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EDUCATION'S ROLE IN DEVELOPMENT

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EDUCATION'S ROLE IN DEVELOPMENT

by Alexander L. Peaslee

INTRODUCTION

In the last one hundred years, significant economic growth has been achieved only in those countries in which a high proportion of the total population is found in primary schools. High enrollments in elementary education do not guarantee growth; other complex factors are obviously involved. But high enrollments appear to be a requisite for significant growth.

As economies industrialize, urbanize, and mature, their requirements for more sophisticated citizens appear to increase. After primary enrollments have become high, in the more economically successful countries the emphasis on education has shifted onward to the secondary and higher education levels.

This paper presents a hypothesis of the relationship of the various levels of education to economic growth and - by implication - to political and social growth. It examines the association of elementary, secondary and higher education enrollment ratios to total population with economic development. The paper summarizes historical trends in enrollment ratios to total population in what are now the more economically developed nations. The type of educational investment most likely to be conducive to growth in the developing countries is outlined. In conclusion, an optimal educational mix for growth is suggested.

It is necessary to stress that while certain quantitative educational levels are a requisite for economic development, they do not by themselves assure it. Other factors - economic, behavioral and political - will continue to exert their varying influences.

PRIMARY EDUCATION

A close relationship appears to exist between high primary enrollments as a proportion of the total population and healthy economies. Those countries¹ which in 1920 had more than 10% of their population in primary schools were compared with a United Nations listing of nations according to their gross domestic product per capita in 1958. Twenty-five countries had more than 10% of their population in primary schools in 1920. In addition, France and Hungary historically had a record of enrollments well above 10% and their temporary decline below that level can be ascribed to low birth rates during World War I. These same twenty-seven countries led the world in per capita output by 1958, with only minor and explicable exceptions.² The details are

^{1/} Only countries with more than one million population in 1920 were listed in order to reduce exogenous factors.

^{2/} The U.S.S.R. had only 3.6% of its population in primary schools in 1920, but rapid expansion of primary education resulted in achievement of the 10% mark by the early 1930's. Japan lagged slightly in per capita production by

presented in Table 1. No country with a population over a million that is not listed in Table 1 had a per capita production in 1958 or 1962 as large as the twenty-seven countries.³

By 1938, six countries were added to the "over 10% category: The U.S.S.R., Ceylon, Greece, Mexico, the Philippines, and Rumania. (By that time, Sweden's low birth rate resulted in a decline below 10%, but practically all of the Swedish school age children were in school.) Of the six new "over 10%" nations, three of them - U.S.S.R., Greece, and Rumania - also ranked among the first 30 in per capita production in 1958. Ceylon's relatively low position is not readily explained, although by 1958 it had a production per capita rate double that of its South Asian neighbors, none of which to this day has reached the 10% level in primary school enrollments. The Republic of the Philippines also is ahead of its Southeast Asian neighbors although it is not among the ranking nations in per capita production. Mexico ranked 34th in per person production in 1958 with US \$288 per capita, not an impressive record. However, by 1962 it had reached US \$356.

By 1948, three more nations had joined the "over 10% club: China, Taiwan, the Republic of Korea, and Venezuela. Newly-established Israel had 9.4% of its total population in primary schools and it soon moved well above the 10% level. By 1958 Venezuela and Israel were among the ranking countries in terms of production per capita. Korea's economy was still in a stage of reconstruction after the 1950-54 war. Taiwan's economy was making impressive gains, although it did not rank among the leaders. On the other hand, it had one of the highest per capita production rates in Asia. In 1948, Belgium, Czechoslovakia, Sweden, and Switzerland's primary enrollments were below 10%. This was a reflection of low birth rates during the war years and not an indicator of weakening in elementary school coverage.

2/ (Cont'd) 1958, but it moved up significantly by 1962. Bulgaria's enrollment figures failed to reflect poor attendance and quality. The inefficiency of the Bulgarian system is suggested by its relatively high enrollment ratio during the late nineteenth and early twentieth centuries and a continuing high rate of illiteracy. It is questionable whether Bulgaria should actually be considered among the "over 10%" countries. Actually, average attendance figures are even better indicators than enrollment data, but in many cases the statistics are not available. Generally, as primary educational systems are developed, the gap between enrollment and average attendance narrows.

