

4/-
2/10
4/-

Reflections on the Economic Role of Education in Underdeveloped Countries

An Inaugural Lecture

GIVEN IN THE UNIVERSITY COLLEGE OF
RHODESIA AND NYASALAND

Professor W. L. Taylor

OXFORD UNIVERSITY PRESS

REFLECTIONS ON THE
ECONOMIC ROLE OF
EDUCATION IN
UNDERDEVELOPED
COUNTRIES

An Inaugural Lecture
given in the University College of
Rhodesia and Nyasaland
on 26 April 1963
by
W. L. TAYLOR
Professor of Economics

SPEC. COLL.

LONDON
OXFORD UNIVERSITY PRESS
1964

Oxford University Press, Amen House, London E.C.4

GLASGOW NEW YORK TORONTO MELBOURNE WELLINGTON
BOMBAY CALCUTTA MADRAS KARACHI LAHORE DACCA
CAPE TOWN SALISBURY NAIROBI IBADAN ACCRA
KUALA LUMPUR HONG KONG

© *University College of Rhodesia and Nyasaland 1964*

*Distributed in Southern Rhodesia
solely by Messrs. Kingstons Ltd.
on behalf of the University College of
Rhodesia and Nyasaland*

PRINTED IN GREAT BRITAIN

REFLECTIONS ON THE ECONOMIC ROLE OF EDUCATION IN UNDERDEVELOPED COUNTRIES

The most valuable of all capital is that invested in human beings.¹

I

MR. PRINCIPAL,

At the ceremonial beginning of my professorial duties at this University College I want to place before you some views of the application of the branch of human knowledge entrusted, for the time being, to my care. I shall, in what I have to say, confine myself principally to a discussion of a few aspects of recent economic thinking designed to reflect some light on the fundamental economic problem in Africa, with some passing reference to the position in Central Africa.

Many of those who have spoken on occasions similar to the present have marked their entrance to the work of a professor by indicating the scope and method of the discipline professed. I do not follow such precedents in the choice of a subject, nor do I follow them in the originality of their treatment. I do, however, I hope, follow them in attempting to show how some elements in the work of economists have an intimate bearing on the actual practice of day-to-day affairs in the life of a country. In this spirit, then, I approach my subject. In so doing, I have two preliminary explanations to make.

First, I feel it incumbent on me to explain that an Inaugural Lecture is delivered when one is 'admitted to office with ceremony'. However, Sir, there are those here

¹ Alfred Marshall, *Principles of Economics* (6th edition), Macmillan, 1910, p. 564.

this evening who are aware that I have been privileged to be a member of this College for the past seven years. There might even be some who know that I delivered my inaugural lecture—inaugural, in the sense of first—at 7.30 a.m. on Monday, 4 March 1957. That lecture was, incidentally, the first formal teaching lecture to be given in the College. The only real difference between the two occasions, it seems to me—apart from the utterly un-academic starting time of the morning lecture—was that the 7.30 a.m. performance was conducted without ceremony of any kind.

Second, in relation to my topic: it is a sign of our times. Only in these last few years has there been a renewal of interest among economists in this subject. It is unlikely, for example, that even a generation ago the subject would have been considered a fruitful one for discussion by economists. Indeed, it is only during the last half-decade or so that economists and educators have begun to re-examine seriously the relationship between a country's total educational effort and its economic, political, and social advancement. Such, however, has been the degree of concentration of attention on this question, in this short period, that I have very little original to say; nevertheless, I shall endeavour to appropriate to the present occasion a few random reflections which are, in many parts of the world, but not necessarily here, now fortunately becoming common property.

II

Economics is an outgrowth of current economic conditions; it is the product of social unrest; 'what ought to be' in Economics has always been the spiritual father of 'what is'. If, in my opinion, Economics is to be of any

real service—especially to a society as confused as ours—it must grapple with the important phenomena of economic and social life. In the new and vibrant adolescent Africa of 1963, who can doubt that economic questions will play a greater part in the life, thought, and action of the remainder of this turbulent century—to look no further ahead—than they have up to this date? Who can doubt that the imperative drive for social and economic well-being will increasingly become the paramount goal of the peoples of all African nations? Who among us would not welcome these developments? It is in effecting a synthesis between the ideals and aims of the work of economists, and helping the countries of Africa turn their growing, but still meagre, resources to their best use for social well-being, that the African economist finds his greatest but most difficult challenge.

My primary focus this evening is on education. I shall be examining it, however, as a powerful force for the promotion of economic growth and social development in the underdeveloped countries of Africa. To begin with, it is not unfair to say that educators and governments have been—and still are—to a regrettably large extent, somewhat schizophrenic towards education. Education's virtues are commonly praised on all sides, but when it comes to allocating more money to education, it is notable that deeds usually fail to match pious words. Generally speaking, expanding educational desires in all parts of Africa have far outgrown national educational efforts, creating a deep educational chasm which must be bridged, largely from African sources, if significant future economic progress is to be made—irrespective of the size of the flows of internal and external capital investment being employed in these countries.

