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Science in the Philippines:III
Science and Education

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Dear Dick,

In talking to Filipinos about science and development, I was struck by the extent to which education was offered as the ultimate long-term solution to nearly all their problems. Education could cure the rising generation of peasants of their conservatism, could make them literate and more willing to adopt new scientific and technical innovations. Education could provide the many technicians and middle class workers that are needed. Education could provide the more highly skilled professional people. Education might even make people more politically responsible. In short, education was offered as the ultimate salvation for everybody and every thing, from peasants to politicians and from crops to corruption.

Alongside the more general ideas of the good of education, were more specific thoughts about manpower development. It was suggested that one of the reasons why economic growth had been so slow and economic aid ineffective over the past decade was that too much attention had been given to the development of physical resources, and too little attention to the development of human resources. It was realized that a survey must be made of manpower requirements. The Government must determine how many doctors, engineers, managers, lawyers, scientists, technicians, etc., the country will need over the next few years, and the education system must be geared to meet these needs. This is a new concept for the Philippines, and the required manpower survey has just begun.

This is not the only new concept to find favour among leading Filipino educators, in fact the whole of the present philosophy of education in the Philippines has recently been under attack. New ideas and proposals for major reforms are contained in a report which is being prepared for the Government by officials at the Program Implementation Agency. But before I discuss these new proposals I will review some of the facts about the present education system, so that the need for reforms can be better understood. I will pay special attention to science education.

Some Facts about Education in the Philippines

1. The State is committed by law to provide free primary education for all Filipino children. In fact 85 - 90% of all children do

attend at least one year of primary school. However, there are many drop-outs. As Figure 1 shows, out of each 100 students who started school in 1948, only 35 began their final primary school year in 1953.

2. In 1963-64, 25% of the National Budget was spent by the Government on education. Of this 94% went for elementary or primary education.

3. The number of students at Government and private schools and universities is shown in Figure 2.

4. There are 299 colleges and 25 universities in the Philippines. One out of every 100 of the population is at a college or university. This is a greater percentage than any other country in the world except the United States. It is six times greater than the comparable figure for Britain.

5. There are three types of private schools and colleges:

- i. Religious
- ii. Privately owned institutions
- iii. Stock Companies.

The latter two groups predominate, and are operated to make a profit. The stock companies declare dividends.

6. At the private colleges and universities, graduates in education, commerce, and law, made up 75% of all graduates from 1947-1959. A more detailed breakdown of graduates by subject at both private colleges and the State owned University of the Philippines is shown in Table I.

The most striking aspect of these figures is the extent to which the Government has put all its eggs in the elementary education basket, leaving secondary and particularly higher education largely in the hands of private institutions, many of which operate for profit. Many Filipinos now feel that this is a mistake. The critics said that even the large investment in elementary education had not been wisely administered. I was told, "There are too many examples of school houses built for political purposes and too many students drop out before they are even literate." One reason for the literacy difficulty is that primary school children must cope with three languages: the vernacular; Tagalog (the National language); and English.

It is at the secondary school that science education begins. The problems of science education at secondary schools were analysed in Senator Manahan's Senate Report on the status of science in the Philippines, and were mentioned in my last letter. Many of these problems stem from a law made in 1957 which emphasized the teaching of science. This resulted in teachers with no previous experience or knowledge of the subject trying to teach high school physics, chemistry, and biology, often without proper equipment and textbooks. The Secretary of Education, testifying to Manahan's committee, said that less than 2% of physics teachers

Figure 1
% of enrollment
in Grade I

SURVIVAL RATES
(Students starting Grade I in 1948)

