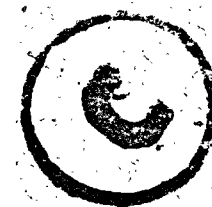


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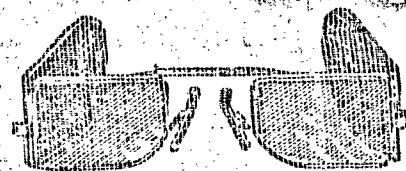
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VOCATIONS FOR YOUNG MEN— THE TEACHER.*

YOU know that the subject of my address this evening is: Teaching as a Vocation for Young Men. From the numbers that I see here, I should take it that a large number are anxious to become teachers. But I do not know if after 5 or 10 years of teaching you would be quite so anxious to remain as teachers as perhaps you are anxious now to become teachers. All the same it must be said, as has been said on so many platforms before, that teaching is one of the noblest of professions.

I take it for the purpose of this discourse that every young man just on the threshold of life looks about himself, studies his own tastes, inclinations and aptitudes, examines the ideal requirements of the profession

* A lecture by M. R. Hy. P. A. Subramania Ayyar, B.A., L.T., Headmaster, Hindu High School, Triplicane.

XXX—19

which he seeks to enter, then considers whether he has that in him answering to these ideal requirements and then again considers the practical limitations under which he will have to pursue that particular profession, and then makes up his mind. As a matter of fact however, these things do not enter into our consideration at all. Very often the choice is a haphazard one; and particularly with regard to the teaching profession, it used to be said, and I think with some degree of truth, that you begin to think of the teaching profession when all other professions have abandoned you. I do not know if it is a good thing that a young man should begin to think of life in this haphazard fashion. I should think that he should exert the very best of his thought on questions concerning the value of the different professions and his own tastes and inclinations.

I will therefore take up a little bit of your time to consider what the ideal requirements of the teaching profession are. I do not know if you have read the lecture of Ruskin on *Books* in his 'Sesame and Lilies' which is devoted to a consideration of what books to read and how to read them. In the course of that lecture, Ruskin has drawn a most beautiful and powerful picture of the kind of men we ordinarily meet with in life. He says addressing himself to his readers, "Do you know the Scythian custom when the head of a house died. The custom was to decorate the dead body with all sorts of jewels and dresses, to place the dead body in a car, carry it from house to house, place it at the head of the dining table, and the living people dined at the table at the head of which the dead body was placed." "Now, suppose," says Ruskin, "a man makes a similar offer to you—that you should be honoured like the Scythian dead, that people should feast and make merry in honour of you but that like the Scythian dead you should have your soul dead within you—I daresay you would not accept that." But as a matter of fact, do you know that is what exactly happens in natural life? Many a man who calls himself great or is fit to be called great on account of his influence in the community of which he is a member, lives a kind of life that this dead head may be supposed to live. It gets more honour, more jewels, more cloths; but it does not get what may be called a personal soul. Of most of us people in this world, this picture is true, for we forget that we have a soul, that it requires cultivation, that there is such a thing called the spirit and it is the living spirit alone that matters, and not the things which are known as the goods of the world. Then he winds up the beautiful pic-

ture saying, "He alone is advancing in life whose heart is getting softer, whose intellect keener, and whose spirit is entering into living peace."

Thus we can divide mankind into two classes—those who care for honours, riches and material possessions and those who, though they do not shun material prosperity have their hearts turned towards spiritual culture and spiritual advance. It would be wrong to think that these two classes are mutually exclusive, for even in the worst of men, it happens that while they have a hankering after worldly goods, they are not without a yearning for spiritual advancement and excepting perhaps a rare Mahatma Gandhi here and there, no spiritually-minded man is altogether without some longing for what may be called the goods of the world. This distinction is as old as the world. Our own Upanishads speak of people who long for the pleasant and of those who long for the good and it is exactly the same classification that we find in Plato's works, so that we may take it as a rule of human nature that in human beings, there are to be found side by side these two longings—longings for the goods of the world and longings for spiritual advance.

Who then would become a good teacher? It is in my opinion that man in whom the longing for spiritual advance is more predominant than the other longing. I would take it therefore that he would make an excellent teacher who, while he certainly does not discard the worldly goods, yet thinks that man does not live by bread alone, that there are certain things which are spiritual and moral which he has necessarily to acquire, and that there are more things in heaven and earth than are dreamt of in mundane man's philosophy. It is

that man, I think, that would turn out an excellent teacher.

Another characteristic of a good teacher ought to be that he pursues ideals for their own sake. Whatever may be the difficulties and temptations which beset him, he should be peace-minded and steadily and fixedly pursue them, for in no department of human activity is low aim a crime as in the department of education. The teacher has to deal with, not dead matter as the manufacturer has, but living matter. No man can say what the possibilities are that lie embedded in the little child that is entrusted to his care with heavenly smile on its lips. No man can say that. And how can a man bring out, evoke the possibilities of these human-divine beings unless his soul is lofty? Unless he has that faith in himself and retains that faith unsullied and undimmed in spite of failures and discouragements, he cannot hope to become a good teacher.

The third requirement that follows necessarily from this is that a teacher should always keep his mind alert, his intelligence bright, and his emotional temperament fluid and liquid. And if for any reason, his intellectual soul, his spiritual being becomes set, that man ceases to grow and that man will fail to teach adequately; for unless the teacher is constantly a learner, he will fail to perceive how to make others learn. He must equip himself by familiarising with the various processes by which new truths enter human minds and unless he does that, he cannot seek to rouse the dormant intelligence of the little children entrusted to his care. This is a very important requirement and no teacher can call himself a teacher if he deteriorates into a mere machine.

Another characteristic which ought to be found in all good teachers is liveliness and sympathy. The famous Dr. Arnold was written to by an old pupil of his who asked him whether he would advise his old pupil to become a teacher. Curiously enough, the Doctor sent a reply to say that he would not advise him to become a teacher, for he had about him what was known as "the Oxford manners." By "Oxford manners" is meant a sort of air which you generally associate with a lack of spontaneity. Such a manner, says Dr. Arnold, is quite inconsistent with the general manner of a good teacher. A good teacher, if anything, should be optimistic. He should be full of joy himself and radiate it to those about him. It is not enough that the joy is hidden in some recesses of his heart. It should find a free play in the expression of the muscles of his face and in every action of his and unless he can radiate joy in every way it will be impossible for him to bring his children to that level of emotional being when truths may easily flow into their souls. The great necessity for the imbibing of new truths is that the person who imbibes new truths must be emotionally in a high plane. This is a necessary condition of learning and in order that a teacher may make his own pupils joyous and happy, he must radiate joy and happiness himself.

These then are the essential requirements of a teacher. He must have a large part of his soul longing for spiritual things. He must be a constant reader. He must never shun truth from whatever quarter it may come and he must pursue his ideals without being discouraged by failures. Fourthly, he must be a centre of joy from whom will radiate joy to the children who are entrusted to his care.

You will tell me that it will be hard to get such teachers and that if people of these qualifications alone should become teachers, our schools will be left empty; there will be none to teach although there may be so many to learn. Happily, there is that in human nature which can adjust itself to new conditions, which by means of *Vairagya* and *Abhyasa* will enable us to become what we long to be. It may be that teachers produced after this pattern may not be quite so good as those to whom teaching is a second habit. All the same, in the long run, if the soul is there, you may be sure that a man with a longing for the teacher's profession may equip himself with the necessary qualifications.

You may tell me, you started by saying that teaching is not as good as some other professions and now you say that teaching is not an easy profession to follow. Why then do you advise us to become teachers at all? You must remember that there is no inconvenience, misfortune or trouble in life that has not its corresponding compensation. If you put yourself to this hard discipline you may be quite sure that as a compensation for the hard discipline that you subject yourself to, you will reap some reward, even though the reward may not be of a material character. For, if you examine the life of a lawyer or a busy medical practitioner and the life of a fairly decent schoolmaster, you will find that there is something in the life of a decent schoolmaster which you see lacking in the life of the busy practitioner of law or medicine. A lawyer can, if he happens to be a budding lawyer, never be sure of his time. He cannot call his time his own. The same is the case with the busy medical practitioner. No lawyer can say,

"Here is some time for me and it is open to me to make the best use of it." No medical practitioner can say that either. But a teacher can say that. Unless he be a bad sort of teacher, he would not be able to say, "I have no time left for me." If he says that the profession does not give him time for self-improvement you may put him down as a bad sort of teacher. That is one great advantage which, as you grow older and older, you will appreciate in greater and greater degree.

And then again, it is easy for you to order out your life in a manner which is impossible to the practitioners of either profession. You as teachers know exactly what the day's requirements are; you know exactly how to meet those requirements; you have time enough to prepare yourselves for meeting those requirements. It is not only in this; even in matters of house-hold expenditure you can budget for yourselves what you will spend. That also is a great advantage which you will appreciate as you grow old.

Thirdly, you will grant that a schoolmaster's life is a life of comparative innocence. In the school-house at any rate there is no cross-examination of witnesses; there is no trouble with people who are prepared to swear anything and everything. There is no dealing in crime unless it be juvenile crimes. Do you think that it is not a great advantage for a man to live a kind of life which gives no opportunity whatever to him of having to deal with criminal people and people sunk in vice.

Fourthly, there is also that freedom from the hurry of life such as characterises most people in large cities and having a quiet time of it all your life.

These then are the advantages which no thinking man can easily give up and these advantages I claim most emphatically for a man who makes teaching his profession.

But what are the limitations under which the schoolmaster's work is to be carried on in school? What are the disabilities which appertain to the schoolmaster's profession? Ah! friends, I have a very sad tale to tell. It is true that ever since the beginning of the world, in no country of the world has it happened that the schoolmaster's profession was the most paying one and I do not want it should be an extremely paying one, for in the last resort the teacher has to show by his own life what are the things in life that matter, that it is not riches alone that matter, but something else. Even France and England have, particularly after the war, come round to the opinion that even though a nation may be rich and prosperous, count all its treasures in millions of pounds, still if the citizens of those countries are not spiritually advanced, if they do not turn away even for a small moment from the goods of the world, that nation is bound sooner or later to come to grief. This has been the experience of Europe and has been reported to be the experience of great nations in former times like Rome, for example.

I do not therefore want that teaching should be one of the best paid professions. But I do want that the man who takes up the profession of teaching should be placed above want, above the harrowing cares of life, should be given that mental peace which will make possible for him the pursuit of that ideal to which I made some reference a few minutes ago. That a man should be above want is one of the primary conditions of life.

It is true, in former times, in our own country, our teachers, the Sanyasins, were extremely poor and undertook the education of a few. But I wonder whether education like mass education that we have in view could be undertaken by a handful of Sanyasins. It is true these few Sanyasins lived very noble lives and were able to infuse enthusiasm in their pupils. But I do not think the education of a whole nation could be taken up by a body of people like that. On the other hand, the education of a vast continent like India must be taken up only by a large number of lay teachers. And it is very essential that you give them just those bare necessities of life which will keep the wolf from the door. It is a prime necessity and it is fortunate that this view is getting more and more recognised in countries like England and the United States. Even there till a few years ago, the complaint was that the teaching profession was very ill-paid. It was left to that great man, Mr. Fisher, who became Minister of Education during the period of war, to come in very largely for the relief of the poor and down-trodden teacher. The condition of the teaching population there has very materially advanced since the improvements effected by Mr. Fisher. In our own province we have an Indian Minister of Education. I am sorry I am not at present able to say that he has been able to effect this great reform. It is true that within the short space of three years that he has been in charge of the Portfolio of Education, not much can be expected. But I do believe that if we in this country want a nation of Indian citizens to spring up in future, this problem of enabling the teacher to live a decent life should receive immediate attention. How

can you talk of ideals, of enthusiasm and disinterested service to a poor teacher on Rs. 30 or 40 a month? You cannot expect him to be intellectually, emotionally and spiritually alive to the needs of India's children. It is impossible.

I do not want that a teacher should be rich enough to ride in motor-cars or spend Rs. 7,000 on his daughter's marriage. As I said, it would be a sin that a teacher should want that he should be materially so rich, for his very riches may stand in the way of his being a good teacher. But I do want that he should get just that minimum of the bare necessities of life which will enable him to

give full scope for the full play of his intelligence and spirits in a manner calculated to bring up the future citizens of this land, calculated to advance by hasty steps the reaching of that goal that you and I wish that our country should reach in future. And it is up to you, young gentlemen, who either would become teachers or who will have the lot of teachers in the hollow of your hands to see that this condition is ensured to every teacher so that our aim may be reached very soon, so that the future prosperity of the country may be assured.

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A CHAPTER ON SQUARE AND CUBIC MEASURE.

THERE has always been wanting a certain amount of clearness of ideas in the teaching of this portion of Elementary Mathematics in the lower forms of High Schools. The pupil comes up with very hazy ideas of measurement of surface and space and his solutions to problems on this subject expose the hollowness of his understanding, which in a majority of cases is due to defective teaching. For example, when a pupil is asked to state how many copies of a book of given size can be arranged side by side on a given table, his answer shows the possibility of tearing of books into pieces so that there may be no space unfilled. His method of working is identically the same as that required for paving a floor or varnishing the table. An element of impracticability enters into his solution, which is sometimes ludicrous. He bases his calculation on the mechanically-learned formula: find the area of the table and divide it by the area of the book; then the number of books required is got. It is very dangerous to import into the young minds such ideas not only from the point of view of original thinking on the part of the pupils, but from a sense of the severe shock felt by them when they proceed to test the truths by application to concrete cases. Mathematics divorced from practical life is not a fit subject for introduction in lower classes. The teacher should always attempt to introduce real and concrete questions in his teachings.

Much of this kind of defective teaching is due to want of some courage on the part of the teacher, required in properly presenting to the pupils the necessity of a 'unit of measurement.' The pupil must be made to realise for himself the need for a 'unit of measurement' in comparing areas or volumes.

Calculation of areas:—Suppose there are two rectangular sheets of paper, one of which is 10 in. by 5 in.; and the other 25 in. by 2 in.; which of

these pieces is greater or occupies more space on the table? This question requires comparison of the two pieces. This can be done in two ways:

(1) either by placing the one over the other so that one of them is definitely within the other and hence obviously smaller than the other in size;

(2) or by comparing both with another smaller piece which will go an exact number of times in each of these, the number of times in the one being different from or equal to the number of times in the other.

