LITERACY VS. ILLITERACY
An Historical Substitution Analysis

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August 1984
WP-84-62

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PREFACE

The search for stable and simple behavior of social systems led to interesting results in the area of economics, e.g. in my analysis of energy systems, cars, transportation, when physical parameters were measured, and not money indicators.

This led me to think that the primary mechanisms are to be sought in cultural patterns, i.e. in the way the individual and society manipulate information. "Action" is seen then as a transcodification of cultural imagery in much the same way an animal species is a transcodification of DNA strings.

In order to proceed in that direction I have started studying sorts of "actions" where money is not directly involved and even economic advantages at large are not an indirect cause.

The examples reported here refer to the expansion of literacy in some Western countries and Japan starting from the last century. They have been chosen in relation to completeness and credibility of the data series.

LITERACY vs. ILLITERACY

An Historical Substitution Analysis

Après qu'ils ont appris à lire et à écrire, la bêtise latente se dégage.

– Montaigne

Cesare Marchetti

General Comments on the Tables

Competition analysis using Volterra equations has proved very successful in describing many sides of human affairs, especially in the field of physical economy, i.e. when physical indicators are used to monitor economic processes, instead of the usual money indicators [1][2][3][4].

My subjacent hypothesis is that human affairs are a projection, a transcodification, of mental affairs in a strict formal analogy of DNA being transcodified into living creatures swimming and fighting in their ecological niches. In this frame of thinking human affairs, organization and economy in particular are the "phenotypic" correspondent structures created and manipulated in the individual and collective mind and should be controlled by mechanisms and rules therein.

All this may appear as a form of platonism filtered through biological templates. I think it is more than that. It is the recognition that platonism did detect and reconstruct, if partially and imperfectly, the working of a biological system. Human society, its culture and behavior, are obviously an outcrop of evolutionary biological processes, and I see no contraindication in trying to map them under a unitary formal theory [5].

That said, I have been chasing for examples where the usual economic drives are not directly accountable for explaining behavior, and where credible statistics are available. The case I will examine now is that of literacy.

Our brain is certainly endowed with extraordinary memory capacity and humanity for a long time relied on it alone. Hunting-gathering permitted only scattered populations with small aggregates having limited cultural pools and interpersonal interactions to keep record of [6].

When managed agriculture and husbandry increased the spatial intensity of the food yields and the corresponding *spatial density of human population*, much larger aggregates became physically possible (villages and cities) with a consequent increase in the complexity of the cultural pool and personal interactions. At that point an "external" memory started showing its advantages. Writing, for quantities and qualities, emerged precisely at that point and was already present in the "fertile crescent" in around 3500 B.C.

The external "hard" memory is obviously more useful where the messages are complex, the time spans are long and the distances large. Administration, commerce and religion were the most important recipients, and consequently the capacity to input-output this memory did not need to spread outside the very restricted elites of power and wealth.

The situation did not change much for the following four thousand years, in my opinion because the complexity of a social system depends on population density, and agricultural practices did not substantially increase the food production densities which control population during that period of time. Much of the idea of continuous progress in time actually comes from increasing ignorance when dealing with more and more ancient civilizations. 3000 B.C. Mesopotamian culture appears extraordinarily *complex and modern* when the opportunity is given to delve into the socioeconomic units by interpreting the massive heritage of clay tablets.

Through a number of mechanisms the first breakthrough came at the end of the first millennium A.D. and a second during the Renaissance, and an explosion of human population followed in the 18th and 19th centuries [8].

Population explosion means spatial densification and the introduction of new levels of complexity into the structure of Western society, in particular large- scale urbanization and the creation of an industrial structure. The need to communicate to the individual became more variegated and the individuals in their larger numbers more difficult to reach. It is here that literacy as a means of transferring downwards from the powerful, wealthy and learned to the masses started to show selective advantages and was pushed under various motivations.