Sir, the dominating economic problem, the central question facing us in Africa is, What makes the economy grow? Fundamentally, economists are vitally interested in the question not because they are social analysts—I refuse to use the slightly pretentious term ‘scientists’—but because rapid and equitable economic growth is necessary to alleviate the widespread poverty that surrounds us. Economic growth is necessary because there is so much poverty in the world. ‘It is no longer accepted that poverty is ordained by God. Men today will not be kept down in poverty because it is a part of the symbolism of a caste, a class, a religion or a race. Man *can* and men *will*, do something about it.’¹ We do not wish to leave people in the condition which Faulkner portrays in his description of the lonely cultivator: ‘The man and the mule and the wooden plough, which coupled them furious and solitary, leaning terrifically against nothing.’ We must, therefore, look for and be concerned with the basic causes of economic growth if we wish to see an improvement in the lot of over two-thirds of the world’s population.

It was not ever thus. Thirty years ago, for example, the world was just emerging from the depths of the Great Depression and the attention and energies of economists and governments were directed towards explaining and curing the painful and wasteful short-term fluctuations in employment, income, and prices that seemed to be almost endemic in the developed countries of the world. This concentration of endeavour flowered in the path-breaking work of the modern master of our fellowship, John Maynard Keynes. It is principally through his analytically pioneering efforts that governments have been

¹ Theodore W. Schultz, *Human Wealth and Economic Growth*, Beacon Press, 1961, p. 2. Reprinted from *Reconstruction in Religion*, Beacon Press, 1961.

provided with the requisite basic tools for handling efficiently the twin problems of full employment and economic stabilization in the developed countries.

Today, however, the wheel has turned full circle. Our concern is now with economic growth, just as it was almost 200 years ago, when Adam Smith published his very significantly titled classic—*An Inquiry into the Nature and Causes of the Wealth of Nations*.¹

The Keynesian theories are of considerable help in this pursuit. These theories, however, together with their more modern lineal descendants, are largely static in the important respect that the technological and social environment in which the short-term variations in quantities, prices, employment, and income occur is taken for granted. In the African context this is a grave defect. Changes in this framework are usually assumed in the Keynesian exegesis to be external to the system, and their influence assumed away under that old, favourite, and rather battered umbrella of the economist—*ceteris paribus*—‘other things being equal’. It is now becoming increasingly recognized by economists that if this veil—I almost called it a shroud—could be removed and the consequences of technological and social change thoroughly accounted for, a more rounded and satisfactory explanation of economic growth and social development might be achieved.

One of these ‘other’ factors, conveniently placed in deep-freeze by the Keynesians, is education. If the economic impact of this factor could be added to the Keynesian tool-box and integrated into a more realistic theory of growth, we should probably achieve a more complete explanation of economic growth than we now have at our command. This blotting out of ‘other things’ has been

¹ First published on 9 March 1776.

continued largely by fellow economists in the more developed countries of the world, as they spin their highly theoretical growth models in the serenity and solitude of their tranquil studies. To a very large extent they have left these 'other things' unexplained and unrelated to the other more easily manageable variables of their highly developed, mathematically precise, and geometrically elegant constructs. The work, however, of a handful of pioneers is beginning to indicate that social and technological changes, hitherto conveniently thrown into the *ceteris paribus* dustbin as an inconvenient 'residual', might possibly explain a large part of economic growth.

Nevertheless, the nature of this problem is so complex that strikingly rapid advances cannot be expected. These 'other factors', e.g. education, training, and the health of the community, involve the analysis of a large number of highly diversified and complicated processes. The way ahead is far from easy although the route has been sign-posted. The primary need, at this stage, is for empirical fact-finding, and this is one of the tasks with which my Department is concerned.

At the same time, while the fundamental problem is complex it is relatively easy to isolate. Stated baldly, it is, What makes the economy grow? In Central Africa we have been so obsessed with flows of internal and external capital and 'chunks' of physical investment that the economic significance of these other factors has been largely ignored, overlooked, or just not understood. I am not, of course, denying that investment in physical goods and equipment is vital. Such investment leads ultimately to increased output per man-hour. But increased output depends on the new technology embodied in capital equipment, and this, in turn, depends on research and

education, especially on the education and health of the equipment operators—the wage-earners. Again, it might be asked, What induces industry to invest in new capital equipment and what induces labour to migrate towards more efficient employment? The orthodox answer is the lure of higher profits and higher wages. But the effect of these incentives, in turn, depends directly on the level and kind of education and knowledge available. The key to economic development, I believe, lies mainly in *man himself*, and not only in material resources.

