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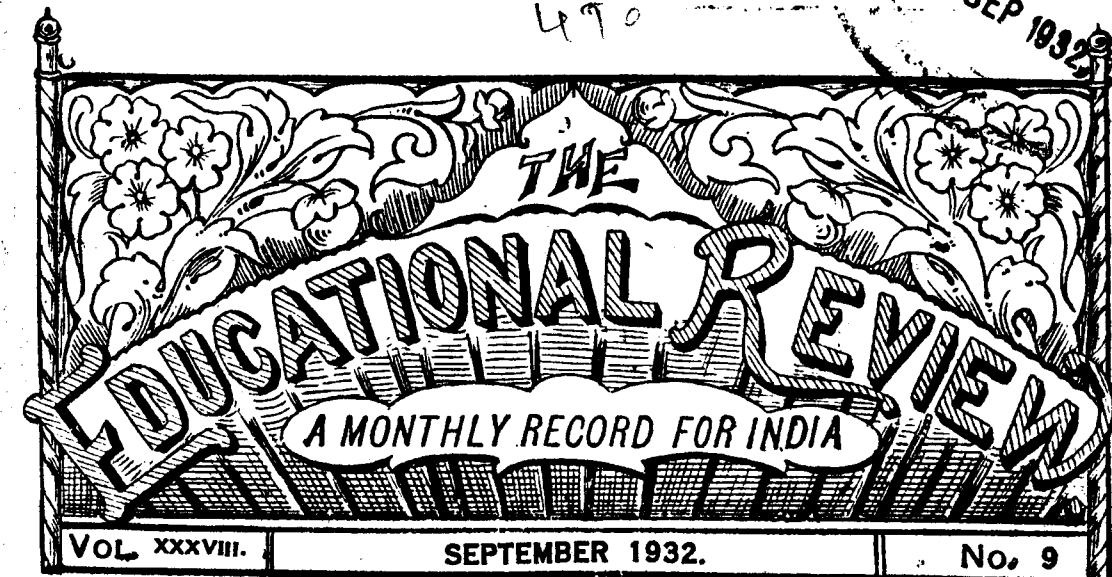
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VOL. XXXVIII.]

SEPTEMBER 1932.

[No. 9.]

SERIOUS PLIGHT OF GERMAN SECONDARY SCHOOLS.

BY DR. OTTO HERBORN,

Frankfurt-Main, Germany.

THE secondary schools in Germany are at the moment passing through an extraordinarily critical time. The economies effected by the German Government have drastically reduced the financial means at the disposal of the schools and have lowered the salaries of the masters. Other economies are being carried through by special administrative measures. The German girls' schools are in an identical position, but for the sake of brevity let us confine our consideration to the boys' schools alone.

For the sake of a clearer understanding of this article it is necessary to survey quite superficially the course of University study pursued by, and the work subsequently expected from, a German secondary schoolmaster, say f. i. in Prussia. The State demands that every schoolmaster must study for at least four to five years at one or various Universities. In some cases this length of time is even exceeded. When he has studied for the prescribed time, the prospective master is qualified to sit for the so-called "Staates-examen" (State Examination). This examination is roughly equivalent to an M. A. degree in England. If he is successful in this, he can apply to a Provinzial-Schulkollegium (i. e., the supervisory educational body of a Prussian province) for training in teaching and when, as up till now has almost always been the case, he is accepted by this body, he becomes a Studienreferendar. After a further training in teaching, which he acquires at ordinary secondary schools under special tutors, he is entitled to sit for his second so-called "pedagogical examination." He then becomes a "Studienassessor" and is given independent work at secondary schools. If he proves efficient, his name is inscribed in the so-called "numerus clausus." Once the name of a master is inscribed in this list, the State guarantees to pay him a certain salary if he should be unemployed (in practice the latter eventuality hardly ever occurs). After some time he can then be "appoint-

ed for life" and receives the title of "Studienrat." He is then entitled to employment in State, municipal or council schools, three types of schools which are practically indistinguishable both in their rights and their duties. As is well-known, non-State or municipal-owned secondary schools, such as the English public and private schools, are rare in Germany. But such private schools as do exist, can and do "appoint" their masters, although naturally such an appointment is not backed by a guarantee on the part of the State, municipality or council.

The economies recently effected in German education have brought about approximately 2000 staff reductions alone in the Prussian schools, to which we will confine ourselves in this article. Why were these staff reductions necessary? In the first instance because the State has considerably reduced the payments which it had pledged itself, for one reason or another, to make to the schools. Smaller communes or private schools, who were unable to carry on their schools without this State assistance, were either forced to close schools entirely or to amalgamate one school with another. They therefore shortened the number of tuition hours given to a pupil in the secondary schools, increased the number of teaching hours for each individual member of the staff and considerably raised the number of pupils in each form.

I should like to enlarge upon the last point. The new regulations state that

the lower forms must have at least 50 pupils, the middle forms at least 40 and the upper forms at least 30. It is obvious that these over-filled classes demand exceptional pedagogical skill on the part of the master if work of any real value is to be accomplished. The official statistics further show that of the 51,459 children attending the VI Prussian form (*i. e.*, the 9 to 10 year olds) 8,465, *i. e.*, 16.5% are attending a class which contains even more than 50 pupils. If we look back to the statistics of the preceding years we see that in 1931, 350 VI forms had between 45 and 49 pupils, in 1930 the number was 340. Of the Upper II forms (containing boys of 15-16 years of age and representing in Germany the first form of the Upper School) there were, in 1929, 193 having 30 to 33 pupils each, whilst the total in 1931 was only 122. And all this, whilst so many young masters are waiting for employment and for "appointment."

The situation amongst the young masters at the moment is briefly thus:—At Easter 1932 the number of "Assessoren" had increased to approximately 2,100 and that of "Referendaren" to approximately 1,800. For all these work cannot possibly be found. It is clear that under these conditions the various masters' organisations have asked that the training of fresh young masters should be "blocked." There are already several academic professions in Germany which have been "blocked," at any rate from time to time, because there were not enough posts to be filled—

such, for instance, are the forestry profession and the career of higher post office officials. A similar "blockade" might well be erected in the teaching profession. It has already been erected in the case of the teachers of artistic subjects, *e. g.*, drawing, singing, who in Germany are trained at special academies. Even the so-called "Pädagogische Akademien" (elementary teachers' training colleges) which train elementary teachers but demand a leaving certificate (matriculation) as a qualification for their trainees, have this year (1932-33) not accepted any fresh applicants for training. Thus an important profession is practically barred for boys and girls leaving school.

The great question is now arising in German educational circles: "What is to be done with the thousands of boys and girls who are leaving school with a fully qualified leaving certificate (matriculation) but for whom the future is practically without prospects?" 45,000 of this type left the German secondary schools in 1932. In former years about 85% of these went on to study at the University. At the moment about 140,000 students are studying at the German Universities. In 1913-14 the number was 80,000. Thus the economic law that the number of students at the Universities increases in times of economic distress has again proved itself to be true. At the moment about 100,000 men with University degrees in Germany are out of work. It has been calculated that 5-6,000 vacancies can be found for academically trained

persons every year and that every year 25,000 academically trained persons become ready for employment. The logical conclusion of these calculations is, that if no change in the situation occurs, an academic proletariat of several hundreds of thousands of people will gradually be formed who will be far more dangerous to the German State than millions of unemployed.

The German Government will have its work cut out to tackle this problem in the near future. It will have to devise some means of sorting and apportioning its unemployed University men. Certainly this is not a problem which is singular to Germany, but it is one for which Germany must find some solution soon if serious consequences are to be avoided.

PRE-MUSALMAN INDIA

Volume I—PRE-HISTORIC INDIA

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THE BUCCANEERS IN PANAMA

BY MR. G. G. JACKSON,
Cobham, Surrey.