A supporting argument for this thesis is that new vehicles for "pushing down" information such as radio and television are progressively displacing literacy, which in my opinion is of dubious usefulness to the individual below a certain level in the hierarchical scale. I have known myself businessmen with rich personalities, splendid memories, fast calculating capacities and great success in their trades, who were perfectly illiterate.

All these considerations serve to dress my opinion that mass literacy is not really the talisman of social progress, freedom and intellectual illumination, but just one of the possible tools to transmit downward social information, and consequently should be considered one technology in competition with others.

The problem with the statistics is that literacy is different things to different persons. Very interesting data series from ancient church register books of marriages, where literate is he who can manage to write two simple ideograms, his name, are difficult to mesh with the Doxa statistics searching for those who can (still) read the ads (less than many advertisers usually suspect!).

Keeping all that in mind, one can look cautiously at the analysis I made of literacy strings which appear in [7] and are reported on in Figures 1–10.

The facts are clear: in less than three centuries the system went from a few percent literates to a few percent illiterates, *following a logistic competition curve*. Considering the relative softness and inevitable inhomogeneity of the statistical data, the quality of fit is remarkable, giving another point of support to the thesis that processes in the minds follow the same rules as processes in the economy. My platonist conclusion that this is because "*Nihil est in sensu quod pria non fuerit in intellectu*", should in due time become inevitable.

REFERENCES

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6. Marchetti, C. (1979) *On Energy and Agriculture: from Hunting-Gathering to Landless Farming*. RR-79-10. Laxenburg, Austria: International Institute for Applied Systems Analysis.
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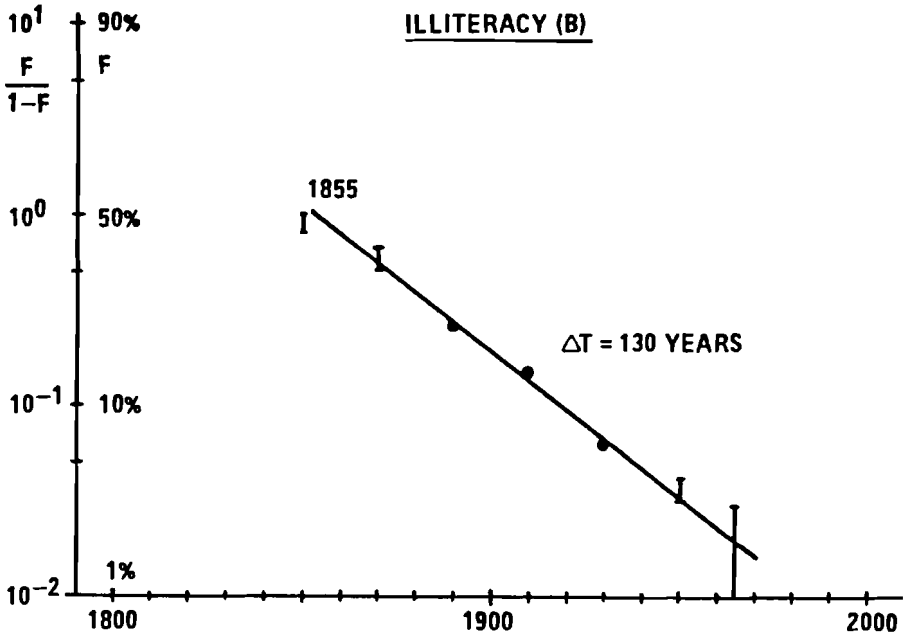
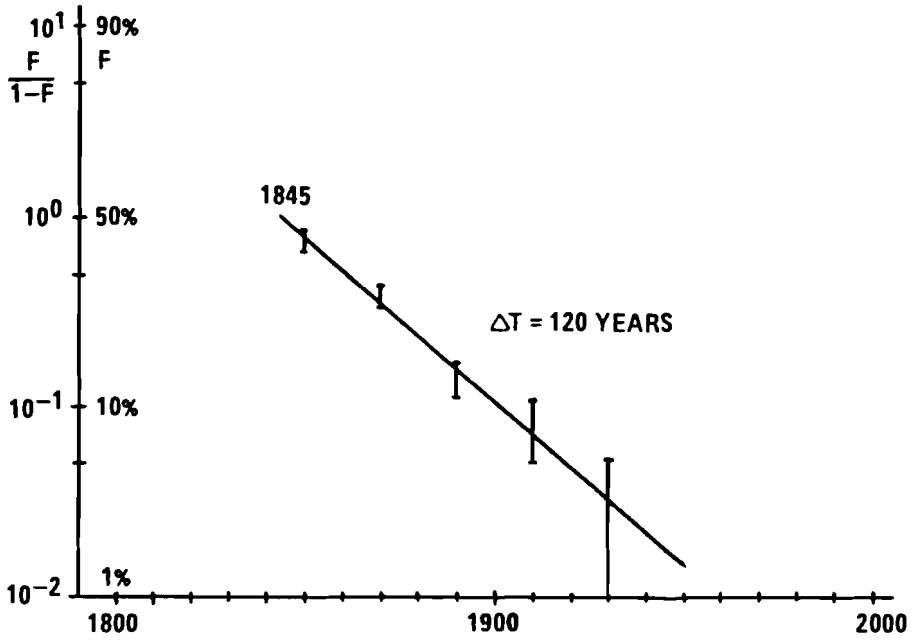


