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॥ उद्धरेदात्मनात्मानम् ॥—The Gita

Raise yourself by your own efforts



What is Teaching?

At present, teaching is many things to many people, and there is a need for a more adequate concept of the meaning of the term. In seeking to clarify this concept, perhaps a definition appropriate for the present emerges. Perhaps teaching is the application of the best known principles of human behaviour in efforts to promote the highest possible achievement of personal adequacy through learning. In addition it involves the teacher in continuous study to discover new knowledge concerning the nature of personal adequacy in our society, and the processes involved in the achievement of such adequacy. As such know-

ledge is learned, teaching — both as to objectives and techniques — changes, somewhat as the “practice of medicine” changes with the discovery of new knowledge and the development of new techniques appropriate to this new knowledge.

Perhaps through such study we can progressively achieve a more valid concept of the appropriate structure and dynamics of teaching for our age.

(—HERMAN FRICK, Professor of Education, Florida State University, Tallahassee. Educational Leadership — December, 1961).



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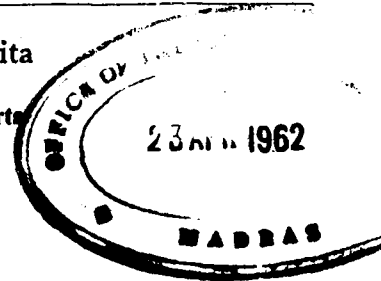
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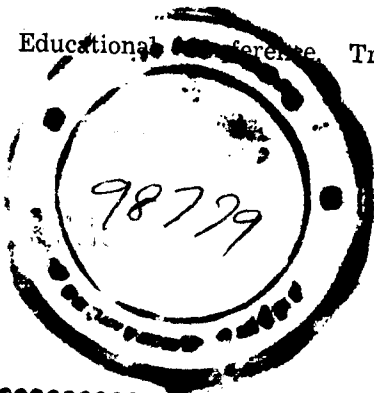
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CONTENTS

Editorial	Page
Symposium on the Teaching of Science — S. Venkataraman	123
The Basic Concepts of Mathematics — J. B. Freeman	125
A Report of the Geography Exhibition held at the Presidency College, Madras	131
36th All India Educational Conference, Trivandrum — Resolutions	135
News and Notes	138
Our Letter Box	141
Our Bookshelf	143
	145



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THE SOUTH INDIAN TEACHER

Vol. XXXV

APRIL 1962

No. 4

EDITORIAL

THE FIFTY-SECOND MADRAS STATE EDUCATIONAL CONFERENCE

A strong and influential Reception Committee is being formed for the ensuing Conference in the early half of May 1962 in Madras. The exact dates can be known only after getting to know the convenience of the President-elect of the Conference. Subjects of vital importance to every stage of school Education will be discussed at the Conference.

This year's General Body meeting of the South India Teachers' Union promises to be very lively in that, matters relating to securing increased strength, vitalising the administration and improving the financial resources will be come up for discussion.

It is hoped that a large number of delegates will attend the Conference and make it a success.

KERALA TEACHERS

Our sympathies are with Kerala Teachers who are being threatened with disciplinary action by the Government for poor results at the Public Examination. The unreliability of the present system of Examination is too well known to need expatiation. Yet prejudice in its favour is so great that it continues to do its havoc. Kerala has been noted for the high

standard of efficiency of instruction in schools. The sudden fall in results should have only made the Government to cause an enquiry to be made, in co-operation with teachers, with a view to getting to know the real causes and finding remedial measures.

The very fact that the Government attaches such undue importance to this effete public examination is proof of its unprogressive ideas on Education. To say the least, it is indiscreet on the part of the Government to hold teachers wholly responsible for results, when factors militating against school discipline and orderly work have been indisputable beyond the control of teachers.

THE NEW MINISTRY IN MADRAS

We congratulate the Chief Minister Mr. K. Kamaraj and his colleagues on their success in the recent elections. We are glad to welcome Mr. Bhakthavatsalam as the Minister for Education. He is the most experienced minister in our State. He has been known for his deep scholarship, sobriety of thought, and great piety. We are sure that he will keep up the traditions left behind by Mr. C. Subramaniam, a great friend of teachers and supporter of the organised teaching profession. We trust that he will do his best to alleviate the lot of teachers by giving sympathetic consideration to the representations of the South India Teachers' Union.

(Continued on Page 136)

MADRAS LEGISLATIVE COUNCIL

TEACHERS' CONSTITUENCY ELECTION

(Madras-Chingleput Districts)

Polling Date : 9th April 1962.

AN APPEAL TO ALL VOTERS

Dear Friend,

I am seeking re-election to the Madras Legislative Council from the Teachers' Constituency of the districts of Madras and Chingleput.

With your kind support I served in the Council for two years during which time I availed myself of every opportunity to plead for a better status for the Teaching Profession and strove for the improvement of Education in the State. I have had experience as assistant master, and later as Headmaster of the St. Gabriel's High School and also of the Secondary Training School in my service of over 35 years.

I am actively associated with important educational bodies at the State, National and International level. As a member of the Executive Board of the South India Teachers' Union, Secretary of the S.I.T.U. Publications Limited and Director of Projects of the S.I.T.U. Council of Educational Research, I am in active touch with the problems of education in the State. As Vice-President of the All India Federation of Educational Associations, member of the All-India Councils of Secondary Education and of Primary Education, Government of India, Member of the Governing Body of the National Institute of Education, New Delhi, and Member of the Central Board of Secondary Education, I am in close touch with the several stages and various aspects of education at the National Level. As Vice-President of the World Confederation of Organisations of the Teaching Profession and Chairman of the Asian Committee of the WCOTP, I am in intimate association with the educational problems of the world.

At the suggestion of my friends I am seeking your suffrage a second time so as to serve the cause of Education and of Teachers through the Legislature. I request you to give me your FIRST VOTE placing the number 1 against my name in the ballot paper and support my candidature. Assuring you of my devoted service,

Yours in the cause of Education,

S. NATARAJAN.

SYMPOSIUM ON THE TEACHING OF SCIENCE

S. VENKATARAMAN

INTRODUCTION

Gentlemen,

At the outset, I must thank you and the Co-ordinator of this symposium for affording me this opportunity of meeting you and sharing my few thoughts, perhaps haphazard and not well organised, with you this afternoon. I deem it a rare privilege offered to me and an honour shown to me as one belonging to your own profession, the only difference being that you are on the threshold but, I have been in it for a few years. Perhaps some of you may be here because of the natural urge to this calling and taken up to teaching as your vocation; there may be also others who may be in it because other openings, perhaps more remunerative and attractive in other respects, have been denied to you. But whatever it may be, now that you have taken up the profession of teaching, it is up to you to make the best out of it and equip yourself in every respect so that you will be in a position to give your best to the children, entrusted to your care.

SCIENCE — ITS IMPORTANCE IN THE MODERN WORLD

Now permit me to come to the subject about which we are going to have a discussion to-day.

The topic suggested for discussion, as you are aware is 'Preparation for class-room teaching' and this afternoon it will pertain to 'Teaching of Science.' At the outset, before going to the details for preparation, I believe a teacher of science must first be aware of the scope, aims and teaching techniques of the subject and his preparations must suit those needs. Further I wonder whether the teaching of Science can ever be confined to class-room alone, if we desire to

develop the scientific interests in the pupils and create in them a scientific bent of mind. Let us look at the topic as preparation for 'Science Teaching' not only inside the class room but in its various aspects. I crave your indulgence to proceed with the subject on the following plan :

Science and its important place in the curriculum of studies; aims and scope; teaching techniques correlated with the preparation for teaching.