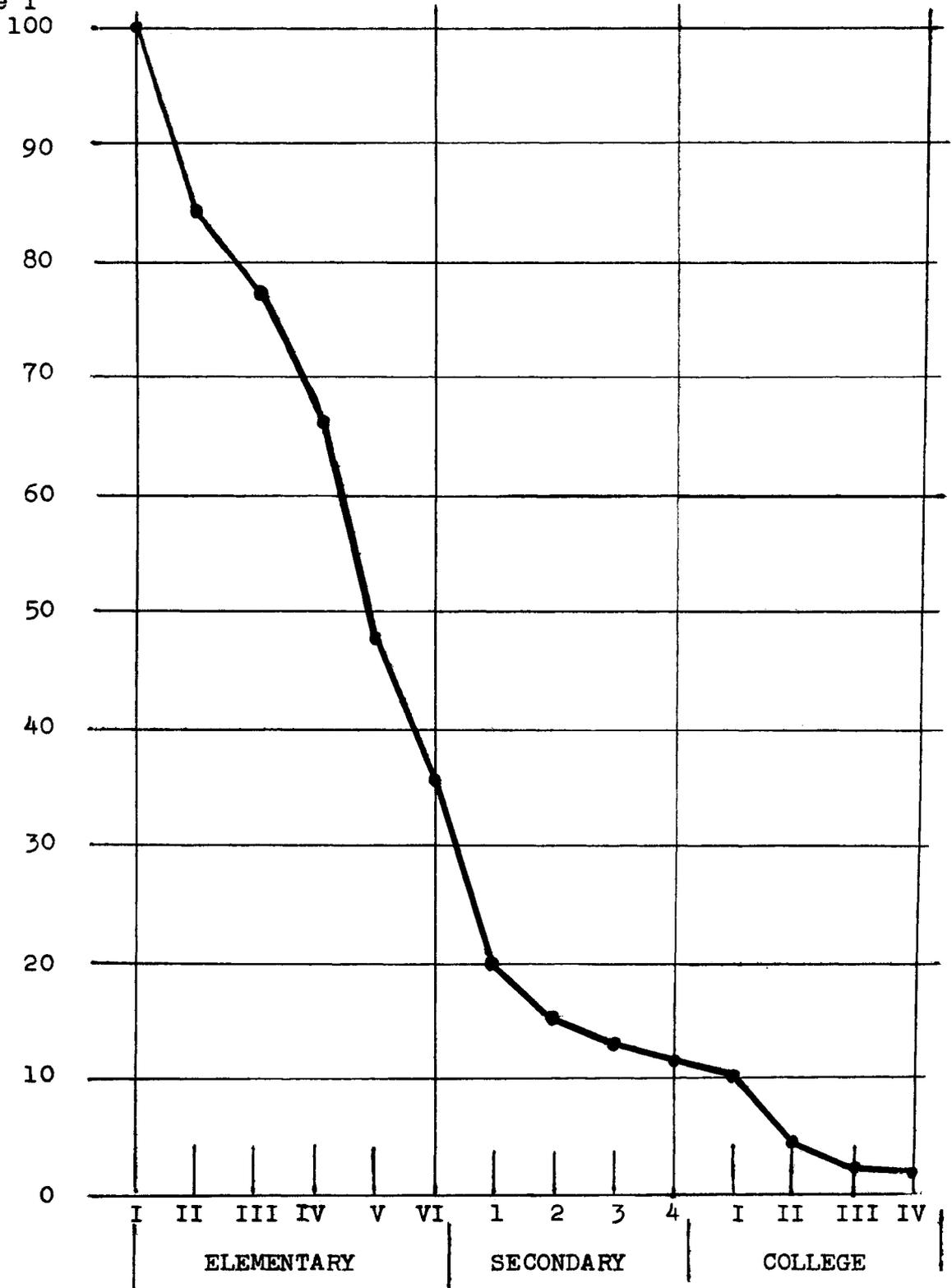


Table and graph adapted from: Investment in Education: The Philippine Experience, a mimeographed report by Sixto K. Roxas.