(Continued from page 564.)

II. THE BUCCANEERS CROSS THE ISTHMUS.

JUST before Christmas 1670, Captain Morgan and his fleet came to anchor off the island of St. Catherine and a force was quickly landed to subdue the shore batteries which the Spanish had erected upon a smaller island. This was divided only by a very narrow strait from the larger.

The Spanish opened a very hot fire upon the pirates as they advanced and compelled them to retreat out of range, and here for a time they were exposed to torrential rain, their spirits sinking as quickly as they had been raised by former successes against the Spanish.

So disheartened and miserable were the men ashore that Morgan feared they would revolt and go back to the ships without carrying out their task. Ever ready for such a failure Morgan told his fellows that he would quickly put them out of their present discomfort if they would but trust him. He obtained a canoe and with a white flag at its stem he sent it along to the fort with a demand for its surrender; if the defenders refused, he would take it by force and put every man to the sword. Such was the terror of Morgan's name that the commander, after some delay, sent emissaries to treat with the pirate leader, suggesting that, for the credit of the commander, the English should make a show of attacking the main fort

and town, but not using bullets in their muskets!

Morgan agreed and so St. Catherine's with its neighbouring island and nine forts was surrendered without further delay. Morgan's men had been on short commons and were exceedingly hungry. In a very short time the whole of the domestic stock had been eaten and then they sent out the men folk of the islands to forage for wild animals, whilst the women and children were locked in the church.

Whilst this search for food went forward Morgan visited the nine fortresses and secured all their ammunition and such guns as he thought worth while taking aboard. Then he demanded some outlaws from Panama who knew the Isthmus and would be able to guide him. Three fellows stepped forward and they agreed with alacrity to lead Morgan to the city of Panama upon his promising them a share of the plunder and also that he would set them free on Jamaica, or some other suitable island, at the end of the enterprise.

It now seemed to Morgan that he might hope to begin upon the real object of his expedition, yet he was afraid that if he appeared in force in the Chagres River to take the forts which guarded it, he would so arouse the suspicion of the Spanish as to his

final ends that word would be carried across the Isthmus. He, therefore, detached four ships and a boat under Captain Brodley with instructions to take the castle which commanded the entrance to the Chagres River. Brodley, Morgan's second-in-command, was chosen for what was no easy undertaking, since the castle was perched on a hill which had been rendered exceptionally capable of defence, whilst the guns commanded the mouth of the river and some distance to sea. In addition, a deep moat surrounded the castle, entrance being gained to the fortress only *via* a drawbridge.

The Spaniards seem to have been well prepared for the coming of the pirates, and when their ships entered the estuary they were met with a heavy discharge of artillery. Possibly it was ill-directed as there is no mention of damage to the pirate vessels, and the landing of the bulk of the men was carried out with precision. Brodley's guides averred that, whilst an attack would be difficult, they knew the best way of making it. The pirates were then led across an open space where they suffered greatly from the fire from the landward bastions. For a time the advance was stayed and the Spaniards began to congratulate themselves on having checked, if not stopped entirely, the onset of these hardy venturers. Certainly it did appear that here they had met their match at length. But the Spaniards could not know quite the spirit which animated these desperate

fellows. They were callous, cruel, bloodthirsty—all these, but of their bravery there can be no question. There was the constant urge behind them not to let down their friends, and doubtless they rather dreaded what Morgan would say—and do—if they returned from the castle at Chagres without having reduced it. Life was cheap in those days and no commander, whether of pirates or otherwise, ever hesitated to throw men into a breach. So it came about that the buccaneers decided to try again, despite the fact that their losses had been very heavy. On this second attempt a most extraordinary accident helped them more than they could have foreseen or hoped. An arrow from the castle pierced the breast of one of the attackers. Without a moment's hesitation the fellow, suffering intense pain from a jagged wound, pulled out the barb, wrapped it round with cotton and forced it into the barrel of his still smoking musket. Then he took aim at a man on the wall of the castle. Apparently his shot missed the man, but it did far greater harm and began the downfall of the Spaniards, though they were unaware of the fact. In rushing through the musket barrel the friction of the passage of the arrow apparently ignited the cotton and when the arrow struck the roof of a palm-thatched building in the castle it began to smoulder. Then, helped by a favouring breeze, the fire spread without the Spaniards, intent on their defence, noticing it. Too late they tried to put

out the fire, which quickly spread to the stout wooden pallisade. This was soon blazing furiously, and in turn caused the earthworks, which the stakes supported, to fall towards the pirates. The dense smoke helped the attackers and it was now almost impossible to see them at all. Slowly they crept up the slope, having crossed the moat by some means, and as they ascended, they picked off the defenders until a breach could be made in the pallisade; through this they swarmed.

Up to this point they had been actually egging the English to come on, calling them dogs, and promising that they should go no further on their way to Panama, (already their objective was known), taunting them until the pirates became even bolder than they would have been.

Knowing that quarter was not likely to be extended to them after so game a struggle the Spanish leapt from the castle walls into the sea, preferring to drown than to be tortured. A few of the defenders, under the governor of the castle, retreated to the strongest of the towers, resolved there to sell their lives dearly. But the defence was soon ended, a well directed shot piercing the governor's brain. With the governor dead, the rest of the defenders surrendered. Out of over 300 Spaniards only 30 remained alive, and either because of their gallant defence, or from the fact that they gave the victors full details of what had transpired at Panama, how their coming was known, and how steps

had been taken to form an army to ambush the pirates, they were spared.

The pirates lost close upon 200 men, more than half that number being killed, so that the victory was dearly bought. Yet Morgan knew perfectly well that it would have been unsafe to have forced a passage up the river whilst leaving the castle in the hands of the Spanish.

News of the victory was sent to him and very soon his fleet was anchored in the Chagres River. Later the pirates took all the provisions they could lay hands upon, and then set off up the river.

Morgan came very near to disaster when entering the Chagres River. He and his men were so overjoyed at seeing the English flag waving from this stout castle that they relaxed their discipline and so gave less attention to the pilotage of the ships, with the result that four of them, including Morgan's own vessel, went so badly ashore that they could not be re-floated, and only by good fortune were the crews and munitions saved. There followed a storm which finished the breaking up of the ships, so that they were lost entirely. This was not such a disaster as may first appear, Morgan had already lost many of his men in the fighting and particularly from disease; in addition, it was necessary to leave a strong garrison at Chagres Castle. For the ascent of the river the ships were useless; all that they were needed for now was to take

home the victorious pirates and the treasure—when obtained. There was a small fleet of Spanish vessels in the harbour; these were taken, and, far more valuable than the larger vessels, were some much smaller craft which the Spaniards used to bring down the products of the country for shipment to Europe. These were exactly what Morgan needed for the next stage of his venture; he also wanted many canoes, and these again were to his hand, so that with the boats from the ships he had a flotilla capable of taking up river all the men he could spare from the defence of Chagres Castle.

In order that the castle should be able to withstand a siege from any Spanish ships which might be sent for the purpose whilst Morgan was away, the prisoners were set to work to make good as much of the damage as possible, particularly to replace the burnt out pallisade.

At last Morgan set out by canoe and boat, taking with him twelve hundred men. Believing that he would be able to feed his men *en route* the commander ordered them to travel light. Two days by water brought them to the point where further progress was impossible, save for extremely light canoes. Leaving 160 men in charge of the boats Morgan then commenced his march, having been warned that he must expect to be ambushed by the scouts sent out by the governor of Panama. A portion of his company was still proceeding by water on the fourth day. The Spanish had

cleared the country of everything eatable and now the pirates were suffering intensely from lack of food, so much so that when they came upon a deserted camp of the Spaniards, they fell to quarreling upon the division of some leather bags which they were constrained to gnaw to satisfy, in some degree, their great hunger. Had it not been for the fortunate discovery of some bags of meal, which the retreating Spaniards had attempted to hide, it seems probable that the invaders must have abandoned their enterprise, for many of them were now so weak that they could not struggle along the difficult path. Later they found a barn full of maize and so great was their hunger that they fell upon it eating it dry—a very unpalatable meal.