Now it is obviously impossible by any adjustment to make the one fall inside the other or even exactly fit into the other. Hence the first method fails. It is therefore necessary to compare both with a third piece. Let us suppose that this piece is 5" by 2". This can be spread consecutively on the first sheet 5 times, and on the second also 5 times. Thus this third piece measures each of the sheets 5 times. Then we say, that the area occupied by the first sheet is equal to that occupied by the second, in other words, the two sheets are of the same size or extent. In this case we call the piece 5" x 2" as the 'unit of measurement,' i.e., as the standard which measures each. But cases arise in which even this 'unit' is too large, where it is required to adopt a still smaller 'unit.' For the purpose of measurement a square piece 1" long is taken as the smallest unit of measurement, so that it is possible to measure how many times this enters into pieces whose dimensions are expressed in inches and higher denominations. But even a square inch (for such is the name of the squares of 1" side) is sometimes too large and a 'square unit' many times smaller than the above has to be taken. These units are all fractions of a square inch. For example a square of side $\frac{1}{10}$ " measures a square inch 100 times. Hence this 'unit' is $\frac{1}{100}$ of a square inch. Four times this unit is $\frac{4}{100}$ or $\frac{1}{25}$ of a square inch, that is $\frac{1}{25}$ of the space of a square inch is occupied by 4 units of this size. Similarly 25 times this unit = $\frac{1}{4}$ of the square inch; 50

times the unit = $\frac{1}{4}$ sq. in. Thus with the floor 26' by 19' (1) if broken pieces can be used; and of a 'square inch' as the least unit of measurement, a given surface can be measured giving how many times the square inch it is and what part of the square inch the remainder of the surface is.

Expressed in terms of this unit, the area of a rectangular surface can always be easily found.

Example 1.—The area of a rectangle of sides 10" by 5" is 50 square inches; for a square piece of 1" side can be consecutively spread over the rectangle 10 times along the length and five times along the breadth, thus forming five rows of 10 squares each.

Hence the area of a rectangle is always put down as length into breadth, each being expressed in the same denomination of measure.

Example 2.—The area of a square = length $\times$ breadth. But since the sides of a square are equal, we say that the area is the square of a side.

The area of a square of 7" side = 7×7 or 49 sq. in.

Example 3.—How many slabs each 3' by 2' are required to pave a rectangular floor 30' by 20'?

There are two ways of solution: (1) when the slabs are arranged so that the length of a slab faces the length of the floor and the breadth of the slab the breadth of the floor. (2) taking as the unit 1 sq. foot (a square of 1' side) this unit enters 6 times in the slab and 600 times in the floor. Therefore the slab which is 6 times the unit enters 100 times into the floor ($\frac{600}{6} = 100$).

$\therefore$ The number of slabs is 100.

But in certain questions the number of slabs may not be a whole number; fractions of a slab have to be used. In such cases we take for granted that a slab can be broken (not contrary to practice) into pieces to get the required fractions of a slab.

Example 4.—Find the number of slabs each 27" by 20" required for paving a rectangular hall

(2) if no broken piece can be used, the inter-spaces being filled by mortar.

In the first case, taking 1 sq. in. as the unit of measurement, we have to find out how many times 27×20 sq. in. enters into $26 \times 19 \times 12 \times 12$ sq. in. for 1 sq. in. enters 27×20 times into the slab and $26 \times 12 \times 19 \times 12$ times into the floor.

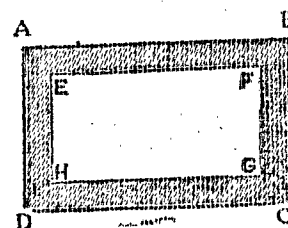
$$\therefore \text{The No. of slabs (integral and fractional)} = \frac{26 \times 12 \times 19 \times 12}{27 \times 20} = 131\frac{1}{3} \text{ or } 131\frac{1}{3}$$

or 132 to the nearest integer.

In the second case, the number of slabs depends upon their arrangement on the floor. If arranged in lengthwise direction, there are 11 rows of 11 slabs each = 121 slabs; if in breadthwise direction, there are 8 rows of 15 slabs each = 120 slabs.

$\therefore$ the greatest number of integral slabs, with minimum inter-spaces is 121.

Example 5.—What length of oil cloth 2 yards wide is required for covering the floor of a rectangular hall 120 ft. long and 30 ft. wide, leaving all round a pathway 1 yard wide?



Here we have to exclude from the whole area the area of the pathway, the shaded portion. The unshaded portion is the area required. It is a rectangle whose length is $40 - 2$ or 38 yards and width $10 - 2$ or 8 yards. $\therefore$ The area of the cloth required is 38×8 sq. yds.

But the width of the cloth is 2 yds.

$\therefore$ The length of cloth required is $\frac{38 \times 8}{2}$ or

152 yds.

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Example 6.—To find the area of the four walls of a room 7 ft. long, 5 ft. broad and 4 ft. high.

Here there are two lengthwise walls and two breadthwise walls.

Each lengthwise wall is a rectangle whose area is lh sq. ft. $\therefore$ The area of the two lengthwise walls is $2lh$.

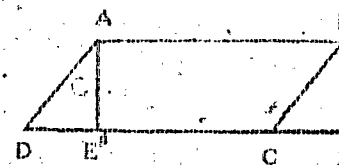
Similarly the area of the two breadthwise walls is $2bh$.

$\therefore$ The area of the four walls is $2lh + 2bh = 2h(l + b)$ sq. ft.

N.B.—The practice of allowing the pupils to get by rote $2h(l + b)$ should be discouraged.

Each question should be done by reducing it to its elementary areas, not by substituting in the formula the figures for length, breadth and height.

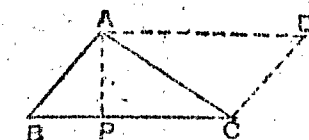
Areas of some rectilinear figures.



(1) A parallelogram is a figure in which the opposite sides are parallel. Let ABCD be the parallelogram. Draw AE perpendicular to DC. If the triangle ADE be cut off and placed in the position BCF, the figure formed is a rectangle.

$\therefore$ The area of the parallelogram is now the area of the rectangle ABFE. But the area of the rectangle = $AB \times AE$. $\therefore$ The area of the parallelogram is $AB \times AE$, i.e., the product of AB (a side of the parallelogram) and the perpendicular between AB and the opposite parallel side.

More generally this may be stated as the product of any side and the perpendicular distance between that side and the opposite parallel side.



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(2) *The area of a triangle.* Let ABC be any triangle. Complete the parallelogram ABCD. Now the triangle ABC is half the parallelogram, since AC a diagonal divides the parallelogram into two equal triangles which can be made to coincide by superposition.

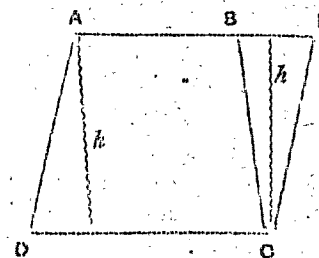
But the area of the parallelogram is the product of BC and the altitude between the parallels,

$\therefore$ The area of the triangle is half this area = $\frac{1}{2}$ base $\times$ altitude (i.e., perpendicular from A to BC). More generally the area of a triangle may be stated as half the product of any side and the perpendicular drawn to that side from the opposite vertex.

In the case of a right-angled triangle one of the sides containing the right angle may be taken and the other side itself is the perpendicular.

$\therefore$ The area of a right-angled triangle = half the product of the sides containing the right angle.

(3) *The area of a trapezium.* A trapezium is a four sided figure in which a pair of opposite sides are parallel. Let ABCD be a trapezium.



Through C draw a parallel to DA so that AECD is a parallelogram. Now the area of the figure ABCD = area of parallelogram AECD + the area of the triangle BCE

$= DC \times h - \frac{1}{2} BE \times h$
 $= (DC - \frac{1}{2} BE) \times h = (2DC - BE) \times \frac{1}{2} h$
 $= \frac{1}{2} (DC + AE - BE) \times h$, since $DC = AE$
 $= \frac{1}{2} (DC + AB) \times h$, i.e., half the product of the sum of the parallel sides and the perpendicular distance between the parallels.

(4) The area of any rectilinear figure can be found by dividing it into a number of triangles and finding the sum of the areas of these triangles.

(5) To find the area of a triangle in which the sides are given.

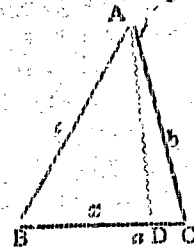
Two methods are available here: (1) Describe the triangle with the given measurements to scale; find out the altitude by measurement.

Then the area is $\frac{1}{2}$ base $\times$ altitude.

This method which depends entirely on the use of mathematical instruments must necessarily give only approximate result.

(2) The second method helps us in calculating the perpendicular without measurement.

For



Let a, b, c , units be the sides of the triangle.

It is required to find h in terms of a, b, c .

If BD be x units, $DC = a - x$ units.

$$\begin{aligned} \therefore c^2 - x^2 &= h^2 = b^2 - (a-x)^2 \\ \therefore c^2 - x^2 &= b^2 - (a-x)^2 \\ \text{i.e., } 2ax &= c^2 + a^2 - b^2 \\ \therefore x &= \frac{c^2 + a^2 - b^2}{2a} \\ \therefore h^2 &= c^2 - \left(\frac{c^2 + a^2 - b^2}{2a} \right)^2 \\ &= \frac{4a^2c^2 - (c^2 + a^2 - b^2)^2}{4a^2} \\ &= \frac{(2ac + c^2 + a^2 - b^2)(2ac - c^2 - a^2 + b^2)}{4a^2} \\ &= \frac{\{ (c+a)^2 - b^2 \} \{ b^2 - (c-a)^2 \}}{4a^2} \\ &= \frac{(c+a-b)(c+a+b)(b+c-a)(b-c+a)}{4a^2} \\ &= \frac{2s \times 2(s-b) \times 2(s-a) \times 2(s-c)}{4a^2} \\ \text{If we put } 2s &= a+b+c \\ \therefore h^2 &= \frac{4s(s-a)(s-b)(s-c)}{a^2} \end{aligned}$$

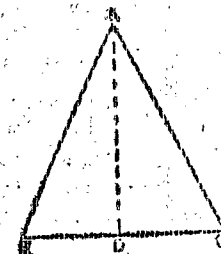
$$\therefore h = \frac{2}{a} \sqrt{s(s-a)(s-b)(s-c)} \text{ units.}$$

$\therefore$ The area of the triangle

$$= \frac{1}{2} a \times h = \sqrt{s(s-a)(s-b)(s-c)} \text{ sq. units}$$

where s is the semi-perimeter.

Caution: In any question involving numericals, it is always better that the pupil calculates the perpendicular direct in the above manner, and then finds the area instead of mechanically substituting his figures in the formula.



The area of an equilateral triangle: Suppose a side is a units. Since the perpendicular from the vertex to the opposite side bisects the side, we have $h^2 = a^2 - \frac{1}{4}a^2$.

$$\therefore h^2 = \frac{3a^2}{4}, \therefore h = \frac{\sqrt{3}}{2} a$$

$$\therefore \text{The area} = \frac{1}{2} a \times \frac{\sqrt{3}}{2} a = \frac{\sqrt{3}}{4} a^2$$

(6) Regular Figures: A rectilinear figure is said to be regular when all its angles are equal as well as all its sides. Taking the centre of the figure and joining it to the vertices, we get as many equal isosceles triangles as there are sides.

Hence if we find the area of one triangle and multiply it by the number of sides we get the area of the regular polygon. The area of this triangle is $\frac{1}{2}$ the product of a side and the perpendicular to it from the centre of the figure.

In the case of a regular hexagon (six sides) since each of these triangles is equilateral, the area of the hexagon of side a units is $6 \times \frac{\sqrt{3}}{4} a^2$ sq. units where $\frac{\sqrt{3}}{4} a^2$ represents the area of the equilateral triangle.

PROGRESS IN EVOLUTION

By MR. K. VENKATARAMAN, M.A., L.T.

THOUGHTS about a previous golden age are so freely held by several people nowadays that it is really worth while to enquire whether any such fancied age really existed. Ideas die hard, and the imaginary *Krita Yuga* is a time when milk and honey flowed in the land, and happy people wandered in joyous freedom.

On the other hand, the picture that confronts us in the mists of the earliest age shows a crowd of human beings, little different from, if not worse than, a flock of sheep, and living a dull life of hopeless ignorance and squalid misery. The earth was very different from what it is at present. Indeed, when we view our present condition and the world around, we cannot help feeling that life is essentially one of progress in all aspects.

We cannot fix the time when the natural world, as we see it, was established. It is considered probable that the earth was a "part of a spiral nebula heaved off from the central sun," and if so, it can be readily conceived that vast stretches of time would have been needed for it to get cooled and become fit for life in any form. At some distant epoch, continents and oceans were formed, thus facilitating the rise of living creatures. Yet, the earliest examples of life must have been only in specks of living matter—some rude beginnings of Amoebæ.

Geologists have attempted to estimate the age of the earth and the beginnings of life by the study of the fossil remains contained in rocks. The period of the oldest rocks with no fossil remains—what is called the Archæan Period—need not have been an age of no life, as it is conceivable that the first forms of life might have arisen now. But, it is only in the next geologic period (the Primary Period), that an abundance of life confronts us. The

(7) Areas of curves: The area of a figure bounded by a curve (not a straight line) can be found out by dividing it into an infinitely large number of squares or triangles or rectangles each of these being infinitesimally small and adding the areas of these elements.

The area of a circle can be found out in this manner. Take two indefinitely near points on the circumference, so that the join of these points may for all practical purposes be taken as a st. line. Join these to the centre. Then a triangle is formed whose base is AB and altitude the radius r of the circle. The area is $\frac{1}{2} AB \times r$. If we divide the circle into such small triangles the sum of these triangles gives the area of the circle $= \frac{1}{2} r (AB + \dots) = \frac{1}{2} r \times \text{circumference} = \frac{1}{2} r \times 2\pi r = \pi r^2$.

(To be continued).

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world is marked by a rank and luxuriant vegetation and a prolific spread of marine animals and insects. Though there are, as yet, no birds, no mammals, or even flowers, progress is indicated in three ways:—(1) The animals and the plants have parted company and follow separate laws of existence. (2) So far, new life has had its rise from the breaking off of buds or of big pieces from the parent organism—a process, essentially wasteful. Now arises the division of the sexes, and the multiplication of life through special germ-cells. (3) We find also greater complexity in the organism seen in the development of the senses.

The next age (the Secondary Period) is marked by the rise of many of our modern trees and flowers, and also of reptiles in astonishing numbers—some like the *Dinosaurius* reaching a monstrous size. We meet also the first birds, and the beginnings of mammals in the marsupial family (e.g., the Kangaroo). The living creature has now become more and more master of its fate, with the rapid development of the muscular and the nervous systems. The struggle for existence must undoubtedly have been intensely ferocious and competitive, but we may be sure that it must also have had its gentler phases as in the rise of parental care and sympathetic responses.