It would be rather strange and preposterous if any one were to deal with or advocate the necessity for an important place for the study of General Science in the school curriculum; for we live in the age of atom bombs, artificial moons, sputniks and what not! The great claim of science for a place in the school curriculum is its provision of new knowledge, knowledge which is increasing, knowledge which is driving the whole world ahead, knowledge which behoves every citizen to possess. It is no wonder therefore to find that even in such a scientifically advanced country like the U.S.A., that, President Eisenhower during his regime gave his approval to a new four year educational programme costing a **thousand million dollars** as a first step towards matching Russia's scientific progress. It was an answer to Russia's continuing build-up in the field of scientific progress, where, we may say, it has beaten even U.S.A. And to-day President Kennedy is for giving every incentive to the study of fundamental science and development of research in various branches, cost what it may. And in our own country, our Prime Minister, realising the great importance that science is playing in the modern world in the industrial and economic uplift of a nation, has taken the right step in opening the great Scientific Re-

search Institutes, that are spread all over our country. But the question of man power, men of calibre and intelligence with highly developed scientific attitude and bent of mind is a problem staring in our face. It calls for a most thorough and greater attention to science education not only in training colleges but more especially in primary and secondary schools.

AIMS AND SCOPE

Now, gentlemen, it is good for us to recognise at the outset that science is so close to the life of a boy or girl that there is no need to confine its study to the reading of text books or hearing lectures. It is an intimate part of the environment, in any part of the world — wherever we are — the earth, the sky, air, water, heat, light and sound that we feel, see or hear and of the many living and non-living things around us. If only the natural instinct of curiosity to know the why and how of things in children is kindled, we are leading them into the realm of science. But our aim in the teaching of science will necessarily vary with the age group, with the background of knowledge already acquired and the purpose for which the training is imparted at the higher stages of learning. The aims can never be stereotyped. Naturally at the primary stages, the aim will be confined to the study of the problems that are found wherever children live — more formally stated — it is **The Study of the Environment** — a study of things that arouse and maintain interest in nature and environment. It is not Chemistry, Physics, Botany or Biology and no classification of such types is ever envisaged in the early stages. To be more specific, children are interested in the why and how of things; how a seed grows into a plant, what makes a rainbow; why we breathe or eat and so many other things arouse their curiosity, the answers for which they are eager to know and learn. While attempting to teach these things our aim must be to develop the child's habit of observation, exploration and

make him think in a systematic way and draw his own inferences from facts that he observes. We help to classify them if necessary. If only we inculcate such habits from the early stages we are building in the child a scientific attitude to all problems of life.

In the higher stages an earnest attempt should be made to help the pupils to understand the relationship between cause and effect; to know the how and why of natural phenomenon and a better understanding of his environment and how the forces of nature, inventions and discoveries are made use of for a better living. The boys and girls must generally never confine themselves to desk study. They must learn not only a good deal about things, they must also be taught to do things, conduct experiments, use tools. The use of the eyes and hands in unravelling the meaning of the wondrous changes which are going on around us shall be taught systematically — that is to say an endeavour shall be made to inculcate the habits of observing accurately, experimenting exactly, with a clearly defined logical purpose, of logical reasoning from observation and results of experimental inquiry.

TEACHING TECHNIQUES

Gentlemen, need I say that our teaching techniques must suit our aims. It is most unfortunate that most of the teachers have become slaves to text-books; they are quite helpless without the text-books and the most sorry spectacle, is to see a science lesson being converted to a **reading lesson**. It is not expected that we should pump facts and information into the minds of the pupils and they should repeat them parrot like. Perhaps this may produce satisfactory result at the examination. But our methods should be conducive to the formation of habits of self-reliance. Boys and girls must learn to think and act for themselves, to utilise the knowledge they have and increase their knowledge. To impart information at our disposal is very

easy — but to develop habits of mind in our students, to train them to think for themselves, is very difficult.

The scientific way of thinking requires defining a problem, suggesting several hypotheses, gathering evidences, drawing conclusions, checking conclusions. It does not mean that every problem has to be treated by scrupulously adhering to the track of these formal steps. For example pupils observe the dew drops on the green leaves on an early morning. The problem to be solved is — how do these drops of water appear? Then pupils suggest many answers. The rain may have fallen in the previous night. Water would have been evaporated from the leaves — and so on. They thrash out the absurdity of the answers and come to definite conclusion. Water vapour in the air should have condensed on the leaves on account of the cold in the mornings. They check the explanation discovered by known authority and they have solved the problem and can make use of their knowledge. They learn that things don't just happen; they happen because of natural causes.

A study of how plants grow may stir up an interest in plant culture; children are interested in all aspects of their environment. Many life long interests are born in early childhood experience.

We must also lead children to appreciate the things around them. Vague talks on the beautiful sky, the coloured butterfly or the harmful mosquitoes are not of much help. But we must teach them to see, to examine closely, and to discover for themselves what wonders there are in the world about them.

EXPERIMENTS AND DEMONSTRATIONS

There is no other subject in the curriculum which lends itself to easy demonstrations and experiments as the study of Science. The avidity and eagerness of students to perform experiments or witness demonstrations

should be capitalised. In this connection permit me to indulge in an anecdote culled from an issue of "Teaching".

259
"A class of young boys were listening to a science lesson. Their teacher was that day in an eloquent mood and he had been lecturing a long time. Suddenly the entire class was galvanised into attention, for the teacher, from a man of words, turned into a man of action. He got up from his restful chair, plunged his hand into his pocket, rummaged in it for a while and produced a match box from it. Even before the pupils could realise what was going on, he struck a match against the box and obtained a brilliant glow that lit the room and probably lighted some dark corner of the inattentive half slumbering brains of his silent pupils. Some of the boys were conscious for the first time that for the past 30 minutes, their teacher had been giving them a lesson on Safety Matches. However that being the only experiment demonstrated that term, they enjoyed it thoroughly and at least knew that a lesson on safety match had been taught. Look at the eagerness of the pupils to witness a demonstration!"

It is unfortunate that most of the schools are ill-equipped. They have no laboratories or work benches and tables for demonstrations, much less the most essential equipment. But it is still more unfortunate, that teachers seldom make use of them even though all the facilities are available and reduce teaching of science to that of imparting information and still worse to dictation of notes. To quote Dr. A. Lakshmanaswami Mudaliar, our distinguished Vice Chancellor "I deplore the fact that in many schools, little or no equipment is available and even in schools where such equipment is available, the teacher of science does not exert himself to fit up the apparatus and to show the experiment that illustrates his subject. This tendency had even spread to the colleges." A true and sincere teacher of science is one who has the initiative to overcome

short-comings and creates facilities and improvises his own apparatus for demonstrations in science wherever possible. Let me place before you some of the points to be borne in mind to make the experiments themselves very effective.

1. Simple apparatus is to be preferred to complicated ones lest pupils' attention is distracted. An improvised apparatus made by the teacher or by the pupils themselves is preferable to readymade and costly ones.

2. Careful planning is essential. All the materials must be ready on hand. The laid out procedure followed to ensure dependable results.

3. The pupils should be taught to make careful observation and draw their inferences. If the teacher tells everything, no food for thought is given to the growing minds.

