebellion and infidelity." (3:37).

This concern for the lower classes of society stemmed from an admixture of genuine sympathy for the miseries of the poor, the operation of a stern but benevolent Christian ethic, and an intense desire to make the masses aware of their duty to be "faithful servants of God and men and heirs of eternal life" (3:33). To many, still remembering the dramatic revelation of the power of the press during the Puritan regime, one way of insuring such discipline was to keep the masses ignorant. Yet, as the Society for Promoting Christian Knowledge, founded in England in 1699, pointed out, there was a dilemma here, for how else were the masses to acquire the elements of religious faith, morality, industry and "acceptance of their place" if not in schools? The answer to this question was the setting up of hundreds of charity schools in the first half of the eighteenth century. The main purpose of these schools was to teach the reading of the Bible, plus any other religious works that happened to be available. Such literacy as was acquired was solely for religious and moral purposes, for what need had the poor for any learning beyond that?

Another factor that contributed to increasing the literacy of the poor was the Sunday School movement. While some Sunday Schools had appeared earlier it was in the last decades of the eighteenth century that the movement grew apace and had a considerable impact on a wide sector of society. The main impetus for the rapid spread of the movement was provided by the publicity given it in 1780 by
Robert Raikes, the editor and owner of a Gloucester newspaper. This is just another of the countless instances of the usefulness and potential influence of literacy and of the circulation of the printed word. Both the established Church and the Dissenters supported the Sunday School movement with enthusiasm, and one of the earliest undenominational national organizations in England, the Sunday School Society, was organized in 1785 to co-ordinate the work of these Schools. The Sunday Schools had the same aims as the charity schools had had, but there was in addition the distinct advantage that they did not interfere with the work week and earning capacity of the child. This fact, plus the appeal of Raikes' writing, moved the already literate and relatively affluent members of society to support the movement.

Another development that did much to encourage the reading habit among the lower classes was the religious revival led by John Wesley. Wesley held that reading Christians would be knowing Christians, and to this end he organized the publishing of a vast amount of literature. Interestingly enough, the Wesleyan movement differed from the others in that it went considerably beyond the mere reading of passages of scripture. Realizing the very elementary state of literacy among his followers, most of whom were working class people, and aware that reading ability could only flourish if there was something for it to grow on, Wesley brought out simplified editions of the classics, a short book on grammar, and even a small dictionary (3:37-40).

Other factors that stimulated interest in reading, or that came into existence in response to the demand for reading material, were the growth of newspapers and journals, the writing of novels and other forms of fiction, the various clubs and literary societies, the circulating libraries, and, above all, the coffee houses. The latter, the "penny universities" as they have been called (44), were particularly important in the years before the appearance of daily newspapers—and it must be remembered that newspapers are only economically feasible when there is a sufficiently large literate public to read them. At the coffee houses people could gather not only to drink the popular and fragrant beverage, but also to enjoy the warmth, the conversation, and the latest news. One of
the most important aspects of the coffee-house, and of the better tavern, was that it provided a place where the non-literate, through communication with the literate, could acquire a certain amount of knowledge and information, particularly about local events and political affairs. This sort of learning, through talk rather than the written word, was to be greatly extended with the invention of radio and television in the electronic age of the twentieth century.

Throughout the decades these developments that were gradually leading to the growth of a larger and larger reading public—and it must be acknowledged that to some extent it was only a potential reading public, for no high degree of literacy could result from once-a-week Sunday School classes—were viewed (3:66)

...with an alarm originating largely in concern for the individual reader's personal morality and his ability, faced with the luxurious temptations of print, to give an honest day's work for a modest day's wage.

A phrase vividly indicative of conservative opinion described the circulating library as (3:64)

...an evergreen tree of diabolical knowledge! It blossoms through the Year!

As they had throughout the centuries, the upper classes sensed that the existence of masses of literate low-class working people would pose a threat to their comfortable and well-established status quo.

An event that caused the ruling classes real concern, and that demonstrated anew the tremendous power of the press and a literate public, came at the time of the French Revolution with the publication, in 1791, of Paine's "Rights of Man". Even although the price was three shillings—high enough "to keep it out of the hands of people who had no business reading it" (3:69)—thousands of copies were sold, and a ferment of social and political discontent was unleashed that made the conservative superior orders tremble for the nation's security (61). In the words of one author: (3:76)
The astounding circulation figures...for the writings of Paine, had enabled the ruling class of England for the first time to grasp in concrete terms the size of the existing public. Every new reader in the lower ranks of society meant another potential victim of radical contagion. 

...the specter of insurrection could not easily be forgotten...

Although many of the well-educated members of the middle and upper classes, such as Byron and Shelley, supported the writings of Paine, at least at first, the general reaction of these classes was one of fear and anger at the power of the press, and measures were taken to silence all seditious and atheistic writings. But the Royal Proclamation of 1792, which led to the arrest and fining of radical booksellers and the trials of radical writers, only served to focus more attention on the matter. The real trouble was the existence of literate persons (3:73)

...who after all could be deprived of their literacy by no device short of extermination.

Those who had been most involved in the Sunday Schools came in for a great deal of criticism. In an effort to counteract the radical writings of Paine and others a huge mass of Cheap Repository Tracts were written and published. The evangelical Hannah More had a large hand in composing these moral tales and ballads, and they sold by the thousands in the last few years of the eighteenth century. That they sold so well testifies to the fact that reading was becoming more and more popular.

One reason for this increasing popularity was the great hunger for diversion, the need for escape from the physically and spiritually deadening working and living conditions under which the majority of the population lived. Other reasons for the increased interest in reading were the desire and curiosity to keep up with the changes of the times; the social dissatisfaction which created a demand for political writings; and the growing spirit of self-improvement that the individualistic philosophy of the age encouraged (3:97, 61).

In spite of great efforts to channel literacy ability in the direction of religion, morality, and acceptance of one's allotted place in life, there was no stopping a trend that had been started centuries earlier. Through books and
pamphlets a means had been found for expression of opinion concerning the social and political problems of the times. In spite of continuing attempts to silence radical thought this trend led eventually to a number of large-scale social and political reforms in the nineteenth century. Literacy played a significant role in bringing about these reforms: by being able to read the literate could acquire new knowledge, they could find out what others thought about certain subjects, they could exchange ideas, or promote them, and in the process certain groups could form and exert an influence for change.

IV. INDUSTRIALIZATION AND CHANGING CONCEPTS OF LITERACY

The history of industrialization and urbanization—two processes which dominate the story of nineteenth century life in the countries of the western world—clearly shows the powerful interrelationships between the scientific formulation of ideas, technological improvements, and the economic and political developments of a flourishing capitalist society. That any profitable enterprise would benefit from greater division and specialization of labour, the use of steam-engines or electrical machines, and other revolutionary scientific inventions soon became obvious. Not so immediately apparent, but inevitable none-the-less, was the fact that the functioning of the new machines and the new industries and the provision of a work-force that could cope with them, were going to require a new type of education for the working-classes. The prevailing concept of literacy for the lower classes—a minimal ability to read the Bible—was gradually realized to be woefully inadequate.

Throughout the nineteenth century, and against a continuing background of loud opposition from a majority of the entrenched supporters of the status quo, a number of forces operated to bring a new concept of literacy into being. Of importance as one of the first major acknowledgements on the part of the wealthy of the need for a special kind of literacy was the founding of the Royal Institution
by Count Rumford in 1799. Rumford (11:382) saw... that the Industrial Revolution could not be a success unless there was some means of training a new type of mechanic who could base himself on science instead of blind tradition. For that he persuaded the wealthy to put up the money for an institution under royal patronage for "diffusing the Knowledge and facilitating the general Introduction of useful mechanical Inventions and Improvements, and for teaching by Courses of Philosophical Lectures and Experiments the applications of Science to the common Purposes of Life."