III

It is reported, Sir, that when the Emperor Augustus learnt of the destruction of his legions under Varus, he is said to have crashed his noble head against the nearest and most convenient marble pillar and shouted, presumably in Latin: 'Varus, Varus, General Varus, bring back my legions.' So it is today in the vital sphere of the development of the educational systems of African countries.

There is growing widespread and profound regret for the locust years, when critical decisions might have been taken which would have produced the educated people on whom the economic future and well-being of these countries depend—possibly more than on any other factor. But the lost years cannot be retrieved. One of the first lessons that Economics teaches is that by-gones are for ever by-gones.

I can well imagine that there are many among us tonight who are asking themselves why an economist presumes to poach on their territory; education is regarded very definitely as the sole preserve of the educator. This is not

a new situation for an economist. No one occupies a less enviable position than he. Exploring the misty area between proven knowledge and supposition, his work and advice are often scorned and rejected. If he establishes a sure law of human nature he is upbraided by large numbers of people who think their own common sense sufficient. Every man is his own economist. After all, Henry Ford did not study Economics. What business is it of economists to interfere in education?

By contrast, of course, physical science has, to repeat a hackneyed phrase 'never had it so good'. The great advances and awful power which physical science has placed at the disposal of the human race are on every side accepted and feared.¹ Yet, for all their force, impact, and tremendous potential for the development and destruction of the human race, they are but the smaller half of what mankind wants. It is more obvious here in modern Salisbury than in modern New York, London, Moscow, or Auckland that the highest successes of scientific achievement and modern technology are compatible with deep, almost abiding poverty in the mass of the people. Yet of what advantage are these scientific attainments, while human distress remains unanswered and large sections of the population are too ignorant and careless to understand or accumulate the wealth which science confers?

In Central Africa during the last decade we have tried an experiment, and to a great extent we have failed. The growth of agriculture, manufacturing, and mining have widened the means of employment and increased wealth

¹ For a dramatically brilliant account of the birth of the atomic age see Robert Jungk, *Brighter than a Thousand Suns*. This book was originally published in Germany under the title, *Heller als tausend Sonnen*, in 1956. The English translation was published in 1958 by Victor Gollancz Ltd., and Rupert Hart-Davis Ltd.

for larger numbers of people to a level previously unknown in these parts. Nevertheless, within these last few years we have also seen poverty as prevalent as ever, and the slightest downturn in the general level of economic activity throw large numbers of people into a state of poverty little short of destitution.

There are, of course, many reasons—some economic, some non-economic—to account for this depressing state of affairs. It is no part of my present business tonight to inquire into the latter. But it is my business to indicate that in my opinion one of the contributory reasons is that—despite valiant efforts by devoted administrators—the state has allowed people to perish for want of work and education. Economic development has been sought without its being fully recognized that this is the more easily and rapidly achieved when education, as an initiating and sustaining factor in the growth process, is given due weight.

If greater investment in education had occurred in Central Africa in the past few years, our present economic ills might well have been modified, or even contained within the limits of manageable proportions. The accumulation of intellectual capital as a means of cushioning the economy against economic fluctuations is as important—perhaps more important—than the one-sided accumulation of physical capital.

Earlier in this lecture, Sir, I said there had been a 'renewal of interest' in the relationship between economic growth and education. I deliberately used this phrase, 'renewal of interest', because it really is a renewal. The fathers of our discipline were deeply concerned with the value of human capital, and appreciated its importance for national development. Not only did they discourse at some length on the subject but, more importantly, they made strenuous,

if somewhat quaint—at any rate to modern eyes—attempts to measure this intangible. The sort of questions they asked ran as follows: What is the economic value of an education to the individual and to society? What is the economic contribution of a skilled labour force? What do immigrants contribute to a nation's growth and what does emigration deduct?

A very early discussion of the money value of a human being to society was made almost 300 years ago by Sir William Petty. Admittedly, Petty had several shots at this somewhat bizarre and slightly repellent calculation, producing estimates between £69 and £90 as the value of a resident in England. Incidentally, he argued in 1687 that since in England a person is worth £90 and only £70 in Ireland, transportation would be economically desirable. He would be a bold man who would advance such claims today; but is it not possible that in Central Africa, for example, the 117,000 migrant labourers from Malawi or the 107,000 migrants from Mozambique working in Southern Rhodesia have a greater value—to themselves and to their adopted country—than in their respective homelands?

Minute streams of discussion of this question flowed gently on for the next three centuries or so. Methods of analysis were crude and the data imperfect, and the contributions were not always accorded recognition. Orthodoxy was, as is so often the case, triumphant. Although the efforts were primitive and the concept failed to take its rightful place in the development of economic thought, the antecedents of present concern are there, discussed and examined. What has stimulated this rebirth of interest in an old idea? Why are economists beginning again to emphasize education's role in economic development?