3/ Except for Japan in 1958. Japan's lead in elementary education in the Far East was subsequently paralleled by its pre-eminence in production per capita.

Thus, we find that among the first 35 countries in per capita gross domestic product in 1958, all but six had a record of over 10% of their population in primary schools by 1920 or earlier. The six exceptions, attained the 10% mark by 1938 (U.S.S.R., Mexico, Greece), or by around 1948 (Venezuela, Israel), or had hovered around the 10% mark for decades (Uruguay).

Of the more than 50 countries that had not reached the "over 10%" point, only one - Colombia - had attained by 1958 production above US \$300. It ranked 33rd in per capita production. If allowance is made for the 1955 (rather than 1958) data on Bulgaria and Japan's subsequent rapid growth. Colombia appears to rank about 35th. Colombia, itself, passed the 10% primary enrollment mark in 1956.

To sum up, almost all of the nations that achieved high rates of primary enrollment subsequently were among the 34 world leaders in production per capita. The few countries not among the ranking 34 that had had high primary enrollment rates were in almost all cases growing impressively and were ahead of their neighbors.⁴ No country had achieved significant growth until after 8 to 10% of its total population was enrolled in elementary education.⁵

Available data did not permit as detailed an assessment of enrollments in proportion to age groups. A comparison of the country-by-country enrollment statistics with the initial periods of growth in real income per capita indicates that sustained growth generally starts when primary enrollment is in the neighborhood of 30 to 50% of the school-aged population (those aged 5-14, which is the age group generally used in population age data).

The key factors in the association of expanded primary enrollments and subsequent economic growth appear to be:

4/ Per capita gross domestic product in recent years has been, in U.S.dollars

<u>Country</u>	<u>1953</u>	<u>1958</u>	<u>1962</u>
Ceylon	114	122	129
China-Taiwan	78	97	121
Republic of Korea	77	97	110
Philippines	90	113	125
Mexico	222	288	356

Source: Yearbook of National Accounts Statistics, 1963, United Nations. Ceylon and Mexico figures from Table 3A; China-Taiwan, Korea and Philippines data from Table 3B.

5/ French data indicate that primary enrollment was less than 8% when it began to show sustained per capita growth.

- 1) The "crust of custom" in traditional societies is not broken until a significant segment of a culture has been introduced to a more systematic means of obtaining and disseminating information about the production and distribution of goods. In fact, we might speculate that the tighter the grip of traditions, the longer it takes to break the "crust of custom". This may explain why France reacted more rapidly to enrollment expansion than did Spain. The French in the first part of the nineteenth century had just come through an era of rationalism which left relatively little "crust of custom" to break, whereas the strongly traditional Spanish culture was a tougher "crust" that took much more time to break.
- 2) By breaking traditional, inefficient word-of-mouth communication patterns, primary education on a large scale brought a new more systematically informed set of actors onto the economic stage.
- 3) This break in the traditional way of doing things, further reinforced by the information obtained in school, contributed to the increased productive efficiency of each person.
- 4) The expenditure of considerable funds on the expansion of educational enrollments in itself gives a lift to each nation's economy.

This coincides with the conclusions of economists such as Abramovitz, Kendrick, Denison, and Schultz that the tremendous increases in per capita product in the now-developed countries derive primarily from a rise in efficiency. Technical knowledge does not take root in a traditional society. It can, and does, establish itself when that society has had many of its members exposed to a more systematic approach toward knowledge, especially knowledge related to production and distribution.

The triggering effect of primary education tends to explain why traditional agriculture has been transformed in some countries and seems immovable in others. The conclusions reached in this paper agree with those reached by an observer in the field, Dr. A. B. Lewis:

General education in the elementary schools is perhaps the best instrument for breaking the fetters of the traditional way of thinking just as it is for teaching the people to read, write and count and interpret cause and effect in nature. The elementary school is the place where one could succeed in destroying superstitions, where first of all one could stimulate ordered thinking and where one could impart knowledge of a new and better life. Agricultural experts find a greater understanding and a greater confidence in their advice amongst people who have had the benefit of good elementary education than amongst people

who are ignorant.⁶

SECONDARY EDUCATION

Secondary enrollment ratios to total population are not associated with economic growth until the 8 to 10% primary enrollment ratio has already been attained. Subsequently, a pattern of secondary school expansion and output increases appears. India, for example, has had a secondary enrollment ratio since World War II that compares favorably with many European countries. However, India has not yet attained an 8 to 10% primary enrollment ratio, whereas all of the European countries have.