Belgium

Sources: Cipolla, C.M. 1967: Literacy and development in the West. London: Penguin Books. 1856: Estimate "adults"; 1870: own estimate, over 10 years; the percentage of recruits who could not read or write was 44% in 1850, 39% in 1860, 29% in 1870, and 22% in 1880; the illiteracy rate of the population of 10 years and over was 31% in 1880; thus the illiteracy rate was estimated at 35-40% in 1870; 1890: 10 years and over;
UNESCO, 1953: Progress of literacy in various countries. Paris. 1910, 1930.
UNESCO, 1957: World illiteracy at mid-century. Paris. 1950, estimate; 1947: 3.3%; 1965: own estimate.

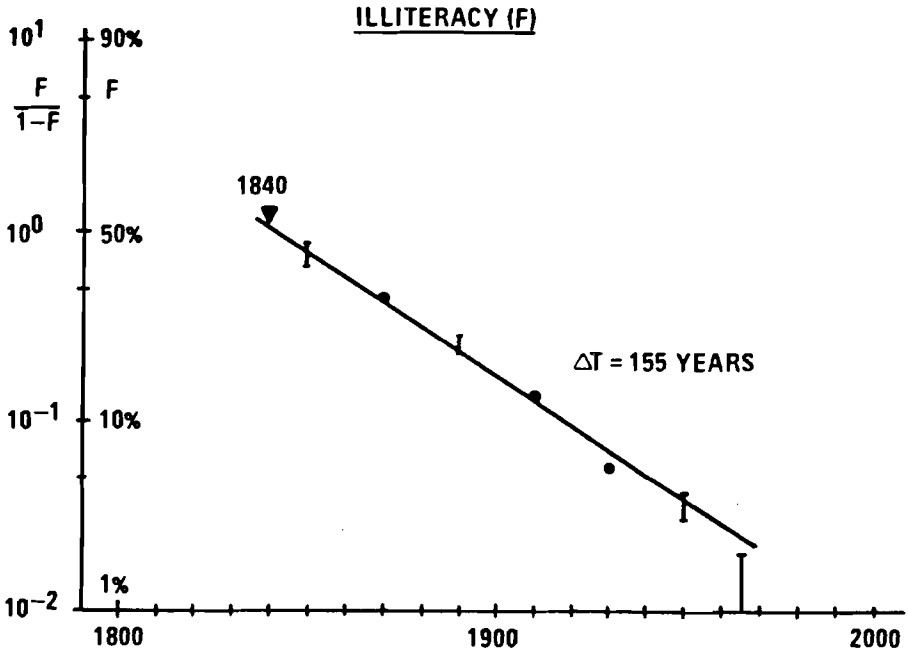
ILLITERACY (ENGLAND AND WALES)