Significant as it was for the principles it expressed, the Royal Institution actually provided such education for very few. To a large extent the demand for more and better education came from certain quarters of the working-classes themselves. With the growing demand for political and social reform, and with the realization that knowledge is power, at least some of the working-class people began to attach high importance to education for both children and adults. Indicative of the spirit of unrest and dissatisfaction were the Hampden clubs that advocated universal suffrage, the trade-union movement, the creation of co-operative societies, and the various demands for free elementary education and free libraries (57:341). The very existence of such organizations as working-men's clubs, mechanics' institutes, self-improvement societies and debating clubs testifies not only to their demands but also to the need for new abilities and new kinds of instruction in an increasingly urbanized and specialized society.

For the most part, however, the kind of instruction that was needed was not to be found in the regular grammar schools or universities. In these long-established institutions opposition to any departure from the accepted curriculum of classical studies, with its emphasis on Latin and Greek, remained strong well on into the latter years of the nineteenth century. The difficulty with which such subjects as arithmetic, history, English literature, chemistry and sociology were introduced into the schools or universities is a long story in itself (11, 16, 19, 33, 41, 81, 84, 100, 113).
In large measure the education of the workers grew out of the schools that had been set up specifically for the instruction of adults. The earliest of these schools were those founded in Wales by the Rev. Thomas Charles in 1811 and the Bristol Adult School started by Wm. Smith and Stephen Prust in 1812 (53, 72, 111). While their original purpose was the giving of moral and religious instruction it was not long before some of them branched out, usually as organizations with entirely different names, to include arithmetic, drawing, geography, natural history, mechanics, and whatever else might be useful to a manufacturer or craftsman. The many references to drawing as a subject of instruction indicate an important change as to what constituted "adequate literacy": the "drawing" in question had to do mainly with the ability to draw and interpret plans of models for mechanical devices and other construction.

Without doubt the ultimate prodding force in increasing the spread and content of education—and this can be taken as equivalent to a recognition of the need for a new kind of literacy, particularly where the common man was concerned—was the practical necessity of having sufficiently skilled and educated workmen. The testimony of Alexander Galloway (71:188) before one of the many Select Committees of the House of Commons in 1834 can be cited as just one example of the pressure that was building in favour of universal education. Galloway, an engineering employer, stated that:

From the mode of managing my business by drawings and written descriptions, a man is not of much use to me unless he can read and write.

Not all people agreed that writing was of equal importance with reading. In the early years of the nineteenth century there were some "well-disposed individuals", to use Pole's phrase (111:74), who "refused their subscriptions in support of such schools as have adopted writing along with reading in the adult schools." In the eyes of those who feared the secularizing effects of writing the concept of literacy (if indeed the word can be used at all here), at least as it pertained to the lower orders of society, was to be limited to reading only. In defending the teaching of writing Pole had this to say (111:74):
The whole system of school teaching is abstractedly a secular employment; and, if that consideration is a sufficient objection to writing, it will be to reading also; which, if admitted, has a direct tendency to abolish the whole of what a great part of the Christian world is now ardently embracing; It is a secular employment, but for a religious purpose; and, I think, it would be wrong to object, because a temporal advantage attaches to it.

Elsewhere, in writing of the Adult Schools which he had supported and helped organize so avidly, Pole (111:69-70) emphasized the advantages to society at large of universal education of the poor:

The Divine Creator has, for wise and beneficial purposes, bestowed on man an endless variety of talents, which, when brought into action, are productive of new discoveries; from whence spring many improvements in the arts and sciences, adding, from time to time, fresh articles for manufacture—new sources of employment for our poor, and consequently an extension of our commerce. It is well known that many labouring artists and manufacturers have evinced a genius for improvement; and not a few of the most important and profitable discoveries have been made by unlettered men of strong minds, whose active and inventive talents might have shone with still more conspicuous splendour, had they been blessed with even a humble education; and thereby qualified for reading the experiments of others, and ascertaining the mechanical, chemical, or philosophical principles of the arts or sciences to which they have directed their attention.

It is not easy, or I should rather say it is impossible, to estimate the mass of genius and useful talent that has, through preceding generations, been lost by the ignorance which has hitherto existed amongst the lower classes.

While Pole's concept of literacy was still very much directed to religious and moral purposes it is clear that it also contained considerable recognition of the "apparent educational needs" (to use a phrase adopted earlier in this thesis) of the times. By the mid-nineteenth century further changes in attitude toward education had occurred, as the following excerpts from Hudson indicate (64:v, 64:vii, 64:1, 64:212, 64:216):
The unexampled efforts now making in every part of the kingdom for the intellectual and physical improvement of the lower classes of the community, distinguish the present, as the age of philanthropy and good-will to all men. ... The press is prolific with carefully collated proofs of the connection between offences and ignorance, as they appear in the calendar of crime; civic magistrates begin to hold it a duty to take part in all meetings which have for their object the dissemination of useful knowledge amongst the multitude; the agriculturist is alive to the importance of the allotment system, and institutes Farmers' Clubs; while the manufacturer finds it profitable to form schools and factory libraries, to rear amateur bands of musicians amongst his workmen, to encourage frugality by savings' banks, benefit societies, sick clubs, clothes clubs, burial associations, and by occasional tea meetings at which he and his family partake, to destroy that barrier between men, which pride and wealth sometimes ungraciously erects.

With the increase of population, society has extended and developed itself in new circles, and the requirements of the age, demand for the labouring classes, not only free public libraries, free public news-rooms, free public lectures, but evening classes, free to the half-educated shopboy, and the unlettered apprentice.

The first movement in adult as in infant education was sanctified by that important object, the dissemination of religious truth, but as success spread with its development, so did religious fervour proportionably diminish. Sunday schools extended their sphere of usefulness, step by step, until instruction in writing and arithmetic became part of the general system, although some religious bodies, fearful of piloting their several educational charges into seas of thought, whose limits were undefined, steered their course along the prescribed tract, adopting the narrow gauge (sic) of instruction, and excluding penmanship as an accomplishment purely secular, and of trifling import.
With the exception of the two thousand coffee-houses, which the metropolis contains, there is no provision made for the improvement of the working mechanic, with which he is disposed to connect himself for intellectual culture. The London Mechanics', the Westminster, and the Greenwich Institutions, have but few of the labouring classes enrolled in their books, and the Christian associations of London do not possess a greater intellectual proportion of the working mechanics... The youth who leave these schools (the free schools, the cheap academies, the Sunday schools) have acquired a taste for learning which should not, as at present, be obliterated from their minds as soon as they are introduced as apprentices, or assistants in shops and manufactories...

**

It has been correctly asserted that America seldom adopts anything useful from the Old World that she does not improve; and it is certain that in establishing and carrying out a system of public libraries, colleges, and Mechanics' Institutions the United States have far excelled Great Britain. The perfect Mechanics' Institution can only be found in the Western World, for in no part of Europe can a Peoples' Institute be seen in which machine shops supplied with necessary mechanical tools for the accommodation of the diligent and for inventors, is accessible to all; where the laboratory is available for chemical instruction and experiments; where free lectures, on scientific and literary subjects are systematically delivered to the working classes, and where that class alone has the management of the Institutions established for their benefit.

