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GLIMPSES OF THE MAKING OF THE VIDYODAYA SCIENCE FACULTY, 1965 - 1971*

by

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I now come to a few of the innovations I was responsible for at university level, at Vidyodaya (now called Sri Jayawardenapura) University.

By the time I came to Vidyodaya in 1965 I had already worked with and amongst our scientists for almost 18 years—long enough to realise there was much that needed changing in the way we trained them. And I promptly set about doing what I could to make changes aimed at producing the sort of scientists that a nation newly emancipated from about 450 years of political subjection to foreign rule needed—men filled with zest and joy in their work, with an independent outlook, and with confidence in themselves; men who, whilst free from the "confidence" of con-men, were yet *neither* timid "walking encyclopaedias" *nor* the more or less efficient implementors of foreign instruction, executors of the behests of foreign agencies.

First : It was clear to me that the average science graduate, general or special, produced by our usual university-courses, was sadly lacking in knowledge of matters other than those falling within the boundaries of the subjects he had studied. (I trust that you will remember that my remarks this morning do *not* refer to exceptional students. And now that I have interrupted my narrative here, this will be a suitable place for me to point out that these innovations of mine were fortunate, that *I* was fortunate, at Vidyodaya in that I had a Science Dean, Professor G. C. N. Jayasuriya who, once he had been convinced by my advocacy that an idea of mine was valuable, would champion it himself at the Senate and higher levels of the academic administration. I am *especially* grateful to him; and also to the academic staff not only of the Department of Biological Sciences but also of the other science departments of Vidyodaya, not only for their co-operation in implementing innovations but even more for their contributions, during many and long and critical discussions by the Faculty, grateful for their contributions to the development of these ideas of mine and to the means of their implementation.)

Back to my narrative: The average science graduate was so deficient in knowledge outside his own subjects that he might, without injustice, be dubbed

* This is the second half of a lecture entitled "Some Innovations of a Biologist", delivered by Dr. A. C. J. Weerekoon, Professor Emeritus, Sri Jayawardenapura University, at the Seminar on "Science Education", conducted by the Sri Lanka Association for the Advancement of Science on 13th December 1983 as part of its 39th Annual Session.

uncultured. As a step towards correcting this I suggested that our science student, in addition to the *Sinhala Buddhist Civilisation* which he was already required to study in common with all Vidyodaya undergraduates, should also learn something about the nature and history of the world, both animate and inanimate, into which he had been born. And I invented a subject, which I called *The Human Heritage*, which would begin with brief accounts of scientific cosmogony, then take the student through the origin and evolution of the solar system; of the Earth and the formation of its scenery; the origin and evolution of life, of animals and plants, of Man himself; the origin and evolution of his civilisations, his societies and his cultures, including his religions, his arts, his forms of government, and so on. Our student would have to study this subject over the whole of his first year with us. Many specialists would teach it for us. I have brought with me a copy of the syllabus of this subject for those of you who may wish to examine it after my talk (see Appendix).

Second: It was also clear that the average Special (or Honours) graduate in Science knew little about branches of science other than his own speciality. There was too much and too early specialisation within science. This, like the previous fault, also began at school, but we at the university could try and repair the damage. We could, I felt, do this by giving every science undergraduate a compulsory foundation of one year's study of *all* the basic practical, science subjects—Botany, Zoology, Physics and Chemistry—*before* allowing him to specialise. (I would have liked to have Geology also in that Foundation, but that would have to wait till a Department of Geology was started at Vidyodaya).

Third: And into that Foundation was also to go an year's study of Mathematics, including elementary Statistical Analysis. As you know, Mathematics is a tool vital to the development of all branches of science. Yet it is generally avoided by all science undergraduates except those who are expecting to specialise in Mathematics itself or in Physics. Apparently the teaching of it in our schools is generally so poor that it inspires our students with a fear of the subject, a phobia, and they avoid it thereafter. I am happy to tell you that *all* our Biology students at Vidyodaya took Mathematics as a compulsory part of their first-year course from 1967/68; and that from 1969 Mathematics formed a *full* and *compulsory* three-year subject for the science degree, a subject which all science undergraduates (including the Biology undergraduates) of Vidyodaya had to take.