The Tertiary Period (the next age) was a time of violent upheavals owing to the operation of the stupendous elemental forces of Nature. The old world was, in outline, blotted out, and the earth began to roughly assume its present geographical aspect with its central mountain range extending from the Rockies to the Himalayas. An unfortunate result was also the extinction of the old, monstrous forms of life; but, we find new

animals taking their place which are more like those of the present day. It is believed from the evidence of organic remains in the rocks, that the general climate of the world, during the earlier part of this age, was tropical and that it gradually cooled.

This fact, probably, explains the huge mantle of ice, which overspread the Northern Hemisphere and gave the name of the Glacial Age to the earlier part of the next geologic period. This period called the Quaternary Period is very important because of the first coming of Man, though there are evidences of human existence in the Tertiary Period. The migration of ice must have resulted in the extinction of various forms of life (e.g., the woolly *Rhinoceros*), the accentuation of the southward advance of the tropical and semi-tropical flora with the spread of Arctic forms of fauna and flora, and numerous changes in the landed surface. But, even before these extensive masses of ice melted away in course of time, Man appeared on the scene. It is interesting to find that, even in remote antiquity, he has been distinguished by his big brain and his upright gait, and recent evidence does not support the idea of there being a continuous progression of descent from an ape to a man. We have no means of judging his mental ability, but it should, undoubtedly, have been crude.

The earliest records of Man reveal only ignorant barbarism and blind subjection to the trammels of credulousness and silly superstitions. But, the march of events, which had ushered in the highest type of animal existence in Man, did not stop—leaving him only as a *primus inter pares* among animals. The wonderful tale of civilisation, with the

silent impetus of the great body of thinkers ever on the alert for improvement, slowly unfolds itself from the remote past. Evolution has moved always in accord with the universal principle of Nature urging growth from stage to stage and on and on, ever to higher steps. From a mere, unarmed helpless creature, Man has emerged into the position of the Dictator of the World—the one who controls and sets limits to both the Vegetable and the Animal Kingdoms, and even attempts to wield the inorganic forces of Nature for his own ends. Advancing civilisation has made the world smaller by annihilating all obstacles to easy intercourse. The mysterious forces of the world have been shackled to serve the purposes of Man. At the same time, progress has meant “the well-balanced movement of the whole human race towards a fuller realisation of what is noble and beautiful and true.” The advance-

in intellectual culture has been no less intense than in the region of material comforts. For, here, too, the march of Nature is “from chaos to order, from ignorance to truth, from ugliness to beauty, from sin to goodness.”

No attempt has been made in this essay to compare the relative merits of the stages of culture and civilisation obtaining among the various nations and tribes composing humanity. The object of the essay has only been to correct a certain pessimistic attitude towards the Present manifested by a large section of people in our country. While the debt of gratitude and reverence to the gallant band of our ancestors struggling from primeval darkness to light should not be withheld, an attempt to enthrone the Past as the ideal for the Present is fraught with incalculable danger to the world, in general, and to our country, in particular.

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MANUAL TRAINING.

MANUAL Training or Hand and Eye Training as it is otherwise called, is a subject which has been engaging the attention of all those interested in the problem of education and which is now sought to be introduced in the curriculum of school studies at the present day. An attempt is made in this paper to consider at some length the value and importance of this subject from a pedagogic point of view and also from the point of view of its utility as a preparation for the pupil's future career.

Training of the senses:—Every scheme of education, however soundly organised, depends for its success on a proper training of the senses. For, education from a psychological point of view, is only an interaction between the mental contents of the pupil and the objects of the external world. Ideas of such objects enter the mind in the form of sense-impressions and the sum-total of such impressions forms what is called the pupil's knowledge or experience. As one of the principal aims of education is instruction in useful knowledge, such knowledge can be imparted to pupils only by means of the senses, and unless the senses are properly trained they fail to discharge their functions satisfactorily thus rendering the imparting of sound knowledge practically impossible. There are hundreds of instances of pupils who have ears but do not hear, who have eyes but do not see and who have tongues but do not speak. All these evidently show a lamentable lack of training of the senses and of the powers of articulation. Anything that is kept out of use or not sufficiently exercised soon gets rusty and very often out of order. It has been said of a child brought

up in a house of dead silence that its sense of hearing gets deteriorated and gradually grows dull and powerless, while one who is accustomed to live in a house of darkness has his vision blurred. On the other hand, an acute hearing, a keen perception and the consciousness of a delicate touch are developed when the senses are subjected to a systematic course of training. It has been said of the American Red-Indian that he has so sharp a sense of hearing as to follow the sound of foot-steps of an approaching enemy even from a very great distance. We have all seen and heard of Ashtavathanees and Dasavathanees who hear, see, and do a number of things at the same time and not only their mental powers, but also their sense-organs have been so well and so carefully trained as to enable them to perform all these marvellous feats. It is also possible by a course of a skilful training for one sense-organ to discharge the functions of another with quite the same ease and accuracy. A well-trained eye, for example, can measure quite as accurately as the hand, while the hand can read quite as well as the eye. It is necessary, therefore, that as a first step in education the senses of the pupils should be trained to receive impressions properly. The Montessori system also lays great stress upon the education of the senses and the great doctor has devised a series of apparatus intended for the use of children of ages from 3½ to 7. Even in schools for adults the curriculum of the school course should include such objects as will afford every facility for the proper training of the senses.

Manual Training—Its aim:—Manual Training aims chiefly at the training of the hand and the eye; for they are the two, by means of which impressions are conveyed

more easily and more vividly into the mind than by others. Hence it is, the teacher employs them more freely in the earlier stages of instruction to render concrete, subjects that admit only of an abstract treatment. The Kindergarten method is based only on the principle of concretion and simple and elementary ideas are put into the child's mind in an easy and interesting manner. Manual Training aims only at extending the operation of this principle and applying it to a wider range of subjects.

A short description of the course:—Manual Training consists chiefly of wood and paper work though it also includes several allied subjects such as modelling in clay or wax, rattan work, metal work and also agriculture.

(a) Cutting and folding:—Cutting and folding are the first processes to be learnt by the pupils in the course. They are first taught how to hold and use the scissors. The teacher then takes up a piece of paper, cuts it in different ways and folds it into different shapes and sizes. The pupils observe them and begin to do the same themselves. They thus gain good ideas of many geometrical shapes such as triangles, squares and circles.

(b) Card-board work:—Card-board work forms the next higher stage in the course. Stiff cards are used instead of paper and the pupils are taught the use of the knife. The cuttings are now more difficult and demand greater physical effort. The pupils are also taught how to do pasting. In pasting the boys are to be very careful as models are likely to get soiled and dirty in the course of the work. As was said before, the teacher makes his own model first and sets it before the eyes of the pupils. He also draws figures on the blackboard showing the different

measurements to be adopted by the pupils in making the models. Some of the processes of construction are also indicated therein. Easy models such as trays, cups, pen and pencil cases are taken up at the beginning and more difficult models such as book-cases, bomban-boxes, letter-racks, toy-houses and toy-shops are taken up later. Coloured paper and coloured card-boards are also used to make the models more attractive which the pupils also like most.

(c) Wood work:—Wood work marks the advanced course in Manual Training. It is taken up only after the pupils have attained a certain degree of development; for it calls forth powers which a pupil of an unripe age cannot possibly supply. But no definite age can be fixed when the work can be taken up; for sometimes it so happens that what a pupil of certain age can accomplish with ease is found to be beyond the powers of one who is much older than he. The age may, however be roughly fixed at 12. The pupils are first told about the tools to be employed by them in making models, of which there are a good many, such as the saw, the plane and the chisel, etc. The teacher describes clearly the different parts of each tool and demonstrates its use practically. It is quite necessary that the pupils should be thoroughly familiarised with the use of the different tools as otherwise they cannot make models successfully. A wrong use of the tool, not only spoils the model but also hurts the pupil, while the tool itself may get damaged. The teacher also gives the pupils some idea about the quality of the wood or timber to be used. He tells them about seasoned wood and unseasoned wood, hard wood and soft wood and the liability of the wood to crack, shrink or warp in

the process of work. A knowledge of the kind and quality of wood is necessary as the pupils have in the later stages to choose the pieces of wood for their work themselves and when they choose bad wood they make only bad models. In practical work the first lessons are in sawing and planing wood to given dimensions. When the teacher is satisfied that the pupils have acquired sufficient skill in manipulation, he proceeds to teach them about joints. The pupils make easy models at the beginning, such as paper-weights, sitting-planks, dining-boards and coat-hangers. Then they attempt more difficult models, such as picture-frames, photo-frames, clock-stands, etc. From this they again proceed to more advanced work such as making boxes, trays, letter-racks, almirahs and tea-chests. In all these cases the teacher makes his own model and sets it as a pattern for the pupils to follow. He further renders them such help as may be absolutely necessary, but does not unduly interfere with their work either by explanation or by correction.

After this brief and general survey of the course, it is well to consider more fully the educative value of Manual Training from psychological and other points of view.

Manual Training from the point of view of modern psychologists:—Psychologists who have studied the child's mind tell us that each child is born with some instincts or exhibits certain impulses which it is always the business of the educator to direct and control by supplying it with suitable occupation. One of such impulses is the impulse to act. The child is supremely an active being and self-activity is a striking feature in the child's life. This spontaneous activity shows itself in its purest form in babyhood as mere physical motion such as running, jumping or throwing

a ball. But as the child gets older it combines it with some form of manual work and is often found engaged either in doing something or in destroying something. Even in the work it does, it only follows what it sees others doing. It sees, for instance, its mother at work at the kitchen-house or its father in the parlour and then imitates the action of both, thus exhibiting a new kind of impulse, *viz.*, the impulse to imitate. It does not however blindly imitate what others do, but always attempts to show some originality of its own either by changing the pattern or by adding some new features to it. Thereby it exhibits a new and a higher type of impulse, *viz.*, the impulse to create. Now Manual Training affords every facility for the healthy growth of these impulses. The latent physical energy stored up in the pupil finds free play when he is engaged in making a wooden model or any kind of manual work. In his attempt to adopt or follow the pattern set before his eyes by the teacher, the pupil exercises his imitative talent and also finds considerable scope for the display of his originality in the course of his work. The pupil has also an aesthetic sense which seeks development when he attempts to give an artistic form to his model.

Manual Training from the point of view of the old school of psychologists:—Psychologists of the old school believed in the faculty theory of the mind and, if according to them, faculties of memory, reasoning and imagination should exist in the mind distinctly as such, even these receive proper training when the pupil is engaged in manual work of some kind. For he frequently calls to mind the instructions given by his teacher regarding the use of tools or the work to which he applies them and thus exercises his memory. A right or wrong use of the tool often helps or

hinders his work and he finds out for himself how in a particular case a particular result is brought about. He has besides, a well-finished model before him which he regards as his ideal and always attempts to conform to that ideal by the care and trouble he takes. His imagination comes into play when he conceives of a new plan or a new design which he may well adopt in the work he has undertaken and tries to give an artistic finish to his work.

Manual Training from a cultural point of view:—The aim of education from a cultural point of view is to promote the growth of a perfect character by the harmonious development of the pupil's mental, moral and physical powers. Looked at from this standpoint manual training affords ample facilities for the promotion of such a character. How the pupils' mental powers are developed has already been dealt with. Habits of care, accuracy and neatness are also developed as the pupil always tries to make his model, as nearly as possible, an exact likeness of his pattern or an exact copy of what it ought to be, as indicated by the geometrical construction or complete drawing and given measurements. A feeling of self-reliance also arises and gains strength in the pupil as he learns to depend more upon himself and less upon the teacher who gives him no more help than what is absolutely necessary for the work on hand. A genuine love of work is also engendered in the pupil which gains in strength as the pupil's work reaches nearer and nearer to perfection. A feeling of respect for labour is also created and the pupil does not think it beneath his dignity to dust the table or clean the tools or set things in order which he has got to do as a duty, while under training. Besides, attention and application, patience and perseverance, truthfulness and obedience and other qualities that are developed in consequence react benefi-

cially upon the pupil's character. As regards physical development the very nature of work which the pupil does demands physical exertion and gives sufficient exercise to his body and limbs. Moreover the postures and movements recommended to be followed or adopted by the pupil while at work, are quite in conformity with hygienic principles and are fitted to cause an all-round physical development. It may well be stated that drill and gymnastics which are primarily intended to promote the health and strength of pupils do not give them that advantage to the same extent which manual training does, though only in an indirect way.

Manual Training and Dalton Plan:—The Dalton Plan recognises the principle that the child is a self-developing creature, influenced greatly by environment and circumstance. Hence it is, it aims at making the child free to develop itself and gain knowledge by its own individual effort. In manual training the same principle is recognised and followed and the pupil is left to work for himself unhampered by too much interference by the teacher. Consequently there is more of mental alertness and keenness displayed on the part of the pupil who feels himself capable of mastering any difficulty that may arise in the course of the work. The teacher following the Dalton Plan adopts individual teaching and the same is done by the manual training instructor. For, it is only in individual teaching the personal influence of the teacher reaches each individual pupil more fully and reacts upon him more powerfully. And as pupils differ greatly from one another in intellectual capacity and other respects, instruction, in order to be of the highest educative value must be adapted to each individual and this applies equally to all subjects of the school curriculum. But in the case of manual training subjects it is much more so, as here the pupils are engaged in practical work and want only

personal guidance from the teacher just as those who work under the Dalton Plan.

Manual occupation as a pursuit of recreation: Some of the subjects of the school curriculum are more intellectual in their nature and cause severe mental strain while others are more mechanical and demand only physical exertion on the part of the pupils. The humanitarian subjects and the natural and abstract sciences tax the mental powers of the pupils too much while drill and gymnastics and games involve only physical labour, the last giving pleasure also to the pupils. Hence it is, the latter are regarded as a happy change of employment to the mind affording great relief and are classed as recreation pursuits. Some writers on education include manual occupation also in this group of subjects because of the physical labour it involves and the pleasure it gives to the pupil, though the leaders of the Manual Training movement consider this position rather inferior, in view of the varied influences the occupation exerts upon the pupil. Regarded however only as a pursuit of recreation, it gives far greater pleasure than drill and gymnastics which are sometimes found to be dull and monotonous and the joy that is derived from the shaping and artistic production of a wooden model is far greater than that, if any, arising from the mere mechanical movements of the body. There are in fact some who cultivate and practise some kind of manual work, such as carpentry or gardening as a hobby which they continue even in after-life, though not for its usefulness, at least for the pleasure it gives.