When enrollment ratios at the primary and secondary levels are placed on a semilogarithmic graph along with gross national product or real income per capita data a fairly clear pattern emerges. There were 12 cases in which there were obvious sharp increases in secondary enrollment ratios.⁷ The average lag until real income per capita climbed rapidly for all cases of secondary enrollment was 11.5 years.

When the trend lines for secondary enrollment ratios on the country graphs are compared with subsequent real income per capita, there is a general tendency for the two to show a good relationship after universal primary education has been attained. As time passes, however, the relationship between secondary ratios and growth becomes less close and a better correlation appears between university enrollment ratios and subsequent economic growth.

We will have additional comments to make about secondary enrollment ratios after we have looked at the relationship of higher educational enrollments and economic growth.

HIGHER EDUCATION

The association of higher education enrollment ratios with subsequent growth in real income per capita (after more or less universal primary education has been established) is impressive. Of the 37 countries for which we have analyzed and graphed data, we find that 21 show a very close relationship between rate of growth of university enrollment ratios and subsequent growth of real income per capita. In 7 countries the rate of increase of higher

^{6/} A.B.Lewis, "El Fomento de Recursos Agricolas," in *El Desarrollo Agrícola y Económico de la Zona del Mantaro en el Perú* (New York: International Development Services, Inc., December 1954), pp. 1 and 145.

^{7/} Belgium, Denmark, Great Britain, Netherlands, Sweden, Switzerland, Italy (twice), Portugal, Argentina (twice), and Chile.

education enrollment ratios has been greater than that for growth in real income per capita. In 4 countries the data are not complete enough to allow a judgment, although the statistics that are available show no variation from the pattern in other nations. In 5 countries, the prerequisite primary enrollment ratio has either not been attained or it was reached so recently that judgment of the relationship of growth and higher education enrollment ratios is not justified. The breakdown for countries is contained in Table 2.

Table 2

Summary of Graphs on Higher Education Enrollment Ratios and Real Income Per Capita Growth

Countries in which real income parallels and follows trend lines of higher education enrollment ratios:

Western Europe-Austria, Belgium, Denmark, Finland, Germany, Great Britain, Ireland Netherlands, Norway, Switzerland;
North America-Canada, Puerto Rico; Southern Europe-Greece,
Latin America-Argentina, Mexico; Africa-South Africa;
Oceania-New Zealand.

Higher education enrollment ratio during extended period increased at greater rate than real income per capita:

Western Europe-France, Sweden; North America- United States;
Eastern Europe-Russia; Asia-Japan; Latin America-Venezuela;
Oceania-Australia.

Insufficient data, but pattern shows parallel between real income and higher educational enrollment ratio:

Eastern Europe--Bulgaria, Hungary, Poland, Rumania.

"Triggering" Primary enrollment ratios not achieved or only recently attained:

Southern Europe-Portugal; Latin America-Chile, Cuba, Uruguay;
Asia-India.

Only one of the four categories of countries listed in Table 2 seems to call for comment. Why did France, Sweden, the United States, Russia, Japan, Venezuela, and Australia have extended periods in which the higher education enrollment ratio increased more rapidly than subsequent growth in real income per capita?

Undoubtedly, part of the answer involves other factors unrelated to education. The United States, for example, showed greater growth in the university enrollment ratio compared to real income per capita during 1910-40. Some of the difference in growth rates can be attributed to the effects of the great depression of the early 1930's. We may speculate as to whether the U.S. economy was operating inefficiently during this period in terms of human resources as exemplified by university enrollments. That is, a question is raised as to whether U.S. education was itself inefficient in comparison to other countries, or whether the economy was inefficient in using the human resources provided by formal education. There may well have been a mixture of both.

One other question arises in this connection: was education overexpanded in the U.S., or expanded too rapidly? The answer to either version of the question seems, 'No', for two reasons: 1) the overall pattern of development in the other countries studied does not suggest that the U.S. during 1910-40 approached either a saturation point or expanded too rapidly; and 2) the U.S. in subsequent years has shown a better rate of economic growth, especially in the 1960's.