4. As far as possible, pupils should perform the experiments individually or in groups, the teacher acting as a guide.

5. An experiment is to be done more than once before conclusions are drawn lest mistakes will arise by careless observation.

6. In experiments involving the verification of a principle or a law the attention of the pupils must be drawn to as many applications as possible to every-day life. Learning without application will certainly prove purposeless. The gap between theory and practice should be narrowed.

7. Wherever the teacher demonstrates an experiment, he should be confident of securing the desired results and be sure of his fact and never flounder before his pupils nor try to throw the blame on the apparatus or the attender for the failure of the experiment.

VISUAL AIDS, CHARTS, MODELS, FILMSTRIPS, FILMS, LANTERN SLIDES

Any science lesson can be assessed as a failure, if it is devoid of either demonstration by the teacher, or if it does not involve pupil's activity in the

form of an experiment, or in the absence of a visual aid either in the form of a chart, model, the projection of a slide or filmstrip and film. One of these should necessarily be there to make the lesson realistic, interesting and arrest the attention of the pupils. These audio visual aids make our teaching easy and realistic, help to cater for individual differences in the learning process, for different senses come into play, make learning interesting and pleasant to the pupils, give a concrete basis for teaching and make learning permanent.

If motion pictures are used, the teacher should be careful in selecting the film to suit the standard of the class, the films should be previewed by the teacher, the classes should be prepared for the film as they should know what to look for in the film and end with the follow up discussion, when questions are asked, ideas clarified. Pupils should realise that films are shown for learning and not for entertainments.

FIELD TRIPS AND EXCURSIONS

Another most valuable aid to teaching of science is the organisation of field trips or excursions. They must form an integral part of a subject that is being studied and require careful planning and follow-up work. Very often such excursions are taken to be holidays by the pupils and sometimes by the teachers too, when the very purpose is defeated. Trips to a zoo, a museum, an airport or a water purification plant in conjunction with the lessons taught wherever possible, afford a direct first-hand observation to pupils who evince great interest in asking questions about things observed and clarify their learning. An effective correlation of Science to every-day life will be ensured.

SCIENCE CLUBS

The organisation of science clubs in school is a very valuable adjunct as it affords very great scope to develop the spirit of discovery and invention. There, the pupils have plenty of opportunity to assemble things, make their

own contrivances, initiate their own experiments and enjoy the pleasure derived by looking at their own creation of models, instruments and improvised apparatus. As a part of club activities they can hear from eminent men of science about the latest discoveries and inventions. They can get inspiration from the lives of great scientists like Faraday, Darwin, Pasteur, Madame Curie and C. V. Raman about whose life and history, talks can be organised. Their remarkable devotion to their work and their self-sacrifice at the altar of science will indeed be, not only a source of inspiration to the young and but also serve as one of their own ideals. The following activities can be suggested for a school science clubs :

1. Making simple scientific appliances for the class use.

2. Constructing working models of Electric bells, Telegraphy, cells, Telephones.

3. Assembling amplifiers and radio with the help of its component parts.

4. Preparing charts and other visual aids for Science Classes.

5. Cultivating photography as a hobby and learning the several processes such as developing, printing, enlarging, mounting etc.

6. Learning house wiring — installing switches, fuses, fuse boards etc.

SCIENCE EXHIBITIONS

Opportunities should be provided for pupils for creative thinking, learning by doing and feeling the inexpressible joy on seeing their own creative work. Organisation of science exhibitions, though it may involve much labour, cost and time, is worth attempting at least once in a year by a single school or by pooling the resources of a number of schools close by; it goes a long way in not only creating the scientific interest in pupils but also in clarifying their scientific interest in pupils but also in clarifying their scientific knowledge besides helping to widen the outlook of the numerous visitors.

Now gentlemen, we have a glimpse of the enormous preparation that a teacher of science will have to make in his teaching work. A stereotyped chart for preparation of his teaching is most inadvisable. Each topic or each lesson has to be prepared in such a way as to stimulate the interests of the pupils, to grip their attention, to satisfy their instinct of curiosity and to develop a scientific attitude of mind. A demonstration lesson, a film show, an excursion or whatever it may be involves careful preparation and planning before hand to make the lesson most effective. Indeed, the preparation of an hour's lesson may involve double the time or even more depending on the nature of the topic. A science teacher must shoulder this heavy burden for the sake of his love for teaching.

Now, before I conclude, let me point out the most outstanding marks of a successful science teacher for he is the hub of the wheel, the very core of the fruit because the very atmosphere of science in a school depends on him.

(a) He must not only know his own subject thoroughly but keep himself constantly up-to-date as far as possible and be conversant with all branches of science.

(b) He must have a wide reading and a sound grasp of the other branches of science.

(c) He must be able to express himself lucidly — a quality which is expected from a teacher of any other branch also.

(d) He must be very confident of his skill in manipulation.

(e) He must be resourceful in his laboratory, and

(f) A logician to the finger tip.

TEACHER TRAINING

I am sorry to bring to light that teaching of science in the lower forms, left as it is in the hands of secondary grade teachers, very often without the guidance of senior science masters of the school or the Headmaster, has reached very low standards. Teaching

has descended to the level of a reading lesson, without any demonstration, the use of charts or other aids as it ought to be. In short, science classes have become a boredom to the children who are denied any opportunity of a field trip or an excursion or seeing even an interesting experiment. The Secondary Grade teachers are only those who come out of our schools and they in turn were denied the very same opportunities. They themselves had never enjoyed the pleasure of doing an experiment while they were at least in the higher forms. We are travelling in a vicious circle and somewhere it should be broken.

The time has come when our training institutions at the Secondary Grade or College level should devote greater time to the practical aspect of teaching techniques and less on theoretical aspects. A teacher after training should feel quite at home in his class, with the subjects he is handling and with the techniques that he is employing and this will be achieved only when a teacher is given an opportunity to handle the class every other day so as to gain the necessary experience in applying his teaching techniques and assessing the value of his performance. This means every afternoon or forenoon should be allotted to teaching practice.

Yet another welcome reform will be the training imparted to the teacher in the use of any audio visual aids with ease and confidence. It may be a film

or filmstrip projector, a tape-recorder or a radio, a gramophone with linguistic records, or they may be charts and models. Most of our teachers fight shy of them and always depend on one individual who is supposed to be an expert in handling them. The modern types of such instruments are made fool-proof and any teacher without knowing technicalities can handle them with ease and safety.

Lastly they must be made to realise that teaching is an art, which should be cultivated from day to day to acquire proficiency, and not merely a layman's job. If only we, science teachers apply ourselves to this great pursuit in which we explore the realm of our environment, we shall find that a new world opens before us and that there are 'tongues in trees, books in the running brooks and sermons in stones.'

CONCLUSION

Gentlemen, perhaps I have taken much of your precious time, reiterating on things that you may be already aware of, but let me have the consolation of bringing those ideas back to your memory in this symposium on the teaching of Science. I do not claim to have covered the several problems connected with the teaching of Science, nor exhaustively dealt on the points I have touched. I crave your indulgence to bear with the shortcomings if any.

I thank you once more for the honour you have done me.

Thank you all.

THE BASIC CONCEPTS OF MATHEMATICS

J. B. FREEMAN

(Continued from last Issue)

2. Zero

33. We have to invent a new number to permit us to subtract one number from an equal number, e.g. to make $a-b$ possible when $b=a$. We call this number *zero*, and give it the written symbol 0. It is such that $a-a=0$, whatever natural number 'a' may be. From the definition itself of zero it follows that zero added to any natural number leaves that number unaltered. We shall consequently take it as true that zero added to zero gives zero. $a+0=a$; and $0+0=0$.