Manual occupation in relation to other subjects of the school curriculum:—Manual occupation, apart from its importance as an intellectual pursuit or a pursuit of recreation, forms also a suitable aid to the teaching of other subjects. Correlation as a principle in pedagogy has often been much insisted upon and no subject offers greater facility for correlation

than manual occupation. The wooden or card-board models which the pupils make often serve to illustrate and impress upon their minds a geometrical truth or proposition. It has already been shown how the elementary processes of cutting and folding help to convey to the pupil's mind clear ideas of many geometrical shapes and figures. Lessons in Geography derive the greatest benefit from clay-modelling which is also a subject of manual occupation and models made by the pupils in clay convey to them vivid pictures of many interesting landscapes and land-formations. Drawing is so intimately connected with manual occupation that the one may be said to be a necessary complement of the other. It will also subserve the purposes of history if the pupils can be made to imitate some of the works of art or the things, in common use, of the ages which they study. Pupils, for example, who study the Tudor times may well imitate a box of the Elizabethan age or the beautiful ship *Rose*; and those who read about the Aboriginal tribes of India may imitate the model of a Toda Hut or of any of the rude weapons or implements used by them. In Physics the pupils may be asked to make some of the simple apparatus used to illustrate the principle of the lever, pulley, etc. An object lesson can be based on some of the finished models of pupils and composition (oral and written) can be taught with the help of the same. In fact the advantages that may be derived can be multiplied and the scope of its usefulness considerably extended, but it all depends upon the interest and willingness with which the teacher works himself and also seeks the co-operation of others.

Manual Training from a practical or utilitarian point of view:—It has been the cry for a long time that the present system of education is more literary and less practical than the needs of the country justify or require. The same view was expressed by the Government

of India as early as 1883 in one of their Resolutions on the subject of Technical Education and they emphasised the necessity of giving a more practical bias to general education and incited the Local Governments to take the necessary action in this direction. The Commission on Indian Constitutional Reforms held much the same view and said in their Report of 1918 that "India has been much handicapped by the want of professional and technical education." Mr. P. T. Srinivasa Aiyangar who presided over the last Provincial Educational Conference deplores the fact that the present day education is neither cultural nor vocational in its character. It is not cultural, because, he says it has led to a practical neglect of "the age-long literature of the pupils' mother-tongue" and the "entrancing history of their mother-land", while it aims at making fruitless attempts to implant on the Indian soil the exotic plant of Western culture. It is not vocational even in the strange sense in which he has used it inasmuch as the "market is glutted with a plethora of English-knowing men and the possession of English no longer means the certainty of earning at least Rs. 20 a month as it used once to be." Attempts are therefore being made in all quarters to revise the course of studies and to include within the school curriculum such subjects as are likely to give a practical bent to the minds of pupils and equip them for their future career. Among the many subjects which have been included in one or other of these courses manual training occupies a more prominent place. The Committee appointed to consider the applicability of the recommendations of the Calcutta University Commission has included Manual Training in wood-work, metal-work, gardening, and other similar occupations as a compulsory subject in the curriculum of the Middle School course. Even in the Headmasters' Conference which was held

in May 1923 resolutions were passed including Manual Training in the curriculum of the first two of the three courses of Secondary Education. It is no denying therefore that Manual Training is best fitted to give a practical bent to the minds of pupils in their early years and its principal aim, being the co-ordination of the work of the hand and the eye, the pupil learns to apply this principle in carpentry and other handicraft work in which he happens to be engaged. He also begins to show an aptitude for any particular kind of work or occupation which he may afterwards choose as his own vocation in life. In general while the pupil gains knowledge and culture more by sense-experience than intellection, the practice of one or other of these simple crafts sharpens his sense of perception and gives him a ready power of hand which he will always find useful in life whatever may be the profession he may have to enter.

There are, however, some who are not satisfied with the practical bias given to general education, but want to make education both general and vocational at the same time. They wish to tag vocational training classes to Secondary Schools and train pupils for as many occupations as it can possibly be done. The pupils, they say, should be made to work as carpenters, weavers and smiths and earn their livelihood even while they are learning at school. Their objects seem to be in fact, to convert every school into a workshop and every pupil an artisan. "This broad-and-butter-view of education" is gradually gaining acceptance, probably as a result of the keen economic pressure that is felt all over the country and the number of those who subscribe to this view is increasing day by day. Attempts are also being made to start institutions with combined courses for general and vocational training and the Ramakrishna Home at Madras is the first institu-

tion of the kind where the new scheme has been introduced and worked out with some degree of success. The Minister for Education and other distinguished persons who visited the institution have also expressed themselves to be much pleased with the types of work executed by the pupils. We cannot however generalise from a particular instance and it is still a serious question for consideration how far a scheme or course in vocational training can be made to fit in with a scheme of general education. Such a thing appears to be quite impossible unless some of the present subjects of the school curriculum which is already much over-loaded are dropped or the present school course is rendered lighter by the cutting down of the present syllabuses; while at the same time there is much room for apprehension that any tampering with the existing scheme may adversely affect the cultural side of education. This is indeed a much debated subject and opinions cannot be easily hazarded on either side; but so far as Manual Training is concerned it has always its place in a general education whether vocational training is made to form part and parcel of it or is kept distinct from it, and the advantages to be derived from it can always be had, though perhaps in a more effective way in the latter than in the former case.

Manual Training and State Aid:—Though much has been said about the importance of Manual Training as a subject of school instruction and though resolutions have been passed in many Conferences recommending its introduction in schools, still it is regrettable to observe that in many institutions it has not been introduced even on a modest scale. It is possible that in the case of some of these institutions the financial position may not be so strong as to enable them to incur the necessary expenditure that may be caused thereby. At a rough estimate the build-

ing, furniture and tools necessary for starting the course would involve an initial outlay of about Rs. 1,000 and the supply of stationery, timber and other materials necessary for use during the course as well as the payment of the Manual Training Instructor would cause a recurring expenditure of at least Rs. 100 a month. If any institution cannot meet the expenditure itself, it is necessary and reasonable that the Government should come to its aid and encourage it to start the course, by making a substantial grant specially for this purpose. It is generally the Government that takes the initiative in starting or helping to start schemes likely to promote the interests of the public and the Government is already spending a good deal on education and other matters the beneficial results of which are far remote. It is no denying that any special grant given by the Government to encourage Manual Training in schools will amply repay the expenditure incurred on that account. The Government cannot, however, introduce Manual Training in schools by means of grant alone. Manual Training Instructors are necessary for conducting classes in schools where the course is introduced and they ought first to open schools for training such instructors in different subjects in different centres. The instructors should not be mere artisans, but real teachers capable of giving instruction to pupils according to strict psychological methods. The Government should also organise periodical exhibitions at convenient centres where the best types of work executed by the pupils of the different schools may be exhibited, and prizes awarded for the best of them as an incentive to pupils to work with greater interest and gain more improvement by the course.

Manual Training and Parental Co-operation:—Just as the support and aid of the

Government are necessary on the one hand for introducing Manual Training in schools, the sympathy and co-operation of the parents are necessary on the other for a satisfactory progress of the course. For, the majority of pupils going to schools are partly under the control of the teacher and partly of the parents and it so happens that in many instances, the parent has not the same training, mental outlook and fore-sight into the future of the pupils as the teacher has. Unless, therefore, the parents and the teacher see eye to eye, think and act together, smooth and satisfactory progress is not possible and success is always uncertain. The progress of the Scout Movement, for example, of which so much has been said, is not after all so satisfactory as it ought to be, because it has not enlisted the full sympathy and support of the parent population, many of whom are yet to know the wholesome influences which a course of Scout Training has, in the building-up of the character of the children. As regards Manual Training there are many who have not yet familiarised themselves with the aims and objects of this useful course and many there are, who do not know or do not care to know why the pupils are made to work in paper, wood and clay and how the work they do will enable them to understand the principles better. It is true that some of these men, perhaps of a more passive type, think it to be a forbidden province, the mysteries of which they are not competent to inquire into, while others though capable of assuming a defiant attitude, still tolerate the manufacture of these toys and tinsels on the part of their children out of mere courtesy and regard to the pupils' revered teachers. It is indeed very precarious, if not quite dangerous, both for the

teacher and the pupil, to work under these hard conditions and it is highly necessary therefore that steps should be taken for keeping parents well informed of the purpose and aim of Manual Training before the same can be successfully introduced in schools.

Conclusion:—The subject of Manual Training has now been considered though only in a modest way in all its possible aspects and some of the means for the successful introduction of the same in schools have also been suggested. It is only hoped that those entrusted with the welfare and management of institutions will see their way to the early introduction of this useful subject in their schools if the same has not already been done. And we, teachers who are entrusted with the pleasant, though onerous, task of nurturing the growth of the young minds committed to our care, will ever be ready to sow the seeds of knowledge in them and shall, like all good and honest workmen, labour hard till we are able "to taste its fruitage pure."

V. K. RAJAGOPALA IYER.

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THE BANGALORE SCIENCE CONGRESS—1924.

(IMPRESSIONS BY "A DELEGATE.")

IN this country where Conferences and Congresses, mostly All-India in character and not necessarily annual, are steadily increasing to a bewildering number, it augurs well for the future of scientific research in India that scientists scattered all over this vast continent have begun to recognize in larger numbers the Indian Science Congress as a great annual event, affording them ample and invaluable opportunities to get in touch with workers on allied subjects. Membership this year is the highest on record, members of all classes totalling 429. It is curious that student members outnumber the associates, who form about half the number of full-members.

It was in the fitness of things that Bangalore with its Indian Institute of Science, the pioneer Research institution of its kind in India, and the well-equipped Science Laboratories of the young Mysore University should have the honour of welcoming for the second time, the august assembly of Indian scientists. It was indeed a disappointment that Sir Asutosh Mukerjee, "scholar, educationist, administrator, one of the foremost personalities of India to-day," was prevented by the state of his health from presiding over the deliberations of the Congress. Dr. Annandale, who has since been elected a Fellow of the Royal Society, was chosen in his place. Being a scientist—he is a distinguished zoologist and ethnologist having obtained his Doctorate of Science for his classic thesis on Magic—his presidential address was on a scientific subject "Convergent and Divergent Evolution." In spite of a profusion of lantern-slides which accompanied the lecture the subject was certainly too technical—he read another paper

on the same subject, in the zoological section later—for an audience none too selective and which included not a few who paid merely to see the Conference open. The address was received with obvious dissatisfaction except at the conclusion when he wound up with an exhortation to young Indians with foreign training not to despise and ignore the work done in their own country but to form an indigenous School of Zoology which would make full use of the opportunities held out here to study scientific natural history.

A record number of papers (268) was submitted this year, Chemistry appropriating 63, and Mathematics and Physics 57. Our Presidency unlike in former years was not so much to the fore. A great proportion of the papers was of purely academic interest though there were many of great practical value. It was as it were nature's warning to abandon the tendency to become academic and pedantic that while H.H. the Maharaja's welcome speech was read, exactly at the point of reference to the results of the mingling of pure science and industrial research, the electric lights in the hall suddenly went out!

In the Agricultural section there were 26 papers, 9 of which were from Madras. India being essentially an agricultural country there is no doubt that the valuable papers on cotton, the most important industrial plant in India—its future was the theme of the presidential address of Mr. Bart—cattle-breeding, manures, etc., contribute substantially to her material improvement. Jaggery and sugar-cane were other industries dealt with. Mr. Ramakrishna Iyer's valuable suggestions to the market-gardener in checking insect pests should be

translated into all vernaculars and distributed free to all agriculturists by Government, if they should serve the purpose intended for. 43 papers were submitted in the Botany section, Madras claiming 12 for its share. Dr. Agarkar, the famous explorer of Nepal, selected for his address the Study of Plant Sociology. In spite of its bearing on practical forestry and agriculture, the subject while of absorbing interest to the specialist, failed, it must be confessed, to rouse the interest of the most scientifically inclined layman. The titles of the papers were very varied, Anatomy, Morphology, Leaf-fall, etc. There were however only 2 concerning plant diseases. One of these dealt with the spike disease in sandal and unfortunately for the author, Mr. Jivanna Rao of the Madras Agricultural Department, the President allowed it to be read only in parts, mutilated and condensed—whether it was because Mr. Rao's conclusions contradicted those of some local authorities or because his experiments were unsatisfactory and inconclusive or because somehow he had offended the tin-gods who were running the show—it was not known and the paper had to be published almost in *extenso* in a daily. This and other things lead one to the conclusion that the Sectional Committees do not exercise their judgment properly in admitting papers. If shortness of time is the excuse, the last day for sending the papers may be advanced a month or two earlier.

In the section of Mathematics and Physics presided over by Dr. Raman, who has since been elected a Fellow of the Royal Society, of the 57 papers submitted 25 were from Madras. In the interesting presidential address on Matter and Radiation, delivered in his usual and inimitable popular manner

he proved that the study of Physics included all interesting topics under the sun, so as to make a research chemist present to declare then and there his intention to abandon the study of obnoxious gases in favour of Physics! Besides many papers of absorbing scientific interest and some novel statistical studies for which some Madrasis distinguished in the educational world, were responsible, there was a joint discussion, a unique feature of the Congress, of the sections of Agriculture, Chemistry, Mathematics and Physics, and Medical Research on the "Role of Surface Forces."

In the Chemistry section presided over by Dr. Watson of the Cawnpore Research Institute, 63 papers were submitted of which 29 were by Madrasis. The presidential address dealt with the question of organisation, direction and stimulation of Chemical Research and pleaded for a greater contact between manufacturers and workers in Applied Chemistry who should tackle not merely problems of local interest. A large proportion of the papers emanated from the Tata Institute and most of these related to Bio-Chemistry dealing with agriculture, power-alcohol and lac industry. It was indeed a pity that when the session broke up, a jarring note was struck by a delegate at the 'Vote of Thanks' time who gave vehement expression to the divergence between the lip encouragement of chemical research in this country and the snubs administered to enthusiastic beginners in the Congress when reading the results of their honest work there.

The President of the Zoology Section Dr. Bahl being unavoidably absent, Dr. Gravely of the Madras Museum, read Bahl's address and presided over the meetings. Of the 30

papers received 11 were by Madras. Apart from the scientific value of the papers read, whose titles were, in the words of a delegate, enough to frighten any scientifically inclined layman out of all enthusiasm for Zoology, an important resolution was passed on the suggestion of Dr. Bahl regarding the early opening of a Biological station with facilities for research. The Botanists who were consulted on the matter fell in readily with the scheme and are keen on obtaining Krusadai Island which is now in possession of the Madras Fisheries and which has a rich algal flora. Dr. Annandale however preferred Karachi for Zoological Research. By circularising various Universities and Local Governments and Indian States, it is hoped that something tangible will come out of this resolution in the near future. The President was uniformly courteous to all readers of papers though frequent interruptions were experienced by all, beginners and others, at the hands of Dr. Annandale who apparently clean forgot his declaration, made earlier, of promoting Indian research.