Morgan's greatest concern now was to capture either some Spaniards or Indians in order that his men might be led to some food of a suitable nature. Day by day his fellows were getting weaker and were in no fit condition to beat off an attack, nor could they make much progress, though it would appear that the weakest of the men were paddled or towed along the river in canoes, which means that Morgan was compelled to follow the tortuous windings of the stream instead of taking a more direct route for Panama.

On one occasion they fell into an ambushade and lost several men from the arrows of some Indians. Strangely enough this was welcomed rather than the reverse as it seemed to prove to

Morgan that he was not far from the villages of the natives where he might hope to get some food. Some of his men leapt into the stream, crossed and pursued the Indians with the idea of making captives from whom guides to the villages might be obtained.

On the seventh day of their march which was accompanied with many complainings from the sick and the

weak, they saw smoke ahead. This, their guide said, was the village of Cruz, the head of the navigable river. Hurrying along as fast as they could they came to the village, only to find it deserted and the smoke arising from the burning houses. Not a scrap of food could they find, nor yet a beast, save cats and dogs which had been left behind; these they killed and ate.

(To be continued.)

PEDAGOGUES AND PUBLIC HEALTH.*

BY MR. P. G. G. UNNITHAN, M.B.B.S., B.S.SC., D.P.H., D.T.M. & H. (ENG.),

Madura.

I THANK the organisers of this Conference for the opportunity given to me to talk to you, the members of the teaching profession assembled here this afternoon, and through you to a wider circle of your co-professionists, on the nature and importance of the contribution which you can make towards the promotion of public health. I consider that for making a substantial contribution in this direction you are situated in a more advantageous position than any other group of people. Barring the home and the parents, the school and the teachers exert the greatest amount of influence over the younger generation. It is during the most formative period of their life that they are committed to your care and you can "strike the iron while it is hot." Their minds are like clean slates on which you can write whatever you like and that which is written there first will have a very important and lasting effect in their after-life. It is this privilege which you enjoy that enables you to build up a strong and healthy public opinion which is the most

powerful factor in the success of our public health activities.

If you now impart to the students sound and scientific ideas regarding the mysteries of life and death and implant in them a desire to use scientific methods for devising ways and means for the promotion and preservation of our health, then these ideas will be really "oaks in acorns" and in later years would form invaluable assets in the creation of a public opinion which would demand the utilization of all scientific advancements for the improvement of public health. By creating in students proper and scientific attitudes and habits in relation to health we can secure through them, greater rationality in our customs, conventions and laws affecting health. This is one aspect of your contribution towards the improvement of public health.

There is another aspect which consists in the improvement of the health of students directly and of the general public indirectly.

Before I attempt to tell you what are the various things which you can do to achieve these objects, let me say a few words regarding public health work in general. Improvement of public health is undoubtedly one of the methods for the furtherance of our well-being and happiness. But I am afraid, many have not yet appreciated the fact that it is not merely one of the methods, but is the most important and the only method that can ensure our uninterrupted progress and prosperity. When we study the multiplicity of factors that play a part in the promotion of human welfare we soon realise the fact that the condition of the human machine is the vital element in the progress of mankind, the rate of which is determined by the soundness, strength and stamina of this marvellous little machine. In the problem of human welfare, improvement of man himself is therefore of paramount importance and the question of affording him facilities for his progress is only a matter of secondary importance. Heredity and environment are the two fundamental factors that determine the inherent strength or weakness of the human machine and its potentiality for achievement. Improvement of man by improving his heredity and environment is the aim of public health work which now occupies a foremost place in the programme of welfare work in every progressive country. As has already been said, the success of public health work is in direct proportion to the extent to which the public is willing to co-operate whole-heartedly in this work. An elaborate administrative machinery may be set up to handle this work and large amounts of money may be spent year after year for this purpose, but if there is lack of appreciation of the work on the part of the leaders of public opinion then all

our efforts are doomed to failure in the long run. Creation of an enlightened public opinion which can fully appreciate the all-important nature of our work is the key-note of our success in public health activities. It lies in your power to contribute a great deal towards the creation of such a powerful factor so essential for our success. You can do it by impressing upon your students and those with whom you come in contact, the principles of healthy living. Before you attempt to do it, it is of course necessary that you should learn these principles yourselves. In the case of some of you, I am sorry to say, it may also be necessary to unlearn many things which ignorance and superstition have taught us. It is only during recent years that we were able to know the causation, mode of spread and methods of prevention of various diseases that are prevalent among us. Before this knowledge was acquired, people, naturally enough, believed that diseases were caused by some supernatural element. There is no justification for us to think that they were stupid in believing like that, because our present methods for unravelling the causes of these mysterious happenings, were not then available. Stupidity consists in our still entertaining such beliefs when they have been shown to be thoroughly erroneous. Such beliefs we have to unlearn and that as quickly as possible. We should replace those old beliefs with new ones based on scientific knowledge which gives us correct ideas regarding the various factors that can make or mar our physical and mental well-being.

To appreciate fully the value of these new ideas it is necessary to have implicit faith and unwavering belief in certain fundamental facts relating to us. These are axiomatic truths which should quite unconsciously occur

* A Paper read at the Provincial Educational Conference at Madura.

will give you lot of useful information on these subjects. Having given you a general idea of public health work, let me now tell you in particular what you can do for its improvement :—

1. Believe in modern public health work yourself.

2. Get from reliable sources as much information as possible about the laws of healthy living and pass it on to your students and to those with whom you come in contact.

3. Impress deeply upon your students and others the fact that prevention of diseases and promotion of health can never be brought about either by talismans or miracle working cures or by following the advice of quacks, and that they can be brought about only by the every-day application of scientific knowledge relating to the laws of healthy living.

4. Render as much help as possible to the Health authorities in popularising vaccination and protective inoculations against diseases like cholera, plague, etc.

5. Encourage the prompt reporting of cases of communicable diseases to the Health authorities.

6. Tell your students the story of the microscope and its marvellous achievements which have enabled us to look into the world of micro-organisms which were hidden from our view till recently and to learn a great deal about our friends and foes inhabiting the microscopic world.

7. Tell your students stories about the life and work of pioneers of public health, like Pasteur, Jenner, etc., who are considered

as the greatest benefactors of the human race.

8. Try your best to root out from the minds of our people all superstitious beliefs regarding the causation of diseases.

9. Look after the cleanliness and sanitation of your class-rooms and schools.

10. Teach your students the elementary principles of healthy living, both by example and precept.

In conclusion let me invite your attention to the fact that schools and colleges are no longer considered as mere store-houses of knowledge on various subjects and that your duty towards those committed to your care is no longer considered as merely teaching them a few subjects. There is a poem of Muriel Stuart which describes a seed-shop where, one who can realize the hidden potentialities, sees the dry grains and says:

" Meadows and garden running through my hand

In this brown husk a dale of hawthorn dreams
A cedar in this narrow cell is thrust
That will drink deeply of a century's streams.

Here I can blow a garden with my breath
And in my hand a forest lies asleep."

Such seed-shops are the schools and colleges and on their keepers rests a great responsibility because on them depends the extent to which the hidden possibilities can be unfolded. A portion of this responsibility is yours and the way in which you shoulder it will determine to a great extent the progress and prosperity of our country in the welfare of which you and I are very vitally interested.

TEACHING OF ARITHMETIC.

BY MR. V. SANKARA AYYAR, M.A., L.T.