Of the many who continued to work and speak in favour of universal education the name of Matthew Arnold deserves special mention. As Her Majesty's Inspector of Schools and as the author of the Reports on Elementary Schools (1852-82) and innumerable other writings his views are of considerable significance (65, 82). Among other things Arnold insisted that education should be a national concern, and he was emphatic in stating that the endowed schools and the universities were too rigid and too ecclesiastical. On one occasion he expressed his criticism of the universities by saying (65:195-6):

The want of the idea of science, of systematic knowledge, is, as I have said again and again, the capital want, at this moment, of English education and of English life; it is the university, or
the superior school, which ought to foster this idea...

...Our great universities, Oxford and Cambridge, do next to nothing towards this end... for mastership or doctorship, Oxford and Cambridge have, as is well known, either no examination at all, or an examination which is a mere form;...

Arnold saw clearly that the need for popular education arose out of the "ideas and necessities of modern times" and he somewhat sarcastically wrote that (65:156):

> Our educated and intelligent classes, in their solicitude for our backward working class, and their alarm for our industrial pre-eminence, are beginning to cry out for technical schools for our artizans.

He also made one of the outstanding humanitarian remarks of his day when he said of the children of poverty (65:101):

> ...for them the great danger is not insolence from over-cherishing but insensibility from over-neglect.

For Arnold "the business of instruction is to seize and develop" the aptitudes with which every man is born, and, ideally, such instruction should include both the humanities and nature and her works (65:180):

> Meanwhile, neither our humanists nor our realists adequately conceive the circle of knowledge, and each party is unjust to all that to which its own aptitudes do not carry it. The humanists are loath to believe that a man has any access to vital knowledge except by knowing himself—the poetry, philosophy, history, which his spirit has created; the realists, that he has any access except by knowing the world—the physical sciences, the phenomena and laws of nature.

A comment might be made in passing to the effect that the above concept of ultimate aims, of the basic inseparability of the humanities and science—of what might be called a highly evolved kind of literacy—can scarcely be said to have been widely attained even today in this, the latter half of the twentieth century. Be that as it may, in Arnold's time it was the urgent practical needs of the rapidly-expanding industrial era that mattered. By the end of the nineteenth century the concept of the function of literacy, particularly as it pertained to the
masses, had changed significantly (16, 59). From a literacy whose prime aim was religious and moral it had become a literacy designed for usefulness in the world of work. Gradually the idea of a basic education for all developed into a practical reality: a state system of elementary schools for children of ages six to thirteen was set up under the Forster Act of 1870. Changes had also occurred at the universities: it was now possible to study not only such subjects as theology, philosophy and the classics, but also the sciences, economics, history, and English language and literature. With respect to the latter Arnold, who had made comparative studies of educational systems on the continent, remarked (65:185):

\[
\text{We have still to make the mother-tongue and its literature a part of the school course; foreign nations have done this, and we shall do it; ...}
\]

Gradually too it was realized that technical training for those with technical ability was needed, and just before the turn of the century a central body was set up with authority over elementary, secondary, and vocational schooling. In all, these changes occurred, partly because of the social agitation, but primarily because at all levels the economy needed better-educated workers, and, as an important corollary, because it provided jobs in which the newly-acquired knowledge and skills could be used.
CHAPTER VII

THE TWENTIETH CENTURY: LITERACY AND ECONOMIC DEVELOPMENT

Since the close of the nineteenth century the rate and extent of change in all areas of life—social, economic, governmental, military, cultural and political—has been so vast that there is scarcely a part of the globe that has not by now been affected in one way or another. One of the most significant facts of the twentieth century is that the occurrences and trends that shape people's lives have affected, and are continuing to affect, not small groups of people but the masses everywhere.

The point about this century being the century of the masses is an important one. In looking back it is all too easy to forget that the culture of any nation, that is, its literature, philosophy, science, etc., was mainly the perquisite of a very few, a portion of the upper and middle classes. Indeed, until the early years of the nineteenth century at least, it could be said that while the poor did not show themselves very apt scholars (96:11):

...their betters were not well instructed either. Among the gentry the men would have usually had some slight classical education, and the women would know how to read and write, the latter often imperfectly. The lower middle classes in the towns would have such rudiments of literacy as they needed
for their trade or occupation; in the country the farmers were mainly illiterate. It was the upper middle class and a few of the nobility who maintained the highly intellectual society of the age.

In the past very few had both the opportunity and the leisure for any degree of education and culture, and it should be noted that the primary impact of socio-economic change was on the upper reaches of society. The majority remained semi-illiterate or totally illiterate, and most spent their days in hard physical labour, mainly on the land. With the growth of the industrial working class, however, and in face of its great importance to society and its increasing power, this is no longer true. As Bernal has said (11:887):

...it is the aim of a rising class to capture literacy, culture, and science and in the process to make them far more generally available.

While the nineteenth century saw the major initial phases of industrialization, rising population, increased life expectancy, urbanization, and the working class struggle for education, it is the twentieth century that is experiencing the fantastic outcome of these developments. In the highly developed nations of the world today the outstanding features are mass literacy, mass industrialization, mass urbanization, mass transportation systems, enormous use of power from inanimate sources, and (compared to earlier times), massive social mobility. As in earlier periods, the primary cause of socio-economic change in the twentieth century has been scientific and technological development (7:278). Since the turn of the century scientists have been actively involved in most of the major economic, industrial and military developments of their time. This in itself is a marked change from the days when scientists and their activities were regarded as (perhaps) interesting, but rather apart from the mainstream of life, and it is a change that has come about because leaders of government and industry have become aware of the usefulness of scientific and technological work.

While the way in which science develops is poorly understood by the majority of the population, nearly everyone today is at least aware of the fact
that science and technology have a bearing on practically all aspects of life. A point that warrants frequent reiteration is that science itself, meaning basic research, leads to new understanding of the physical world—nothing more, nothing less. Change results from the ways in which the wider community exploits the new understanding. The mere fact of rapid and extensive socio-economic change challenges a community's powers of adjustment, and requires new concepts of literacy and education. The difficulty is compounded many times over by the great diversity of interests of the "wider community", ranging as it does from applied researchers, engineers, technologists, managers, industrial magnates, investors, federal governments and numerous government agencies, to finally, the consumers, the workers and parents who happen also to be taxpaying voters.

In any highly developed nation, where the whole socio-economic structure of life has its roots in a scientific and technological base, one of the main educational concerns may eventually be the development of citizens who are scientifically literate enough to adjust to and share intelligently in making socio-economic changes. This could be accomplished not so much by having specific or detailed scientific knowledge as by becoming aware of the choices, uses, and the probable consequences of their actions.

In any case, it is against this background of scientific development and socio-economic change that there has emerged in this century a new and continually changing concept of literacy, and a vastly expanded view of the uses, content, and distribution of education. In order to better understand the changes that have occurred some of the major events and developments of the twentieth century are discussed in the following pages, and an effort is made to assess their effects on education and on the whole concept of literacy. As new developments have gradually evolved in the sphere of science and technology they have been paralleled by changes in the social structure, in the economy, and in education.
I. CHANGES IN THE SOCIO-ECONOMIC SPHERE

Three of the most important developments of the century are:
1) mass production, soon to be followed by automation, both of which are inescapably allied with mass consumption; 2) a tremendous rural to urban shift of population, made possible by intensive mechanization of agriculture and use of highly scientific procedures with respect to plant and animal production; 3) a job revolution which has included the development of tertiary and even quarternary areas of employment.

Mass production, which is really an organizational rather than a technical or scientific development, depends on the combining of two requisite elements. These are the availability of inter-changeable parts, made possible by precision metal-cutting, and the assembly line or conveyor belt. Both of these elements had been known and used in earlier times. Water for the gardens of Ninevah was scooped up from a well by jugs fastened at intervals to a continuous rope; precision metal working stems from the mid-nineteenth century. However, it was not until the first decade of the twentieth century and in America that they were combined to make possible the fast efficient production of large numbers of machines.