The section of Medical Research was poorly represented both in the number of delegates and of papers. Lt.-Col. Christophers of the Kasauli Institute, the President, spoke on medical research and epidemic diseases in India and two of his remedies for reducing the death-rate are town-planning and increase of home-grown food supply by scientific agriculture.

India's mineral resources though of great value have not yet been developed and it is disheartening to find little or no interest evinced in the Congress by geologists in India. 18 papers of which 7 were from Madras were submitted besides the presidential address delivered by Dr. Smeeth of the Geological Survey of India.

The section of Anthropology is the only one which can really claim to be highly interest-

ing to the general public. Of the 28 papers received 12 were from Madras. The President, Rao Bahadur L. K. Ananthakrishna Iyer, who as Curator, Cochin Museum, published a classic monograph on the castes and tribes of Cochin, described in his address the evolution of dress, food, habitation, implements, language and customs of the primitive tribes of South India—later there was also a lantern lecture on these tribes. Mr. Cammiade, the Chief Presidency Magistrate, with his pigmy implements from Godavari, was fortunate in securing a large audience, as his followed the presidential address. Other interesting papers on the Kurumbas, the Theravans, the Muthuvans, the Bhils, and the Baigas deserved a larger audience. A paper on the folklore about crabs was very entertaining. Dr. Modi's papers on the Sati, nudity spells, etc., were read by Mr. Roy of 'Man of India' in the absence of the veteran Parsi anthropologist. Mr. Richards, I.C.S., read 3 well-written papers on Indian pottery, anthropological geography and anthropology at the Cross Roads. The last was followed by a paper on 'The Future of Ethnographic Research in India, by the Mysore Anthropologist, Mr. C.H. Rao, and one on 'Ethnographic Museum and Study of Ethnography,' by the President. As a result of the discussion and in spite of Dr. Annandale's advice that the young Indian anthropologist should be restrained and not encouraged, it was proposed to start a branch of the Royal Anthropological Institute at Madras early, as it was obvious that data should be collected soon, India fast ceasing to be the anthropological museum it once was. Mr. Richards' efforts have already materialised and an influential Madras Committee with Mr. T. V. Seshagiri Iyer as President and Mr. K. Rangachari as

Secretary have started work quite in earnest.

The mornings being taken up with the scientific business, the local Secretaries, ever alive to the various needs of the delegates, had arranged excursions, short or full-day, to places of interest in and around Bangalore. The Hebbal Farm where Agricultural and Dairying operations are carried on, the Sandalwood Oil Factory which distills annually oil worth 30 lakhs of rupees, the Jewel Filters through which water supplied to the City passes, the Military Dairy Farm with its fine cattle and up-to-date machinery for extracting dairy products, the A Transformer Station which after receiving the high tension lines from the Cauvery Power Station at Sivan-samudram distributes the energy to various parts of the City, the Minto Ophthalmic Hospital and Victoria Hospital were the places seen.

Tea parties were also much in evidence, some exclusive, e.g., the Maharashtra Union 'At Home' of Monday, and the South Indian Science Association 'At Home' of Saturday, and others not. The Vice-Chancellor of the Mysore University was 'At Home' to the delegates on Friday at the Observatory Gardens. On Wednesday evening the delegates were shown round the various departments of the Indian Institute of Science, the Director and Council of which were 'At Home' to the delegates.

Full day excursions were arranged to Sivan-samudram, Krishnarajasagara, Mysore City and Kolar Gold Fields. The K. G. F. Europeans had a welcome and a dinner party for the European delegates and the Indian visitors were left to manage as best as they could. Baba Doodle of the Madras Punch, says:

"The great subject of controversy at the Indian Science Congress was 'Why should not Indian Scientists be allowed to eat with European delegates.' The scientists came to an agreement and the Indian and European scientists ate together. Thus a keen scientific controversy ended." There were also popular public lectures on scientific subjects, e.g., White-ant Hills by Dr. Annandale, Fossil Plants by Dr. Sahani, Sun by Dr. Royds, Whispering Galleries, Soap Bubbles, etc., by Dr. Raman, whose lectures were, while being educative, most entertaining and humorous.

Judging from the fact that almost all delegates are Government servants, one may conclude that the Congress is a recognised institution of the Government. It owes its existence to the Asiatic Society of Bengal, and Government will do well to depute all officers who could advantageously be sent to the Congress. Many of the Madras Government departments are sinners in this respect. Some members with papers to read were not allowed to attend merely because they belonged to the cursed non-gazetted ranks. Some were sent on duty while some were given permission to attend with the travelling allowance restricted to a single 2nd class fare or double 3rd. Bangalore being in our Presidency the travelling allowance could not be so considerable as to outweigh the advantages of attendance. A week's absence could easily be arranged for. The Madras Industries Department in spite of its being manned by many scientific officers was very sparsely represented at the Congress. The small number of delegates and papers of the Medical Research Section, a subject of paramount importance to the country, points to the glaring neglect of the Congress by the Government. It is hoped that in the future at least, in these days of Reforms when public health, education, industries, etc., are transferred subjects, Government would do more to make the Indian Science Congress as worthy an organisation as the British Association for the Advancement of Science.

TEACHERS AND PRIVATE TUITION.

By MR. M. V. RAMAKRISHNAN, M.A., L.T.

IT is common knowledge that many teachers engage themselves in their leisure hours as private tutors to two or more boys. It has been recognised that the activity of the teacher in this direction is detrimental to good work in the school in which he is employed, let alone the scant courtesy and regard he receives at the hands of his boys. This contagion of taking up private tuition has spread to the members of the College staff, though not to such a great extent as it obtains with the members of the staff of a High School. It is the purpose of the present writer to discuss the merits and demerits of teachers taking to private tuition; and to call for the opinions of teachers in regard to this question.

A teacher employed in an institution is a full-time servant of the institution, and as such, the manager of the institution has every right to demand of the teacher his full time for the work of the school. Till recently the managers of certain institutions refused to allow their teachers to hold any private tuition, but later on the rule was relaxed, allowing the teachers getting a salary of less than Rs. 60 per mensem to take up private tuition and enjoining on teachers getting more than Rs. 60 per mensem, to get the permission of the management before taking up such work. Now there is no rule forbidding teachers of schools to take up private tuition; and if the management of a school has such a rule, permission is freely granted to higher grade teachers to have private tuition. It is not the intention of the present writer to condemn the action of the managements relaxing the rigidity of the rule; but what the present writer

aims at is that the teacher himself—at least one of the higher grade—should have nothing to do with private tuition, whether there be a rule forbidding him or not. The teacher may be left to his good sense.

Now, why should teachers seek private tuition at all? The teaching profession is poorly paid, and no wonder its members seek some extra work to supplement their income. People in affluent circumstances do not take up this profession, but only such as are in needy circumstances. The first step, therefore, that is to be taken to let the teachers devote their whole time to school work is the all-round increase of their salaries. The educational system of the country is the very last that a wise national economy would curtail. You could not reduce the pay of the teachers without indirectly affecting the quality of the teaching. In other words, you cannot hit the teacher without hitting the child. Therefore, every effort should be made by managers of schools to make their school work efficient, and this can be done only by supplying their teachers the usual wants of mankind.

A good teacher is one who is also a learner. He should be in constant touch with the outside world; he should acquaint himself thoroughly with up-to-date knowledge; he should watch the development of knowledge from year to year, and keep himself informed of the latest phases of such development. To do this he must get good journals—foreign and Indian—and in this direction the management should help him by itself subscribing for journals. His school work over, a teacher should prepare his lessons for the next day or should be engaged in the development of knowledge or assist in its development. To engage himself

in his leisure hours to private tuition for a few rupees is to miss the true mission of a teacher.

The present writer has often observed that the respect of the pupil towards the teacher who takes up private tuition is quite different from that towards one who holds no private tuition. If the teacher happens to be the tutor to a boy of the school in which he is employed—and this is almost always the case—the boys will always be attributing motives to the teacher for every action of his. This tendency on the part of the boys leads to indiscipline in the class and the scant respect shown to the teacher. It is therefore best to avoid giving room for the boys to think wrongly of the teacher.

Yet another reason. The tutor being a servant of an institution and of a private individual is naturally desirous of pleasing both his masters. Just as the results in the Public Examination are taken by the management of the school as a mark of the efficiency of the teaching, the success of the tuition boy marks the efforts taken by the tutor to teach him. If the tuition boy fares badly in the examination the fault is attributed by the guardian to the tutor. And usually we meet with dull boys and tutors, and not bright boys and tutors.

Again the boy works all day in the school under the guidance of the teacher; and he must be allowed to think for himself of the work done by him. Outside the school, if there is the tutor, where is the opportunity given to the boy to think for himself and work independently of his teacher? In many instances, even the boy's home-work has to be done by the teacher. Such a state of affairs is very bad for the boy; and cannot the teacher see that he should not be responsible for it?

Private tuition should, therefore, be never taken up by teachers employed in schools. Their leisure hours may be spent in the development of human knowledge, and such development is not possible if their leisure hours are taken away by a rich parent for his dull boy. It is also urged that managers of schools should increase the salaries of their teachers, and thus prevent them from taking up private tuition to add to their poor income.

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PRIMARY EDUCATION AND THE PROBLEM OF ILLITERACY.

"There is no darkness but ignorance.—Shakespeare.

ACCORDING to the Census of 1921, the population of the Madras Presidency is 42,794,155, of whom 39,126,418 are illiterate, i.e., about 92 per cent. of the people are not in a position to read and write their own mother-tongue. It is admitted on all hands that "to send an uneducated child into the world is injurious to the rest of mankind," and various attempts are being made by different agencies, such as the Government, Local Boards, Missionary Bodies, Philanthropic Societies, etc., for the speedy removal of illiteracy from the country, and large sums of money are spent year after year for the purpose. But the results achieved so far cannot but be considered disappointing; for, on an average there is an increase of only one per cent. in the number of literate persons for every decade, as shown below:

CENSUS	LITERATE PER 100
1901	6.8
1911	7.5
1921	8.5

If literacy is to advance at this rate, when are our teeming masses to be educated and when are we to rise to the level of other enlightened nations? The problem is a difficult one but we have to face it boldly, thrash it out thoroughly, and arrive at a satisfactory solution speedily, if we really care for the interest of the country. It is with this object I venture to offer a few suggestions that may be of some practical help to those engaged in the field of Elementary Education. Let us therefore consider *in seriatim* :—

* The tragedy and the urgency of the situation will be better realised if the following figures are studied :—

CENSUS	POPULATION	LITERATE	ILLITERATE
1901	38,052,558	2,436,743	36,216,815
1911	41,870,160	3,130,205	38,739,910
1921	42,794,155	3,667,787	39,126,418

In the twenty years the population has added to itself nearly three million illiterates, five-sixths of the entire number literate to-day, a labour of 100 years!—EDITOR.

I. The various obstacles in the way of Elementary Education.

II. Why the steps already taken have not shown any appreciable improvement in the matter of literacy.

III. Whether any scheme better suited to the existing conditions of the country can be propounded.

I. The chief obstacles are:

(1) *Indifference* on the part of a section of the people, especially the poor. They do not care either for literacy or for "civilization" or for reforms in Government. All that they want is their daily bread, and when they get it they are satisfied.

(2) *Dislike* on the part of another section of the people—especially the cultivators and the craftsmen. They consider the present system of Elementary education as unpractical and tending to estrange their children from their hereditary occupation without at the same time training them for anything better.

(3) *Opposition* from a third section, especially the richer and the socially "higher" classes. They are afraid that the education of the depressed and the poorer classes will result in dislocation of social customs and disorganization of the existing labour system.

(4) *Poverty* on the part of the teachers. The bulk of the Elementary school teachers are poor. Their income is disgracefully low, and in several cases much lower than the wages of an ordinary cooly. Very often they run into debt, or get entangled in litigation, or try to increase their income from questionable sources, to the neglect of course of their legitimate work. What zeal and enthusiasm can be expected from teachers of this type?

(5) *Unsuitable Curriculum*. Villagers, as a rule, question the efficacy of the scheme of studies followed in recognized Elementary schools. What they usually want is indigenous arithmetic, recitation of familiar poetical pieces from standard authors, singing of popular songs to appropriate

ragas, reading and writing of manuscripts with recognized local abbreviations, a fair knowledge of astronomical and astrological terms used in ordinary almanacs, etc., and in some cases a smattering of English. As these subjects are not given prominence in recognized schools, they prefer to send their children to *piat* schools, even on payment of higher rates of fees.

(6) *Faulty Methods* of teaching. The methods generally followed in Elementary schools, especially in the lowest class, are not only unscientific and uninteresting, but also have a tendency to lengthen unnecessarily the initial stage; consequently, it becomes a laborious task and takes about five years for a pupil to learn to read and write the mother-tongue fairly well. But it is an undeniable fact that the majority of the villagers who are agriculturists and day labourers are not in a position to send their children to school regularly and consecutively for such a long period. Some of them who are anxious to educate their children do actually send them to school for a few months, but when they find the progress disappointing they get disheartened and stop them. This is the main reason why a large number of children leave school after a short stay even without learning the alphabet. The attendance register of any village school will show clearly that, as a rule, pupils are regular during the first six months. But as this precious period is generally wasted in Elementary schools, more than 50 per cent. stop away before the end of the year.

(7) *Unfavourable Rules*. The rules prescribed for recognition and aid in regard to accommodation, equipment, staff, registers, school fees, syllabus, time-table, etc., are considered as an infliction and a worry by a large number of village teachers. In fact, they are more honoured in the breach than in the observance, and consequently the tone and discipline of Elementary schools are at a low ebb.

II. It seems, therefore, necessary that before launching out any scheme, the above seven obstacles should be taken into consideration and ways and means found to overcome them.