Figure 2

SCHOOL ENROLMENT BY EDUCATIONAL LEVEL

SCHOOL YEAR 1961-62

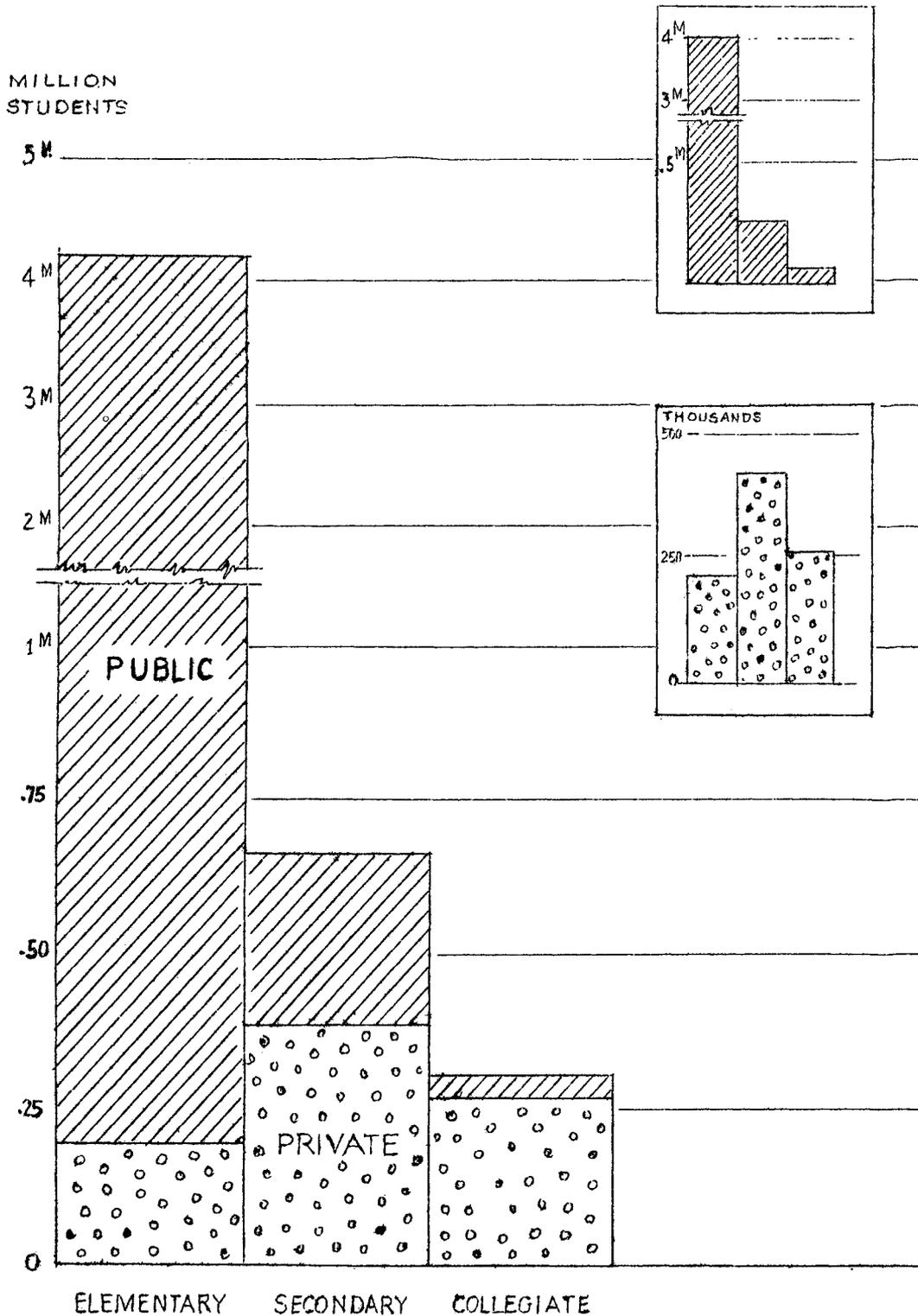


Table I

GRADUATES FROM COLLEGES AND UNIVERSITIES 1947-1959

	Private Colleges		State University	
	Total	% of Total	Total	% of Total
Teacher Training (Edu.)	182,779	45.2	2,305	19.6
Commerce	81,031	20.0	-	-
Liberal & Fine Arts	53,340	13.2	1,605	13.6
Engin. & Technology	23,257	5.7	1,009	8.6
Law	19,370	4.8	1,104	9.4
Pharmacy	9,917	2.5	629	5.3
Medicine	9,073	2.2	1,153	9.8
Dentistry	6,025	1.5	223	1.9
Nursing	5,434	1.3	208	1.8
Midwifery	3,413	0.8	-	-
Home Economics	2,501	0.6	-	-
Agriculture	2,124	0.5	1,543	13.1
Nautical	2,061	0.5	-	-
Music	1,251	0.3	63	0.5
Chemistry	1,223	0.3	185	1.6
Optometry	899	0.2	-	-
Foreign Service	467	0.1	146	1.2
Home Arts	248	0.1	-	-
Social Welfare	183	-	-	-
Business Admin.	-	-	595	5.1
Science	-	-	410	3.5
Forestry	-	-	141	1.2
Philosophy	-	-	46	0.4
Hygiene	-	-	45	0.4
Fisheries	-	-	4	-

had received formal training in that subject. There are various schemes afoot to improve matters, the Peace Corp Volunteers are proving helpful here, and closed circuit television lessons in physics were tried successfully last year. But with these difficulties it is not too surprising that the university staff complain about the low level of attainment of the freshmen science students.

The budding scientist also has many problems to face once he gets to a university or college. Having graduated from his vernacular to Tagalog and English (the language of instruction at high school) he must now learn Spanish, thus diluting the time he can spend on his special subjects. The fact that most colleges are run as a business concern for profit means that their investment per student is kept to a minimum. As a result at most of these private institutions there is little equipment, and what equipment there is, is frequently only for display to attract prospective students. Professors must teach for four hours a day, and often must give extra tutorials in the evening to supplement their insufficient salaries. They have little time to prepare lectures or do research. Although an institute is required to do a certain amount of research before it can be called a university, only a few universities do research of much significance. So that if a Filipino student intends to do graduate work he almost always goes abroad, mainly to the United States.