The first conspicuously successful result of mass production methods was the appearance of the motor car industry. Expensive racing and luxury cars had been produced on a made-to-order basis in the latter part of the nineteenth century. Now, however, it became possible to produce automobiles in large numbers for a relatively low price. There followed a chain of developments that affected masses of people, for mass production methods were soon extended to an almost infinite variety of other goods. Cars were followed by trucks, tractors, and aeroplanes. These in turn required oil, steel, gas, plastics, chemical and electrical industries. The existence of the new industries led to an ever-increasing demand for supplies of raw materials. Competition for control of such resources as oil and nickel developed, giving rise to intense conflict of interests between nations. Ramifications in the sphere of politics and power have
been numerous and complex. Inter-locking corporations or cartels have been formed in an attempt to solve some of these conflicts. At intervals various nations have sought solutions by waging wars, both large and small. In one way or another the under-developed countries, no less than the developed ones, have been involved, for the search for raw materials, cheap labour, and markets for manufactured goods and agricultural products operates on a worldwide scale.

These various developments, all of which are related to the use of mass production methods, have greatly altered the social structure and the economy of people's lives in a variety of ways, particularly in the industrialized countries. One of the chief features of an industrialized society is the great concentration of people in urban and suburban areas, a phenomenon that is an inevitable consequence of the complex inter-dependence between industries, businesses, and the services provided by banking, shipping, advertising and other commercial interests. At the time of its founding in 1776 the United States of America had only six cities with a population of 8,000 or more, and only about 3 per cent of the people lived in them. By 1900, however, the population of the United States had reached 76 million, and over 40 per cent lived in towns and cities (18:43). In recent years many city boundaries have become blurred, resulting in what is called urban sprawl. Using a revised definition of urban population so as to include the inhabitants of densely settled urban-fringe areas and of unincorporated places of 2,500 or more outside the urban fringe, the U.S. Census of 1960 reported 70 per cent of the total population as urban. Even this does not accurately describe the actual situation, however, particularly for areas of urban sprawl such as the Megalopolis of the northeastern seaboard of the United States. The trouble lies in the fact that all those who are not classed as urban are counted as rural, and rural dwellers are most commonly thought of as those who live off the land. In point of fact, however, about 70 per cent of these so-called rural people would be better described by the phrase "rural nonfarm population", for it has been estimated that that fraction of them derive their income from urban pursuits or city jobs (42:46).
Some additional findings on world population and urbanization are presented in Tables III and IV. In general, great increases in urbanization are only possible where science, technology, and industry are sufficiently developed so as to replace human farm labour with machines, and where agricultural techniques, including use of fertilizers which depend, in turn, on the existence of a well-developed chemical industry, are highly sophisticated. Some Canadian statistics are of interest here: since 1867 the population of Canada has risen from an estimated 3.5 million to 20.8 million in 1967. In 1956, 58 per cent of the people were living in urban areas, and the estimate for 1980 is 66 per cent (29:147). In 1926 the agricultural labour force was 1,181,000; during the depression days this rose to a peak of 1,293,000; by 1958 it had fallen to 725,000. According to some estimates for Canada, over the period 1939-1958 the agricultural labour figure went down by 44 per cent; the labour force in business increased by about 50 per cent; that in government by 100 per cent. Over this same period farm cash income went up from $712 million to $2,787 million. Predictions are that by 1980 the ratio of business to agricultural labour force will be about ten to one (27:35).

This great rural-to-urban shift of populations, and the highly intensified expansion of industrial enterprise with which it is associated, is intimately connected with the increasingly advanced twentieth century concepts of literacy and education. The reason lies in the greatly increased number and complexity of job opportunities. The primary occupations, farming and mining, and even the secondary ones, manufacturing, are gradually being superseded by what are called service or tertiary occupations. The latter, which include such classifications as clerical, commercial, retail and wholesale trade, financial, medical, government work and special professions such as law and architecture, have come to occupy a considerable fraction of the labour force. In fact it is said that the proportion of those employed in tertiary occupations is now greater than the proportion of those employed in manufacturing (42:81). As division of labour increases and jobs become more and more highly specialized the labour force must become more literate, more highly trained in skills and knowledge.
# Table III
## Percentage of World's Population Living in Cities

<table>
<thead>
<tr>
<th>Year</th>
<th>Cities of 20,000 or more</th>
<th>Cities of 100,000 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800</td>
<td>2.4</td>
<td>1.7</td>
</tr>
<tr>
<td>1850</td>
<td>4.3</td>
<td>2.3</td>
</tr>
<tr>
<td>1900</td>
<td>9.2</td>
<td>5.5</td>
</tr>
<tr>
<td>1950</td>
<td>20.9</td>
<td>13.1</td>
</tr>
</tbody>
</table>

# Table IV
## Percentage of World's Population Living in Cities, by Regions

<table>
<thead>
<tr>
<th>Region</th>
<th>In Cities of 20,000 plus</th>
<th>In Cities of 100,000 plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>Oceania</td>
<td>47</td>
<td>41</td>
</tr>
<tr>
<td>North America (Canada and U.S.A.)</td>
<td>42</td>
<td>29</td>
</tr>
<tr>
<td>Europe (except U.S.S.R.)</td>
<td>35</td>
<td>21</td>
</tr>
<tr>
<td>U.S.S.R.</td>
<td>31</td>
<td>18</td>
</tr>
<tr>
<td>South America</td>
<td>26</td>
<td>18</td>
</tr>
<tr>
<td>Middle America and Caribbean</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td>Asia (except U.S.S.R.)</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>Africa</td>
<td>9</td>
<td>5</td>
</tr>
</tbody>
</table>

Certain other aspects of the greatly altered socio-economic conditions of life must also be mentioned, for they too have important implications where literacy is concerned. For one thing, with continuing scientific discovery and technological innovation the early industries have gradually branched out and given rise to a number of new industries in such things as radio, television, satellite communication, computers and so on. These in turn have made possible mass communication, with content ranging from slick advertising to factual (?) news coverage; from propaganda to useful information. Another fact of twentieth life is that as the goods produced by mass methods have become more abundant, more varied and more complex the consumers of these goods have had to be not only literate but also more and more sophisticated in their knowledge, desires and tastes. This sort of sophistication is one of the things acquired through education, and through psychological manipulation of the public by means of mass media advertising: in either case literacy is involved.

The outstanding advantage of mass production is that it makes possible the production of more goods per man-hour of work. The result has been a greatly increased standard of living accompanied by an appreciable increase in leisure time. This time factor is of crucial importance in making it possible for people to acquire higher levels of literacy. The combination of leisure time plus the intermingling of people in an urban environment gives large masses of people opportunities such as were never possible in earlier centuries: opportunity to talk to others, to listen, to think, to acquire new knowledge if they so desire, to be creative, to travel, to hike, to ski—the variety is limitless. While class stratification still exists, and equality of opportunity is nowhere a reality, at least it can be said that the barriers for large masses of people are by no means as rigid as they were at one time. Not only are higher levels of literacy essential to the economy and useful to the citizen in finding work and supporting himself; the increased level of skills and knowledge provided by the urban-industrial environment makes possible in high degree the intrinsic development of the individual. The upsurge in adult education, the great boom in paperback publications, and the all-pervasive influence of the mass media such as newspapers, magazines, radio and television are relevant examples here.
II. EDUCATION AND ECONOMIC GROWTH

Turning now to some of the changes that have occurred in education, Table V shows that a gradual increase in the number of years of schooling has occurred since the early years of the century. It should be noted that while the educational attainments of the Canadian and U.S. labour forces appear to have been fairly close to each other in 1911, by 1961 a considerable educational gap had appeared. As Table V shows, the median for Canada was 9.37 years in 1961; for the U.S. it was 10.30 years in 1960 and 11.10 years in 1962.