My suggestion about compulsory Mathematics for Botany and Zoology students had been thrown out by the Colombo Science Faculty in the mid-fifties despite the fact that our Dean in Colombo at that time, Professor C. J. Eliezer, Head of the Mathematics Department, had supported it. Here at Vidyodaya years later it was accepted, and implemented by 1967/68 even

before our new Foundation Course was due to begin. I want especially to thank Professor P. W. Epasinghe, then newly appointed our Professor and Head of Mathematics, for accepting the idea and for successfully implementing it despite a grave shortage of staff in his Department. That was an unique and wonderful period in the history of the Vidyodaya Science Faculty, the period between 1965 and about 1971, when we all worked together and pulled together—inspired possibly by the very newness of our Faculty, encouraged possibly by its small size, spurred possibly by the fact that we were despised as a 'Pirivena' Science Faculty. There certainly were many other reasons as well, which we need not now examine, and about which there is likely to be debate. The fact remains, however, that it was a wonderful period for which I am grateful to all who contributed; and for the passing away of which many of us still mourn.

Fourth: It was also clear that the average science graduate produced by the usual university-courses of that time had little or no knowledge of the applications of the sciences he learnt. He was given no such knowledge. When we at the universities provide a training which divorced our science student from activities intrinsic and vital to the life of his society, had we a right to resent those who chose to brand him as highly theoretical and of little use outside the cloisters of academic learning? Here it is important for us to remember that in a society like ours which despises manual labour, such science graduates are not only ignorant of the applications of their sciences but soon come to despise and to shun them as well.

So I decided that, without neglecting in any way to train our students in the fundamentals of science, we would also introduce him more and more to its applications. In Biology, for example, we introduced *Fisheries*[1] into the B.Sc. (General) course in 1965/66, *Applied Microbiology* also in 1965/66, *Plant Pathology* in 1968/69. *Forestry* was planned for 1969/70 but had to be postponed for reasons which will appear later. The other science departments also began teaching applied sections of their subjects—like *Electronics* and *Plant Chemistry*. I must remind you at this point that Vidyodaya's introduction of these applied sections into her first degree courses[2] came long before the recent scramble amongst Science Faculties in this country to offer training in applied sections.

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[1] As a direct result we were able to have one of our own graduates register for our M.Sc. research degree as early as 1968/69. Working and living with the fishermen during each season he studied the important Flying-fish Fishery off Trincomalee and presented 2 research papers at the 1971 S.L.A.A.S. session and, shortly thereafter, also his Thesis for which his examiner, a renowned Japanese Fisheries scientist, recommended that Vidyodaya should award him the M.Sc. degree—which she did. Flying-fish is an important substitute for the bait-fish which has to be imported for our nascent Tuna-Fishery.

[2] Post-graduate courses (Diploma level) in the applied fields were also begun as early as 1967/68 in *Statistics* (by the Mathematics Dept.), in 1968/69 in *Food Science* (Biology Dept.); in *Optometry* in 1969/70 (Physics Dept.). *Polymer Science* was planned for 1970/71 by the Chemistry Dept., but delayed for several reasons including the Insurrection. All these Diploma courses were soon upgraded to M.Sc.—level courses.

Fifth: I asked myself how I could re-kindle in the university student the zest, the wonder and the curiosity about the natural world around him which a scientist must have if he is to be successful as a scientist. *All* healthy children have these qualities—they are born with them—all healthy children have these qualities before they are put through the 13 or 14 years of "education" at school, an education which fills them with facts but bludgeons them into boredom and even into dullness. By the time they come to us at the universities they are generally quite bored with science—and study it only to collect a degree and in the hopes of landing a cushy job. But, really, who can blame them, after all the "education" they have had to survive? When we entered the university the teaching in our schools was not much better—*but, thank goodness*! there was so much less of it then there is now—what with all the new-fangled, jargon-ridden methods copied from elsewhere, picked up at workshops, conferences, study-tours and the like, and introduced with much enthusiasm but little real understanding either of these methods or of local needs. In my student days at the university four years of Botany, Zoology, Physics or Chemistry brought us to the level of the B.Sc. (Special) degree. Today one is forced to absorb as many years' teaching of all these 4 subjects merely to *reach* the university *entrance level*! This crawlingly slow and repetitious advance stifles interest and breeds boredom.