34. Since $0+1=1$, 1 is the successor or 0; and since $1-1=0$, zero is the predecessor of 1.

35. From the meaning of subtraction as taking away, the notion of zero as the result of counting out from a group completely is "nothing" or "not even one unit". This notion remains unaltered by admitting zero as a number.

36. We now have a number-system consisting of the natural numbers with zero before one.

0, 1, 2, 3, 4,

Addition of any two numbers is possible, and subtraction is possible except in the case where the subtrahend is greater than the minuend.

37. The introduction of zero and its symbol 0 is very useful in other ways. It makes possible by an easy way to give a different name and a different symbol to each and every number. With the nine digits and the zero we can write down and name any number whatever in our decimal scale of notation. Those ten "figures" are quite sufficient. The Hindus first introduced zero to represent the concept of a number expressing *none*, precisely to render possible the subtraction of one number from an equal num-

ber. The Arabs took over the concept and the symbol to build up a system of numerals far superior to any previously in use, which gradually became universal and which we still use. If we call a group of ten units a "ten", a group of ten tens a "hundred", and a group of ten hundreds a "thousand", and so on, then any of our known numbers can be expressed as made up of such groups or "denominations", as they are called, we can indicate the absence of frequency in any denomination by 0, and there will be no denomination with more than nine in it. In the written numeral the place occupied by a digit indicates its denomination. Thus the Arabic system of numerals is a *place-value* system. 325 denotes three hundreds plus two tens plus five ones. 7007 denotes seven thousands plus no (i.e. zero) hundreds plus no tens plus seven units. The system also makes easy the operations of addition and subtraction, as well as the other two operations of multiplication and division, with which we shall become acquainted presently.

38. When adding, we add in denominations starting from the lowest; if the sum in any denomination is expressed, in part at least, in a higher denomination we "carry", i.e. add on, that part of it to the higher denomination. This is done also for *continued addition*, i.e. when there are more than two addenda. We do not consider it necessary to illustrate the process here.

39. In the case of subtraction we shall explain the process that is commonly used, to subtract 3684 from 7509.

7509
3684
—
3825

3L

7m 21, 1730
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52nd Madras State Educational Conference

Venue: Madras.

The delegation fee for the above Conference is Re. 1.00 for each delegate.

Subtracting 4 from 9 in the units' place we get 5, because 5 added to 4 gives 9. In the tens' place 8 cannot be taken away from 0; so we add ten tens both to the minuend and to the subtrahend, which make no alteration to the difference (see n. 30 above); in the subtrahend, however, we add it on to the next higher denomination at the next step. 8 from 10 gives 2, which we place underneath. In the hundreds' place 6 plus 1 (to make up for what was added to the minuend in the previous column) as already noted, gives 7. Here again we need to add ten hundreds to the minuend to make the subtraction possible. 7 from 15 gives 8, and we must add 1 in the thousands' place to 3 to make up for what was added in the hundreds' place to the minuend; we get 3. The difference required is 3825. The expressions "borrow" and "pay back" are misleading when this method is used; they may be replaced by "add" and "add" respectively. The principle used will be easily understood by pupils. (n. 30) This method is more convenient than the one where we actually "borrow" and consequently have to reduce the number in the higher denomination. This explanation is given because some teachers do not seem able to explain the method commonly used.

40. Zero, moreover, helps us to extend the number system further by the introduction of "negative" numbers, as will be shown.

41. The particular scale of notation is not of the essence of number. We may use any scale we choose. The scale of twelve, called the "duodecimal" scale of notation, was in vogue in Russia right up to the last century. The scale of two is now being used in electronic computers; it can express any number with only the two symbols 0 and 1. The decimal scale has for most purposes become universal.

42. Denominations of weights and measures have not always followed the decimal scale. For example, in the Avoirdupois Scale of weights, we have the denominations: ounces, pounds,

stones, quarters, hundred weights, tons, where 16 ounces make up one pound, fourteen pounds make up one stone, two stones make up one quarter, four quarters make up one hundredweight and twenty hundredweights make up one ton. The scale is irregular, and gives unnecessary trouble. That is why the decimal scale is used in all scientific work for length and mass and their derivatives, and is being adopted for common use also in money, weights and measures. International units have been rigidly defined.

43. *Multiplication* is the operation of adding equal addenda, using what are called Multiplication Tables or the Multiplication Chart for the process; this gives the results of the process at a glance for the smaller numbers, which results can also be used by an algorithm for multiplying any two numbers. (An *algorithm* is a mechanical process of computation, which when followed correctly will give the desired result.)

44. $\times$ read: "times" or "multiplying", is the sign of the operation of multiplication. $a \times b$ is read: "a times b" or "a multiplying b", and indicates that we are to take the number b, a times and add them together.

45. $a \times 1 = a$, since this is the result of adding 'a' ones together.

46. $a \times 0 = 0$, this being an extension of the result $0 + 0 = 0$. And number of zeros added together gives zero as the sum.

47. *The Multiplication Chart*. This is first constructed operationally and is then taken as a Rule to be followed.

$\times$	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

48. The results embodied in the chart are so very often required that reference to it saves a great deal of time and labour. It would be still more profitable if the results were committed to memory after the significance of the chart is understood. Each row is a multiplication Table, and the tables may be learnt by heart row by row. In the expression $a \times b$, a is the operator, called the *multiplier*, b the operand, called the *multiplicand*, and the result of the operation is called the *product*. In the Chart the multiplier given in the left-hand column, the multiplicand in the topmost row, and the corresponding product is in the square common to them.

49. It will be seen operationally as well as by consulting the Chart that if we interchange the multiplier and the multiplicand we get the same product, i.e. $a \times b = b \times a$. Thus 7×5 means seven groups of five added into a single group; out of these seven groups five groups may be made, each of which has one unit from each of the seven groups, so that in the new grouping of the same set of objects we have five groups of seven, and the sum is the same in both cases i.e. $7 \times 5 = 5 \times 7$. This method applies for numbers other than the specific ones chosen, and can be accepted as true always. Similarly a rectangular array of given rows with five dots in each row will, when turned through a right angle present the appearance of five-rows with seven dots in each row; and the total number of dots remains the same.

50. *Law of Commutation for Multiplication*. The result of the last paragraph is known as the Law of Commutation for Multiplication, symbolically expressed thus; $a \times b = b \times a$. Since multiplier and multiplicand are interchangeable they may both be called "factors" of the product, and the product may be termed a *multiple* of either factor.

51. As a corollary of nn. 45 and 46 we may state that $a \times 1 = 1 \times a = a$, for all values of a; and $a \times 0 = 0 \times a = 0$, for all values of a.

52. *Continued Multiplication* is had when the operation has to be performed more than once, e.g. $a \times b \times c$. This may be taken to indicate that the product of a times b is to be found first and then the product of this product times c, or, using brackets, $(a \times b) \times c$.