Let us now consider how far the scheme of *Compulsory Education*, which has recently been sanctioned by the Madras Government, is likely to overcome these obstacles and improve Elementary education. The Elementary Education Act of 1920 makes provision for the levy of an education tax by Local Authorities, and contemplates free and compulsory education for all children between 6 and 11 years of age, with certain exceptions. The rules framed under the Act prescribe for each child compulsory attendance at school for four hours a day. If the people, especially the high caste and the well-to-do, would co-operate with Government, as in other countries, this could easily be done. In Christian countries the earnest desire on the part of the people that everyone, whether rich or poor, should learn to read the Scriptures seems to be one of the most powerful factors that contribute largely to the success of compulsory education. But it is this *desire* for literacy that is wanting in our country. At the same time, existing conditions do not seem to show that the opposition of the classes and the indifference of the masses are likely to disappear in the near future. The richer classes care more for cheap labour than for mass education, while the poorer classes are afraid of incurring the displeasure of the rich. Further, neither education, nor religion, nor travel, has succeeded in eradicating, to any appreciable extent, the sentiment of caste, which is the most deeply-rooted and the most pernicious characteristic of the Hindu mind, and which is perhaps at the present moment more rigorously observed by the lower classes than by the higher. It is not uncommon that when a Paraya teacher is sent to a Palla school, the Pallas stop their children; a Valluva teacher would not enter a Paracheri and call the children to school, nor would he handle the duster touched by a Paraya child. As the Hon'ble Sir A. P. Patro once said, "Unless an awakening is created in the country and a desire is really felt by the people, the action of Government will not bear fruit."

In these days of retrenchment the question of finance cannot easily be set aside. But even supposing that the money required for compulsory education is raised by extra taxation, and all the children between 6 and 11 years of age are put in

school, there are yet a number of other questions to be solved. How are we to arrange for the work which is now done by these youngsters, grazing cattle, collecting manure, looking after babies, etc.? "A child's work is equal to eight adults' work," is a Tamil proverb. Do not the children generally become unfit or rather disinclined to do such kind of work after leaving the school? What guarantee is there that at the end of their school life they will all be literate and still the bulk of them follow their hereditary profession of agriculture, the main prop of the country? The Elementary Education Act requires only compulsory attendance, and not compulsory literacy. And we know how the majority of the present-day teachers, who are a body of discontented men, work in village schools, and how pupils are kept in the same standard for years together. In schools intended for the depressed classes children are generally kept in the first standard from two to six years! One has, therefore, to consider seriously whether the scheme is not likely to dislocate labour, and affect agriculture and other allied industries.

It is suggested by the Indian Fiscal Commission that the Primary school curriculum should include some form of manual training, and that the educational system should be devoted far more than at present to the awakening of an interest in mechanical pursuits. But in this country, where the bulk of the population live directly or indirectly on agriculture, it seems neither practicable nor desirable to give a distinctly industrial turn to the education imparted in village schools. Further, industrial schools and manual training classes may turn out a number of amateurs, but they can hardly produce real workmen who could follow up the industries as their profession in life. Such men naturally find it difficult to compete with those trained in workshops run on commercial lines; the apprentice course in a large workshop is quite different from the technical course in a small school. As a rule, one who comes out of a technical school expects a ready-made appointment on a decent salary, with a good number of holidays and leisure hours, and when such privileges are denied in regular workshops he gets discontented.

Some European missionaries are under the impression that the illiteracy of our country is due to the difficult and cumbrous nature of the vernacular alphabet, and they have devised a set of new symbols to simplify the alphabet. So far as the Tamil language is concerned, the assumption of the missionaries is unwarranted. The Tamil alphabet, when compared with English, is more scientific, more rational, more phonetic, and much easier to learn. It has only 40 symbols, and if taught on right lines according to the method indicated in my *Tamil First Book** and *Hints to Teachers*,* any one, whether man or woman, boy or girl, will be able to read an ordinary newspaper and write an ordinary letter fairly well within three or four months by attending school for about an hour or two a day. In fact, some time ago, a batch of young men were actually taught to read and write fairly well within a month by devoting an hour a day, and this was demonstrated to some of my friends at Trichinopoly. The proposal to introduce a new system of alphabet for Tamil will create fresh difficulties in regard to the training of teachers, re-writing and re-printing of the existing books in the new script, teaching the new system to the already literate, etc., and will finally result in adding a new script to the existing scripts. If it is argued that the proposed alphabet will serve as a common script for all the Indian languages, then the question arises—Why should there be a common script for the Indian languages only, and why not for all the languages in the world? The International Phonetic Association have already tackled the question, and their phonetic script has been accepted and adopted throughout the civilized world. If ever a common script for all the languages is to come out it must evolve from the International Phonetic Script. The phonetic symbols for the sounds occurring in Tamil are given in page ix of my *First Steps in Tamil*. They will not in any way be helpful to a Tamilian to learn easily to read his mother-tongue, though they may be of immense help to a foreigner to learn the correct pronunciation of Tamil words.

III. From the foregoing remarks it will be evident that any scheme which is likely to disorganize

* Q. L. S., Memorial Hall, Madras.

the existing labour conditions and affect the immediate interests of the people in general, and the rich Mirasidars in particular, is sure to meet with opposition and end in failure. It seems, therefore, necessary that the scheme should be such as to create confidence in the minds of the people that literacy will not in any way dislocate labour nor put them to any financial or other material loss, but will on the other hand be a powerful means of increasing their wealth, health and prosperity! With a view to help those who wish to work out such a scheme, I venture to offer the following suggestions:—

(1) If rural education is not to interfere with agricultural operations, then the best course is to commence school immediately after the paddy harvest, say in February, and finish the first session within the succeeding five months before the monsoon sets in. Villagers have generally light work during that period. But it is also a fact that the bulk of them are not in a position to attend school the whole day. Therefore during that season school may be held for 2½ hours a day, at any time according to the convenience of the people, and this may be divided into three periods of 45 minutes each—one period for reading, another for writing, and the third for local arithmetic. Within these five months it should be possible to teach every pupil to read and write the mother-tongue fairly well. This is a very important point to be borne in mind, and I am of humble opinion that in the case of the Tamil language this can easily be done, if it is taught according to the method indicated in my *Tamil First Book*.

(2) As the villagers have generally heavy work during the remaining seven months of the year, it seems desirable to have school only for about an hour a day, preferably in the night. During that period, the first day may be devoted to reading, the second day to writing, and the third to local arithmetic and so on. This arrangement will not only keep them in touch with the school, but will also prevent them from forgetting what they learnt during the previous session.

(3) For the present, it seems desirable to confine the curriculum of village schools to the 3 R's.

only. Whatever general knowledge that may be necessary for villagers regarding agriculture, industries, cattle-breeding, commerce, co-operation, hygiene, sanitation, temperance, civics, good manners, etc., should be included in the reading lessons. It is not advantageous to teach these as separate subjects. Indigenous arithmetic should also be included in the curriculum and given prominence in village schools.

(4) There should be no hard and fast rule regarding accommodation, furniture, apparatus and appliances, professional qualifications of teachers, levy of fees, etc. Village schools may be allowed to be held anywhere, even in a pial or under the shade of a tree, to have their own rates of fees, either in cash or in kind, and to be taught by any teacher, whether trained or untrained, according to any method with or without apparatus. Every teacher should also be given full assurance that if he works with earnestness and zeal he will get a decent lump grant from Government at the end of every year. The relaxation of the rules regarding recognition and aid and the reintroduction of payment of grants by results may be necessary till the percentage of literate persons comes up to at least 25. If village schools are conducted on these lines teachers will not only have more freedom, but will also have more time at their disposal to do any extra work necessary to keep above want.

(5) For conducting the examination of the pupils of village schools no separate Government inspecting agency seems necessary. For each taluk there may be a small Examination Board, consisting of a few members appointed by each District Educational Council, somewhat on the lines of the old Primary Examination Board, but on a much simpler scale, and they may be allowed a remuneration for doing the work. The present five years' Elementary School Course may be reduced to three, and the examination may be a simple one in three grades and may be confined to reading, recitation, composition, subject-matter of the readers and arithmetic only. The final or third year pupils may also be granted "Elementary School Leaving Certificates" by the Chairman of the Examining Body immediately after the examination. Grants may be paid to the teachers on the results system. Pupils who want to prosecute their studies beyond the Elementary course may be sent to Middle schools, which may, if necessary, be reorganized to suit altered conditions.

(6) With a view to prevent the literate from relapsing into illiteracy, village schools should be encouraged to open libraries and reading rooms, and to have periodic classes, weekly bazaris, etc.

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In Christian villages every church may be supplied with copies of the Bible, Prayer Book, Lyrics, etc., for the use of the congregation, and arrangements made for the conduct of daily services in the church by one of the leading members.

(7) It is also desirable to have a rural education committee for each village or group of villages, with a view to study the needs of each particular locality and to induce the people to send their children regularly to school.

It is suggested that District Educational Councils and Managers of Elementary Schools may give this scheme a fair trial in a few select villages for about a year, and if found successful to extend it gradually to other villages.

In conclusion, I wish to say that I shall consider it a privilege and a pleasure to give practical instruction to the teachers and others interested in rural education, and demonstrate to them the method by which ordinary villagers could be taught to read and write the Tamil language fairly well within three or four months.—Mr. S. G. DANIEL in *The Young Men of India*, April, 1924.

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TEACHERS' ASSOCIATION, TIRUPATI.

At a meeting of the D.H.S. Teachers' Association, Tirupati, held recently, it was resolved that the following subjects be discussed at the ensuing Conference:—

I. 1. Indian History and Geography be included in the "A" Group.

2. The marking system in the IVth and Vth Forms be done away with.

3. Presidency average or 40 per cent. whichever is less, to be the minimum for eligibility in English and "O" Group subjects.

4. Practical Examinations in Science subjects be dispensed with as this can be tested in the Theory paper itself.

5. Examinations in Typewriting and Shorthand at S.S.L.C. Public Examination be held on two different days, as much inconvenience is felt by the candidates who have to sit for about seven hours at a stretch according to the present time-table and they shall be treated as separate optionals.

6. Commercial Practice and Geography may be made as two optionals—(1) Commercial Practice, and (2) Commercial Geography.

7. In Book-Keeping and Commercial Arithmetic the latter may be deleted as the former alone covers a very large portion to be done.

8. Commercial Arithmetic may be included in Elementary Mathematics and Graphs may be entirely dispensed with.

II. Resolved that not less than 50 per cent. of the seats in the District Secondary Education Board be thrown open to election by the teachers of all Secondary Schools including the Board, Municipal and Government Schools.

III. Resolved that the Government be requested to dispense with the costly Inspectorate and to appoint a rolling commission of experts in various subjects to give model lessons and lectures and do such other constructive work.

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NATIONAL EDUCATION

By Mr. D. N. SEN, M.A., I. E. S.,
Principal, B. N. College, Bankipur.

I. Education—the most important problem all the world over.

The struggle for existence is as keen and cruel among the nations as in nature. The stronger nations, particularly those that have well-developed 'mailed fists,' are not slow in backing up by their armaments the advantages which they possess in the world-competition. The fight for food and shelter is as keen and relentless among them as it is among the lower orders of life. Only think of the long suckers which have been thrown out by them for exploring the richest soils in all the parts of the world and how strenuously and persistently they are trying to force them deep into the strata they have struck. And in order to equip themselves with the necessary knowledge and power, they have built up elaborate educational systems to make them fit for the battle of life. Whatever we do we do without much knowledge and in a languid way, and the lack of organisation is patent even to the casual observer touring over India. With India, as with all other civilised countries, therefore, education is the most important problem, and it has a special application to this country as we have to cover a great deal of lost ground.

II. Education and the State.

If there be any branch of activity which requires thorough organisation from the point of view of national, as opposed to individual or communal, requirements, it is education. We cannot leave it to the dubious chances of spasmodic private effort, even when such effort emerges from its primitive stage and rises to the communal level. Education is a national concern and must be nationalised. Educational activities must be largely guided by organisations or trusts representing the best intellects in the land and supported by liberal subventions by the State. It is only the State which can bring

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about such organisations and in all the progressive countries of the world, the State is taking an increasing interest in Education and accepting larger financial obligations for furthering it. Prior to 1889, the English Universities and University Colleges were dependent for their incomes upon their own unaided resources, i.e., upon endowments, subscriptions and students' fees, but the total Parliamentary Grant for 1921-22, rose to £1,500,000 and in addition a sum of £500,000 for assisting the institutions to provide retrospective super-annuation benefit for the staffs of Colleges; and the estimate for 1922-23 for Great Britain only was £1,169,000. Our local legislature has had the distinction of passing the educational demands without a demur and it has been recognised that money spent on education is well-spent and that the educational investment, though apparently not reproductive, at least in a direct way, is in its far-reaching effects vastly more profitable than any other public investment.

III. The Ideal of National Education.

(a) *Physical basis of culture*: National life, like plant life, must first of all secure a firm footing in the environment in which it lives. If you have watched the growth of a plant, you must have seen that it is the tiny, threadlike roots which first burst through the seed-coat and they plant themselves in the soil. Ere long the plant rises on its legs bearing the primary leaves, not unoften crowned with its discarded husk. Its future life depends entirely upon what nutriment it can draw from the soil into which it has sent down its roots and the atmosphere by which it is surrounded. Similarly, a vigorous natural life and a propitious environment are the indispensable conditions of progress in power and civilization. Can we say that our children and young men are being trained in healthy surroundings and encouraged to cultivate habits of active life which alone can enable them to build up a sound basis of healthy human growth? It is a well-known fact of Eugenics that defects of inherited con-

stitution can be to a great extent remedied by proper treatment. In childhood and in youth we must help our children to build up bodily and mental stamina which will supply them with an inexhaustible store of potential energy and they will be able to draw upon it in the storm and stress of life which await them after they emerge from their pupilage. Our crowded cities are regular death traps and their annual toll of both adult and child life is appalling. They do not and cannot supply the suitable environment for the up-bringing of our children and our youth. Most of the children at school live with their parents in homes from which it is impossible to remove them in order that better conditions of growth may be ensured. But it is different with hundreds of young men who come from their village homes for University education. We should let them have a better chance of normal growth, mental as well as physical. Patna, the largest educational centre in Bihar, is peculiarly unfortunate in this matter. We may have all that is desirable in the educational institutions themselves and in the hostels under their control. But at their very door across the road lie heavily crowded insanitary areas where disease and death are manufactured in the foul drains and unhygienic habitations. When an epidemic breaks out we have hardly any chance of escaping it, and our inadequate residential arrangements necessitate a large portion of the student population to live in the crowded quarters of the city. This is a serious handicap and can be removed only by teaching and residential arrangements away from the bazar.

Residential arrangements in healthy surroundings are, however, not enough. Systematic physical training also is necessary. We are very much deficient in play-grounds and the games afford facilities of exercise only to a very limited number of students. Japanese students have progressed rapidly in physical culture since the introduction of compulsory drill and military training for the

lads. We do not possess any organisation for supervising and guiding this important branch of education. The boys in Japan have taken to military training with great enthusiasm and this has contributed in a large measure to the splendid spirit of citizenship which they have developed.