I had done no Zoology or Botany *at all* at school when I entered the university in Colombo; and I still remember vividly the wonderful new world that opened to me when I was first taught about and looked at *living Amoebae, Paramaecia, Chlamydomonas, Euglenae* and such-like microscopic animals and plants at the university, pippetting them myself in little drops out of jars of pond-water or culture solutions. Could I perhaps generate in our jaded students, who often knew all about DNA and the Double Helix—in theory only!—could I perhaps generate in them something of the same excitement and wonder by teaching them the applied subjects like *Fisheries*—which I knew had not been taught them at school—or *Applied Microbiology*, with lots of practical work by the students themselves, including the making, growing and examining of *their own* bacterial and protozoan cultures? We decided to try.

I also decided to get our student to learn his techniques and his facts by making a complete *Investigation* of some one kind of animal about which there were no text-book descriptions or dissection-guides; to get him to investigate it—I used to tell him—in the way the pioneers of our science must have investigated a strange new animal they happened to discover. I have given a fairly full account of this device of mine, in my talk "The use of research for education in Science at pre-graduate level" to the S.L.A.A.S.-G.R.C. seminar[3] last month and I shall not repeat any of it today.

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[3] Seminar on "Research in Science Education" by the General Research Committee of the Sri Lanka Association for the Advancement of Science. Proceedings to be published.

And I also decided—please remember this was 1965/66—to emphasise very greatly, study of the living organism in *relation* to its environment, that is to emphasise the study of *Ecology*, at the expense of the Comparative Anatomy and Taxonomy which usually form so large a part of biology courses. Practical classes in the laboratory and in the field were to be stressed. In fact, the new course called for six field classes in the students' very first year itself!

Sixth: All the changes we were making, of which I have mentioned just a few in the fore-going account, meant that the degree course needed lengthening—and we decided to lengthen ours from three years to four. We also had another, equally important, reason for doing this. Long experience with the 3-year degree courses given B.Sc. (General) students in our universities had convinced me that they were rather useless and something of a fraud. Students were stuffed with facts, most of them not organised into any sort of system; they were seldom given, or able to acquire, any real understanding of the basic principles and concepts of the sciences taught; and at the end of the three years' study, when they collected their degrees they were not really in a position to think intelligently about the sciences they had learnt, let alone teach them at school!

So we decided to lengthen ours to a 4-year course for *all* our students; none of them was to be meted out the cinderella treatment which is the usual B.Sc. (General) course as compared with the B.Sc. (Special). In our new 4-year course, on the Foundation of the first year's study there would be based three years of further study. Some of the students would spend that time in an in-depth study of one of the science subjects. This course would correspond to the usual Special degree of other universities but would differ in many important ways, the most obvious being that instead of just one subsidiary subject there would be several, shorter, subsidiaries, each being a portion of one of the other science subjects, any portion considered in some special way useful to the student's understanding of the main subject being studied in depth, or likely to be of relevance to that student's future career or current interests. Thus a student specialising in Physics and hoping to take to a research career in Oceanography would not need to study the whole Biology course but only some portions of it which dealt with the Algae and with Crustacea, for example, or with Aquatic Ecology. He could leave out many sections, like those on Genetics, the Angiosperms or Flowering Plants and even the Vertebrata; and spend the time thus saved on sections of Chemistry and Mathematics more relevant to his future career or more in keeping with his current interests.

The rest of the students would *all* study three subjects during those three post-Foundation years. Two would be science subjects; and the third would either be another science subject or a non-science subject to be selected by the

student from a prescribed list containing, to begin with, subjects like Law, Economics, Management Studies, Education, Pali, History and so on.

We hoped by means of these new 4-year courses to produce not only the science "specialists" from whom would be recruited our country's future research scientists; but also science "generalists" who, according to what non-science subject they had studied during their three post-Foundation years, would provide the country with better teachers for our schools, better administrators for our departments and corporations, better managers for our factories, and so on; and in any case better citizens for the industry and technology dominated future that our country would be entering.

Seventh: At the beginning of this talk I referred to Sri Lankan science graduates as "walking encyclopaedias". I was quoting a certain British opinion. It is quite correct, of course; our graduates *do* know more facts than their British counterparts. But it is, alas! equally true that they care less about the sciences they have studied, have much less enthusiasm, show much less initiative. I decided, therefore, to cut out all the deadwood from the biology syllabuses, whilst introducing new methods and approaches, calculated to stimulate interest and to develop self-reliance and self-confidence.

We cut out the numerous dissections and type-studies that are usually done—often for no better reason than that they had been required by the old London University syllabuses or that some of them had been a useful introduction, for medical students, to vertebrate and therefore to human anatomy. Instead I introduced, as I have already mentioned, the complete *Investigation* of just one kind of animal (and, of course, also one kind of plant).