Ambasamudram.

NEED FOR THE ARTICLE.

WHEN exactly two years ago from this date, I was first sent to handle classes in a Training School—though only of the Elementary Grade—I was deeply struck by the comparative want in them of an understanding of the principles underlying the various operations of Arithmetic which they were manipulating with varying degrees of skill and elegance. I found them immensely satisfied if they were given several types of questions with the steps that should be set down in attacking each. They were not only not eager to know the rationale in attempting questions but even went to the length of feeling that they were being taught things that were not quite necessary for a pass in the examination. An instance may make my point clear. "A person pays Rs. 23-3-3 for 15 copies of a certain book. How much did he pay for each?" In attempting to solve this evidently simple question they should be definitely told if it was a case of multiplication or division. They did not show any sort of eagerness to find out for themselves which operation it was that was applicable to the problem to be solved.

Not that I have found this attitude in evidence in teachers under training only. Even trained teachers in independent charge of classes have been found to be satisfied with a parrot-like repetition of what they remember to have themselves been taught or of what they find in others' works. The

other day, I was surprised to find in a four line verse set to a child for memorising—mere memorising without any attempt at understanding—no fewer than four mistakes either of spelling or of grammar or both. This, I presume, is due to a lack of interest in the teacher to try to give to the children under his charge just that and that only which he knows to be correct. He will always have to bear in mind that it is no good for the blind to try to lead the blind.

It may be that in the village where you have got to work you have to satisfy parents who judge you by the quantity of work their children appear to turn out in school. But you should always remember that it is only the quality that will tell in the end. It has generally been found very difficult for grown-up men to forget what they have badly learnt as children—தப்பது for முப்பது; மமோபாத்த for மமோபாத்த, etc. So it will be the duty of the teacher of young children to be thorough with what he intends imparting to them and with how best he can do it.

In bringing this charge of inadequacy for his task against the teacher I may be accused of generalising from insufficient data. But I may tell you that the two experiences quoted above, I came across in parts of this Presidency about 500 miles apart from each other and as in the Tamil proverb about the test of boiling rice I think I am right in presuming that my diagnosis is correct.

NEED FOR KNOWLEDGE OF THE PLACE OF MATHEMATICS IN THE SCHOOL CURRICULUM.

The usual invocation to the Guru in our land runs :

अज्ञान तिमिराण्डस्य ज्ञानाञ्जन शलाकया ।

चक्षुरुन्मीलितं येन तस्मै श्रीगुरवे नमः ॥

The teacher is here compared to a physician who heals you of your ignorance. Even as a physician with a poor knowledge of diagnosis and treatment would compel the public to avoid him, so also a teacher without proper equipment would be put down by the public as inefficient and therefore as of little use. Hence it is but fair to expect in the teacher a knowledge of the place of the several subjects in the curriculum, in addition to a thorough grasp of the fundamentals of some at least of these, if not of all. I shall, in this paper, confine myself to Mathematics and particularly Arithmetic, its place in the school curriculum, some essential and useful concepts in this branch of human knowledge and the applications of these in other branches as well.

VALUE OF MATHEMATICS.

Considered historically Mathematics is a subject which has been taken as one of the departments of knowledge, initiation into which is sought to be given to the human child even in its infancy throughout the world. The Tamil saying, “என்றும் எழுந்தும் எண்ணாத தரும்” bears testimony to the prevalence of this view in the Orient and in the Occident we find great stress being laid on the Three R's, in the elementary stage of education.

UTILITARIAN VALUE.

Much time and space need not be spent over a consideration of the utilitarian value of

a study of Mathematics, for it is a well known, well recognised and well established fact that a man who could boast of any education will be the butt-end of all ridicule if he should betray ignorance of the elementary principles of Arithmetic. From the milkman to the millionaire, from the scavenger to the king, all have to know something of the calculations of Arithmetic if they want to get on well in this world.

CULTURAL VALUES.

Coming now to the cultural side of the value of a study of Mathematics, it trains us in habits of clear thinking, neat analysis, fine reasoning and correct expression. No problems in Mathematics, why, no problem in Arithmetic can be attempted with any hope of success unless the full import of the problem is understood and this requires clear thinking without which it may end in confusion. Loose thinking will always land the student of Mathematics in difficulties which he may afterwards find very difficult to surmount. Take, for example, a problem like this: “A, B, & C, start for an excursion with Rs. 35, Rs. 20 and Rs. 40 respectively on the understanding that the expenses of the trip should be divided equally among them. On return they find that A and B are each left with Rs. 10 while C returns with Rs. 30. Find who should pay whom and how much to make the account square.” Unless we think out clearly it may not be possible to answer this seemingly simple question correctly and loose thinking will lead to all sorts of incorrect answers.

Again the question will have to be clearly analysed as to what is given and what has been asked to be found out and this requires skill in stripping up of the veil of language

and setting and laying bare the arithmetical operations to be performed in solving it.

After this neat analysis of the problem comes the fine reasoning that will lead one from what is known to what is desired.

After all this, comes the final stage of recording or in correctly expressing all the various stages in the solution of the problem. Constant drill in solving problems in Mathematics trains one therefore in habits of clear thinking, neat analysis, fine reasoning and precise expression.

Mathematics is also reputed to be the most exact among the sciences and a training in Mathematics makes a man aim at exactitude in whatever he does. Thus we see that a study of Mathematics besides being of value on the utilitarian side has a cultural value of its own.

NEED FOR CORRELATION.

To make the children derive the maximum benefit on these two counts out of a study of Mathematics the teacher must be conversant not only with the fundamentals of his own subject but also with the bearings of his subject on others in the school curriculum. The claim of any subject to be ranked as a science is judged by the number of contacts it can establish with Mathematics, *i.e.*, by seeing how far that subject can be treated mathematically. The problem of fatigue and the question of intelligence are now being studied mathematically and bio-metry is the science of the growth of living bodies studied mathematically. Such being the signs of the times topics on Elementary Science, Nature Study, Geography, etc., can all be very easily and more effectively taught if the mathematical back-ground behind them is properly

understood. In the following pages, therefore, an attempt will also be made to set forth in detail the mathematical back-ground of some of the more useful concepts that are attempted to be conveyed to school children.

THE NUMBER CONCEPT.

First and foremost among these concepts is the number concept. What do we mean by number? Why do we require it? How do we use it? How many of them are there? These are some questions that will suggest themselves to us as we read about number. “Number is an indefinable something which characterises certain collections or classes” In comparing collections with regard to their number an easy way is to see if there is between them what is generally known as one-to-one relation.

ONE-TO-ONE RELATION.

Suppose there is a monogamous community like the Christians. Then we can say without going through the tedious process of counting that the number of husbands is the same as the number of wives. For, in that community corresponding to every husband there will be one and only one wife and for every wife one and only one husband. The relation of husband and wife under such conditions is what is called an one-to-one relation. Two collections are said to contain the same number when there is an one-to-one relation which correlates each of the terms of one class, with one and only one term of the other class in the same manner in which the relation of marriage in a monogamous community correlates the collection of husbands with that of wives. Thus this definition of number gives the meanings of the numbers 2 and 3 as the common characteristics of couples

and two's respectively and similarly for the other numbers.

OCCURANCE OF FRACTIONS.