<table>
<thead>
<tr>
<th>Years</th>
<th>Canada (Median years of schooling)</th>
<th>United States (Median years of schooling)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1911</td>
<td>7.35</td>
<td>7.41</td>
</tr>
<tr>
<td>1921</td>
<td>7.75</td>
<td>7.68</td>
</tr>
<tr>
<td>1931</td>
<td>8.04</td>
<td>8.01</td>
</tr>
<tr>
<td>1941</td>
<td>8.43</td>
<td>8.55</td>
</tr>
<tr>
<td>1951</td>
<td>9.74</td>
<td>9.00</td>
</tr>
<tr>
<td>1961</td>
<td>9.37</td>
<td>10.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11.10</td>
</tr>
</tbody>
</table>


Inasmuch as the U.S. figures are given for the whole male population age 25 and over, the U.S. median is understated relative to the Canadian one, for inclusion of persons in the "65 and over" group, who have lower average educational attainments, would lower the median calculation.
As shown in Table VI, the medians for the older age groups in both Canada and the U.S. are lower than for those in the younger groups. The fact that the Canadian median is more than two years lower than the U.S. median for the younger age group also shows a widening gap in educational attainments between the two countries.

**TABLE VI**

**MEDIAN YEARS OF SCHOOLING, MALE LABOUR FORCE**

**CANADA 1961 AND UNITED STATES 1962**

<table>
<thead>
<tr>
<th></th>
<th>Median years of schooling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Canada</td>
</tr>
<tr>
<td>25 - 34</td>
<td>10.0</td>
</tr>
<tr>
<td>35 - 44</td>
<td>9.6</td>
</tr>
<tr>
<td>45 - 54</td>
<td>9.0</td>
</tr>
<tr>
<td>55 - 64</td>
<td>8.3</td>
</tr>
</tbody>
</table>


Additional evidence of the improved educational level of the labour force in both the United States and Canada is shown in Table VII. An important feature of the changes shown in this table is the decline in the proportion of persons with only elementary schooling. It can be noted that for the youngest age group of 25 - 34 years of age, 81.5 per cent in Canada and 88.9 per cent in the U.S. had achieved at least eight years of schooling. Table VIII is of interest because it shows how large the differences are between the two countries, particularly at the university level for both the younger and the older age groups.

While it has long been recognized that education enhances the quality of life, for the individual as well as for the whole quality of the community, it is only in recent years that the relationship between education and economic growth
TABLE VII
EDUCATIONAL ATTAINMENT OF THE MALE LABOUR FORCE BY AGE GROUPS,
CANADA 1961 AND UNITED STATES 1960
(Percentage distribution)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total</th>
<th>0-4 Years</th>
<th>5-7 Years</th>
<th>8 Years</th>
<th>1-3 Years</th>
<th>4 Years</th>
<th>Some University Education</th>
<th>Complete University Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total, 25-64</td>
<td>100.0</td>
<td>7.5 5.8 20.8 12.4</td>
<td>17.6 16.0 29.7 20.5</td>
<td>8.7 24.6 10.1 9.5</td>
<td>5.6 11.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-34</td>
<td>100.0</td>
<td>3.9 3.2 14.6 7.9</td>
<td>19.5 9.8 33.8 21.9</td>
<td>8.7 30.8 13.5 11.7</td>
<td>6.0 14.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-44</td>
<td>100.0</td>
<td>6.1 4.5 21.4 9.9</td>
<td>15.0 12.9 31.6 21.4</td>
<td>9.5 29.5 10.1 9.9</td>
<td>6.3 11.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-54</td>
<td>100.0</td>
<td>9.5 6.9 23.4 15.3</td>
<td>17.8 20.1 27.3 20.7</td>
<td>8.5 20.0 8.4 8.3</td>
<td>5.0 8.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55-64</td>
<td>100.0</td>
<td>15.3 11.1 29.1 20.1</td>
<td>18.3 26.1 20.3 16.6</td>
<td>7.4 12.2 5.3 6.9</td>
<td>4.2 7.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Includes Grade 13 for provinces in which Grade 13 is given.

### TABLE VIII

**MINIMUM YEARS OF EDUCATIONAL ATTAINMENT OF MALE LABOUR FORCE, AGED 25–34 AND 55–64, CANADA 1961 AND UNITED STATES 1960**

<table>
<thead>
<tr>
<th>Minimum Educational Attainment</th>
<th>Per cent of Male Labour Force</th>
<th>Percentage by which U.S. exceeds Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age Group</td>
<td>Canada</td>
</tr>
<tr>
<td>8 years elementary school</td>
<td>25–34</td>
<td>81.5</td>
</tr>
<tr>
<td></td>
<td>55–64</td>
<td>55.5</td>
</tr>
<tr>
<td>4 years high school</td>
<td>25–34</td>
<td>28.2</td>
</tr>
<tr>
<td></td>
<td>55–64</td>
<td>16.9</td>
</tr>
<tr>
<td>University degree</td>
<td>25–34</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>55–64</td>
<td>4.2</td>
</tr>
</tbody>
</table>

has been studied in any systematic way. Various attempts are now being made to measure the variables contributing to economic growth, and to assess the role of education as one of the significant variables (38, 43).

The essence of economic growth is increased productivity, usually measured in terms of output per person employed. It is the increased output per man-hour that ultimately serves to increase the average real income per individual, and this in turn is the basis of an increased standard of living. Among the factors that contribute to economic growth are increased labour resources (more manpower); increased physical resources (more machinery, buildings, land, etc.); improved quality of the labour force (more knowledge and skills); use of more technologically advanced equipment; and improved efficiency obtained through increased specialization, larger scale organization, or better organization of production processes (43:45-47).

In spite of the fact that it is very difficult to measure exactly the contribution of education it has none-the-less been widely accepted for some time that education is one of the more important factors contributing to economic growth. This belief, keeping in mind the maxim that correlation does not necessarily imply causation, seems to be well supported by a large number of economic analyses in a variety of countries. For example, in Canada it has been estimated that the average real income per person in the male labour force was about 25 per cent higher in 1961 than it would have been if the average educational levels had remained as they were in 1911 (43:92). A key assumption in making this calculation was that three-fifths of the differences in incomes of individuals is attributable to differences in education, the other two-fifths being attributable to such factors as intelligence, family background, chance, and so on.