Basically, the reasons are two. First, since 1945 econo-

mists have become increasingly concerned with problems of growth in the developed countries. They have tried to understand the process that underlies it. To do this, they must read and understand the record of the past; they must know not only where countries are in the growth race but how they got there. So economists examine and attempt to measure the process of growth and the contributions that increases in quantities of various inputs have made to increases in total output. The evidence here is clear and striking. Less than half of the increase in output of the U.S.A., for example, can be explained by increases in the stock of tangible capital and man-hours worked. This staggering result has prompted economists to look again at their orthodox conventional classification of inputs. This re-examination indicates that almost one half of the residual can be explained by increased productivity, achieved by higher levels of education for greater proportions of the population.

Secondly, our renewed interest stems from our concern—shared by all here this evening—with the underdeveloped countries. Of what use are engines without engineers, or engines and machines manned by a diminishing supply of white engineers—of machinery without machinists? True, here in Central Africa we have imported our technology and technologists and will probably continue so to do for a good many years yet, but our technicians must be trained within our own borders. Nor is this merely a question of training only a relatively few skilled workers; it is also one of creating an educational system that reduces illiteracy and diffuses knowledge at all levels.

On this point, Alfred Marshall has said:

We may then conclude that the wisdom of expanding public and private funds on education is not to be measured by its

direct fruits alone. It will be profitable as a mere investment, to give the masses of the people much greater opportunities than they can generally avail themselves of. For by this means many, who would have died unknown, are enabled to get the start needed for bringing out their latent abilities. And the economic value of one great industrial genius is sufficient to cover the expenses of the education of a whole town: for one new idea, such as Bessemer's chief invention, adds as much to England's productive power as the labour of a hundred thousand men. Less direct, but not less in importance, is the aid given to production by medical discoveries such as those of Jenner or Pasteur, which increase our health and working power; and again by scientific work such as that of mathematics or biology, even though many generations may pass away before it bears visible fruit in greater material well-being. All that is spent during many years in opening the means of higher education to the masses would be well paid for if it called out one more Newton or Darwin, Shakespeare or Beethoven.¹

Would that this was the text in the office of every politician and civil servant in all African countries!

Despite these and other similar views, there are still many today—many who tread the corridors of power and influence—who would say that we here in Central Africa cannot afford investment of this kind. Many who would discount in Central Africa the advent of another Darwin, Newton, Shakespeare, or Beethoven. But surely—on a more material plane—they do not really believe that it would be wiser to reduce educational expenditure, use these funds for consumption and free teachers for other work? The implication must be that education is a less productive form of investment than alternative uses of funds. What does the everyman economist say on this point?

¹ Alfred Marshall, *Principles of Economics* (6th edition), Macmillan, 1910, pp. 216-17.

He might cautiously refer to that old bogey of 'priorities'. This is, of course, a real problem. Hitler and Stalin have in their various ways shown that education, when accorded high priority in the national scheme of things, can be used to enslave human beings. One may even discern disturbing signs of this same process developing in various parts of this continent. It is still the hope, however, that a process can be devised to preserve individual freedom while securing the common good. To do so, however, priorities in terms of the social needs of society in relation to its physical and human resources must be decided. To decide priorities—there is the rub.

Just how are the educational priorities in Central Africa to be settled? Is the Minister of Education in Zambia to establish in that territory a new university with the same faculties, degrees, and entrance standards as this one? Or should there be established a complementary institution designed to satisfy quite different—but nevertheless equally important—educational needs and aspirations? Or should he build new secondary schools or more primary schools, or develop on all fronts? On what lines is the Southern Rhodesia Minister of Education to decide between spending money on training colleges, or on scholarships to the university, or on more efficient secondary schools? Should Malawi neglect children of ten years of age and under and invest its money in schools of law and agriculture? These are the sort of questions which present hard choices. The answers to them will permanently affect the lives of thousands of people.

It is often forcefully argued that the key to the answers to these problems lies in expanding the wealth of the territories. Only when this is achieved, runs the argument, will the countries be able to afford the educational and

other services which are so desperately needed. This is true, as far as it goes, but it is almost impossible to increase the area's wealth without, at the same time, improving the quality and level of its human resources.

The fact is that in such an economically vital field there can be no 'either-or'. There can be no sacrifice of one part for the benefit of another. In the first years of development, the stage Central Africa is still in, the paramount need is for trained minds. That is why the founding of this University College was essential for economic development in Central Africa. That is why the establishment of new universities and institutions of higher education in Zambia and Malawi is now also essential. From these will flow in ever-increasing numbers the teachers, doctors, economists, scientists, administrators, and agriculturalists who will assist in the development of their homelands. Educated within the region, among the problems of their country and able to relate them to the experience of the rest of the world, their students will contribute directly and effectively to economic growth and development. Israel is a shining example of how much the intellectual, motivated by patriotism, can contribute to the development of his country.

This implies putting emphasis on secondary and higher education: it means quality rather than quantity to start with. Similar emphasis on primary schooling at first will be a waste of precious resources. This has been Southern Rhodesia's tragically sad mistake. The first major need is for teachers, not for primary school pupils and bricks and mortar: for technologists to create the opportunities for the technicians. It is the multiplicity of trained minds that will spearhead the attack on poverty, ignorance, and disease.