Having thus seen the meaning of a natural number we shall just consider the use of these. After their abstraction they can be and are used in measurement and for this we require what are termed "units of measurement" depending upon the nature of the thing to be measured. Thus for instance, for measuring time we have the day as the unit; for money, the rupee, etc. In practice we find while we try to measure with these units that the quantity we have to measure does not always contain the unit or the standard an exact number of times. We then choose smaller units—a definite part of the primary unit—and then use these in measuring the excess. Even as the primary units require to be subdivided into smaller units, the whole numbers, as we have got them, not being adequate to represent the number of units in the quantity measured we invent another kind of number *i.e.*, the fraction. We have seen how the relation between the primary unit and its sub-unit is not always a fixed one; thus in the case of the day and the hour it is 24 to 1, the day and the Ghatika or Naliga 60 to 1, the rupee and the anna 16 to 1 and the foot and the inch 12 to 1. In the same way the relation between unity and the fraction of it that we take to express the difference in, may be any convenient one depending upon the needs of the occasion. In the particular instance in which we take this relation to be some power of ten we call the fraction a decimal fraction. The advantage of the decimal fraction over the ordinary fraction is that all the rules of operation for integers may be applied with only slight changes for operations on decimals.

NUMERATION FOLLOWS THE DECIMAL SYSTEM.

In passing it may be observed that in the ordinary notation for whole numbers, each digit has got two values; one an intrinsic value which is constant and the other the local or place value which is dependant upon its place in the number *i.e.* if we take the number 55555 and if we number the digits from right to left, the intrinsic values of all the digits there, are the same but when we come to the place value

that of the	1st	5	is a	5
"	2nd	5	;	fifty or ten times 5
"	3rd	5	;	500 or ten times 50
"	4th	5	;	5000 or ten times 500
"	5th	5	;	50000 or ten times 5000

so on or putting it down in the reverse order the place value of the 5th 5 is 50000

"	4th	5	;	5000
				or a tenth of 50,000
"	3rd	5	;	500
				or a tenth of 5000
"	2nd	5	;	50
				or a tenth of 500
"	1st	5	;	5
				or one tenth of 50.

If now we have a similar notation for the fractional part, where the relation between unity and the unit fraction is ten or powers of ten, this same relation will hold among the digits that the place value of any digit will be ten times that of the digit to its right and one tenth that of the digit to its left. Thus the rotation for the whole numbers as we use them follow the decimal system of notation. Hence it is that the rules for operations on decimal fractions are those applicable to integers with some slight changes.

THE IRRATIONAL NUMBER.

We have so far seen two classes of numbers, the whole number and the fractional number. There is a third class. Take for instance the number which when multiplied by itself gives 2. By a process of trial, we will find that this number lies between these pairs: 1.4 and 1.5; 1.41 and 1.42; 1.414 and 1.415; 1.4142 and 1.4143, etc., *ad inf.*, or we may say that this number divides numbers into two classes, an upper class and a lower class, the upper consisting of all numbers whose squares exceed two and the lower all numbers whose squares are less than two. Thus this number whose square is equal to two does not correspond to any number of the classes we have so far seen. Such a number is called an irrational number.

NUMBER AS DENOTING POSITION OF POINT AND CONVERSE.

These numbers, as we have seen, are used in measurement, and so in representing these in a way capable of easily appealing to the eye and hence of easy comparison we can use the straight line; and distances on this straight line as measured from a fixed point in a fixed direction will represent these numbers, or again these numbers may be indicated by the positions of the corresponding points on a line, *i.e.*, the whole numbers will correspond to mile-stones on a straight road and the other numbers, the fractional, and their rational, the distance from the original point to some point on the road intermediate between two mile-stones. We may just state this in other words. "To every number, integral, fractional or irrational, corresponds a point on our line and to every point on the line there corresponds a number, integral, fractional or irrational."

NUMBER OF NUMBERS COUNTLESS.

It is a matter of very common experience to observe that between any two points, however close to each other on a certain line, it is always possible to locate another point. Similarly also we can always find a number intermediate between any two given numbers however close they may be to each other. Extending this principle we can see that there are an infinite number of points on a line between any two points on it even as there are an infinite number of points on a road between any two mile-stones, and translating this in the language of numbers, there is an infinity of numbers between any two given numbers however close they may be.

Hence we say that the number of points on a line is unlimited and hence also the number of numbers is unlimited.

NUMBER GROUPS OR SERIES.

We have so far seen what numbers are, what they are for and how many of them there are. We shall now take up groups of numbers. Even as it is impossible to speak of an ill-ordered society, it is not possible to treat of disjointed groups of numbers. We shall therefore confine ourselves to groups among the members of which there is some sort of relation. Such groups are called series. Among these series there are two very familiar cases; the arithmetical series and the geometric series. Thus

- 1, 3, 5, 7, 9... The series of odd numbers.
- 2, 4, 6, 8, 10... The series of even numbers.
- 1, 5, 9, 13, 17... An ordinary arithmetical series where the common difference is 4.
- 1, 4, 16, 64, 256... An ordinary geometric series where the common ratio is 4.

SUM OF SERIES.

Each member of a group is called a term of the series. When the number of such terms is limited it is called a finite series and when the number is very large or countless the series is said to be infinite. Thus the series of odd numbers and the series of even numbers are infinite; while the series 4, 6, 8, 10, 12, 14, though consisting of even numbers only, is finite as it consists of a limited number, *i.e.*, of six terms. In the case of such finite series we can talk of the sum of the series. But in the case of infinite series like the series of odd numbers or of even numbers it will be foolish to talk of their sum; because even after the largest number that you have taken in the summing there will still be left a large number of odd or even numbers that would have been left out of consideration. Thus in the case of such infinite series it is not possible to speak of their sum.

Now we shall consider the series

$1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$ where each term is half the preceding one. The first four terms when added give $1\frac{7}{8}$ or $2 - \frac{1}{8}$.

The first five give $1\frac{15}{16}$ or $2 - \frac{1}{16}$.

" " six " $1\frac{31}{32}$ or $2 - \frac{1}{32}$.

" " seven " $1\frac{63}{64}$ or $2 - \frac{1}{64}$ and so on;

and as we go on taking a large number of terms the difference between the sum and two gets smaller and smaller. In this case we say that the sum of n terms of the series 'tends to 2' or the 'limit' of the sum of n terms of this series is 2; *i.e.*, by taking a sufficiently large number of terms, we can make their sum approach 2 as near as we want or we can make the difference between their sum and two as small as we please. 2 is by definition the

sum of this series. Similarly the sum of the series $1 + \frac{1}{7} + \frac{1}{7^2} + \frac{1}{7^3} + \dots$ *ad inf.* is $1\frac{1}{6}$

and of the series $1 + \frac{1}{13} + \frac{1}{13^2} + \frac{1}{13^3} + \dots$ *ad inf.* $1\frac{1}{12}$.

So now we have seen that while finite series have a definite sum, the infinite ones have either no sum at all or only what are called by definition their sum, meaning thereby that their sum cannot be got by taking any number of terms, but that the difference between the sum so defined and the sum of any number of terms can be made as small as we please by taking a sufficiently large number of terms. Similarly, in Geometry we say that the limiting position of a chord is a tangent meaning thereby that when the points of intersection of the circle and the chord approach one another, the chord approaches indefinitely near the tangent. A straight line may be regarded as the limiting position of a circle when the radius is indefinitely increased.

APPROXIMATION.

Reverting again to number as used for measuring, either because of impossibility of exact measurements or because such exact measurements are not of much practical utility, we are generally content with finding the approximate value of the quantity that we measure to varying degrees of approximation depending upon our requirements and the nature of the quantity measured. Thus while weighing out firewood the weight of a piece of wood which may come to some palams is neglected, while in weighing gold even the turning by a hair's breadth of the pointer is not tolerated. Again the distance between any two houses in a street may be

measured variously by different people, the difference running up to several inches; but in measuring out a piece of costly cloth even a quarter of an inch either way is not permitted. The same person measuring out the same heap of rice may get varying amounts on different occasions. So all our measurements in this mundane world are but approximate and the difference between the real value and the approximate value as measured is called the error.