England and Wales

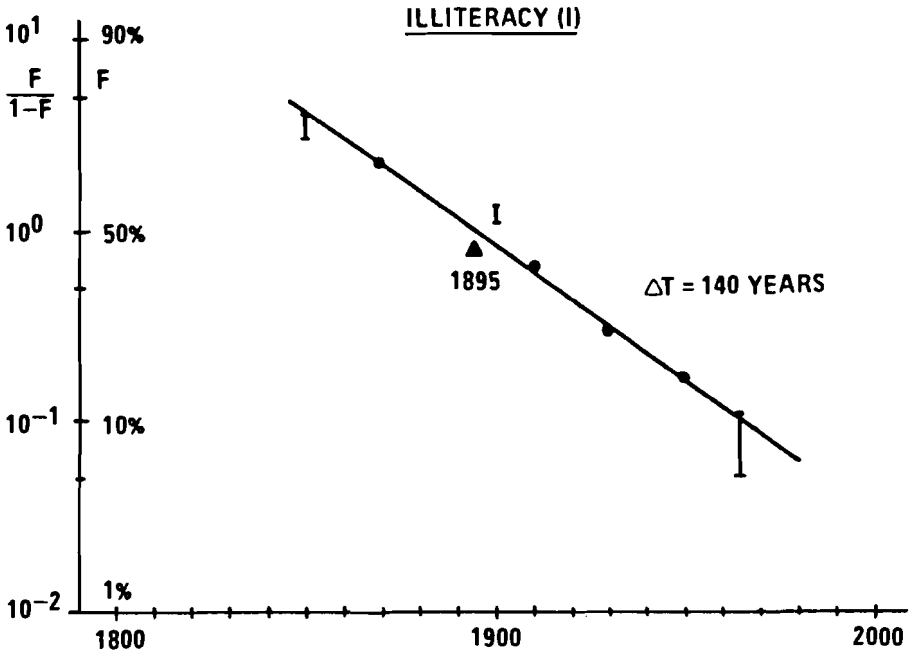
Sources: Cipolla, C.M. 1967: Literacy and development in the West. London: Penguin Books. 1950: own estimate of "adults"; for 1851 an estimated illiteracy rate of 30-33% is given; contrary to this, in 1851 38% of bridal couples could not sign their marriage certificates; in Italy 41% of bridal couples were illiterate and the illiteracy rate of the population over 6 years was 48% in 1901; thus the alaphabet rate of England's and Wales's population was estimated at 50-45% in 1850; 1870: own estimates, "adults"; in 1870 23.5% of bridal couples could not sign their marriage certificates; in France the illiteracy rate of bridal couples was 29% and that of the population of 6 years and over 31%; thus the illiteracy rate of the population of England and Wales in 1870 was estimated at 25-30%; 1890: own estimate, "adults"; 1890 7.5% of bridal couples could not sign their marriage certificates; therefore, the illiteracy rate of the population was estimated at 10-15%;

Abel, J.F. and N.J. Bond, 1929: Illiteracy in the several countries of the world. Washington, D.C.: Department of the Interior, Bureau of Education, Bulletin Nr. 4. 1910, 1930: own estimates, "adults"; 1924 only 0.34% of bridal couples could not sign their marriage certificates.