Table IX also indicates the advantage of a higher education in determining income level. Other sources show that over the period 1911-61, income per man, considering only years of schooling, increased almost twice as much in the United States as in Canada, and it is interesting to note that over those years the percentage change in average years of schooling was 58.5 per cent in the United States compared to 38.6 per cent in Canada (13:52).
TABLE IX  
AVERAGE ANNUAL INCOME FROM EMPLOYMENT BY LEVELS OF 
EDUCATION, MALE NONFARM LABOUR FORCE, 1960

<table>
<thead>
<tr>
<th>Education</th>
<th>Dollars</th>
<th>Index (0-8 years = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 8 years elementary</td>
<td>3,526</td>
<td>100</td>
</tr>
<tr>
<td>1 - 3 years high school</td>
<td>4,478</td>
<td>127</td>
</tr>
<tr>
<td>4 - 5 years high school</td>
<td>5,493</td>
<td>156</td>
</tr>
<tr>
<td>Some university</td>
<td>6,130</td>
<td>174</td>
</tr>
<tr>
<td>University degree</td>
<td>9,188</td>
<td>261</td>
</tr>
</tbody>
</table>


By way of further illustration, there would seem to be a relationship between the high per capita income in the United States and its relatively greater investment in education when these are compared to levels in other countries. For example, the per capita income in the United States in 1965, as reported by Kahn and Wiener (70:118-184), was $3,557 while that in Western Europe was about $1,800, and the figure given for Russia was approximately $1,200. The authors noted that at this time one-third of all students in the world in higher education were American. In such countries as the United Kingdom, France, Germany, and Italy it has been estimated that about 90 per cent of the 13-14 year olds are in school, but that after the age of 15 there is a sharp drop-off. In the United States, on the other hand, 99 per cent of the 13-14 year olds are in school, and at age 18, still more than 45 per cent of them are pursuing their education (92:80). It has also been stated that the per capita productivity of the United States in the mid-sixties was 40 per cent above that of Sweden; 60 per cent above Germany; 70 per cent above France and 80 per cent above that of Britain. According to the Chorafas report, the percentage of the 20-24 year olds who were attending university or some other
institution of higher learning during this same period was as follows: U.S. 43; U.S.S.R. 24; Canada 22; Japan 13; France 16; Sweden 11; Britain 7; Italy 7; Germany 7.5 (92:73).

Another example of the effects of low literacy levels is to be found in a study, published in 1956 by Clough and Livi (34), on the uneven development of Northern Italy as compared to the South. While the South has 41 per cent of all the land, and 37 per cent of the population, it accounted for only 20 per cent of the national income (1953). Although the North has many industrial advantages that are not related to literacy, such as better iron resources, more fertile land, and more water power, still it is considered that the backwardness and low productivity of the South is in part due to its lower standard of education. On this point it was stated by the authors that:

...the labour force in the South has not been able, because of extensive illiteracy and lack of technical education, to develop skills, at least from early ages, at the same rate as in the North. In 1871 the number of illiterates per 100 inhabitants over six years of age was 59 in the North and 84.1 in the South, while in 1948 the corresponding numbers were, respectively, 5 and 24. In 1949–1950 the North and center accounted for 70 per cent of all school children in technical or professional upper middle schools, that is, for young people from approximately the ages of 13 to 18, while the South accounted for the other 30 per cent.

The authors also noted that public health was generally better in the North, and that life expectancy at birth was notably higher there.

In a detailed study (104) made under the auspices of the United Nations a total of seventy-four countries and territories were grouped by level of per capita national income and the group averages for twelve economic and social indicators were compared (Table X). Per capita national income and per capita energy consumption are economic indicators, taken to reflect the value of total goods and services available as well as the level of industrialization in a given country. The social indicators refer to actual "levels of living" in such areas as education, health and nutrition. Of the many qualifying statements, explanations and cautions given in the Report itself, it is only relevant and necessary
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>$100-200</td>
<td>$200-300</td>
<td>$300-400</td>
<td>$400-500</td>
<td>$500-600</td>
</tr>
<tr>
<td>II</td>
<td>$600-700</td>
<td>$700-800</td>
<td>$800-900</td>
<td>$900-1000</td>
<td>$1,000-1,100</td>
</tr>
<tr>
<td>III</td>
<td>$1,100-1,200</td>
<td>$1,200-1,300</td>
<td>$1,300-1,400</td>
<td>$1,400-1,500</td>
<td>$1,500-1,600</td>
</tr>
<tr>
<td>IV</td>
<td>$1,600-1,700</td>
<td>$1,700-1,800</td>
<td>$1,800-1,900</td>
<td>$1,900-2,000</td>
<td>$2,000-2,100</td>
</tr>
<tr>
<td>V</td>
<td>$2,100-2,200</td>
<td>$2,200-2,300</td>
<td>$2,300-2,400</td>
<td>$2,400-2,500</td>
<td>$2,500-2,600</td>
</tr>
<tr>
<td>VI</td>
<td>$2,600-2,700</td>
<td>$2,700-2,800</td>
<td>$2,800-2,900</td>
<td>$2,900-3,000</td>
<td>$3,000-3,100</td>
</tr>
<tr>
<td>VII</td>
<td>$3,100-3,200</td>
<td>$3,200-3,300</td>
<td>$3,300-3,400</td>
<td>$3,400-3,500</td>
<td>$3,500-3,600</td>
</tr>
<tr>
<td>VIII</td>
<td>$3,600-3,700</td>
<td>$3,700-3,800</td>
<td>$3,800-3,900</td>
<td>$3,900-4,000</td>
<td>$4,000-4,100</td>
</tr>
<tr>
<td>IX</td>
<td>$4,100-4,200</td>
<td>$4,200-4,300</td>
<td>$4,300-4,400</td>
<td>$4,400-4,500</td>
<td>$4,500-4,600</td>
</tr>
<tr>
<td>X</td>
<td>$4,600-4,700</td>
<td>$4,700-4,800</td>
<td>$4,800-4,900</td>
<td>$4,900-5,000</td>
<td>$5,000-5,100</td>
</tr>
</tbody>
</table>

**Source:** UN World Social Situation, 1961, p. 44.
here to explain what is meant by "school enrolment ratio". This term is based on the assumption that the normal period of schooling, excluding pre-primary and higher education, covers twelve years or four-fifths of the 5-19 age group. In Table X the enrolment ratios are expressed as a percentage of four-fifths of the 5-19 age group.

If, instead of looking at the group averages, countries are ranked under the different indicators, mathematical measures of correlation can be used to throw further light on the closeness of the relation between these indicators. The coefficients of rank correlation between different indicators are given in Table XI. The authors of the Report noted that the most important social indicators—infant mortality, school enrolment and calorie consumption—are all more closely related to per capita national income than to either energy consumption or level of urbanization.

**TABLE XI**

COEFFICIENTS OF RANK CORRELATION AMONG SELECTED SOCIAL AND ECONOMIC INDICATORS

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per capita national income</td>
<td>0.90</td>
</tr>
<tr>
<td>and energy consumption</td>
<td></td>
</tr>
<tr>
<td>infant mortality</td>
<td>-0.84</td>
</tr>
<tr>
<td>school enrolment</td>
<td>0.84</td>
</tr>
<tr>
<td>calorie consumption</td>
<td>0.80</td>
</tr>
<tr>
<td>starchy staples</td>
<td>-0.86</td>
</tr>
<tr>
<td>Energy consumption and infant</td>
<td>-0.69</td>
</tr>
<tr>
<td>mortality</td>
<td>0.76</td>
</tr>
<tr>
<td>school enrolment</td>
<td></td>
</tr>
<tr>
<td>Urbanization and infant</td>
<td>-0.69</td>
</tr>
<tr>
<td>mortality</td>
<td>0.71</td>
</tr>
<tr>
<td>school enrolment</td>
<td></td>
</tr>
<tr>
<td>starchy staples</td>
<td>-0.66</td>
</tr>
<tr>
<td>calorie consumption</td>
<td>0.69</td>
</tr>
<tr>
<td>Infant mortality and school</td>
<td>-0.67</td>
</tr>
<tr>
<td>enrolment</td>
<td>0.43</td>
</tr>
<tr>
<td>number of inhabitants per</td>
<td></td>
</tr>
<tr>
<td>physician</td>
<td></td>
</tr>
<tr>
<td>calorie consumption</td>
<td>-0.81</td>
</tr>
<tr>
<td>Literacy and school enrolment</td>
<td>0.78</td>
</tr>
<tr>
<td>Male labour force in agriculture and infant mortality</td>
<td>0.86</td>
</tr>
<tr>
<td>energy consumption</td>
<td>-0.89</td>
</tr>
<tr>
<td>school enrolment</td>
<td>-0.81</td>
</tr>
<tr>
<td>Source: UN World Social Situation, 1961, p. 43.</td>
<td></td>
</tr>
</tbody>
</table>
From even the limited amount of evidence presented thus far it is plain that in those countries where economic growth has been extensive, where industrialization and urbanization have occurred on a large scale, where per capita income, standard of living, life expectancy, energy consumption, and many other such factors are high, educational levels have in fact increased accordingly. Whenever the economy requires better educated workers, and whenever citizens require a good education in order to obtain jobs, then education seems to become available.