53. *The Law of Association for Multiplication*. By the Law of commutation we see that $(a \times b) \times c = (b \times a) \times c = c \times (a \times b) = c \times (b \times a)$. We can show operationally that we should get the same product if we multiplied b and c first and then their product by a. Thus $7 \times 5 \times 3$ can be represented by three rectangular arrays each of seven rows and five columns put together in different ways. Building blocks also may be used. Since the method of demonstration is not dependent on the particular numbers taken, the general conclusion may be stated thus: in a continued multiplication the product remains the same in whatever order the operations are performed. This is called the Law of Association for Multiplication, which is expressed symbolically thus:

$$(a \times b) \times c = a \times (b \times c),$$

which taken along with the Law of Commutation would show that the order of multiplication does not matter.

54. *The Law of Distribution of Multiplication over Addition*. This law states that the factor multiplying a sum can be distributed over the addenda, thus: $a \times (b + c) = (a \times b) + (a \times c)$, where the products on the right should be found first and then added. Thus $7 \times (3 + 5) = 7 \times 8 = 56$; also $7 \times 3 + 7 \times 5 = 21 + 35 = 56$. This law can be demonstrated operationally by joining together a rectangular array of a rows of b columns with one of a rows of c columns to show that the sum is that of one array of a rows of $(b + c)$ columns. Since the method is not dependent on the particular numbers involved the result can be accepted as true always.

In $a \times (b + c)$, b and c are parts of the sum of the two, which is one of the factors; hence we may call b and c *partial factors*, and the products

$a \times b$ and $a \times c$ partial products; these when added together give the complete product.

55. Let us now see the results of multiplication by a number of a single digit according to place-values. When we multiply a number of one digit by another of one digit we get one, or at the most, two digits. When we multiply a tens' number by a units number or *vice-versa* we get either one digit, which is a tens' number, or two digits made up of a tens' number plus a hundreds' number. When we multiply a hundreds' number by a units' number or *vice-versa* we get either a single digit, which is a hundreds' number and a thousands' number; and so on. When we multiply a tens' number by a tens' number we get one digit, which is a hundreds' number or two digits made up of a hundreds' number and a thousands' number; and so on. When we multiply a tens' number by a tens' number we get one digit, which is a hundreds' number or two digits made up of a hundreds' number plus a thousands' number; and so on.

56. *Short or Simple Multiplication.* The algorithm or method of procedure is best illustrated by an example. When we multiply any number by a units' number, we have simple multiplication. Let us find the product of 685 and 7. (The Grid may be used.)

Put down 685 as the multiplicand and below it set down the multiplier 7, which will be in the units' place.

685 7 ——— 4795	N.B. Always put units figure of the multiplier under the units' figure of the multiplicand. 7 times 5 is 35; put down 5 under the 7 and "carry" 3 to the higher denomination. 7 times 8 is 56; add the 3, we get 59; put down 9 and "carry" 5 to the higher place. 7 times 6 is 42; add the 5, we get 47; put down both figures.
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(We are multiplying by a units' number, first the units' number 5; we carry over the tens' part of the product 35 to the tens' place, and so on. If the whole working is spread out, it would be:

685 7 ——— 35 56 42 ——— 4795	It may be advisable for the teacher to get the pupils to work in this form firstly, especially for the benefit of the slower ones, before teaching the process of "carrying" to the next place.
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N.B. It will be observed that we are using the Law of Distribution, because the process is really the same as shown thus:

$$7 \times (5 + 80 + 600) = 35 + 560 + 4200 = 4795.$$

In the working shown we omitted the zeros for convenience.

(To be continued).

18-YEAR-OLD BRITISH VOLUNTEER TO TEACH IN INDIA

Mr. William Courtauld, 18-year-old step-son of the British Home Secretary, Mr. R. A. Butler, has just arrived in India from London to serve for nearly a year as a volunteer.

He will teach at the Lawrence School, Sanawar, Simla Hills. His appointment there has been arranged through Voluntary Service Overseas, the British organisation which sends young people to developing countries as voluntary workers. They receive no

pay but only minimum expenses and pocket-money.

Mr. Courtauld is the first of more than 200 young men and women who will go overseas under the scheme this year. At present there are 159 volunteers in Africa, South America and Asia, some of them in India.

Mr. Courtauld has been studying at Eton, and on his return from India hopes to go to Cambridge University.

—(B.I.S.)

A REPORT OF THE GEOGRAPHY EXHIBITION HELD AT THE PRESIDENCY COLLEGE, MADRAS

In accordance with the resolution of the Standing Committee on Geography, the S.I.T.U. Council of Educational Research held an Exhibition in Geography on Saturday the 3rd February 1962 at the Presidency College, Madras. The Exhibition was open on the 4th February also. It was visited and much appreciated by teachers and headmasters representing 30 Secondary Schools and some Elementary Schools, and members of the staff and students of social studies section of training colleges in the city, besides others interested in geography.

The exhibits consisted mainly of (i) the materials of the Geography Department of the Presidency College, (ii) Maps, Charts and Atlases of the Central Survey Office, and (iii) Books and Maps from leading publishers in the City.

The exhibits of the Geography Department of the Presidency College related to the teaching and learning of Geography at the secondary level. The apparatuses and plastic relief maps on show particularly attracted the geography teachers.

The exhibit of the Central Survey Office was of special value to teachers. It comprised a representative set of their maps essential for the teaching of local and state geography.

The success of the exhibition was due entirely to the hearty co-operation of the Education Department, the Central Survey Office, the Extension Services of the Meston Training College, and Messrs. Macmillan & Co. Ltd., Orient Longmans Ltd., and Oxford University Press. The S.I.T.U. Council of Educational Research is very grateful to all concerned in getting up the Exhibition.

We are grateful to the Principal, Presidency College, Madras, for permission to hold the exhibition in the Presidency College and wish particu-

larly to record our appreciation of the thought, care and time expended by Professor Jamal Muhammad, his colleagues on the staff and his enthusiastic students in getting up the exhibition.

WELCOME SPEECH

Sri Jamal Muhammad, Professor of Geography, Presidency College, in his welcome speech stressed the importance of the study of geography to solve some social and economic problems confronting the nation. He deplored that geography did not attract talented youth in sufficient number for degree courses in the university. He hoped that the exhibition would help teachers know where to find materials for teaching geography and how to use them. He drew special attention to the maps and charts sent by the Central Survey Office.

He pointed out that the apparatus and appliances of his own department on show would indicate the scope of equipment needed for the efficient teaching of geography. He paid a tribute to Sri B. M. Thirunaranan for the meticulous care with which he directed the arrangement of the exhibits.

Sri V. Natarajan, President of the S.I.T.U. Council of Educational Research, while requesting Sri M. R. Perumal, Principal, Teachers' College, Saidapet, to open the Exhibition said that the Council was putting forth its best efforts to improve class instruction by its conferences, seminars and exhibitions.

OPENING SPEECH

In declaring the Geographical Exhibition open, Sri M. R. Perumal, Principal, Teachers' College, Saidapet, said that teachers holding degrees or diplomas in geography were very few in number and the majority of teachers handling geography had not studied the subject at the degree level nor had training in the special methods of

teaching geography; they therefore lacked subject competence as well as teacher-competence. Seminars and exhibitions of the kind held by the S. I. T. U. Council of Educational Research were according to him, really useful in pulling up the tone of classroom instruction.