(b) *Bread Education*: While talking of national education, we cannot forget that we must first of all learn to *live* before we can attempt cultural accomplishments. Civilisation became possible only after the requirements for maintaining the earthly life were amply provided for. The races of primitive wandering shepherds had little chance of developing the arts of civilisation before they migrated into well-watered valleys and settled down to agriculture and industry. What are we doing for our agricultural and industrial pursuits? The claims of these two departments of national education have been sadly neglected. Where an English farmer grows four blades we grow only two. We are so ignorant that we cannot dispose of our own raw material, and send them out to all the places in the world for being turned into finished products and resold to us for our use. A national system of agricultural and industrial education alone can secure the necessary foundation for a superstructure of higher culture. The loin-clothed rustic in his miserable mud-hole and living on a perpetual starvation diet cannot be expected to sustain on his narrow shoulders and lean members the heavy weight of modern civilisation with its exacting demands upon the intelligence as well as the physique of the individual. Life is now a strenuous battle and the weaklings have little chance in the struggle. With most of us old age comes prematurely and with many there is a breakdown before our powers have attained their full normal growth.

(c) *Cultural Education*: In an ancient land like India, the claims of cultural education do not require any special advocacy. We have to remember that with us it is not like beginning with a clean slate. The finest elements in Indian

culture have been so well-preserved not merely in dusty tomes and buried relics but in the actual lives of men who have devoted themselves to the task of keeping the light of ancient Indian culture burning with a clear, white flame, that it would be simply suicidal to ignore them in the organisation of our studies. They are not a part of our dead past but the soul and inspiration of our living present. I am speaking, of course, of the ancient Indo-Aryan culture. It is possible for an English University (Oxford) to give up Greek or Latin classics, for neither Greek nor Roman History is a part of English History in the same sense as the early history of India is a part of Indian History. We cannot give up our classics, at least as an Entrance qualification into our Universities, and we cannot make even Science a substitute for it. Our classics are a part of ourselves and have been woven into the very warp and woof of our national being. No ideal of Indian culture can be complete without an essential basis in ancient Indo-Aryan culture. India can never be self-conscious and understand herself properly, her deep-rooted instincts, ideals, aspirations and sentiments, unless this stratum of her sub-conscious mind is awakened into full consciousness. Sanskrit drama and literature have found due recognition in the curricula of our University studies but the whole of the literature carrying in it the highest spiritual culture of the Indo-Aryans has no necessary place in our courses for the earlier graduation. Though well-equipped with a fair knowledge of European Philosophy, our graduates go out of our Universities in utter ignorance of the Indian interpretation of life, without even a hurried glimpse of the higher sunny uplands of the culture of their forefathers, where the ideals of their race have been formed and visions of unparalleled grandeur have descended upon them. The most memorable period of ancient Indian history is the ten or twelve centuries which followed the time of Buddha. There is a rich and ample literature of this period both in Pali and Sanskrit, but if the

present conditions are allowed to be perpetuated they will for ever remain a sealed book to our under-graduates.

While speaking of Indian culture we cannot forget that among India's heritage we must count the priceless treasures which have been brought into India by our Moslem brothers. Among the world forces which have built up nations and empires, Islam occupies a very important place. The penetrating power and the simple grandeur of the message of Islam is a great national asset. The music, poetry, painting, sculpture, architecture and the literature and philosophy of Moslem India compel respect and admiration and a University which ignores them does not deserve to be called Indian.

And at the present day India stands face to face with tremendous forces which the Christian civilisation of the West represents. The contact with the West has broken to pieces the crust which isolated us from the rest of the world and the culture of the West is pouring into India through every avenue of approach and the power which it represents is electrifying us into a new life.

Modern Indian culture, therefore, is a complex whole and it is the problem of our Universities to present them in a form which will be readily assimilable to the thirsty young souls who throng our colleges. These three priceless elements in Indian humanity of the present day must be harmonised to form the future structure of Indian civilisation. That harmony is not true harmony which seeks unity by an effacement of individual differences. True harmony is unity in the midst of difference. A symphony is not composed of a single monotonous tune but is made up of many harmonious notes which in their sweet blending constitute the beauty and sweetness of music. Every culture represents a music of the human soul struck upon the lyres of our hearts by an Unseen Hand, a burning flame which is a part of the great Central Effulgence, a mighty tidal wave

from the Ocean of Eternity. The waters which roll down from the sunny Himalayan heights, or those that flow down the Jordan, or those which well up from the perennial springs of Arabia have joined here in the land of our fathers and in their harmonious blending will make it rich and compel it to yield golden harvests for the benefit not only of India but also of the world at large. Our task and unique privilege is to assimilate the rich pabulum placed within our reach and turn it into the very flesh and blood of our nation. I am just back from Taxila, the mother of Universities, and have carried back with me memories which will last me a lifetime. There in the very heart of that valley where many world civilisations have met, not always in peaceful friendliness, but often in the midst of the jar and clash of contending arms, as I lay awake in bed in the early morning, the sweet chant of the Moslem prayer would be borne on the still morning air and reach my innermost heart and thrill it with joy. In that moment could I deny that it was the same human cry calling upon the Infinite which has stirred the heart of man in all times and climes in the history of the world, whether in Mosjids, or Cathedrals, or Temples and filled it with pure delight?

I think it is impossible to deny the fact or drown it with specious arguments that modern Indian education does nothing for what is deepest and noblest in Indian culture and which is peculiarly Indian. And this defect makes the highest academic learning characteristically un-Indian. I do not for a moment plead for communal religious training in our Universities. I only plead for fair opportunities to every Indian student to familiarise himself with the richest and finest cultural elements of Indian civilisation and imbibe them not merely for the benefit of his own self but of his race as a whole. I only wish to impress upon the reader the supreme necessity of allowing the Indian student facilities for familiarising himself with the literature, philosophy and the spiritual culture of India. Ninety-nine

per cent. of our under-graduates go out of our colleges without any idea about their own special heritage and with disproportionate notions of what the modern world can give them. We take good care to teach them European Logic, Philosophy and English language and literature and leave their minds entirely blank about the achievements of their own past. We treat the cultivation of our own literatures of the modern times as if it were of no moment and compel our young men to receive their instruction through a language which is not their mother-tongue and to express themselves in a tongue with which they can never hope to be at home as with the one which they have imbibed with their mother's milk and which is the vehicle of ordinary thought and expression every moment of their daily lives. We talk of "Indianisation" but the first thing that stands in need of Indianisation is Indian education specially in the higher stages. I think that our national education while consisting of the best elements which the modern world offers to us, should as an essential factor aim first at rousing the latent forces lying in the deepest strata of our own nature and make them throb with a healthy vigour so that our young minds may be sufficiently awakened and prepared for the assimilation of what is vital in Western culture. Great ideals yet lie asleep in the subterranean vaults of the Indian mind. Let us break open these charnel-houses and let the outer light stream upon them and dispel the darkness in which they lie hidden.

IV. Student Life.

The highest object of education is to emancipate the mind from moral and intellectual thralldom, *i. e.*, to enable the student to act and think for himself. The ideal gardener, though minutely attentive to the infant seedling, devotes very little time to the grown-up trees. His whole effort has only one object in view, *viz.*, to train the plants in such a way as to enable them to require less and less help until they require no help at all. Similarly, though at an early stage spoon-feeding may be necessary, at the advanced stage of student career, it is positively injurious. It actually cripples the recipient of such help

making him lean upon others where he should have more and more leant upon himself. In the German Universities, as the student emerges from school, he is placed under the discipline of freedom. He is free to select what studies he should take up, what lectures he should attend, where he should live and what standard of living he is to adopt for himself. Perhaps this sudden release from tutelage has an unsteady effect upon at least the weaker among the under-graduates. But the object is quite clear, *viz.*, to build up a sturdy manhood for the actual battle of life. In the British Universities the student is never entirely released from guardianship, though the amount of liberty he enjoys is large and at this final stage, the value of self-control and self-discipline is fully recognised as character-forming elements. The corporate life is nowhere else so strong or well-organised as among American under-graduates and there the social side of student life is entirely and thoroughly organized by students themselves. While it will be readily admitted that in all well-managed institutions, under-graduate enthusiasm must not be allowed to waste itself in unnecessary effervescence, it is at the same time equally true that it is really injurious when the spirit of guardianship overshadows and thwarts free and healthy growth. The sense of responsibility is exactly proportionate to the liberty allowed to an individual and the former can never have a chance of free development when the latter suffers from too much interference. The roadway to freedom which now lies open to our future generations, will be only a blind lane unless at the last and final stages student life is based on self-control, self-discipline, and self-respect. This is how they grow in all free countries and if we have decidedly set sail for that goal, the soundest basis of training will always be the inner initiative and the inner control.

V. The Teacher.

The subject of this paper cannot be closed without a reference to those to whom the work of educating the young is to be entrusted. Our effort at education is bound to be a failure unless we have a highly trained body of teachers who will take to education as the supreme business of their

lives and devote themselves entirely to the cause of culture. For this it is necessary to offer them such inducements, pecuniary as well as opportunities of self-culture, as would draw the best products of our Universities. Men have never been drawn to this path of life by the glitter of gold and they do not expect to pile up fortunes by service as teachers. But two things are absolutely necessary as a condition of the success of the teacher's life, firstly, that the burden of his worldly cares should be lifted from his shoulders, and secondly, that ample facilities should be afforded to him for study and investigation. The wage fund for this branch of national service should be ample for enabling the teacher to keep the wolf away from his doors, to maintain himself and his family in a fairly decent way, to provide for the education of his children and to retire on a competence in old age. When the youthful teacher enters into his profession his education as a teacher just commences and unless he has opportunities for a fresh advance in his studies or enquiries, he soon becomes a fossil, his work a dreary routine and in proportion as he deteriorates, he becomes unfit for the responsibilities of the position he holds in his profession. In England, the Government has assumed by Parliamentary legislation, the whole burden of superannuating the teachers of primary and secondary schools and these are not called upon to make any annual contribution to the Pensions Fund. In the Universities and University Colleges, each member of the staff is insured in one of a selected number of companies, the annual premium is met in part by the individual, in part by the University or University College. I have already mentioned in the earlier part of this paper that in connection with the Parliamentary Grant for 1921-22, a sum of £500,000 was provided to assist collegiate institutions to provide retrospective superannuation benefit for their staffs. A national system of education cannot be maintained without a National Insurance in the shape of a well-provided wage fund for teachers. We recognise fully that it is not for us to be ambitious in a worldly way as we have taken upon ourselves, a work in which simple living

must be combined with high ideals, we only desire that we should be helped to fit ourselves for our work by facilities for study and research which we can never hope to obtain for ourselves with the resources at our command and maintain ourselves in a state of tolerable decency.

VI. *The Creative Stage of Education.*

I believe that from the beginning of a student's career he should be encouraged to be a constructor and creator and that from the very first day of a child's entry into pupilage to the last, the best that we could do for him is to guide and discipline his spontaneous activity in the lines for which he has natural aptitudes. This is most important for the final and finishing period of his career. It is in the post-graduate departments of a University that the student finds opportunities for developing his intellectual activities in the lines for which he has a special aptitude. Every University fit to be called by that honoured name concentrates its best efforts in the creation of productive power and for this purpose it is necessary to have at the head of the various departments men who have developed creative power and are engaged chiefly in research work whether in science or arts. Imparting instruction is an important part of education, but it can be left to the colleges as at present.

Post-graduate studies, however, require a costly staff and heavy equipment which can be properly undertaken only by a University. Centralisation is absolutely necessary for this purpose and any dispersion of funds or of energy would be criminal in a country which is not particularly rich and can ill afford to undertake a lavish decentralisation in this matter. Every University in India, and the Calcutta University in particular, is gradually developing its activities in this direction. We must build up a competent staff of University Professors, Lecturers and Readers who will themselves be investigators and help students to investigate. The necessary laboratories and libraries for the highest work of the University must come into existence before it will be possible to make post-graduate study a success. Let the colleges do the under-graduate teaching they have been doing and supply the residential requirements for the students

of the University. But post-graduate teaching must be centralised in the University itself and conducted under the guidance of the University staff. In America where the University is in close touch with national movements, civic, sociological and technological investigations and all such studies as have a direct bearing upon national progress are receiving an increasing degree of attention. We do not desire our highest educational effort to consist in weaving fine idealistic cobwebs but in helping us in strengthening and organising our national activities in politics, commerce, industry and social progress.

VII. *National Destiny and National Education.*

National history is a part of cosmic evolution and has for its driving force the spirit of God Himself, it is sacred history. We must bear in mind that we have behind us forces which are more powerful than anything finite and temporal and arm ourselves with the hope that our national destiny is in the safe-keeping of God. Throughout the universe everything is pressing for self-expression and self-realisation, everything from the tiniest atom to the unfathomed limits of the human soul. These eager, youthful souls who are thronging our colleges and schools have brought in their best as an offering at the altar of the motherland so that their developed minds and powers may be utilised for her glorification. Let our temples of learning rise to the highest stature of their usefulness, fling open their gates to the thronging votaries and be instrumental in bringing to them the fruits for which they have dedicated themselves.—*The Calcutta Review*, April, 1924.

Reviews and Notices.

CHEMICAL PROBLEMS AND THEORIES—FIRST PART—BY HRIDAYA KRISHNA DE, M. A. (MONDAL BROTHERS AND CO., 27/2, CORNWALLIS STREET, CALCUTTA). Price Re. 1.

This book is an attempt at an explanation of the laws and principles of Chemistry through chemical arithmetic. It covers a wide range of subjects like the fundamental physico-chemical laws, determination of equivalent, atomic and molecular weights, gravimetric, volumetric, gas and organic analysis, etc., while the second part which is in course of preparation will contain other portions of physical chemistry. It can be recommended to students of chemistry.

The author claims a distinctive advantage for his book as having a large number of worked-out examples calculated to help students in the solution of problems which ordinary books of a similar nature do not contain. There are also hints in additional notes for the solution of various other problems. We are afraid if such a treatment is really an advantage; for, will it not stifle any exertion on the part of the student to think out for himself?

SANSKRIT BOOKS—FIRST AND SECOND READERS OF PANDIT V. R. T. THATHACHARIAR, BOARD HIGH SCHOOL, NANNILAM—may profitably be introduced as text-books for the first two years' course.

The texts are suitably graded. The author has struck a new note in that his texts contain the life-sketch of some of our great Rishis, stories from the Epics and other Sanskrit words of yore and also specimens of letter-writing which are useful for taking a living interest in the study of the language.