I also introduced the *Unguided Research Project.* In this, each individual student, shortly after joining my Department, is given a small ecological problem or topic, one generally based on the environment around his home; and he is required, during most of the three years of his course, to investigate this problem *without guidance from the staff*, and to prepare and submit a Report or Thesis on his work for Viva Examination at his Finals. I have given a fairly detailed account of this device too in my talk last month[4] on "The use of research for education in science at pre-graduate level," and I shall not repeat myself except to say that both devices, the Investigation and the Unguided Research Project, proved themselves very valuable in practice.

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I have now outlined, very briefly, the new scheme of studies which we of the Vidyodaya Science Faculty drew up. You will, of course, appreciate

[4] At the S.L.A.A.S./G.R.C. Seminar on 'Research in Science Education', held on 25-11-1983. Proceedings to be published.

that the changes I have mentioned involved many other related changes—in teaching methods, in examining methods, and so on. All these were worked out by the Faculty, in so far as they can be, beforehand. It took us all about one-and-half years of very hard work. Finally the scheme and syllabuses were ready. The scheme was put to and approved by our University Senate. We were looking forward to implementing them in 1968/69. We were excited with what lay ahead. So were others outside our Faculty who had heard of what we were doing and of our plans. To give you a striking example: there was the case of a young graduate of Peradeniya University who had been selected for appointment to an Assistant Lecturership in the permanent cadre of the Botany Department there, and who turned that appointment down in order to come to us because he was attracted to and excited by our new degree-scheme and by what we were trying to achieve with it. If he felt like that how much more intensely would we have who had made the scheme ourselves and were soon to put it into full operation?

And then the blow fell. The National Council for Higher Education (N.C.H.E.), then only recently set up, decided to force into our Faculty that year many more students than we could deal with satisfactorily—not just 25 per cent more, not 50 per cent more, not 100 per cent more, but over 250 per cent of the student intake than we had staff, equipment or accommodation for! Nearly 325 per cent of its possible intake into the Biology Department! Our Vice-Chancellor's appeals, our appeals, our explanations as to what would happen, our protests, were all of no avail. The flood of students swept in. Naturally our new scheme *had* to be postponed. Indeed, it was all our Science Faculty staff (academic and non-academic) could do to prevent a complete break-down of instruction[5], even in respect of the existing courses.

No, the N.C.H.E. did not object to our new scheme nor did it wish to destroy these new courses. Indeed it is doubtful if the N.C.H.E. was even fully conscious of the new scheme despite the several letters and memoranda on it which we had sent the Council. No; the Council did not object to the scheme at all; and one finds it difficult not to conclude that the Council merely wished to convince itself, and to show the country, that it could arrange to

[5] Tutorials had to be abandoned, field-classes drastically curtailed; in our laboratory, even after extra work-tables had been squeezed in there was still too little table-room for students to sit and work at conveniently, whilst the extra tables occupied so much floor space as to make it difficult for teachers to move amongst the students they were required to teach in those practical classes; microscopes for the class had to be borrowed from the Education Ministry's stocks meant for schools; table-lamps for use with microscopes had to be improvised from ordinary batten-holders and wooden blocks; microscope-slides and specimens for demonstration were in such short supply that I was forced to compel each student to spend not more than 2½ minutes on any one specimen (which he'd normally require 10-20 minutes to study adequately) merely to ensure that every student in the class had some chance, however inadequate, of examining the specimens (without this compulsion I found that more than half the students in the class had no chance at all of even seeing any of the specimens); entire sections of the "practicals" had to be deleted. These were just a few of the consequences of that monstrous over-crowding.

accommodate in the existing universities *all* the students who had qualified for admission that year. That, in the process, the introduction of a valuable new scheme of Science teaching would be disrupted was of no consequence to it at all.