Lest my professional educational colleagues despair of me as a mere materialist calculator, I would hasten to add that I have some misgivings about the cold application of the economist's art to education. I recognize that education is a live, dynamic, social process, that it is related to living problems, but I also recognize that we should ceaselessly query every development and always attempt to quantify our actions. If the sceptical critic continues to suggest that we cannot afford a good educational system, then rather reframe the question; it is not 'What can we afford to spend on education?' but rather 'What can we afford *not* to spend on a strong educational system?'

For this reason alone the economist must stand shoulder to shoulder with the Minister of Education in the battle for an expanded and improved educational system. May I say here that the fight for education is too important to be left solely to the educators. This is now becoming accepted. There was a period when economists and educators were hostile to one another and mutually mysterious, but now they are discovering together new insights into the economic aspects of education—and making joint progress in the field. At last the economist is recognizing that the development of people is just as important as the development of things—which educators have been hinting at all along. The accumulation of intellectual capital is comparable in importance to the accumulation of physical capital.

Some far-sighted financial institutions in Central Africa have already recognized this fact. For example, between 1957 and 1962 the South African Mutual Life Assurance Society lent £414,500 to various private schools in Southern Rhodesia; during the same period, the British

South Africa Company Investments Limited invested £115,000 and the Legal and General Assurance Society Limited £300,000.¹ These loans—made for school buildings and equipment—are also all guaranteed by the Federal Government. This is commendable enterprise, but it naturally prompts the question, When will similar investments be made in African education in these territories?

The kinship of labour capacity with capital was very clearly recognized by Adam Smith and he explicitly included in fixed capital what he called 'the acquired and useful abilities of all the inhabitants or members of the society'. Smith's simple exposition is worth repeating:

When any expensive machine is erected, the extraordinary work to be performed by it before it is worn out, it must be expected, will replace the capital laid out upon it, with at least the ordinary profits. A man educated at the expense of much labour and time to any of those employments which require extraordinary dexterity and skill, may be compared to one of those expensive machines. The work which he learns to perform, it must be expected, over and above the usual wages of common labour, will replace to him the whole expense of his education, with at least the ordinary profits of an equally valuable capital. It must do this too, in a reasonable time, regard being had to the very uncertain duration of human life, in the same manner as to the more certain duration of the machine.²

There is a danger, however, in pushing this comparison too far. The theoretical position of human beings gives rise to the greatest difficulty in *pure* economic analysis. While they are 'productive instruments' they are not

¹ Federation of Rhodesia and Nyasaland, *Report of the Comptroller and Auditor-General for the Financial Year ended 30th June, 1962*, pp. 60-63. C. Fed. 229.

² Adam Smith, *The Wealth of Nations* (Cannan edition), vol. i, p. 103.

artificial owned 'things'. Thus, human beings as a source of economic services cannot be treated in economic theory in *exactly* the same way as wealth or capital.

IV

Is it possible to make some estimate—however rough—of the magnitude of the higher educational task facing African countries? Although many difficult methodological problems confront the investigator working in this field, some insight and some knowledge may be garnered if one is willing to chance one's arm, aware all the time of the pitfalls and dangers that such a venture entails.¹

Again, the problem is quite simply stated. What is the need for qualified manpower in Africa during the rest of this decade (i.e. to 1970) and what national educational efforts are demanded in terms of both student numbers and teachers to be trained to meet these needs?

Although painting on such a broad canvas tends to obscure much of the detail and diminishes the value of the finished work, the exercise is worth performing if only to draw attention to the enormous magnitude of the problem.

Be all that as it may, Sir, I am going to chance my arm. In short, I shall attempt to estimate the expansion of higher education in Africa on the basis of the *desirable* increase in incomes per head of African countries up to 1970. The figures, therefore, are *not* projections or forecasts based on past trends *but* target figures of desirable

¹ For a fuller treatment of the problem discussed here, the reader is referred to J. Tinbergen and H. C. Bos, 'The Global Demand for Higher and Secondary Education in the Underdeveloped Countries in the Next Decade', in chapter iv of vol. iii, *Policy Conference on Economic Growth and Investment in Education*, O.E.C.D., 1962.

future levels of higher educational activity. In spite of their tentative character some secure conclusions can be based on them.

First, let me deal with the number of students in higher education in African countries in 1970. These figures have been calculated on the basis of three factors: the number of students in the base year, 1958, which is the most recent year for which relatively complete statistical data are available; the population growth in the period 1958-70; and the desired increase in enrolment ratios in the 1958-70 period.

On this basis, then, we find that there were about 130,000 students in higher educational institutions in Africa in all faculties in 1958. The similar statistic for Western Europe was 706,000. Of this meagre total of 130,000 only 26,000 were in the natural and agricultural sciences and technology. By contrast, there were 238,000 studying in these fields in Western Europe.