Thus taking some of the series we have already considered

$1 + \frac{1}{7} + \frac{1}{7^2} + \dots$ *ad inf.* will have as its sum

1'7 to the nearest tenth;

1'67 to the nearest 100th;

1'667 to the nearest 1000th
and so on;

and $1 + \frac{1}{13} + \frac{1}{13^2} + \frac{1}{13^3} + \dots$ *ad inf.*

1'1 to the nearest tenth;

1'8 to the nearest 100th;

1'083 to the nearest 1000th
and so on.

Though we have found the sum to be respectively $1\frac{1}{6}$ and $1\frac{1}{12}$ we find that we never get these values for the sum by actually summing up any number of terms. The sums may be taken variously according to the degree of accuracy that is warranted by the conditions of the problem. I use the word 'warranted' advisedly.

POSSIBILITY OF DIVESTING PROBLEMS OF THEIR COMPLEXITY AND ARRANGING ACCORDING TO THE NATURE AND TYPE OF STUDENT.

In this connection attention may be drawn to this advantage of mathematics over the other school subjects, *viz.*, problems and truths may be so neatly arranged here that they suit the age and stage of mental development of the people for whom they are intended.

For example in the first stages simple problems on the four rules can be suggested with no sort of complication and with the condition that all other things remain the same. But as the student gets older he may be taught the realities of the transactions in the world and then that even the conditions that were originally considered stationary are not really so and that they are alterable and that they should be changed. Thus in the first few classes of the school, the children will have to find the cost of a required number of articles by directly multiplying the price of each by this number. Slowly they may be taught to realise that as the quantity to be bought increases the rate falls down. The idea of commission, *i.e.*, getting 13 for the price of a dozen, etc., may be introduced at a time when they will be ripe to receive and retain such ideas.

NEED FOR CORRECTING ANSWERS.

Take now this question for example: I may require a thousand plantains: how much shall I allot for them when they are selling at 2 pies each? "The proper answer for this will be Rs. 10 not Rs. 10-6-8; because at 2 pies each I can get 100 plantains for a rupee though arithmetically I get only 96, and at a rupee per hundred the thousand fruits that I require want an allotment of only Rs. 10 and not Rs. 10-6-8 as arithmetic would give. Another type of question that is answered without any thought being bestowed on the limitations of the problem is "How many cows can be had for Rs. 250 if each should cost Rs. 60?" The answer should be 4 cows and Rs. 10 left over and not $4\frac{1}{6}$ cows.

ERROR IN DATA AND CORRESPONDING ERROR IN RESULTS.

Hence even as our measurements are but approximate the results of arithmetical

calculations with them will also give only approximate values for the quantities sought to be evaluated, the error always depending upon the error in the data given. For example, in giving the length as measured by a scale of a line as 1.42 cm. the digit in the second decimal place is got only by judging; and the true value may be anywhere between 1.415 cm. and 1.424 cm. Suppose we are asked to take a line ten times as long. This can be done in one of two ways: by taking this distance on a pair of dividers and setting it out on a straight line consecutively ten times or by measuring this line, multiplying it by 10 and then taking a line to represent this distance. Both the methods are mathematical; but the error in the measurement of the original line will be magnified ten-fold in the new one. The line that we draw by the second method will be 14.2 cm. while the one by the first method may be as short as 14.15 cm. or as long as 14.24 cm.—a difference of about half a millimetre either way.

CORRECTING OF RESULTS.

Thus with all our correctness in our calculations what we get as the result of our various operations is but an approximation to the truth and the nearer the approximation to the truth, the better the result. Hence in setting down the results of our mathematical operations we have got to study our data carefully and obtain from them an idea of the degree of accuracy in them so that we might know how near the truth our calculated results can be. Further in our attempt at accuracy we should not lose sight of the practical side of our result. An answer like 47 $\frac{1}{2}$ men will be appalling, and one like Rs. 4-10-5 $\frac{1}{2}$ looks bookish. In the first

instance the answer had better been put down as 47 or 48 according as the conditions of the problem would permit and in the second it would be wrong to set it down as Rs. 4-10-6.

PROPERTIES OF ZERO.

So far we have been considering numbers and the results of operations on them. We have not seen anything about the number zero and its wonderful properties. Before studying its properties we shall just see what it is. For a very long time there was no symbol for the zero that we now frequently meet with. This idea of zero though seemingly easy is very difficult of conception. Ordinarily in arithmetic by zero we mean 'nothing,' i.e., the result of the operation like 3—3. If it is really nothing we cannot think of operations on it or with it. Just to permit the possibility of such operations zero is usually defined as a number and is considered to be the result of subtracting any number from itself.

The result of $a - a$ is the number 0. Therefore also we have $a + 0 = a$, from the definition of subtracting!

A finite number is not altered by adding zero to it or taking away zero from it. When we come to multiplication by zero we remember that $0 + 0 = 0$ and $0 + 0 + 0 = 0$ Thus zero multiplied by any number gives zero and by the commutative law extended to zero, we have any number multiplied by zero gives zero as the result. Symbolically $a \times 0 = 0$.

Now let us come to *division of zero*. By the definition of division when we say that a divided by b gives c we mean that c multiplied by b gives a . If we apply this to

division by zero we see that if $a/0$ ($a \neq 0$) is to be b , b multiplied by 0 must give a ; but no number multiplied by 0 can give a . $\therefore a/0$ is meaningless or division by zero is an impossible operation.

Of course some people introduce infinity, (symbol ∞), at this stage by considering it as the result of the operation $a/0$, and write $a/0 = \infty$, which will however be misleading at the early stages and may give rise to loose thinking and loose expressions.

Let us consider 0 divided by 0. Giving this a concrete setting, I buy no land, for which evidently I pay no price; what is the price of the land per acre? "For aught one knows it may be a rupee per acre, a thousand five hundred per acre, a ten thousand per acre, or if the land be a sand desert which nobody cares to have, nothing at all per acre. Now changing this concrete form of the answer to the abstract we see that $0 \div 0$ is indeterminate. Putting these properties of zero symbolically we have

$$\begin{aligned} a + 0 &= a \\ a - 0 &= a \\ a \times 0 &= 0 \\ a \div 0 &\text{ is impossible} \\ 0 \div a &= 0 \text{ (obvious and hence not mentioned.)} \\ 0 \div 0 &= \text{anything—indeterminate.} \end{aligned}$$

OPERATIONS WITH AND ON INFINITY.

Now coming to properties of *infinity* defined as the limit of a variable which increases without limit, they are just like those of a Sadguru about whom Sri Sankara says:

दृष्टान्तो नैव दृष्टस्त्रिभुवनजठरे सद्गुरोर्नानदातुः
स्पर्शश्चेत्तत्र कल्प्यः सनयति यदहोस्वर्णताम्रमसारम् ।

नस्पर्शस्त्वं तथापि त्रितचरणयुगे सद्गुरुः स्वीयशिष्ये
स्वीयं माम्यं विधत्ते भवति च निस्पृमस्तेनवा लौकिकोपि॥

Even as the quantity of water in a vast ocean is neither increased nor diminished by the pouring in or drawing of a few buckets, this infinity retains its infiniteness when a finite number is added to or taken away from it and even when it is multiplied or divided by a finite number. When multiplied by infinity or divided by a finite number. When multiplied by infinity or divided by zero also it retains its infiniteness. The case is different when this infinity is multiplied by 0 or divided by infinity when it reduces to the form $0/0$ or ∞/∞ both of which are indeterminate. Thus we have for the properties of infinity the following:

$$\begin{aligned} \infty + a &= \infty & \infty + \infty &= \infty & \infty + 0 &= \infty \\ \infty - a &= \infty & \infty - \infty &\text{ indeter-} & \infty - 0 &= \infty \\ & & &\text{minate} & & \\ \infty \times a &= \infty & \infty \times \infty &= \infty & \infty \div 0 &= \infty \\ \infty \div a &= \infty & \infty \div \infty &\text{ indeter-} & 0 \div \infty &= 0 \\ & & &\text{minate} & & \\ a \div \infty &= 0 & 0 \div \infty &\text{ indeter-} & & \\ & & &\text{minate} & & \end{aligned}$$

INTRODUCTION TO CARTESIAN CO-ORDINATES.