Fortunately for us, and because we were a small and new Faculty, unhampered overmuch by the inertia of tradition but gifted with a hard-working band of teachers[6], we had *already* been able to introduce, *separately* and *before* the rest of the new scheme was scheduled to go into formal operation as a whole, many of the component parts of that new scheme. Such, for example, as:—

(*a*) first steps in the amalgamation of the two subjects Botany and Zoology into a single subject, *Biology*;

(*b*) a satisfactory method of *language training* for our science students so that, whilst studying science at degree level in Sinhala, they would also learn to hear and understand, read and understand, English sufficiently well, and to make full use of the Library (with its English-language scientific books and periodicals) for reference and study;

(*c*) the making of *Mathematics* first a compulsory *section*, and shortly thereafter a full and compulsory *subject*, for all Biology students;

(*d*) the introduction of *the Investigation*;

(*e*) the introduction of *the Unguided Research Project*;

(*f*) the introduction of several *applied sections* like *Fisheries* Applied Microbiology, Plant Pathology, Insect Ecology and Insect Pest Control, Horticulture, Electronics, Plant Chemistry and so on;

(*g*) the provision, for the first time in Sri Lanka, of the combination Mathematics, Physics and Biology as an additional option of three subjects which a student might choose to offer for his B.Sc. (General) degree.

Therefore, despite what the N.C.H.E. had done, all was not lost. Indeed, with the many other changes we had introduced since 1965 the Vidyodaya Science Faculty was well on the way to becoming an outstanding science

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[6] One of the more easily observed examples of this was the fact that teaching in the Faculty often went on from 8 a.m. to 8 and 9 p.m. on several days of the week.

[7] Its historical origins within and from an old and renowned seat of Buddhist learning, the Vidyodava Pirivena, meant that the Vidyodaya University naturally had Sinhala as its medium of instruction from its inception. However, when the Science Faculty was founded in 1962 instruction in the latter tended to gravitate into English until a suitable scheme was devised by me in 1966 and adopted by the Faculty, a scheme for teaching degree-level science in Sinhala whilst, at the same time, ensuring that the students gained such mastery of English as would give them access to the latest developments of Science.

faculty[8] in the country by the time the N.C.H.E. struck her with that flood of students. And naturally we hoped to be able to take up our special scheme again some day soon, when that monstrously oversized class which the N.C.H.E. had forced into us that year had passed through and out of the university in three years' time. But to do that it was essential that we should prevent any repetition of that oversized entry during the years immediately succeeding it. The N.C.H.E. did try, tried very hard each year thereafter, to force us to accept more students—twice as many more—than we could. But we successfully resisted all their attempts[9] and about mid-1970 that oversized class took its Finals and left us. We began to think again of implementing our new scheme. But it was not to be. In April 1971 the Insurrection hit us; we were thrown out of our Vidyodaya buildings to make room for the housing of captured and surrendered insurgents. How we converted the ground floor and gardens of an empty-bungalow[10] on Thurstan Road, Colombo 3, into laboratories and lecture rooms, started our classes again, kept our research projects going, conducted our Final Examinations, and even originated and began to implement an important new concept in university science teaching, these constitute an epic of courage, devotion and resourcefulness in the Science Faculty staff, both academic and non-academic, which deserves a separate account. All I shall say now is that as we were busy doing all this, as we were "picking up the pieces" left after the Insurrection had hit us, and repairing the damage to our courses, the 1972 University Act hit us. From that blow there has been no real recovery yet.

And that brings me to an end of this narrative. There are I like to think, many lessons for us all in these experiences. What they are I shall leave you to discover for yourselves.

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[8] Whilst this claim is likely to be disputed, especially by those who had earlier sought to denigrate us and even, several times, to have us closed down, there cannot be any dispute about facts—facts, for example, like the following: At the S.L.A.A.S. Session of December 1971, the year in the April of which we had been thrown out of our classrooms and laboratories by the Insurrection, and 3 years after we had been flooded with a deluge of students by the N.C.H.E., academic staff and research students of our Science Faculty had nevertheless been able to prepare and present to that Session more research reports than had academic staff and research students of corresponding departments of every other Science Faculty, except only the Peradeniya Science Faculty. Reference to Part I of the 1971 *Proceedings of the Sri Lanka Association for the Advancement of Science* shows the following totals and distribution by Departments and Faculties of research reports : *Peradeniya*—Total 14 (Zoology 2, Chem. 12); *Vidyodaya*—Total 12 (Biology 5, Chem. 6, Physics 1); and *Colombo*—Total 5 (Chem. 5).

[9] In one memorable case, by her 5 science professors quietly but determinedly resolving and preparing to resign jointly if even one extra student was forced into the Faculty by the N.G.H.E. There were no threats, no noisy meetings, no attempts to involve any of the other academic staff at all, or the students, no whipping up of emotions . . . . *but* we were not bluffing. In the face of our calm and united determination the N.C.H.E. bid collapsed.

[10] The official residence, then vacant, of the Principal of Royal Primary School.