An examination of the enrolment ratios for higher and secondary education reveals a similarly depressing situation. In terms of the numbers of pupils and students in secondary and higher education per thousand of the population, Africa supported 5.6 while Western Europe had 37. Figures such as these, crude as they might be, very strikingly reflect the low educational levels of the African countries, especially in scientific and technological education. *They indicate quite clearly one of the major reasons for the wide disparity in income per head between Western European countries and the underdeveloped countries of Africa.*

Account must next be taken of expected population growth. Professor Rosenstein-Rodan estimates that the total population of Africa will increase by 24 per cent. between 1958 and 1970. Thus, in order *just* to maintain

the present low ratio between the number of students and total population, enrolment will have to increase by this same percentage. Such, however, is the force of the drive for education in developing Africa that we need to plan, not merely for the maintenance of the present ratios, but for their rapid expansion.

It is illuminating to refine further the enrolment ratios already discussed. If we classify African countries according to their Gross National Product per head, and their respective enrolment ratios per thousand of population, calculated for different income groups, we get the following figures. In African countries from groups of people with an income level of less than £35 per annum in the age group 20-24 years, the number of students in *higher education* per thousand of the income group is 1. In income groups between £35 and £90 the number per thousand jumps rapidly to 29.

I would not choose to burden you with these statistics, but for one interesting fact. They illustrate an important economic relationship between the income level and the enrolment ratio. In *higher education* the ratios tend to increase with increasing *per capita* income, even at relatively low levels of income. In addition, the evidence from developed countries indicates that enrolment ratios grow at a faster rate than *per capita* income and grow faster, furthermore, in the early stages of development than in the more mature phases.

With these points in mind, then, it seems reasonable to make the following assumptions about the desirable target figures for enrolment ratios in higher education:

1. That the total economic effort in African countries will be aimed at an average increase in income per

head of at least 2 per cent. per year up to 1970, and that educational levels will have to be fitted to this rate of development.

2. That if this is the case, enrolment ratios for *higher education* will increase in African countries with a *per capita* income below £90 by 6 per cent. per year, or by 100 per cent. between 1958 and 1970.
3. That for students in the natural and agricultural sciences and technology the enrolment ratios will be trebled, thus growing faster than those in other sectors of higher education.

Taking these assumptions, together with the available 1958 data and the expected growth in Africa's population, an estimate can now be made of the number of students in higher education in 1970. In *higher education*, the arithmetic indicates that there will be 380,000, of whom 130,000 will be students of science and technology.

While figures of this magnitude have serious implications for capital development to provide the institutions to accommodate the increased number, much the more important consequence is the demand and supply situation of teachers required by the swollen totals. In brief, how many university teachers will be needed in Africa by 1970 and to what extent will Africa be able to supply them, and to what extent will the developed countries be called on to assist in the supply of teachers?

It is extremely difficult to find answers to these questions because the supply of teachers is not a constant which can be estimated by extrapolation. Newly developing African countries will make special efforts to increase the supply of teachers by setting up new training institutions and by directing a larger proportion of graduates and

secondary school leavers into teaching. Expansion, however, along these lines will be limited by what past experience shows about the interests and ability of graduates and school leavers to become teachers. Furthermore, the supply of teachers cannot be increased at will because of the length of the training period. The output of teacher-training institutions in the next 3-5 years cannot be influenced by any decisions taken now. This effectively shackles the expansion of higher and secondary education in the near future, unless increases in the student-teacher ratio are accepted or unqualified teachers are employed.

Of particular interest to members of this College and to the university planning authorities in Zambia is the demand and supply position of university teachers. The net increase in the number of university teachers between 1958 and 1970 can readily be calculated from the increase in the number of university students during the period and an estimate of the student-teacher ratio.

To this net increase must be added replacement needs to arrive at the total *gross* demand for university teachers. It can be assumed here that the replacement needs are equal to half the number of university teachers in 1958, which implies an active service life of about twenty-five years.

Calculating on this basis African universities will demand a *gross* increase of 15,000 university teachers between 1958 and 1970. Practically all these teachers will have to come from those graduating in the period 1958-70 and the percentage of graduates which would have to go into university teaching would be, in Africa, 4.5 per cent.

How does this compare with the experiences of developed countries? The figures take on an added significance

when it is realized that less than 1 per cent. of university graduates in developed countries are employed as university teachers. In addition, the figures only refer to university *teachers* and exclude the demand for non-teaching assistants, whose inclusion would probably double the universities' demand for graduates. Furthermore, the graduates of 1958-70 will, in the nature of things, be young people who could probably only fill relatively junior teaching posts, while for senior posts requiring specialization or practical experience appointments will have to be made from elsewhere.