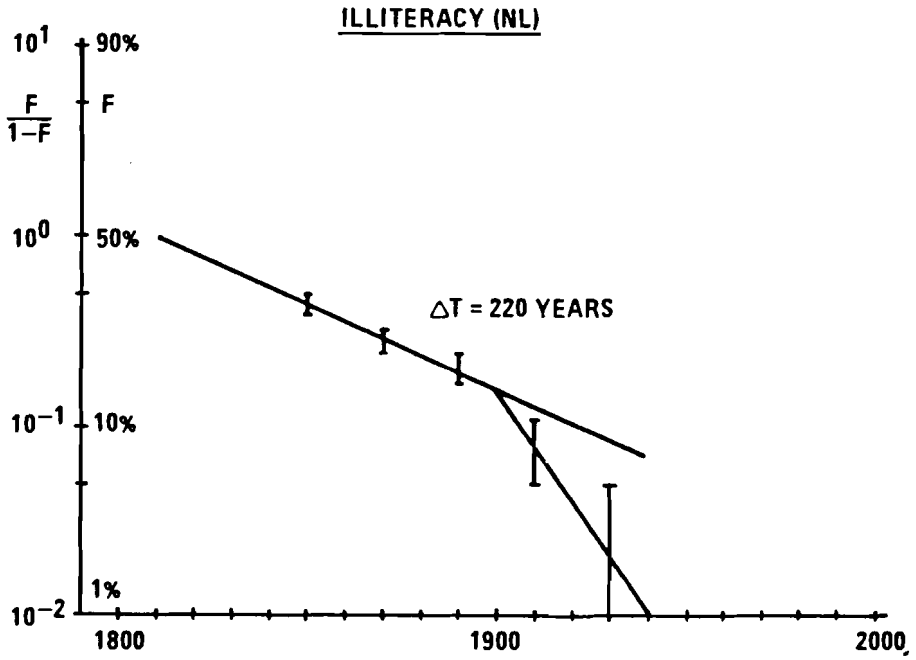
France

Sources: Cipolla, C.M. 1967: Literacy and development in the West. London: Penguin Books. 1850: estimates, "adults"; 1872: 6 years and over; 1890: own estimate, 10 years and over; the percentage of bridal couples who could not sign their marriage certificate was 29% in 1872, 11% in 1890 and 5.5% in 1900; UNESCO, 1953: Progress of literacy in various countries. Paris. The illiteracy rate of the population of 10 years and over was 16.5% in 1901. Thus the illiteracy rate for 1890 was estimated at 18-22%; 1911, 1931: 10 years and over. UNESCO, 1957: World illiteracy at mid-century. Paris. 1950: estimates; 1965: own estimates.