From about 1900 to 1930, Japan's higher education enrollment ratio climbed at a faster rate than real income per capita. The rate of the climb of the higher education enrollment ratio was steady throughout the period, but the rate of increase of Japan's real income per capita picked up momentum. This may indicate that the increasing volume of university-educated Japanese had a growing influence on the economic growth rate.

In the case of Russia, the higher education enrollment ratio grew more rapidly than real income per capita during 1915-60. One cannot discount the effects of two world wars, which undoubtedly explain part of the difference in rates of growth. But the difference may also emanate partly from inefficiencies in Russian utilization of human resources. There has been considerable evidence of such inefficiencies. For example, the chairman of a regional economic council (Sovnarkhoz) complained that most engineers, and particularly the most talented, prefer work in management:

Our plants have far too many engineers and technicians, 1 (one) for every 12-15 workers, whose function is to keep records of fulfillment of norms and plans by the workers. There is a need for a long overdue review of the work of engineering and technical personnel in order to increase their productivity. It would appear necessary to reduce the ratio of engineering and technical personnel to workers from 1 to 12-15 to 1 to 20 or 40 or 50 and to transfer the laid-off engineers to designing bureaus, research departments, experimental shops, laboratories, etc. These services are non-existent in our plants or badly need strengthening and expansion... This we cannot do because the pay of a shop engineer

is substantially higher than the pay of an engineer-designer, researcher, or a laboratory specialist.....⁸

In the cases of France, Sweden, Venezuela, and Australia, there appears to be a fairly obvious explanation for much of the more rapid increase in university enrollment ratios in comparison with real income growth per capita. The relative step-up in university enrollment rates occurred in recent years, and has not yet been reflected adequately in subsequent economic growth. We can expect that these four countries are likely to see the increased university enrollment ratios reflected soon in more rapid growth in real income per capita. This, of course, assumes that all other factors relating to growth remain essentially the same..

Whether one uses the data of Kuznets⁹, Clark¹⁰, Maddison¹¹ or the U.N.¹², the evidence suggests that, after universal primary education is substantially attained, a higher rate of economic growth per capita results when the secondary level number of pupils is 10 or more times the number of higher education students. As time moves on, the proportions should decline to much less than 10 to 1 for the best economic results. In other words, after primary education is well established, emphasis should be placed on secondary enrollments and then gradually the stress should be shifted toward the tertiary level.

CAUSALITY: EDUCATIONAL CHICKEN OR ECONOMIC EGG?

It may be asserted that educational enrollments are associated with economic growth only because rising income enables countries to afford the luxury of education. The evidence, however, does not support this. Aside from our earlier conclusion that there was no "triggering" of sustained growth per capita until after from 8 to 10% of total population was enrolled in primary schools, there is other evidence. India, Pakistan and Egypt, for

⁸/ Spetsiializatsiia kooperirovaniia promyshlennosti (Specialization and Cooperation in Industry), Gosplanizdat, Moscow, 1960, p.183

⁹/ Simon Kuznets, 'Quantitative Aspects of the Economic Growth of Nations: VI. Long-term Trends in Capital Formation Proportions', Economic Development and Cultural Change, Vol. IX, Number 4, Part II (July, 1961), p.29.

¹⁰/Colin Clark, The Conditions of Economic Progress (London: MacMillan & Co., 1960), pp. 88-252.

¹¹/Angus Maddison, Economic Growth in the West (New York: The Twentieth Century Fund, 1964), p. 231.

¹²/United Nations, Department of Economic and Social Affairs, World Economic Survey, 1961 (New York: 1962), p. 90

example, achieved very impressive increases in secondary and higher education enrollment ratios during periods in which little or no per capita economic growth was recorded. Obviously, the three countries found resources to expand education even if their income per capita remained level.

We have graphed the educational and economic growth of 37 countries. On 29 of the graphs¹³ periods can be clearly identified in which per capita real income has been level while enrollment at one or more of the three educational levels has been significantly increased. In other words, there are many examples of periods in which income has not risen but enrollment ratios have been greatly enlarged. In the remaining 8 countries it has not been possible to isolate periods of level income and increasing enrollment ratios on the graphs, because either the economic growth was so steady that there were no level periods (Sweden, Mexico, Israel, and Puerto Rico), or the data were not sufficiently complete (Rumania, South Africa, Cuba, and Venezuela).