From all this, Sir, it will be appreciated that the African countries will be unable to find from their own resources the number of university teachers required during the rest of this decade. Even if the developed countries had to supply as little as 10 per cent. of the increase, this would mean sending 1,500 more university teachers to Africa before 1970. All this, at a time when rapid university expansion is well under way in the developed countries themselves.

Although it should be stressed once again, Sir, that these are but tentative figures, they are at the same time, even allowing for fairly wide margins of error, sobering, even frightening. They indicate vividly what an enormous educational effort will have to be made by developed and underdeveloped countries alike. Bear in mind, Sir, that they are based on an assumed average income per head growth rate of *only* 2 per cent. per annum and you will readily appreciate that they probably underestimate the position. In the present and expected economic conditions of Africa, is a 2 per cent. growth rate assumption politically acceptable? There are many who would say that to assume such a low growth rate is unrealistic, if there is to be any

chance of ameliorating the most serious problem in the modern world, i.e. the yawning and ever-increasing gap between living standards in the advanced countries and those in the underdeveloped countries.

V

While African countries will continue to depend—and depend increasingly—on the developed countries for financial support to implement their expanding educational efforts, and as a source of recruitment for teachers of all kinds, they can fairly easily do much more to help themselves from their own resources.

In no African country that I know of is taxation potential fully exploited. In general, there seems to be no reason why African countries should not be able to collect through taxation at least 20 per cent. of their Gross Domestic Product. If this goal could be achieved there is a better chance that educational expenditures could find their place in the framework of much larger government revenues than is now the case. There is certainly room for considerable improvement in this regard. Only in rare cases is the full taxation potential of a country approached.

Certainly the three territories of Central Africa could do much better in this field, if this even lowish 20 per cent. criterion was achieved—which would not, in my opinion, be very difficult to do. Some of the world's richest countries, admittedly with high incomes per head, raise 30–35 per cent. of their GDP in taxation.

During the period 1954–61 the Gross National Product of Northern and Southern Rhodesia and Nyasaland was some £3,767 million. Of this amount £372 million was

collected in direct taxation and £186 million in indirect taxation, giving a total of £558 million, or only 14.8 per cent. of the total GDP for the period. There is surely room here for a further beneficial expansion of taxation.

TABLE I¹
Total Current and Capital Expenditure of Federal and Territorial Governments and Local Authorities
1955-61

	£ m.	% Total
Education	92.5	12.1
Defence and Police	91.0	12.0
Transport	140.9	18.5
Fuel and Power	45.9	6.0
Health	50.9	6.7
Administration	74.9	9.8
Other n.e.s.	265.6	34.9
Total	<u>761.7</u>	<u>100.0</u>

(including debt charges and changes in reserves)

TABLE II¹
Gross Fixed Capital Formation 1954-61

	£ m.	%
Education	15.4	1.6
Agriculture	81.7	8.3
Mining	158.4	16.1
Manufacturing	86.2	8.7
Finance	17.5	1.8
Other	621.9	63.5
Total	<u>981.1</u>	<u>100.0</u>

Just how well have educational expenditures fared in the Federation of Rhodesia and Nyasaland from this pool of revenue? Taking the period 1954-61, the total current and capital expenditure of Federal, Territorial, and Local

¹ Compiled from *National Accounts of the Federation of Rhodesia and Nyasaland, 1954-61*. Central Statistical Office, Salisbury, April 1962.

Government on education was £92.5 million or 12.1 per cent. of their total expenditures. This compares unfavourably with an expenditure of £91 million (12 per cent.) of the total on Defence and Police, and £140 million (18.5 per cent.) on Transport and Communications. Is this not an irrational scale of priorities in the allocation of public funds for an underdeveloped country to adopt?

If we look at the figures for Gross Fixed Capital Formation in 1954-61, we find that the situation is even worse. Education has received £15.4 million or 1.6 per cent. of total gross fixed capital formation. This contrasts rather oddly with an expenditure of £158.4 million (16.1 per cent.) for mining, £81.7 million for agriculture (8.3 per cent.), and £86.2 million (8.7 per cent.) for manufacturing. Could it be that the investment function of education has not been understood and that we have become obsessed with its purely consumption role? Without doubt, we should be well advised to switch much more of our savings to education. If my view of the matter is correct, it carries radical implications for our thinking about the development of these territories. It implies that fewer large hydro-electric schemes and other big industries should be developed and that more should be invested *in the people*.

The case of Japan is an interesting illustration of what can be achieved in this way. Something happened in Japan at a very early date, and it began to produce not only industrial products but also much more food under the most adverse circumstances. The agricultural achievements of Japan between 1875 and 1910 are miraculous. In 1873 Japan moved to compulsory universal education with the result that it very soon had a literate population. The rural people became more skilled at agriculture, and a large supply

of more sophisticated labour was made available to industry, more sophisticated than that of any European country at the time.