Both are approved by the Text Book Committee, Madras. The get-up is good and the price cheap. (Three annas only).

Copies can be had of the author.

A Note on Mr. M. R. Paranjpe's Article.

Mr. M. R. Paranjpe, in the *Educational Review* of Madras maintains that science is not now so well taught as formerly. Twenty or thirty years ago, school science was very often taught wholly in the class-room; now there is a tendency to teach it wholly in the laboratory. The result of this is that some branches of science are not taught at all in schools, and the scope of those that are taught is limited by the practical work that can or cannot be done by the pupils themselves. Laboratory work may be, and often is, merely a kind of drill, worthwhile, it is said, for the training in neatness, accuracy, and method that it gives. It has been assumed that habits acquired in the laboratory assert themselves in the ordinary business of life. But according to modern educational psychology, there is probably as great a fallacy here as in the old dictum, "Learning by rote trains the memory." As Mr. Paranjpe says, "A careful analyst is not always a clean and tidy person. A trained geologist has no eye for the signboards in a street or the show-cases in a shop. A famous scientist is not necessarily a rational critic." Meanwhile, if school science is judged, not by the reflected glory it derives from the researches of Sir Ernest Rutherford and others, but by the average level of scientific knowledge among the people, it clearly stands condemned. This standard is very low indeed; according to Prof. Smithells, it does not correspond in grammar to knowing the difference between a noun and an adjective. Before the present state of things can be remedied, there must be some radical changes; the dominance of school science by University teachers must cease; the disunited branches of science must be brought together as one subject for school purposes; and finally, lecture-room and laboratory-work must be co-equal—From *Nature*, March 22, 1924.

The Educational Review.

The important place that the Secondary School fills in the educational system is sometimes apt to be under-rated because it is not so spectacular as the University, for instance, nor can it be called grandiloquently, "the education of the masses." But the Rt. Hon. Mr. Fisher paid a striking tribute the other day to the Secondary School and its usefulness. Speaking on the occasion of the prize-distribution of a Secondary School in England, the ex-President of the Board of Education said that it was of the highest importance to the public of every locality that a Secondary School should be placed in its midst. He had had many opportunities of observing the effect which a Secondary School had upon a locality. He had seen great industrial towns in the North redeemed from industrial barbarism by the presence of a Secondary School. He went further and said that at a certain stage a Secondary School was even more important than a University. With a well-governed Secondary School, there was no home in the District, however humble and however poor, where the parents did not feel sure there was open to their children an avenue through which if they had character and ability, they could rise to the highest station in the commonwealth. Believing as he did, that it was most essential that there should be an open career for talent, and that there was nothing more certain to promote a feeling of social harmony and

well-being than the knowledge that no one was excluded from a brilliant future by hard circumstances in early life, he felt there was no greater security for the future well-being and social harmony of this country than the adequate provision of Secondary Schools by which children of humble and straitened circumstances could rise to the greatest and most responsible positions in the State. There is a desire, at least in some provinces in India to-day, to spend enormous sums of money on the creation of new unitary and residential Universities without an adequate expansion and consolidation of the Secondary educational system, but these remarks of Mr. Fisher should enable one to view the Secondary School in its proper perspective.

The Universities' Conference will meet in Simla on the 19th May to discuss many problems in which the Universities are interested in common. The Conference will be opened by H. E. the Viceroy, and the agenda which has been issued raises many interesting questions, though there is no doubt of the fact that it could have been better. The conditions of service in Universities are mentioned as one of the first topics for discussion. The dependence of the Universities on the annual grants of the Legislative Councils and the appointment of members of the staff for temporary periods, have made the conditions of service less attractive than they were in Government institutions, and if the Con-

ference will succeed in recommending measures to make the services more attractive, it will have done something useful. The establishment of double sets of bodies in the constitutions of the newer Universities, academic and non-academic, raises another question, the need for harmonising the two to avoid friction. Increased facilities for military training in Universities—if not for compulsory training—will also be another subject to be discussed at the Conference. Representations may be made on behalf of the Conference to Government that the military authorities should find it possible to respond to this demand. With regard to external affairs, most of the subjects mentioned relate to Indian students in British Universities, their admission, their supervision while in England, and so on. The recommendations of the Lytton Committee regarding the abolition of the Provincial Advisory Committees and the establishment of Universities' Bureaus will also come up for consideration. The last section relates to Inter-University co-operation in India. For want of co-ordination, a lot of effort is unnecessarily wasted by duplication in India, at present, and in the attempt to make each University teach all subjects to the most advanced standard, there is a large amount of avoidable expenditure. The publication of a central journal of research, the exchange of library and other facilities, are among other subjects to be discussed. We hope that the Universities' Conference will result in substantial measure in the advancement of the cause of higher education in India.

It is an old complaint in the Madras University that the really academic man has always found it difficult to make any advance in its affairs. It is interesting to notice the fact that among the delegates elected by the Madras University, for the ensuing Universities' Conference, there is not one who is now actually engaged in teaching work in any college, and it is to a Universities' Conference that the delegates have been elected! We have no doubt that the delegates elected are all estimable gentlemen; there is the Vice-Chancellor, Dr. Macphail, one of the most experienced educationists we have in Southern India; Mr. Littlehales, as Director of Public Instruction, is another worthy representative; Mr. G.A. Natesan, the well-known journalist, has been an active member of the University for many years and has been on the Syndicate, and Dewan Bahadur M. Ramachandra Row has had the advantage of serving on Lord Lytton's Committee on Indian students in England whose report will be one of the main subjects coming up for discussion at the ensuing Conference. But seriously, was it not possible for the University to arrange to send at least one Professor or Principal of any institution connected with the University? A comparison of the Madras list with the lists of other Universities in India will suggest inferences which are not very pleasant to contemplate.

Since the days of the eloquent exposition of the aims of liberal education by Cardinal Newman, there have been statements from time to time of its real meaning by various writers. The writings of Balfour, Bryce, Morley and Asquith, for instance, furnish one with a number of valuable ideas of great value to the true educational reformer. Sir Michael Sadler, well-known to our readers as a distinguished authority in educational matters, has recently been saying some very inspiring things on Liberal Education. Addressing a meeting at Swadlincote, South Derbyshire, the other day, he said that a liberal education, if it was given rightly, was "a form of freedom." It was a privilege which any one who had it would not forego. It was one of the three or four things in life which they might describe as invaluable, as the best things which could fall to man or woman. What a liberal education conferred was enlightenment of the conscience of the mind. Sir Michael laid down the essentials of a liberal education in the following words worth special attention, and we are reproducing only a part of the picture :—

To-day they should say that the fundamental thing was to secure education being given under healthy conditions. During those early years of training conditions of life should be healthy; the body should be trained by systematic and vigorous exercise; and the hand should be exercised not least because of its effect on the brain. Both eye and ear should be trained to discriminating use; the ear by music and beautiful inflections of voice;

the eye by skill with pencil and brush, because one of the great things in life was to have a trained appreciation of beauty.

They needed the discipline which enjoined self-control. Then they expected a liberal education to give them the power of speaking plainly and accurately in their mother-tongue. The mother-tongue ought to be the basis of all education. The reason was that their thoughts or judgments shaped themselves under contact with fact under the stress of emotion in the recesses of their mind which were worthless; and it was their mother-tongue which enabled them, as it were, to clutch these beginnings of thought out of these worthless recesses of the mind and express them as they should be expressed. Nothing was more easy than to receive a kind of education which accustomed them to a certain patter of words and made them the victims of phrases. They could mention whole countries which were far too much under the tyranny of phrases. To no people did it matter so much to have that power of flexible control over expression in the mother-tongue as it mattered to the English because they, more than any other people, faced duties and contingencies in which they had to look at both sides of the question, and often to accept a solution which attempted to do justice to two opposite needs.

Words were the tools of thought, and their English thought, by instinct, was so just and scientific in its quick perception of new and opposite facts that they needed a better training in their mother-tongue than almost any other nation he knew. They needed, from quite an early age, a study of mathematics, in order that they might know about the nature of forms and number. They needed too some study of the records of their race, and, not least of the achievements of their own fellow-countrymen. All these things had to bear upon what they had to do and what their successors had to do. They needed the study of physical science, partly that they might have their eyes opened to the wonders and beauties of Nature,

and partly that they might be able to understand the great scientific applications in modern civilisation; and, not least, in order that they might learn what kind of evidence justified the conclusion.

We must join in the protest against the proposal to abolish the higher courses of studies in the Sanskrit College, Tiruvadi. So recently as in 1909, the District Board began, at the instance of the Government, to reorganise the school and make it a centre of Sanskrit learning by raising it to the Collegiate standard. Since then it has enjoyed a high reputation in Southern India as a Sanskrit College and has produced a large number of Pandits some of whom have been distinguishing themselves even beyond the confines of the Madras Presidency. Owing to unfortunate caste hatreds, the institution is now being threatened with a virtual collapse by the proposed abolition of the higher classes. We understand the grievance is that the institution benefits the Brahmin more than the Non-Brahmin, though there is nothing to prevent the Non-Brahmin from taking advantage of its courses. It is apparently forgotten that Sanskrit culture and civilisation do not belong to the Brahmin alone and Non-Brahmins should share in its pride and glory, especially as many of the contributors to its richness have been from among their own ancestors. We hope that the ill-advised project will be abandoned and the institution will continue to fulfil for many generations to come the valuable functions it has discharged from its inception.

In spite of the serious handicap of want of funds and the astonishing recommendation of the Inchcape Committee, so soon after its foundation, that the question of its very existence should be reconsidered, the Delhi University continues to make good progress and promises to grow into a flourishing centre of higher education, if adequate encouragement is forthcoming. We should have drawn attention earlier to the excellent address delivered by H.E. the Viceroy as Chancellor on the occasion of the first Convocation of the University. He laid special emphasis in the course of his address on the need for the Universities to serve as centres for the efficient training of the youth of India, not only in their individual capacities as will be readily granted, but also in their relation to the country as is not always recognised. As he put it:

University education in my view has a double aspect. It has an obvious influence for good in the case of the individual, but it has an even more supreme importance for the country as a whole. The Universities in India set the standards of national morals and character. A heavy responsibility has been laid upon them. It is their task not only to disseminate knowledge and to provide the youth of India with a training for life, but they have a wider duty in their responsibility for the intellectual welfare of the people of India as a whole. It is for them to strive to build and elevate character, to lift up the mind of the people to a higher intellectual plane, and to set pure standards of taste. Every people has a soul, but where higher education is undeveloped, the heart cannot express what it contains and

the particular genius of a nation may remain dormant and devoid of true influence. By education in the right sense, however, thought is illumined and the mind of a people is equipped to give out the best qualities of its soul.

The Universities are the trustees of higher education; they are the guardians of its hall-mark, they must jealously watch that its excellence suffers no adulteration, and that those who desire it do not receive a shadow in place of the real substance. They must fearlessly attack and expose worthless substitutes for higher education, and maintain unimpaired the high estimation in which their honours and degrees should be held. Popularity is not difficult of attainment, but a false popularity based on an imitation of real achievement is a calamitous heritage. Tinsel may glitter, but it has no value as compared with gold. The volume of production will avail nothing if the quality of the output falls short of the best standards. In my view these are the ideals to be kept before us in our conception of University work in relation to the country and the people as a whole.

This is a truth which will bear constant repetition.

It was however very poor consolation which His Excellency the Viceroy administered to the Delhi University Finance.

University, with reference to the complaint about the inadequacy of funds for its maintenance and efficient work. Drawing attention to the Vice-Chancellor's complaint regarding the absence of funds, His Excellency said: "If Dr. Gour in his address sounded any note of depression, it was on the subject of finance. In view of the present leanness of our purse, we cannot deny that there

are grounds for the pessimistic tone of Dr. Gour's statement, but I find comfort in the thought that the heroes of many famous epics and romances were sprung from what are described as poor but honest parents. Financial stringency may delay the full attainment of the academic ideals of the Delhi University, it may place some difficulties in their way, it may render the path to the desired end less easy to travel, but I do not believe that it can seriously impede or stifle their ultimate realisation." Delhi is not alone among the newer Universities in bemoaning a condition of financial handicap. Nagpur has got a more depressing tale to tell. "A recent statement of accounts issued by the University should make people wonder if better precautions should not be taken regarding financial soundness before embarking on the responsibility of starting new Universities. We are told that the University has "no endowments and no resources and if the Government withdraws its annual grant of Rs. 27,000, the University will cease to exist." The University has not even a building of its own. The Government, strangely enough, has made the condition, in promising a lakh of rupees for the purpose, that it will give it only if the University managed to find another lakh of rupees! Sir Bepin Krishna Bose, the Vice-Chancellor, has issued an appeal for the purpose, but only a third of a lakh of rupees has been subscribed. Commenting on these facts, a correspondent of the *Pioneer* has rightly observed: "It is evident that the University cannot

widen its sphere of activities, if it has no building, no funds and no endowments. There is no doubt that as time goes by, a satisfactory fund will be built up, but the point which deserves the serious thought of the educated public is that it is a very melancholy thing indeed to start a University with funds which will barely cover the expenses of three years' residence in England of an Indian law student."

The Report on Public Instruction in Madras for 1922-23 which Education in the Madras Presidency has been just issued does not contain any startling revelations of progress. The number of Secondary Schools increased from 478 to 486, as the result of the opening of twelve new schools and to the closure or to the classification as 'private,' of four schools. Of the newly-opened 12 schools, 10 were under private management and only two under Local Board control. The rise in the total strength of Secondary Schools for boys was only 1.6 per cent. The total expenditure increased, it is satisfactory to note, from 60.07 lakhs to Rs. 62.70 lakhs of which Rs. 30,251 was a grant to Provident Funds for Aided Schools. Very

little advantage was taken by local bodies in the Presidency during the year of the Madras Elementary Education Act passed during the previous year. We know, however, that since the period covered by the report a more extended use has been made of the provisions of the Act. The work, of course, has only begun, and we hope that in the coming years local bodies will work up the project vigorously and the percentage of illiteracy will go down steadily. The number of public Elementary Schools for boys increased from 33,624 to 35,106 or by about 4.4 per cent. and the strength in them from 1,371,779 to 1,459,170 or by about 6 per cent. The percentage of male pupils rose only by less than half a per cent. during the year, from 5.7 to 6.1. The total expenditure on Elementary Schools increased from Rs. 87.02 lakhs to Rs. 97.98 lakhs. We are afraid it is a very unsatisfactory feature of the year's report that the percentage of private educational institutions decreased by about 30 in number and 25 in strength of pupils. We are told that some useful experiments have been introduced in the matter of vocational education and the education of the depressed classes has shown appreciable progress.

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