This is not to imply that economic factors are the only ones. Indeed, the common use of the expression "socio-economic" indicates that social and economic changes are inextricably inter-related. Scientific and technological developments make new kinds of businesses and new methods of production possible. These in turn usually provide a higher standard of living, and gradually a higher standard of living leads to a greater amount of leisure time. At least two factors then operate to change the educational pattern: the new job opportunities require better-educated people, and the leisure time available (because the economy can do with fewer man-hours of work) makes it possible for an increasing fraction of the population to stay longer at school.

Another facet of the problem is that as industrial development and mechanization of farm labour proceeds, there just are not enough jobs to absorb the ever-increasing numbers of young people. In many cases there would be great unemployment problems if masses of young people were released from school and turned out into the labour market. The whole question of employment, education, economic growth and use of leisure time is extremely complex, and there are no simple one-way paths of cause and effect.

Another social factor (but one that grows out of the prevailing economic opportunities) that leads to a demand for more education is the keen awareness on the part of many people that education makes possible a better standard of living, a pleasanter life, and a better social position. While this awareness is chiefly a characteristic of the more affluent classes, it is also to be found to some extent among the less affluent families in society.
The net effect in the developed countries of the twentieth century has been that as educational needs have gradually increased the concept of literacy has gradually expanded so as to encompass those needs. As discussed in Chapter I, it was fairly generally agreed by 1940, at least in Canada and the United States, that the minimum functioning level of literacy, as seen in terms of the "apparent educational needs" of the times, should be set at five years of schooling completed.

III. SOME PROBLEMS AND IMPLICATIONS

In the developed nations of the world certain anomalies have been gradually becoming more apparent, and these anomalies may have an effect on future concepts of literacy. On the one hand, there is a trend toward what some persons, including many educators, call "over-education", by which they mean that certain people have had more training or education than they actually need for the jobs in which they are engaged. On the other hand, many businesses and industries are gradually becoming more fully automated, and it is certain that this trend will continue markedly in the future. As it does, and as the number of units of material goods or services produced per man-hour increases, the problem arises as to what will happen to the workers who will be displaced. This, of course, is not a new situation: in the early stages of industrialization there was great concern that thousands would be put out of work by the use of machines, and it is true that at different times many did suffer for just this reason. In the future, as in the past, one of the results of extensive automation will no doubt be the appearance of many new kinds of work. As a matter of fact, this is already happening. Although the basic industries, such as agriculture and manufacturing, are increasingly automated, they now employ more and more highly trained people to operate and service the machines. The banking industry can be cited as another example of increased job opportunity even although banks are mechanizing their operations with electronic devices, including elaborate computing systems.
It has been stated that bank employment in the last half of the 1950's increased 65 per cent as compared with an increase of 20 per cent for total nonagricultural employment in the United States (42:90).

An increase in the kinds of work available is not the only possible outcome of automation, however. There is in addition a continuing trend to fewer hours of work per week and longer annual vacations. With the possibility of increasing amounts of leisure time comes the possibility that the present work-oriented concept of literacy may alter somewhat so as to take into account some of the other human needs, such as the need for recreation, for creativity, for a wider range of experience, for intrinsic development of the individual.

There are already indications that the concept of literacy is widening so as to put a greater emphasis on some of the social aspects of life, which is to say that it is becoming apparent to at least some people that the educational needs of the times are changing (20). Kahn, for example, has said that in the Post-Industrial society of the near future private enterprise will no longer be the major source of scientific and technological development; the free market will take second place to the public sector and to social services (70). Galbraith essentially agrees with this view that adaptation of the economy to more complex and controlled relationships will be one of the features of the future (49).

Also indicative of this growing dimension of social consciousness is the increased attention being given by the schools and universities in recent decades to social problems, to the social sciences and to sociology. As an example of this broadening of interest, an interdisciplinary program in science, technology and society is to begin this fall (1969) at Cornell University. According to its director, it will focus on problems of national and worldwide concern such as the relationship among science, technology, and public policy, including defense policy, world food supplies, ecology, population growth, and increased urbanization. Another similar example is the new study center, the Center for the Study of Science and the Future of Human Affairs, that has just recently opened on the Albany campus of the State University of New York. Accompanying these
new developments there has been a marked swing on the part of students away from the sciences in favour of subjects that relate more to the problems of people in the contemporary world. Of particular interest because it is so far removed from their normal activities is the series of studies sponsored by the National Aeronautics and Space Administration on the possible long-range effects of the space program on society. Volume two of this series is entitled *Social Indicators* (8). Such developments surely presage what many educators would call higher levels of literacy, and it is possible that the phrase "social literacy" may come into use.

In an entirely different vein, one of the twentieth century problems that also has implications for literacy and the concept of literacy has to do with the gap between the developed and the developing nations of the world. Inasmuch as the continued functioning of the highly industrialized nations depends so much on the mutual interdependence between nations, it would seem that, in terms of modern technology, the national state is out of date. However true this may be, a major fact of contemporary life is that the world is still dominated by work-oriented cultures and by national state socio-economic systems. The important consequence is that in their efforts to survive politically they continue to control the diffusion, content and uses of literacy. Meanwhile the emerging nations of Africa and Asia are caught between the two opposing ideologies of capitalism and communism (114).

Turning to more immediately practical educational matters there is the problem as to the role of audio-visual devices, programmed instruction machines and the like in achieving literacy in the future. At the moment there is much opposition to innovations of this sort, in spite of the fact that there are at least several examples of their apparently successful use, as for example in the teaching of freshman chemistry at McGill University. Certainly the field is young and more research and study are required, but it is unfortunate that there are so many who dismiss the matter outright. As Samuel B. Gould, the chancellor of the State Universities of New York, said in a recent interview (52):
There are going to be important discoveries about the learning process, but they won't be accepted... not without great resistance, anyway. ...You can see how strong the resistance is to using TV, for example. ...And one thing you can be sure of—whatever happens will just happen, and not because of any elaborate plans we lay.

As to the suggestion that literacy, in the sense of ability to read and write, may well become obsolete— one can only say that millions of people, both now and in the past, have lived without literacy: it is quite possible to do so. Just as the blind get along without vision, and the deaf without hearing, so too could everyone get along without reading and writing. In point of fact, however, there is no indication of any trend away from literacy. Libraries are serving an ever-larger fraction of the public; the paper-back industry which, it must be noted, depends on mass consumption for its profits, is thriving; the list of Books in Print for the fall of 1969 contains 275,000 titles—an increase of 45 per cent over the number published in 1966 (37).

There is considerable evidence that whenever people are given the time, the opportunity, and some assistance, they are in general willing and eager to develop their mental faculties. There would seem to be no valid grounds for making this development subject to an either-or argument as to the relative merits of acquiring knowledge and experience through audio-visual means or through literacy. If the ultimate aim is the utmost possible development of the potentialities of each individual, then the greater the variety of ways of learning, and the more varied the types of instructional media, the better.