From his experience as teacher, headmaster, District Educational Officer, and Principal of Teachers' College, he had no hesitation in saying that unless a content course in geography was combined with the B. T. training course, the instruction in the subject could not be improved. He explained the proposal for instituting separate courses in geography and history for the B.T. trainees instead of the present social studies course. He was sorry to note that irresponsible criticisms were often made by men who ought to know better about training colleges. He asserted that the training colleges were doing their best in the prevailing circumstances and they were looking far ahead in the matter of producing competent trained personnel for the teaching profession

in every subject of the secondary school curriculum. He exhorted the prospective B.T.'s to cultivate assiduously the reading habit so that they might keep themselves abreast of the times and function as efficient teachers. He was outspoken in his observation that the present day trainees in the colleges needed to put forth more vigorous efforts to gain adequate competence in the subjects they would be called upon to teach.

VOTE OF THANKS

In proposing the vote of thanks, Sri G. Srinivasachari, the Co-ordinator, pleaded for the shifting of emphasis from teaching subjects to teaching pupils and said that everything possible should be done to help the pupil to grow to his fullest stature according to his innate abilities. He suggested that in the psychology course more attention might be given to the contributions of Freud, Jung and Adler for individual attention in the process of education.

G. SRINIVASACHARI,
15-2-1962. Co-ordinator.

(Continued from Page 123)

ELECTION TO THE MADRAS LEGISLATIVE COUNCIL FROM THE TEACHERS' CONSTITUENCY

Teacher voters of the Madras-Chingleput District and the Madurai-Ramanathapuram District are to go to the polls on the 9th April 1962 to elect their representatives to the Madras Legislative Council. Valid nominations should have by now been known to the voters. We urge on every voter to make it a duty to go to the polling station and exercise his or her franchise, not minding the inevitable inconveniences of travel and other things. We hope that the teachers will remember that this is a right conferred by the Constitution of India only when the teaching profession shows as high a percentage of polling

as possible in evidence of their high regard for civic responsibilities.

As long ago as 1952 the South India Teachers' Union declared its policy of not putting up any official candidate but to leave teachers to choose their own representative. Its recommendations made in that year are quoted here, for they do contain sound criteria on which the voters can base their choice.

"All teachers should exercise their franchise in the best interest of the profession and its organisation and not to allow themselves to be influenced by any extraneous considerations.

Teachers should bear in mind their obligation and vote for those candidates who are MEMBERS OF THE UNION OF PROVED LOYALTY AND WHO HAVE SHOWN PROOF OF THEIR CAPACITY TO SERVE THE PROFESSION."

OUR SUPPLEMENTARY READERS

TALES AND LEGENDS OF ANCIENT INDIA. By S. W. COCKS, M.A., I. E. S. Fifth Edition.

TALES AND LEGENDS OF ANCIENT BURMA. By S. W. COCKS, M.A., I. E. S. Fifth Edition.

NAGANATHAN AT SCHOOL. By GLYN BARLOW, M. A. Eleventh Edition.

HAWTHORNE'S TANGLEWOOD TALES. Edited with Introduction, by PROF. P. E. RICHARDS, B. A. Second Edition.

LAMB'S TALES FROM SHAKESPEARE. By PROF. F. R. TOMLINSON, B. A., I. E. S. Second Edition.

GULLIVER'S TRAVELS. Abridged and adapted for Indian students, by PROF. EGERTON SMITH, M. A., I. E. S. Second Edition.

ROBINSON CRUSOE. Abridged and adapted for Indian students, by PROF. EGERTON SMITH, M. A., I. E. S. Second Edition.

BLACKMORE'S LORNA DOONE. Abridged and simplified for Indian students, by PROF. F. R. TOMLINSON, B. A., I. E. S. Third Edition.

GOLDSMITH'S THE VICAR OF WAKEFIELD. Abridged and simplified for Indian students, by PROF. J. C. ROLLO, M. A. Fourth Edition.

PRIDE AND PREJUDICE. Abridged and simplified for Indian students, by PROF. FERRAND E. CORLEY, M. A. Second Edition.

STORIES FOR INDIAN STUDENTS. By P. C. WREN, M. A., I. E. S. Eighth Edition.

REYNARD THE FOX. With Illustrations. By P. C. WREN, M. A., I. E. S. Third Edition.

LETTERS TO BOYS. By the Editor of The Children's Encyclopædia (ARTHUR MEE). Adapted for use in Indian Schools. Second Edition.

WORK, WEALTH AND WAGES. By Row and WREN. Second Edition. (HINDI and TAMIL Editions also.)

SIX SHORT PLAYS. For use in Schools and Colleges. By W. TURNER, M. A. Second Edition.

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36th ALL INDIA EDUCATIONAL CONFERENCE, TRIVANDRUM

RESOLUTIONS

The following resolutions were passed by the 36th session of the All India Educational Conference, Trivandrum.

1. This Conference deplores the action of the Railway Ministry, Government of India in withdrawing the railway concession granted to individual teachers for journeys to places of historical, geographical, educational and cultural importance. It urges upon the Central Government and the Railway Board to restore it to individual teachers and to extend it to members of Teachers' Associations.

2. This Conference invites the attention of Governments, Central and State, to the Teachers' Charter adopted by the AIFEA. The Charter contains a Code of Ethics for teachers and defines their rights and responsibilities. The Conference urges upon the Governments, Central and State, to approve the terms of the Charter and calls upon all teachers to abide by the terms of the Charter and also to observe Teachers' Charter Day on 20th November and also secure public acceptance of the Charter.

3. This Conference urges all State Governments to consider the war and military service of teachers for fixation of seniority and increments.

4. The Conference views with concern that despite efforts of the Ministry of Education, Government of India, to improve the salary scales of Teachers, State Governments have been tardy both in implementation of such measures and in the appreciation of the work of the teacher, violating thereby the principle of equal pay for equal work. The Conference, therefore, recommends to the Government of India to appoint a Central Pay Commission for

Teachers whose recommendation shall be binding on the State Governments.

5. This 36th All India Educational Conference expresses its immense joy at the liberation of the people of Goa, Diu and Daman from the Portuguese colonial rule that lasted for more than four centuries and most sincerely congratulates the Government of India for the effective measures they took for the same.

The Conference fully believes that the liberation will pave the way for educational and cultural progress of the people of Goa, Diu and Daman in line with the rest of India.

6. This Conference welcomes the circular from the Central Ministry of Education to State Governments recommending them to introduce Triple Benefit Scheme for teachers in their respective States. The Conference urges upon the Government of India and the State Governments to implement the recommendation without delay.

7. The Conference expresses its gratitude to the Ministry of Education, the Government of India, for having established the National Foundation for Teachers' Welfare.

The Conference requests all State Governments and philanthropists to make liberal grants and donations respectively and thus help the Government of India to achieve its aims.

8. This Conference records its gratitude to the President of India for having instituted the National Award for Teachers, thus recognising Teachers' services. It also notes with satisfaction that some State Governments have already instituted State Awards and urges upon other State Governments to follow the lead.

The Conference however feels that there is need to re-examine the methods and criteria adopted for the selection of teachers for such awards.

9. In view of the rapid progress of education the Conference is of opinion that Education Codes obtaining in the States and in the Centrally administered territories need revision to be in accord with present tempo of education programmes and recommends to the Government of India,

(a) to examine the codes

(b) to take steps to ensure a substantially uniform code of education throughout the country.

10. This Conference is of opinion that education being basic to the development of democracy and the biggest social enterprise of every State, every facility should be given to all sections of the population for setting up and maintaining educational institutions in the country. It notes with satisfaction that the constitutional guarantee in this regard is being carefully observed in most of the States and their experience indicates that such private effort has greatly helped in the development of education. It urges upon all the State Governments to ensure the fulfilment of this guarantee and provide every facility to private agencies in the field of education ensuring at the same time the maintenance of proper standards including qualifications and conditions of service of teachers, and equipment and accommodation.