In striving to emphasize the tremendous importance of education as a factor in the economic growth of underdeveloped countries, there is a danger that it will be expected to achieve too much. Quite obviously, education is not the *whole* of development. If it were, India and Egypt would be much wealthier than they are. There is a lesson here.

No country will launch an expensive investment in, say, steel development, unless it has both the natural resources to exploit and the trained manpower to operate the industry. In the same way, it would be a misallocation of valuable resources to invest heavily in an improved educational system unless there are jobs for the people and capital equipment for them to work with. Here, we are up against one of those circles that face countries at the beginning of development and the one—more than any other—which dismays the educational planner. Jobs or people? The argument is familiar to you all. Why increase the output from our schools and university when there appear to be insufficient jobs for the graduates to go to? Create the jobs, say the educationists, and we will supply the people. This argument contains a certain grain of truth but a much larger amount of muddled thought.

The dilemma can be solved by integrating educational planning with the overall economic planning of the country. Two aims face the planner here. Education must be planned to meet the needs of individuals for their own development, and to meet the needs of the country for its general development. To achieve this, the former is met by making education available to all citizens, irrespective

of race, class, or income, according to their individual gifts and desires. The latter is served if the various sectors of the economy are supplied with the people having the necessary general education and special skills.

There is no conflict in these twin aims. Central Africa may need more engineers than botanists, but more of its students may wish to specialize in botany than in engineering. But this sort of conflict is more apparent than real.

In the first place, supply influences demand. This is simply because people make innovations which alter the conditions determining the growth of industries and consequently change the market for different kinds of education. Since innovations are unpredictable, a national educational policy must allow for them and assume that a person is most likely to become useful to society if he is left to develop his personal skills and qualities.

Secondly, an individual's choice is guided by factors similar to those which govern public policy. Students are likely to be attracted to that study and career in which they feel they will be most useful to society and most wanted by it. This tendency is reinforced by economic motives. The unsatisfied demand will be reflected in high incomes which will attract people to the neglected sector of education. There will be no serious danger of 'over-educating' the population; the greatest risks will lie in the opposite direction. Today's projections of future requirements for well-educated manpower are likely to prove low ten years from now. If economies can establish and maintain a relatively high level of employment and stability, the increased availability of well-educated manpower will stimulate the rate of economic growth and technical advance, thus enlarging more rapidly the capacity of these economies to absorb well-qualified manpower.

VI

Sir, I have tried to point out some of the critical relationships that exist between education and economic growth; to show that these relationships throw a distinct light of their own upon the paths developing countries should take—upon many subjects, indeed, about which neither the educationist, the economist, nor the politician can remain with impunity in even partial ignorance. Once this realization grows it should not be too difficult to make progress. The main difficulty may be psychological: in this work departmentalism must give way to a broader national view—something which is not always easy. Without it, education will fail the economy and the economy will fail education.

The major task is to educate about education. It must be explained that the costs of ignorance and illiteracy are not only the direct costs of teaching the ignorant and illiterate—heavy as these might be—but also the much more important indirect costs of loss of production and output caused by ignorance and illiteracy. These costs are the *real* costs. Society, all of us, must bear these costs. Reducing the direct costs may look much better for the budget, but this may mean that the wrong kind of measuring rod is being used—the wrong budget. The choice lies between paying for education *or* paying for ignorance.

It is time, however, to bring this lecture to an end and not to begin a sermon. Yet I shall be bold enough with your permission to end with some words of advice. To my students I would say:

Economics has a vast literature, and you will not find all the good concentrated in the last marginal increment; you must master the old before you can appreciate the new; a portion of

truth just rediscovered for the hundredth time by some amateur is not of such value as a body of doctrines that have been developed for more than a century or so, by economists of repute.

And to the legislator I would say:

Vaster than the literature of economics is the economic experience of nations; the lessons to be learnt from the multitudinous experiments of the past can never become antiquated, for they have revealed certain broad features of human character that you can no more disregard than the functions of the human body. Just as Harvey did not invent but discovered the circulation of the blood, so Adam Smith did not invent but discovered the system of natural liberty. And nothing has been better established than the position that legislation which neglects to take account of the liberties and wishes of individuals is foredoomed to failure. If they cannot break through the law, they will get behind the law. The first duty of the legislator is to take account of the natural forces with which he must contend, and the great figures of economics have made a survey and estimate of these forces, which, based as it is on the facts of human nature and the experience of nations, it would be wilful to overlook.¹

My sketch, Sir, has necessarily been imperfect, but the hour warns me that my task for the present has ended.

¹ Professor J. Shield Nicholson, *The Reaction in Favour of the Classical Political Economy*. Reprinted in *Essays in Economic Method*, edited by R. L. Smyth, Gerald Duckworth & Co. Ltd., 1962, p. 125.

PRINTED IN GREAT BRITAIN
AT THE UNIVERSITY PRESS, OXFORD
BY VIVIAN RIDLER
PRINTER TO THE UNIVERSITY