In connection with the current controversy as to the possible fate of the printed word it is of interest to note a recent statement made by Paul Johnson, editor of the New Statesman (68):

I do not for one moment foresee the downgrading, let alone the supersession, of the written word. Next to Herbert Marcuse, I regard Marshall McLuhan as perhaps the most wrong-headed prophet of our time, and I reject emphatically his suggestion that we are moving into an audio-visual world in which books will have little part to play.
A greater percentage of the world's population can read and write today than ever before in the history of mankind. More books, per capita, are being written, published, bought and read than ever before. This process too, will accelerate.
CHAPTER VIII

CONCLUSIONS

In over-all perspective the salient point concerning literacy is its importance as a means of communication. With the invention of systems of writing the possibilities for communication were infinitely extended, for ability to read and write allows of contact between people of past, present, and future ages. The things communicated can range from fact to fancy, from elaborate mathematical proofs to fear-ridden superstitions. Not only has the communication of ideas, values and beliefs been of great import in the evolution and development of civilization; even more important has been the communication of knowledge and the recording of facts that could not possibly have been memorized.

Some of the other main points to emerge from a survey of the varying concepts of literacy can be summarized as follows:
1) Literacy is an urban phenomenon and is absolutely essential for the maintenance and continued functioning of the socio-economic structure of a city.
2) Concepts of literacy have always been seen primarily in terms of their usefulness in furthering the economic system and/or maintaining the social structure of the times.
3) The varying concepts of literacy that have prevailed at different periods of man's history can only be analyzed or assessed in a meaningful way by taking into account the content and distribution of education that was apparently considered adequate at any particular time.

4) Suggestions to expand the content and extend the distribution of education have generally been met with resistance.

5) Changes in the concept of literacy have primarily been brought about by changes of an economic nature, and the latter occur under the stimulus of increased scientific knowledge and technological sophistication.

A characteristic that is common to any urban society, whether simple or complex, ancient or modern, is a division of labour and a consequent interdependence among its people. In order to co-ordinate the flow of goods and services, to distribute food, raw materials, manufactured goods and so on, and in order to deal with such problems as the law, taxation, water supply and defense, a certain proportion of the population must be literate. In the days of the earliest cities, and for centuries thereafter, a relatively small number of literate persons sufficed to maintain the functioning of the state, and for the most part it was only necessary for them to be able to read, write, and do simple arithmetic. The traditional concept of literacy—a concept which for centuries has been expressed primarily in terms of some simple though unspecified level of ability to read and write—stems from those days when that concept of literacy encompassed the educational needs that were considered adequate for the times.

In earlier times the main reasons for the small distribution of literacy amongst the population and for the rather elementary abilities involved are two-fold. In the first place, the vast majority of the people were engaged in agriculture—a pursuit that, until the large-scale mechanization of the twentieth century, required virtually no literacy. Secondly, while there were many specialized workers in the city, their skills were mainly manual skills, learned by verbal instruction and demonstration in apprenticeships: the majority of the workers had no need or use for literacy.
In almost complete contrast is the modern industrial society, where a virtually complete reversal of pattern has occurred. No longer is the vast bulk of the population almost totally illiterate and preoccupied with food production. As a result of increased scientific and technological development the modern industrial society is characterized by the complexity of its industrial processes, by a high degree of urbanization, by the great profusion of highly specialized jobs to be done, and, above all, by the high degree of literacy of its people—a distribution and level of literacy that the industrial processes and specialized jobs must have.

Among the exciting possibilities for the future are the extension of literacy on a mass scale to the peoples of the under-developed nations; the expansion of the present work-oriented concept of literacy to include a large measure of social consciousness and a greater emphasis on the ability to choose between alternatives—an ability that would have to be based on consideration and knowledge of the possible consequences of various courses of action; and the extension and up-grading of mass literacy by means of new methods of teaching and learning involving increased use of mass-media techniques and electronic devices.

The possibilities for research in the field of adult education are many: how to make adults more accepting of change, or better prepared to cope with it; what factors determine a person's level of "social literacy"; the devising of programs that would assist people in choosing between alternatives, or indeed make them aware that alternatives often do exist; studies of the learning and teaching processes, and of effective ways of using the new techniques, for example.
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APPENDIX I

OBSIDIAN AND THE TRADE ROUTES
OBSIDIAN AND THE TRADE ROUTES

Obsidian is a hard, brittle glass-like substance of volcanic origin. Tools made of it have been found in most of the early village sites of the Mediterranean region and the fertile river-valleys of Sumer and Egypt. Yet it occurs only in areas of volcanic activity, that is, in parts of Italy, some of the Aegean Islands, and a few areas of modern Turkey and Iran.

Obsidian samples from different regions contain different proportions of trace elements such as barium and zirconium, and these differences can be detected by spectroscopic analysis. By analyzing small fragments (about 60 milligrams is enough to run a test) of tools from various sites and comparing them with analyses of known samples (i.e., from the original source area) it is possible to work out the trade routes by which a given piece of obsidian was carried from volcanic source to a village site.

APPENDIX II

THE ADVANTAGES OF LITERACY
THE ADVANTAGES OF LITERACY

From an Egyptian Papyrus of Uncertain but Early Date:

I have considered violent manual labour—give thy heart to letters. I have also contemplated the man who is freed from his manual labour, assuredly there is nothing more valuable than letters. As a man dives into water, even so do thou sink thyself to the bottom of the Literature of Egypt...

I have seen the blacksmith, directing his foundrymen, but I have seen the metalworker at his toil before a blazing furnace. His fingers are like the hide of the crocodile, he stinks more than the eggs of fish. And every carpenter who works or chisels, has he any more rest than the ploughman? His fields are wood, his tools of tillage are copper. Released from his work at night, he works more than his arms (during the day). At night he lights a lamp...

The weaver sitting in a closed-up hut has a lot that is worse than that of a woman. His thighs are drawn up close to his breast, and he cannot breathe freely. If for a single day he fails to produce his full amount of woven stuff, he is beaten like the lily in the pool. Only by bribing the watchmen at the doors with (his) bread-cakes, can he obtain for himself the sight of sunlight... I tell thee that the trade of the fisherman is the worst of all trades; truly he does not exist by (his) work on the river. He is mixed up with the crocodiles, and if the papyrus clusters are lacking he must cry out (for help). If he is not told where the crocodile lurks, fear blinds his eyes. Verily there is no occupation than which better cannot be found except the calling of the scribe which is the best of all.

The man who knows the art of scribe is the superior through that fact alone, and this cannot be said of any other of the occupations I have set before thee. Verily each worker curses his fellow. No man says to the scribe, "Plough the fields for this person"... One day (spent) in the chamber of instruction is better for thee than eternity outside it; the works thereof (endure like) the mountains. ... (11:88-9).
From an Egyptian Work of Perhaps the Eleventh Dynasty, With the Title:
The Teaching of Khety, Son of Duaúf:

I have never seen the smith as an ambassador, but I have seen the smith at his work at the mouth of his furnace; his fingers like the crocodile's, and he stank more than fishes' eggs. The stonemason finds his work in every kind of hard stone. When he has finished his labours his arms are worn out, and he sleeps all doubled up until sunrise. His knees and his spine are broken.

The barber shaves from morning till night; he never sits down except to meals. He hurries from house to house looking for business. He wears out his arms to fill his stomach, like bees eating their own honey. The farmer wears the same clothes for all times. His voice is as raucous as a crow's. His fingers are always busy, his arms are dried up by the wind. He takes his rest—when he does get any rest—in the mud. If he's in good health he shares good health with the beasts; if he is ill his bed is the bare earth in the middle of his beasts. Scarcely does he get home at night when off he has to start again. 'Therefore, apply your heart to learning. In truth there is nothing that can compare with it.' (117:467-8)