Still another valid question concerns an assessment as to whether the countries with more resources are able to provide more education. Perhaps this is true, but the historical record suggests that variations in energy resources have not prevented educational growth. The last column in Table 1 lists the ranking world countries in stocks of energy resources.¹⁴ Many countries rated in the lower half of the list according to energy resources per capita and yet were among the 1958 leaders in per capita production. Among the lower half in energy were: Switzerland (3rd in per capita production), Denmark (6th), Puerto Rico (18th), Italy (21st), Argentina (22nd), Uruguay (25th), Hungary (26th), Cuba (28th), Rumania (31st), Greece (32nd), and Bulgaria (34th).

It is not possible, however, to completely discount the influence of resources. What seems more important, though, is the emphasis given to education in the allocation of resources. One might ask what economic conditions made Denmark (universal primary education implemented beginning in 1814), Sweden (universal primary education implemented during 1842-47), Switzerland, and many of the German states attain such a high rate of primary education in the first half of the nineteenth century. It seems doubtful that the economic circumstances were so much - if any - more favorable than they were in countries with lower rates of enrollment, such as France, Netherlands, or a few of the German states, such as Mecklenberg-Schwerin and Hesse-Cassel.

¹³/Austria, Belgium, Denmark, Finland, France, Germany, Great Britain, Ireland, Netherlands, Norway, Switzerland, Canada, United States, Greece, Italy, Portugal, Spain, Bulgaria, Czechoslovakia, Hungary, Poland, Russia, Argentina, Chile, Uruguay, India, Japan, Australia, and New Zealand.

¹⁴/ One hundred and sixteen countries or areas were rated, including a number with populations less than one million in 1920.

AN OPTIMUM EDUCATIONAL MIX FOR GROWTH

It is obvious that variations in natural resources, capital formation, behavioral patterns and the host of other factors involved in economic development would create local modifications in any model of an optimum educational mix aimed at maximum growth. Nevertheless, the experience of 37 countries enables us to establish an outline for allocation of resources for education.

The outline would resemble the record of Japan more than that of any other country, although the Swedes, Swiss, Danes, Puerto Ricans, Mexicans, Americans, and Russians (to name a few) all have instructive histories.

In our model, the emphasis at first would be largely on primary education. After the ratio of primary students to total population passed 10%, the stress should be moved to secondary education, although enough emphasis on elementary schooling should remain to carry it to the point of universality.

Japan took 27 years to raise its primary ratio from 3.7% to 10.7%. England and Wales took only 15 years to move from 4.3% to 10.8%. Scotland went from 4.97% to 8.97% in only 5 years. Venezuela went from 3.7% to 6.7% in 5 years and later went from 6.8% to 10.2% in 8 years. Russia went from 3.6% to 10.36% in 9 years. Puerto Rico moved from 6.04% to 11.49% in 6 years. Chile increased its primary enrollment ratio from 5.0% to 10.55% in 4 years. In all of these cases (except for Chile and Puerto Rico, for which we don't have appropriate real income data) the subsequent economic results were excellent.

There does not appear to be anything in the experience of other nations to rule out 10 years as a realistic goal for expansion of primary enrollment to more than 10% of total population if that nation is starting from around 2 to 3%.

As the 10% primary ratio is passed, the emphasis should be turned toward secondary enrollment expansion. The pattern of the economically successful countries has been one that tends to focus on achievement of a ratio of approximately 2% of total population in secondary schools before emphasis is shifted onward to the university level.

Some of the more rapid increases in secondary enrollment ratios have been:

United States from 1.01 to 2.11% in 10 years;

Sweden.....from 1.129% to 1.994% in 3 years;

Spain.....from .868% to 2.41% in 7 years;

Norway.....from 1.355% to 2.652% in 3 years;

Japan.....from .31% to 1.07% in 10 years, and
from 1.07% to 2.80% in 10 years

India.....from 1.31% to 3.64% in 10 years;

France.....from .981% to 2.04% in 4 years; and

Belgium.....from 1.00% to 1.82% in 4 years.