THE HUMAN HERITAGE

L. = Lectures De = Demonstrations Di = Discussions

	Number of L.	De	Di
THE UNIVERSE : Nature, Age, Origin, Evolution (Atomic Species, Nebulae, Galaxies, Stars, Expanding, Steady-state, Pulsating, Finite-, Infinite-, etc.)	3		
SOLAR SYSTEM : Nature, Age, Origin, Evolution	2		
EARTH : Early Evolution (Dryland, Oceans, Continents and Drifts, Organic Cycles, etc.)	2		
	4		2
LIFE : Nature, Origin (2L); Causes of Biotic Evolution (2L) .. Nature of Fossils; Sedimentary Deposits (1L); Biogeological Periods; Lower Cryptogams, Early Animals, Fish (2L); Emergence on Dry land; Higher Cryptogams, Amphibia (2L); Angiosperms, Insects, Reptiles, Mammals (1L); Primates (1L)	7	1	
ORIGIN OF MAN : Pleistocene Ice Ages; Ape Men, Sub Men (2L); True Men (1L)	3	1	2
Ecological Interdependence; Development of Scenery	2		
			1
EVOLUTION OF HUMAN SOCIAL ORGANISATIONS, CULTURES : Lower & Upper Palaeolithic (Food Gatherers, Hunters, Predmostians, Aurignacians, Magdelanians, etc.) (1L); Neolithic Revolution (Domestication of Plants and Animals; Agricultural Settlements, Mixed Farming, Pastoralism, etc., (3L); Urban Revolution (River Valley Civilisations from Nile to Indus; Bronze, Iron, the Wheel, etc.) (3L); Notes on Early Chinese (Hwang-Ho) and American Civilisations (1L)	8		
Magic, Early Science and Technology; Religion	4		
	2	1	2
GREEKS AND GREEK SCIENCE (1L) : Macedonian Empire of Alexander (1L)			
ROMAN EMPIRE : Vandals, Goths, Huns, etc.; Retreat c. 2nd C. (A.D.); Collapse c. 5th C.	2		
CHINESE (HAN) EMPIRE, 2nd to c. 4th C.; incl. Chinese contribution to discoveries, inventions basic to modern science	1		
DARK AGES OF EUROPE (c. 3rd to c. 13th C. (1L); Transition (Middle) Ages (c. 13th to c. 15th C.); Roger Bacon c. 13th C.; Paper/Printing (Chinese) c. 2nd C. (B.C.); Arabs c. 8th C. (A.D.) — c. 13th C. (in Europe) (1L)	2		
MONGOL EMPIRE (c. 13th to 14/15th); Marco Polo (c. 13th C.); Columbus (15th); Magellan circumnavigates World, 16th; Trade, Piracy, Accumulation of Capital in Europe (16th to c. 18th C.)	2		
			2
RENAISSANCE OF LEARNING, LITERATURE, SCIENCE (15th C.)	2		
INDUSTRIAL REVOLUTION : Modern Technology and Science (mid-18th)	2		
			2
MODERN EUROPE TO THE BEGINNING OF THE 1ST WORLD WAR : Growth of Socialist Political Ideas	2		
1st World War; Russian Revolution; 2nd World War; Spread of Socialist Ideas and Industrialisation	2		
ECOLOGICAL DESTRUCTION : Pollution; Man's Future	2		
			1
INDIA : After the Urban Revolution (1L); Gauthama Buddha (1L); Impact of Alexander's Empire (1L); Asoka and the Spread of Buddhism (2L); Impact of Arab Empire (7th to 12th C.); of Mongol Empire (mid 14th to 15th (1L)	6		
			1
SOUTH-EAST ASIA	2		
CEYLON : Geological History; Pre-historic Men; Aborigines (1L); Pre-Wijayan Times (1L); Wijayan (1L); Arrival of Buddhism, Effects (2L); Anuradhapura; Magama; Polonnaruwa and Parakrama Bahu the Great (2L); Early Technology and Science (1L); Art (1L); Period of Decline (1L); Arrival of Europeans (1L); Modern Ceylon (1L); Struggle for Freedom (1L); to present day (2L)	13		
			1
LANGUAGES : Origin, Development, Spread (1L); Languages of Ceylon (1L)	2		
THE HUMAN SPECIES : Definition; Variability; Ethnic Groups; "Races" and Racism; Casteism	3		
			1
Totals ..	80	3	15