Most Filipinos I talked with were very dissatisfied with the quality of their education in general and with science education in particular. "We have sacrificed quality for quantity -- and it was a mistake," one leading educator told me. It has resulted in too few really top people with high qualifications in the sciences and other professions; too many people with a first degree, often in subjects for which there are insufficient jobs; too few people in the skilled middle class, technicians, etc.; and too many in the semi-literate class.

Sixto Roxas, by all accounts one of the most brilliant men in Government service, currently Chairman of the National Economic Council, blames most of the troubles on too strict an adherence in education to the twin principles of democracy and free enterprise. In a recent speech he said:

Our concept of democracy favors diffusion -- the spreading of resources, limited though they be, to extend the accessibility of education to as many as possible. The preponderance of egalitarian sentiments in the country abhors the creation of an elite but would use education as a levelling influence. Yet the most strategic pursuit of economic growth requires, at this stage, not the extensive and shallow plowing of the field but the intensive concentration of resources on the cultivation of an elite crop of effective leaders and technicians, capable of giving substance and depth to the masses later on. We have, however, chosen to short-circuit history. While it may be a political virtue, if not an urgent expedient, to emphasize numbers, it is still an economic waste, for mass education -- for a developing country -- has

more of the character of present consumption than a strategic investment in the future.

The extension of the free play of market forces into the field of education has also stressed the consumption rather than the investment aspect of education. As business corporations, many of our institutions of higher learning adjust their supply to suit the mass demand. And the demand has predominantly been for diplomas in fields that meet the requirements of social prestige rather than of national development. The practice of law is still more prestigious than farming or factory supervision. Our universities, instead of exercising leadership, have confined themselves to satisfying the public's demands."

The Future

When President Macapagal assumed office in January 1962, he embarked on a series of reforms. To implement these reforms the Program Implementation Agency (P.I.A.) was established with Sixto Roxas at its head. More recently Roxas moved to the National Economic Council but the group of bright young men he recruited to head up the different divisions at P.I.A. remain, and his principles guide many of the proposed reforms. During our stay in Manila, Roxas was in Taiwan so I was unable to meet him. I have however, read the scripts of several of his recent speeches. From these it is possible to piece together his ideas on education. The main ones are:

1. Education is not the place for free enterprise. Ultimately, private money making education institutions will have to go.
2. For the best development of the country the Government must determine the manpower requirements. It must then help to provide the trained manpower in the right proportion at the right time. Students must be directed into those subjects which are required for the good of the State. The direction must not be by force, but by a system of rewards. There must be a programming of manpower, with more Government assistance channelled into secondary and higher education.
3. Quality must replace quantity in education at all levels, especially at the top.

The man appointed to head the Education Division at the P.I.A. was Professor Salvador Gonzales. Gonzales is a theoretical physicist who received his higher education in England at Cambridge in 1958. There are two significant facts about this appointment. First, Gonzales is a scientist. This signifies the country's interest in science and the determination to give it proper emphasis in the education system. Secondly, Gonzales was one of the few Filipinos who went to Britain instead of the United States for higher education. He is known to be impressed with some features of the British system and some of the proposed reforms clearly stem from his British experience.

For the past eighteen months Gonzales and his staff have been working on the proposed reforms. His report is almost complete, he was working on the necessary legislation when I called to see him at P.I.A.. "We are determined to start at the top," he told me. "The universities must set the level of excellence which will determine the goal which the secondary and primary schools must reach, rather than the reverse which is the present position."

The proposed reform which is likely to stir up most controversy is the one for national college entrance examinations. At the moment anyone who can pay can attend college. Gonzales wants the colleges and universities to be places of excellence which only take those students who have demonstrated that they can benefit from higher education. In fact, Professor Gonzales said that he would like to see the number of students entering college cut by half. It is realized that if education is to be removed from the market place, the Government will have to provide more of the money. Gonzales proposes something akin to the British University Grants Committee to act as a buffer between Government and universities. The actual workings will be more complex than in England, because at least at first, there will be the four different types of colleges and universities to deal with. But the introduction of a new pattern of financing private education will simultaneously provide a way for shifting educational investment towards those courses most needed.

Other reforms range from measures to restrict primary education to two languages, (of which English will be one) to a proposal for an institute of advanced studies, which in effect will be a post-graduate research institute to serve all the universities. There is a long way to go before any of these proposals are implemented. Opposition is anticipated. Several Filipinos thought that President Macapagal's popularity is beginning to wane and doubted that he would push the reforms against much resistance.

Some of the proposed reforms are brave indeed. The suggestion that the number of college and university students should be drastically reduced must be unique in this day of expanding university enrolments. There will be people in many countries who will watch these developments with interest.

Yours sincerely,

C.H.G. Oldham

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