11. This Conference views with great concern the circumstances which have compelled the All Kerala Private College Teachers' Association and the W. Bengal University and College Teachers' Association, two of the affiliated units of the AIFEA, to resort to methods of collective bargaining for the amelioration of their grievances. It requests the U.G.C., the State Governments, the Universities and Manage-

ments concerned to avert unhappy developments in academic life by taking early steps for the satisfactory solution of the issues involved.

12. This Conference authorises the Executive to appoint a Committee to consider the question of Emotional and National Integration so far as it concerns students and teachers. The AIFEA Committee after ascertaining the views of the affiliated Associations is requested to formulate suggestions for action for developing a sense of national integration in the world of students and teachers.

13. This Conference notes with regret the action taken by certain State Governments which in effect deny the recognition to duly constituted and affiliated units of the AIFEA the right of teachers to organise themselves into Associations. The Conference records its emphatic opinion that such action is contrary to the Fundamental Rights to form Associations. It requests the Central Government to examine all such rules and regulations of the State Governments and to direct them to modify or withdraw such offending regulations which in effect deny the Fundamental Rights.

14. This Conference recommends that in order to ensure a common pattern of technical and scientific terms that would be acceptable to all linguistic groups, the teachers be allowed to use English terms that are now in use wherever possible even from the lowest class.

SECONDARY EDUCATION SECTION

1. This Conference is of opinion that in the interest of education, the preparation and publication of text books should be directly controlled by educationists and educational organizations and under no circumstance is it desirable to nationalise the publication of text books.

BIG AID PROJECT FOR BLIND IN INDIA

A private American foundation is starting a new educational training programme for the benefit of India's estimated 350,000 blind children.

The American Foundation for the Blind Incorporated has budgeted \$ 40,000 (about Rs. 190,000) for a three-year project to keep up the professional standard of teachers of the blind in India. It will provide an American specialist who will conduct a college-level institute in New Delhi for wight of the best teachers of the blind. Teachers will be chosen from the eight major language areas of the country.

The project is being undertaken in co-operation with the United Nation Children's Emergency Fund (UNICEF) which will provide for the stipends and travel costs of the Indian teachers in order that they can attend the institute in New Delhi.

After a certain period at the institute, the teachers will return to their own regions to begin teacher-preparation courses for others. The American specialist provided by the American Foundation, will act as a roving supervisor for about two years for all the regional training programmes.

Paul J. Langan, Counsellor for the Far East of the American Foundation, describes the new programme as "an exciting venture which can step up the programme for trained teachers in India by some 20 to 30 years. Rather

than bringing a few prospective teachers to America each year we hope to train 200 qualified teachers in three years. We can thus give India a concentrated injection of qualified teachers of the blind."

The programme is not the first in India by the American Foundation for the Blind. For the last two years the Foundation has provided financial assistance for the National Academy of Teachers of the Blind at Palamcottah, South India. "The experience gained in this initial programme," said Mr. Langan, "resulted in the proposal to the Indian Ministry of Education by the Foundation of expanding this local teacher preparation to the eight major language areas of the country.

The American Foundation for the Blind is a private organisation financed by contribution with headquarters in New York.

(From "The American Reporter",
Wednesday, February 21, 1962).

P. S. HIGH SCHOOL, MYLAPORE

In aid of the Masters' Benevolent Fund and Poor Boys' Midday Meal Fund, the pupils staged a drama, "Mahtru Bhakthi" on 23-2-1962 under the presidentship of Sri R. Shanmugam, District Educational Officer, Madras South and teachers put on board "Thyaga Ullam" on 24-2-1962. There was an appreciative audience on both the days. Sri P. V. Ramaswamy was the organiser of both the above dramas.

OUR LETTER BOX

THE 36th ALL INDIA EDUCATIONAL CONFERENCE, TRIVANDRUM, 1962

Sir,

Resolution re: the necessity for the immediate change over of the medium Instruction in Universities to the Regional language:

"This conference, in the interests of sound education, recommends that teachers are allowed to use English Terms wherever possible from the lowest class and that all the committees and Boards that are engaged in discovering or coining Scientific and technical terms in Indian Languages are forthwith abolished."

In moving the resolution, Sri Kuppuswami Aiyangar said, "Educationists wanted the change in the medium of Instruction because, English medium, in the words of Gandiji, made our youths crammers and imitators unfit for original thinking and, if taught in their own language, they can understand things better and can be given real education."

Naturally the teachers objected. No doubt, it was not easy for them to move out of their grooves. The objection took the form of want of text books, scientific and technical terms etc. as though they have to teach text books and not the subject. Gandhiji says, "If I had the power of a despot, I would today stop the tuition of our boys and girls through a foreign medium, and require all the teachers and professors on pain of dismissal to introduce the change forthwith. I would not wait for the preperation of text-books. They will follow the change. It is an evil that needs a summary remedy."—But the politicians made this objection a question of prestige and not a question of sound education. They set about appointing committees and advisory bodies at a huge cost to coin new words and phrases and to create text books. It was not realised that

we can learn to swim only by plunging into water. We do not create dictionaries and then produce Literature. These coined words are not less difficult to learn than the corresponding English words. It is an additional difficulty to the teacher. He has himself to learn the newly coined words before he can use them in teaching. The Government which is run by the politicians have power over Secondary Education. The teachers have to submit. They dare not protest. Owing to this and other reasons, Education in schools has become inefficient. The University teachers could not be so easily coerced. They raised additional objections. They cried 'Danger to National Integration'. Regional Language medium will prevent students and teachers moving from one State to another thus impeding free flow of knowledge throughout India. A false sense of prestige and purism in language made the politicians forget how languages are developed and agree to postpone the change in the universities till the languages are sufficiently developed. Now the position is, you teach through the regional language in the High Schools, and suddenly change into English in the Pre-University class. No one who knew anything about Educational Psychology or who have had any experience of teaching in such a situation would recommend this procedure.

I have a boy in the Pre-University class. I know something of the difficulties and the nervous strain involved in this change. The boy is cursing daily this change in which he has not only to learn a new set of terms but to relearn sometimes in a foreign language what he has already leant in the school in his own language. College teachers and prescribers of College text books ignore the fact that students do not enter colleges with sufficient knowledge of English to understand either the teaching or the text

books as they did during the days of English medium in schools. The two books prescribed for this year, 'The Threshold' and 'Men of Science and their Discoveries', contain 41 essays on various disconnected subjects ranging from life under the sea, on the earth, in the air, to the heavenly bodies and in time, from Ancient India to the present Atomic age. I very much doubt whether the teachers themselves understand fully the meaning and scope of these essays. What is the result? The students become mere crammers of summaries, annotations, idioms, etc., just as the school boy under the English medium did. Is it any wonder that standards have fallen? Between the fanaticism of the politician and the obduracy of the university teachers the education of the present generation is being ruined.

WHAT IS THE REMEDY?

The only remedy that will give real Education to our youths and at the same time cure all the ills complained of is to make at once the Regional language the medium in the Universities also and allow the teachers to use from the lowest class wherever possible the English terms that we are now using. No teacher has or can have any objection to this. If it is not stressed in Educational Conferences, it is more owing to political pressure and indifference than to any conviction to the contrary. I know that many top-ranking politician like Sri K. Santhanam hold this view. But I suppose it is party loyalty that prevents them from making it an object of public agitation. Even in law, a Minister is reported to have advocated the use of English terms.