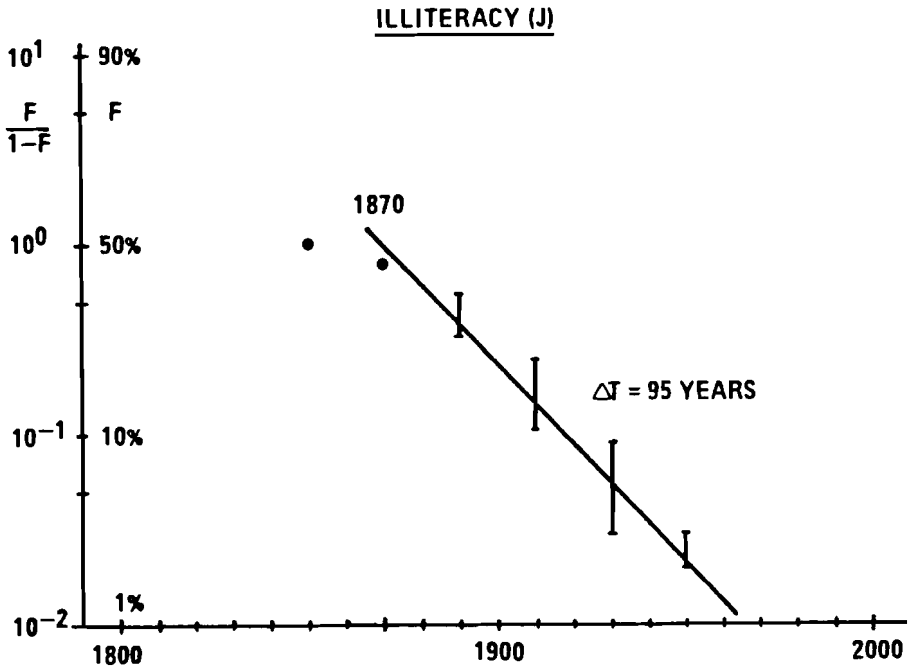
Italy

Sources: Cipolla, C.M. 1967: Literacy and development in the West. London: Penguin Books. 1850: estimates, "adults"; 1871: 6 years and over; 1891: own estimates, 6 years and over; interpolated with the aid of values for 1881: 62%, 6 years and over, and 1901: 48%, 6 years and over.
UNESCO, 1957: World illiteracy at mid-century. Paris. 1911, 1931, 1951.
Banks, A.S., 1971: Cross-Polity Time-Series Data. Cambridge, Mass.: The M.I.T. Press. 1965: own estimates, 7/12 years and over, 8.4%.



Netherlands

Sources: Kolb, G.F., 1975: Handbook of comparative statistics, Leipzig: Arthur Felix. 1850: own estimates, 10 years and over; from 1846 to 1858 an average of 22.8% of the recruits could neither read nor write;
Cipolla, C.M. 1967: Literacy and development in the West. London: Penguin Books. This percentage (about 22%) was registered in France around 1870, in Belgium in 1880 and in Austria around 1890; in the same years the illiteracy of the population of 6 or 10 years and over was 31% in France, 31% in Belgium and 29% in Austria;
Abel, J.F. and N.J. Bond, 1929: Illiteracy in the several countries of the world. Washington, D.C.: Department of the Interior, Bureau of Education, Bulletin Nr. 4. according to this the illiteracy for the Netherlands in 1850 was estimated at 28-33%; 1870: own estimates, 10 years and over; 1875 12.3% of recruits were illiterate;
Levasseur, E., 1879: Primary education in the civilized countries. Paris: Berger-Lerraut. 1889: own estimates, 10 years and over; 1890 7.2% of recruits could neither read nor write.
Abel, J.F. and N.J. Bond, 1929: Illiteracy in the several countries of the world. Washington, D.C.: Department of the Interior, Bureau of Education, Bulletin Nr. 4. around 1900 the rate of illiteracy of the recruits in France was 6% and in Belgium 12%, the illiteracy of the population of 10 years and over 16.5% and 26% respectively (28.7); accordingly the illiteracy of the Netherlands aroung 1890 was estimated at 15-20%; 1910, 1930: own estimates, 10 years and over; 1905 5.4% of the recruits were illiterate, 1913 0.3% and 1923 0.35%;
UNESCO, 1957: World illiteracy at mid-century. Paris. 1950: estimates; 1965, own estimates.



Japan

Sources:

Dore, R.P., 1965: Education in Tokugawa Japan. London. 1850, 1870: own estimates "adults"; although Japan created a modern civil primary school system only in 1972, its basis was laid during the Tokugawa period; from the middle of the 18th century the school system for the general population developed more strongly and 1850 there were already around 1 million primary schoolgoers.
thus the illiteracy rate of the "adult" population was estimated at less than 50% in 1850 and less than 45% in 1870, according to

Hickmann, L., M. Baumann, F. Borschitzky and V. Zwilling, 1898: The primary school in the other cultures of the earth. In On the history and statistics of the primary school at home and abroad, issued by the Special Exposition Commission 'Jugendhalle'. Vienna: Verlag der Sonderausstellungs-Commission 'Jugendhalle',
1854 more than half of the Japanese could read and write.