So far we have seen something of numbers beginning from 0, the limit of a variable which diminishes without limit, to ∞ , the limit of a variable which increases without limit. We have also seen that these numbers can be represented by points on a line and conversely the position of any point on a line can be represented by its distance from a fixed point on it. In so doing the fixed point from which we take these distances is called the origin. If this origin should happen to be in the middle of the line, instead of at

an end, the distance of the point as also its position with respect to this origin—right or left, above or below, according as the line is horizontal or vertical—will have to be mentioned. Instead of noting along with the distance its direction it is customary to prefix to the distance the + sign if the point is to the right of or above the origin and the — sign if it be to the left of or below the origin. Thus a point 15 units to the right of the origin will be described as + 15 and one 10 units to the left as — 10. Similarly if our line is vertical + 20 will be a point on the line 20 units distant from the origin and above it while — 17 will be the point distant 17 units from the origin and below it.

NEED FOR MORE THAN ONE RELATION FOR FIXING UP MEN.

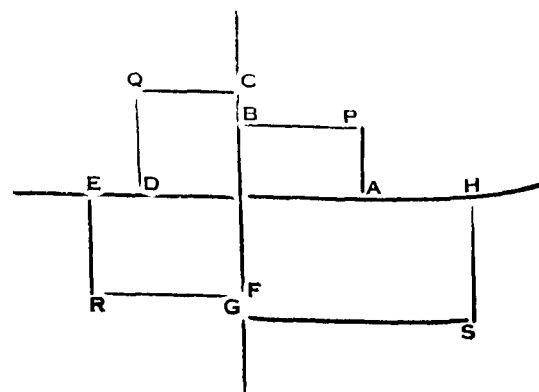
Now comes the question, how shall we describe the position of a point which happens to lie outside the line? Before we answer this question we shall see the meaning of some of our usages and see if any of them can be extended to describe the position of points in a plane. A little thought over the purpose in naming an object or a person will convince us that it is intended merely to distinguish it from others. Further thinking will also show us that mere name is not sufficient to denote precisely the particular individual we mean. For example, in a place like Kalladakurichi if one should ask for Sankaran, he will be answered with the query, which Sankaran, please? Then you have to give either his father's name which in most cases fixes up the person or the street in which he lives or some other further detail which will help fixing him up.

Similarly it is a matter of common knowledge that in order to find out a house in a

town we require the name of the street in which it is located and its number in the street. When we are posted to a new school how we generally identify the boys till their names are known is by remembering his seat like this: "You are the fifth boy in the third row." In the same way the position of a tree in a plantation will be sufficiently clearly described if we know the row in which it stands and its position in that row. From all these we can see that to fix up anything at least two things should be known about it because there may be any number of objects or persons answering to the first description and the second will serve to spot out the required one from among these.

CARTESIAN CO ORDINATES.

Applying these principles to fix up the position of a point in a plane what we now require is two relations that it bears to some known things in its neighbourhood. For this purpose we just take some two lines at right angles as lines of reference. The distances of the point from these two lines will easily fix up the position of the point. Thus the position of the point P will be determined if PB, PA and the directions in which



they are measured are known. It is the convention to mention in the first instance

the distance from the vertical line and then, that from the horizontal line bearing also in mind the other convention we have already referred to regarding directions. Thus in the case of Q and R the distances from the vertical line will be preceded by the — sign? in the case of R and S those from the horizontal will be preceded by this sign, the remaining distances being put down with the + sign before them. Though mathematically it looks as though only two relations are given, careful observation will show that there are really four relations that are given; two distances and two directions.

EXTENSION TO LOCATION OF POINTS ON THE GLOBE.

If only the principles mentioned in the foregoing paragraphs are borne in mind much of what is found to be difficult of conception and of explanation of the methods of fixing up the positions of places in Geography would have been got over. The only additional points to be observed are that instead of a plane we have the surface of a globe which is said to be almost spherical and that therefore the lines of reference instead of being straight lines are circles and that distances along these circles instead of being measured in miles, etc., are measured in what are called degrees of arc.

ANGULAR DISTANCES.

This naturally entails some new ideas, which it should be our aim to grasp. In measuring distances along the circumference of a circle it is usual to suppose the circumference to have been divided into 360 equal parts, each part being called a degree of arc; each degree is further subdivided into 60 equal parts, each of which is called a minute

of arc and each minute of arc is again for purposes of accurate measurement divided into 60 equal parts, each of which is called a second of arc. Thus we have

$$60 \text{ seconds} = 1 \text{ minute}$$

$$60 \text{ minutes} = 1 \text{ degree of arc,}$$

$$360(^{\circ}) \text{ degrees} = 1 \text{ circle.}$$

This method of measuring distances may seem arbitrary because the length, in lineal measure, of a degree of arc will vary with the size of the circle. But a little reflection on the meaning of this sort of division will convince us that, after all, it is not so arbitrary as it strikes one at first because these measurements give the magnitudes of the angles that these several arcs subtend at the centre of the circle. Thus the length of say 45° of arc on a circle of 2" radius measured in inches will be different from the length of 45° of arc on a circle of 3" radius; but the angles that these arcs subtend at their respective centres will both be 45° in magnitude. Thus to represent the position of a point on a circle we simply mention its angular distance, as it is called, from some fixed point on it.

CIRCLES AND GREAT CIRCLES.

Coming now to the fixing of the positions of points on the surface of a globe or sphere, the first thing that we should note is that the section of a sphere by any plane is a circle and all sections by planes passing through the centre of the sphere—and these are called great circles—are equal circles. Though these circles and great circles are sections of a sphere by one plane or another we may just take them as circles described on the surface of the sphere. We may also observe that these great circles on the sphere correspond to straight lines on planes,

Now we have only to extend our principles for fixing positions of points on a plane to the fixing of positions on the surface of a sphere. The straight lines at right angles on a plane will be replaced by great circles on the sphere cutting each other at right angles and distances measured in linear units by distances measured in angular units. This much for points on any sphere.

THE EQUATOR AND THE PRIME MERIDIAN.

For fixing up the positions of points on the surface of the earth, its spinning like a spindle gives us two convenient fixed points on it that help as much in choosing one of these lines of reference. These are the ends of the axis about which the earth spins. These are called the Poles. The great circle which passes midway between the poles—and this is called the equator—is taken as one of the lines of reference by all the nations of the world. But as regards the other one, each nation chooses its own line which is determined by the great circle passing through some point in its own territory and the Poles. Thus our ancients had Ujjain for their territory line and now Greenwich, a part of London, is taken by the English, Paris by the French, and so on. This second line of reference is called the Prime Meridian to distinguish it from other meridians. By the meridian of a place we simply mean the great circle passing through that place and the two Poles. Now a study of a globe with the equator, some meridians and the Poles marked on it will show that the distance of either Pole from the equator along any meridian is 90° and that the distance between the points of intersection of any meridian with the equator is 180° along the equator.

LATITUDE AND LONGITUDE.

Thus to fix the position of a place on the surface of the earth, what we do is this: we take the meridian of the place, find the distance of the place along this meridian from the equator and the distance along the equator of the foot of this meridian from the foot of the Prime Meridian. The distance of the place along the meridian is called the Latitude of the place and this will have to be measured either North or South as the measurement is always towards a Pole. The other measurement will be so many degrees, etc., East or West of the Prime Meridian and this is called the Longitude of the place. Thus corresponding to the four relations that we give for fixing the position of points on a plane, we have four relations for fixing the position of a place on the surface of the earth: two with the Latitude, the distance and the direction North or South and two with the Longitude the distance and the direction East or West.