AN IMPOSSIBLE EFFORT

In the matter of coining Scientific and Technical terms the Advisory Board at its first meeting recommended that the terms chosen should be common to as many of the regional languages as possible. But this is an impossible proposition. Modern Science

and Technology developed in India only as part of English education. Therefore, there are no scientific and technical terms in any of the Indian languages that could be made use of in modern education. Therefore, the most reasonable and practical thing and that which should be acceptable to all the linguistic groups is to use in all cases the English terms that we have learnt, and are using at present.

It is waste of money, time and energy to coin new words. Hence the recommendation that all committees and Boards that are now engaged in coining new words in the regional languages are forthwith abolished.

Anyway if the Government wants to make the regional language the medium of education in universities as they should and if it is to be successful, i.e. if the standard is not to be lowered thereby but improved, teachers should be allowed to use English terms wherever possible from the lowest class.

In writing, transliteration followed by the English word under brackets should be used. Teachers would consult English text books and teach in the Indian language. Text books in Indian languages may at first be mere translations of English books. Original text books will come in due time.

This wholesale adoption of English terms, besides making the change-over of the medium of instruction easier, is advantageous in a number of other ways.

(1) As the present-day teachers had learnt everything in English, the teaching both in schools and colleges will be less difficult and more efficient.

(2) Students need not learn one set of terms at the school and another at the colleges as they do at present and can understand the teaching much better.

(3) As we have agreed to the three languages formula, there will not be much difficulty in the interchange of teachers and students among Indian

Universities and in the free flow of knowledge throughout India.

(4) Study in foreign Universities and taking part in international scientific conferences will also become much easier.

(5) Above all, it will considerably lessen the tension between the North and the South. The North must be prepared to give something and not try to take everything.

Is it too much to expect all genuine educationists and statement to shake off their prejudices and false prestige and improving the education of our youths?

N. KUPPUSWAMY

COMMERCIAL INSTRUCTORS AND THE REVISED SCALE OF PAY

On the representation of the Madras State Commercial Instructors' Association, the Government of Madras have passed the G.O. Ms. No. 1419 dated 22-11-1961, thereby intending to raise the scale of pay of Commercial Instructors in High Schools to Rs. 125-5-175.

But this scale is made applicable only to those who have passed Typewriting higher and Shorthand higher. There will be few Instructors in the State with such a qualification to be benefited by this G.O. Shorthand is taught by a D.Com. holder whose minimum qualification include Shorthand lower. Hence in the case of Commercial Instructors, shorthand lower, (instead of higher) may be considered for the revised scale.

Further, Instructors who have passed and are teaching any other subject under the Secretarial Course, such as Commercial Practice, Commercial Geography in addition to Typewriting may also be brought under the scope of this G.O. so that they may also be benefited.

It is earnestly hoped that the authorities will be kind enough to amend the G.O. suitably and improve the lot of the Commercial Instructors.

V. VISWANATHAN,
(A Retired Teacher).

Manamadurai,
6th February, 1962.

OUR BOOKSHELF

THE VISUAL INFORMATION OF INDIA. ANNOTATED LIST OF FILMSTRIPS ON PLANT LIFE: Supervision and Guide Manuals. By Prof. G. Venkataraman, M.A., M.Sc., L.T.

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Receipt of the following books is thankfully acknowledged:—

1. Educational Co-operation within the Commonwealth.
2. Education in Britain.

MATHEMATICS AND SCIENCE EDUCATION CONFERENCE

The S. I. T. U. Council of Educational Research is holding a Conference on Mathematics and Science Education at the Secondary School stage for four days from the 25th to 28th April 1962, at the Vivekananda College, Myslapore.

The Conference will discuss:

1. Aims and objectives.
2. Curricular content.
3. Learning experience.
4. Equipment and facilities.
5. Evaluation.
6. Teacher-preparation.

On the first day of the Conference (25-4-1962) after the presidential address there will be a symposium on Mathematics and Science Education in Secondary School. This will be followed by panel discussions on General and Differential Programmes in (i) Mathematics and (ii) Science Education at the secondary stage.

The Conference is open to persons interested in Mathematics and Science Education at the Secondary School stage, Headmasters, and Teachers of Mathematics and Science.

Those desiring to participate in the Conference have to register their names with the Secretary, S. I. T. U. Council of Educational Research, Madras-28, on or before the 7th April 1962 by paying a fee of Re. 1. Besides, there will be a conference membership fee of Rs. 5.

V. ARUNAJATAI,
Secretary-Treasurer.

23-3-1962.

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NEWS AND NOTES

XXIVth INTERNATIONAL CONFERENCE ON PUBLIC EDUCATION

The XXIVth International Conference on Public Education, convened jointly by Unesco and the International Bureau of Education, was held at the Palais Wilson, Geneva, from 3rd to 14th July, 1961.

The work of the Conference, in which 85 States were represented, was presided over by Mr. A. J. Markouchévitch, First Vice-Minister of Education in the R.S.F.S.R. The seven vice-chairmen were Mr. Mohamed Aly Hafez, Deputy Minister of Education of the United Arab Republic, Mr. Akhtar Hussain, Minister of Education and Scientific Research of Pakistan, Mr. Nguyen-Quang-Trinh, Minister of National Education of Vietnam, Mr. Aja Nwachuku, Federal Minister of Education of Nigeria, Mr. Alfonso Ocampo-Londono, Minister of National Education of Columbia, Mr. Joaquin F. Vargas Mendez, Minister of Education of Costa Rica, and Mr. Georges Voyatzis, Minister of National Education of Greece.

The discussion of the two pre-drafts of the recommendations on items I and II was introduced by the rapporteurs, Mr. Ras O. Johnson (United States of America), Chief, Africa-Europe Division of Education, International Co-operation Administration, and Mrs. Herbinier-Lebert (France), General Inspector of Education. The text of the two Recommendations Nos. 52 and 53 voted by the Conference has been communicated officially to all the governments. The first concerns the organization of one-teacher primary schools, and the second deals with the organization of pre-primary education. This document will be sent free of charge to anyone requesting it either from the International Bureau of Education

(Palais Wilson, Geneva), or from Unesco (Place de Fontenoy, Paris 7e).

A part of the twenty-one sessions of the Conference was devoted to the discussion of the reports from Ministries of Education on educational progress during the year 1960-61, reports which later will be reproduced in the International Yearbook of Education 1961. As working documents, the International Bureau of Education and Unesco jointly published two studies in comparative education entitled "The One-Teacher School" and "Organization of Pre-Primary Education".

SUGGESTIONS FOR TEACHING OF MATHEMATICS

In the first of a series of fortnightly articles, W. Jeavons discusses '*Secondary School Mathematics*'. He begins with a quotation which is with the attention of every mathematics teacher. It is this: *If the secondary school pupil is able to appreciate his next lesson in mathematics with a sense of anticipation, then a right attitude has been achieved.*"

The contributor's summary of suggestions is extracted here for the benefit of our readers.

1. Arrange the course as a unified whole.
2. Work in one plain exercise book, each pupil to be supplied with pencil, rubber, ruler.
3. Keep quantities small, limit the number of digits in multiplier and divider.
4. Omit conventional mechanical sums in weight, length and capacity.
5. Give frequent tests for the purpose of revision and to check the effectiveness of teaching.

—The Schoolmaster,
January 19, 1962.