These figures indicate that it is, indeed, possible to increase the secondary enrollment ratio very rapidly in a short period. They don't, however, necessarily take into account the quality of the education involved. From the standpoint of effect on subsequent economic growth, perhaps the most useful examples above are those of Spain and Japan. Spain's jump from .868% to 2.41% took place between 1953 and 1960, and to the extent subsequent results can be judged, it seems to have been associated with later very good economic growth per capita.¹⁵ Japan's .31% to 1.07% jump occurred between 1900 and 1910, and its leap from 1.07% to 2.80% took place during 1910-20. The results in terms of growth of real income were excellent.

India is not a good example because it did not first acquire a 10% plus ratio in primary education. However, it is instructive to note that a country with as low a per capita income as vast a population was able to expand its secondary enrollment from 1.31% to 3.64% in 10 years.

It does not seem unrealistic to expect that a country (if it concentrated its resources and were aware of the economic benefits that could be derived, could expand its secondary enrollment from, say, about .5% to 2.00% in 5 years.

As the 2% secondary ratio was approached, we would expect the country to turn its attention to an expansion of university level education. We would expect the country to continue the momentum of expansion of secondary schools in the direction of a 5% ratio (such as achieved by New Zealand) but this should not be the area of greatest emphasis or urgency. Expansion of higher education would then be the focal point.

Some of the better records in expanding university enrollment ratios to the total population are:

Austria.....from .264% to .608% in 7 years;

Canada.....from .424% to .707% in 8 years;

¹⁵/Report of a Mission Organized by the International Bank for Reconstruction and Development at the Request of the Government of Spain, The Economic Development of Spain (Baltimore: The John Hopkins Press, 1963), pp. 52-53.

Greece.....from .133% to .277% in 8 years
India.....from .093% to .218% in 10 years (this represents
an increase in students from 335,000 to 940,484);
Israel.....from .134% to .642% in 11 years;
Italy.....from .095% to .181% in 4 years and from
.181% to .419% in 8 years;
Japan.....from .47% to .68% in 5 years;
Puerto Rico.....from .78% to 1.07% in 2 years;
Russia.....from .347% to .888% in 10 years;
Spain.....from .146% to .281% in 12 years
United States.....from .57% to .90% in 10 years; and
Venezuela.....from .090% to .253% in 7 years.

These figures suggest that it would not be unrealistic to expect a country that emphasized higher education to expand the enrollment by 100% in 5 years and expand that figure by another 100% in the following five years.

Thus, for an optimum mix, a policy framework for expansion of enrollment of an economically undeveloped country would begin with 10 years concentration on primary education, which hopefully could bring enrollment up from around 2% to 3% of total population to over 10%. Then, somewhere in the neighborhood of 5 years could expand secondary enrollment from about .5% to 2.00%. In the final 10 years (while expansion was continued for primary and secondary enrollments), the emphasis could be focused on expanding university enrollments from, say, .075% to .300%. As far as education's impact on economic growth is concerned, the record of countries that have achieved development indicates that this type of enrollment expansion would be most conducive to increases in real income per capita.

We can translate this into approximate ratios of age groups at the appropriate stage in a nation's development. We would expect a nation in ten years to be able to move primary enrollment from around 10% of the 5-14 elementary age group to close to 50% of that age bracket. In the following five years, an optimum educational mix would suggest expansion of secondary education enrollment from a little above 5% of 15-19 year olds to roughly 25%. Optimum expansion of university enrollment would vary considerably as a proportion of the age group 20-24 according to the age structures of each country's population. Generalizing, we can anticipate an increase in ten years from about 1% to less of the 20-24 age group to as much as 5%.

Table 2

Percentage of Total Population in Primary Schools, Selected Years, And Gross Domestic Product Per Capita, 1958, 1962