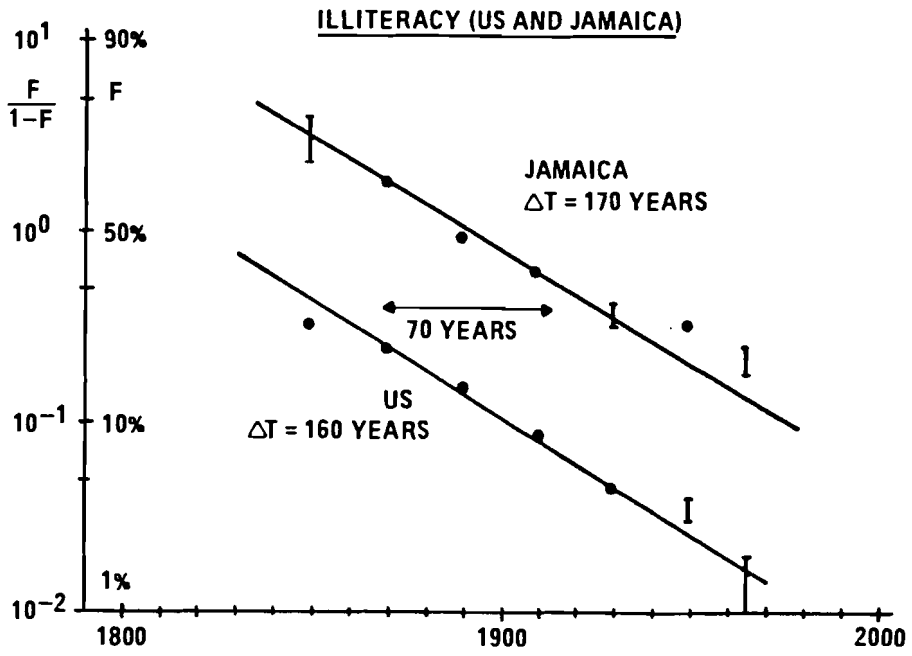
Passin, H., 1965: Society and education in Japan. New York: Columbia University Press. 1890: own estimates, "adults"; in the years 1891 to 1893 an average of 22% of the recruits could neither read nor write.

UNESCO, 1957: World illiteracy at mid-century. Paris. 1930: own estimates, 15 years and over; estimates with aid of illiteracy rates of different age groups, random sampling 1948:

Age group	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Illiteracy	0.5%	0.5%	0.7%	2.0%	3.2%	7.7%	16.8%

Abel, J.F. and N.J. Bond, 1929: Illiteracy in the several countries of the world. Washington, D.C.: Department of the Interior, Bureau of Education, Bulletin Nr. 4. 1925 only 0.88% of the recruits could neither read nor write;

UNESCO, 1957: World illiteracy at mid-century. Paris. 1950: estimates, 1965: own estimates.



USA and Jamaica

Sources USA: Banks, A.S., 1971: Cross-Polity Time-Series Data. Cambridge, Mass.: The M.I.T. Press. 1965 own estimates; 1963: 1.5%
Bowden, W., M. Karpovich and A.P. Usher, 1937: An economic history of Europe since 1950. New York. 1850: own estimates, 10 years and over; of all people of white skin color of 20 years and over 11.2% were illiterate; the estimate is based on the assumption that the colored population was absolutely illiterate and that the population of from 10 to 20 years showed approximately the same illiteracy as that of 20 years and over; 1870, 1890, 1910, 1930: 10 years and over;
UNESCO, 1957: World illiteracy at mid-century. Paris. 1950: estimates; 1965, own estimates;
Banks, A.S., 1971: Cross-Polity Time-Series Data. Cambridge, Mass.: The M.I.T. Press. 1963: 1.5%

Sources Jamaica:
UNESCO, 1957: World illiteracy at mid-century. Paris. 1950: estimates; 1965, own estimates; 1930: own estimates, 5 years and over; interpolated with aid of the values for 1921 and 1943: 32.1%, 5 years and over, 25.4%, 15 years and over; 1950: own estimates, 5 years and over; 1965: own estimates;
United Nations, (1948-): Statistical Yearbook. New York. 1960: 18.1%