Country ^a	1920 ^b	1938 ^b	1948 ^b	Gross Domestic Product Per Capita (US dollars)		Energy Potential
				1958 ^c	1962 ^o	Rank Among Nations KWH Per Capita ^x
Argentina	12.4%	11.9%	13.0%	476	--	71
Australia	14.4%	17.1 ^g	15.0 ^g	1,215	1,416	11
Austria	14.7	12.8 ^h	12.2	656	656	47
Belgium	12.5	11.4	8.9	1,093	1,215	25
Bulgaria	11.8	11.8 ^h	12.7	285 ^w	--	72.5
Canada	20 ^d	18.2 ⁱ	16.8 ^d	1,767	1,807	6
Ceylon	8.8 ^d	13.7 ^d	15.3 ^d	122	129	96.5
Chile	10.7	13.2	11.6	352	--	50
China-Taiwan	3.6	8.7	11.7	114	--	80
Cuba	11.5	10.8	11.9 ^p	379	--	98
Czechoslovakia	14.2	11.7 ^j	8.5	543 ^w	--	23
Denmark	14.4	12.6	11.7	975	1,390	105.5
Finland	12.4	10.5	12.0	751	1,047	52
France	9.6	13.0	11.6	1,089	1,300	44.5
Germany	14.9	10.9	12.9 ^q	920	1,349	9
Greece	8.8	13.9	12.1	307	394	74
Hungary	9.5	10.6	12.3 ^r	387 ^w	--	79

Table 2 continued

Country ^a	1920 ^b	1938 ^b	1948 ^b	Gross Domestic Product		Energy Potential Per Capita ^x
				Per Capita (US dollars) 1958 ^c	Per Capita (US dollars) 1962 ^o	
Ireland	10.8	15.8	15.0 (12.8 ^f)	472	641	44.5
Israel	--	--	9.4 ^s	579	823	--
Italy	10	11.7	10.5	493	688	81.5
Japan	14.5	17.3	13.7	285	504	52
Korea	2.5	4.6	13.3	104	--	84
Mexico	8.3	10.1	11.3	288 ^o	356	59
Netherlands	16.3	14.2	11.8	767	1,003	38
New Zealand	18.6	13.8 (11.9 ^f)	12.6 (10.8 ^f)	1,281	1,316	35
Norway	14.3	12.2	11.6 ^t	1,912	--	12
Philippines	7.9	10.9	13.0	192	--	87.5
Poland	11.8	14.0	14.2	468 ^w	--	7
Puerto Rico	14.8 ^d	15.0	19.2 ^d	581	825	114
Rumania	8.9 ^e	12.5	11.3	320 ^w	--	69
South Africa	8.3	9.1 (18.7 ^k)	12.3 (19.0 ^k)	385	435	8
Spain	12.5	18.7 ^l	15.1	324	--	43
Sweden	12.0	9.8	8.4	1,309	1,703	41.5
Switzerland	14.0	11.1	9.2	1,338	1,740	64
England & Wales	13.8 ^f	11.0 ^f	12.5 ^v			
U.K. - Scotland	13.8	12.4 (11.2 ^f)	7.0	1,084	1,288	10
Northern Ireland	--	15.0	14.1			
U.S.	19.3	14.4	13.0	2,324	2,691	1

Table 2 continued

Country ^a	1920 ^b	1938 ^b	1948 ^b	Gross Domestic Product Per Capita (US dollars)		Energy Potential Rank Among Nations KWH Per Capita ^x
				1958 ^c	1962 ^o	
U.S.S.R	3.6 (6.6 ^m)	19.9 ⁱ	15.2 ^d	682 ^w	---	4
Uruguay	8.8	9.7	9.8	450	---	93
Venezuela	3.0 ^m	6.7	10.2	715	901	29

Footnotes to Table 2

- a Only countries with more than one million population in 1920 are listed in order to reduce exogenous factors. Years are footnoted if they vary more than two from column heading.
- b Years vary slightly according to available sources. Primary sources are Statesman's Yearbooks for years immediately subsequent to data year.
- c Yearbook of National Accounts Statistics, 1962, United Nations.
- d Primary and secondary.
- e 1927-28 enrollment figures as a percentage of 1930 census population.
- f Average attendance.
- g Public and private school enrollment, New South Wales, primary and secondary levels.
- h 1934-35.
- i 1941-42 primary and secondary.
- j 1930.
- k European population only.
- l 1935.
- m 1926.
- n 1945.
- o Yearbook of National Accounts Statistics, 1963, United Nations.
- p 1945 enrollment as a percentage of 1943 population.
- q Excluding Baden.
- r 1954-55.
- s 1951. 13.52% in 1954-55.
- t 1952-53 enrollment as a percentage of 1950 population
- u 1958-59.
- v 1951, including kindergarten.
- w 1955. Norton Ginsburg, Atlas of Economic Development (Chicago: University of Chicago Press, 1961).
- x Ginsburg, op. cit., p.58. This is estimated stock of energy.