THE ZODIACAL BELT AND ITS DIVISIONS.

These same principles are applied in the fixing of the positions of the heavenly bodies in the sky. We have already seen how distances along the circumference of a circle are measured by what are called degrees of arc and how there are 360 of them in the whole circumference. When the positions of the sun, the moon and the heavenly bodies called the planets are observed through a cycle—varying with the heavenly body—it is found that they are generally found to lie in what is commonly known as the zodiacal belt and this belt is divided for the sake of convenience variously into 12 equal parts each comprising 30° and called a *Rasi* or Sign and into 27 equal parts

each comprising $13^\circ\frac{1}{4}$ corresponding to an asterism of the Indian Almanac. The motion of the Sun among the Rasis gives the names of the solar months as Mesha, Vrishabha, etc., and the motion of the Moon among the asterisms gives the Nakshatra of the day as Aswini, Bharani, etc.

THE PANCHANGAM.

The Indian Almanac which is generally called the *Panchangam* is so named because of the five essential details that it gives for each day. The five elements of the Panchangam are *Thithi*, *Vara*, *Nakshatra*, *Yoga* and *Karana*.

VARA.

Of these the *Vara* or the day is named after one or other of the seven heavenly bodies, the Sun, the Moon, Mercury, Venus, Mars, Jupiter and Saturn, the name being determined by the following rule: Each solar day is divided into 24 hours or Horas and each Hora is supposed to be presided over by the heavenly bodies in the order of their distances from the earth; viz., Saturn, Jupiter, Mars, the Sun, Venus, Mercury and the Moon. The day is named after the body who governs the first Hora after sunrise on the particular day. From this rule it can be seen that the day sacred to the Sun—Sunday—is followed by the day sacred to the lord of the 25th Hora, i.e., to the Moon—Monday—and this again by the day sacred to the lord of its 25th Hora, i.e., to Mars—Tuesday—and so on giving the order of the days of the week and the heavenly bodies sacred to them as follows:

Sunday	ஞாயிறு	The Sun	Ravi
Monday	திங்கள்	The Moon	Indu
Tuesday	செவ்வாய்	Mars	Bhauma
Wednesday	புதன்	Mercury	Saumya

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Thursday	வியாழன்	Jupiter	Guru
Friday	வெள்ளி	Venus	Bhrihu
Saturday	சனி	Saturn	Sthira

Says the author of the *Surya Siddhanta*:—

मन्दादधः क्रमेणस्युः चतुर्था दिवसाधिपाः ।

* * *

होरेशाः सूर्यतनयात् अघोषः क्रमशस्तथा ॥

* * *

“Arrange the heavenly bodies in order of their distances from the earth beginning from Saturn. A day sacred to a heavenly body will be followed by a day sacred to his fourth. They will rule over the several Horas in this order.”

THITHI.

Coming now to the *Thithi*, it may not be out of place to mention here that the Tamil equivalent for date is but a corrupt form of this Sanskrit word *Thithi* and *Thithi* in its Sanskrit sense is used to denote the dates of the months in parts of our Presidency like the Andhra Desa where the lunar months are in vogue. We shall have occasion to refer to solar and lunar months later. *Thithi* is translated into English as the age of the moon.

CONJUNCTION AND OPPOSITION.

The question is, from what time? It is from the last New Moon or the last *Amavasya*. As we have already pointed out the heavenly bodies are found to be moving amongst the stars in the sky and in their passage through the heavens they sometimes happen to be together, i.e., at the same distance from our origin of co-ordinates on the zodiacal belt and sometimes to occupy diametrically opposite positions. In the first instance they are said to be in conjunction and in the second they are said to be in

opposition. When the Sun and the Moon are in conjunction we have our Amavasya or New Moon and when in opposition our Poornima or Full Moon. The Thithi is judged by the distance of the moon from the sun. So, then, in order to calculate the Thithi on a certain day we should know definitely the positions of the sun and the moon on that day. We shall now see how these can be found out for any particular day.

DISTANCE OF THE SUN FROM MESHA ON ANY DAY.

It is a matter of common knowledge that the several months of the year are named in two different ways: Mesha, Vrishabha, etc., and Chaitra, Vaisakha, etc., and that Mesha and Chaitra are not coincident nor Vrishabha and Vaisakha, etc. Are the years of varying lengths then? Do they not consist of only twelve months? These are some questions that crop up. The answer to these questions is that all these depend upon which of the luminaries you take to be your guiding factor. If the sun is taken, the year is defined as the time taken by the sun to complete his circuit in the heavens once, i.e., starting from the origin—which is called the Mesha Adi—to come back to it again. This takes about 365 days 5 hours and odd. The months are not all of the same length of time, each being determined by the time taken by the sun to cover the particular Rasi, which is roughly 30 days. Thus, when the sun is in the Vrischika Rasi or Sign of Scorpio we have the Vrischika month; when in Dhanus or Sagittarius the Dhanur month, etc. So, then, to find the position of the sun on any particular day, say the 17th Adi (Karkataka): Beginning from Mesha the sun has traversed through the three Rasas, Mesha, Vrishabha and Mithuna giving 90° and for the 17th

day of Adi it is approximately the 17th degree of Karkataka or the sun is 107° from Mesha Adi. Similarly the position of the sun on any desired date can be found.

NAKSHATRA GIVING THE MOON'S POSITION.

Now, coming to the position of the moon, she completes one round among the stars in about 27 days, and the position of the moon can be ascertained by observing during any night her position with reference to the asterism in which she is found. Suppose, on the night of the 16th Adi she is found to be in Sathabhishag (षाढा) or the 24th asterism. At day-break, on the 17th her distance from Mesha Adi, our origin, will be $23 \times 13\frac{1}{2} + 6\frac{1}{2}$ or 313° nearly. So, on this day, at sun-rise the distance of the moon from the sun will be $313^\circ - 106^\circ$ or 207° .

CALCULATION OF THE THITHI.

Also the moon completes one round relatively to the sun in approximately 30 days. Hence it moves through 12° in one day relatively to the sun. Thus 207° divided by 12 gives 17 and odd as the number of days that have lapsed since the last New Moon. Hence on the 17th Adi, it is 17 and odd or the 18th day which is the third after Poornima roughly. Thus the Thithi at sun-rise on the 17th Adi is Bahula or Krishna Thrithiya which may be found to agree with that given in the Panchangam. Thus the Thithi on any day can be found out by dividing the distance of the Moon from the sun by 12.

THE NAKSHATRA.

The Nakshatra on a particular day is the asterism in which the moon appears to be on that day and as can be observed directly it is Sathabhishag or Sathayam. Of course this method will fail on cloudy days in

general and in particular for a few days on either side of Amavasya, as, then, the moon will not be quite visible. But there are other methods for determining the position of the moon but they are beyond the scope of the present paper.

YOGA.

Having now seen the meanings and implications of the Thithi, Vara and Nakshatra we shall take up the remaining two: the Yoga and the Karana. Yoga as the word implies is the sum. Of what? It is of the distances of the sun and the moon from our origin. Taking now the same day, at the time of sun-rise the sun is 106° and the moon 313° from Mesha Adi giving a total of 419° . Subtracting the $\odot$ (360°) from this we have 59° . For purposes of Yoga the $\odot$ is divided as for the Nakshatra into 27 equal parts, each covering $13\frac{1}{3}^\circ$. So, this 59° gives for the Yoga at sun-rise on that day the 5th. From the slokas giving their order,

विष्कम्भः प्रीतिरायुष्मान् सौभाग्यः शोभनस्तथा ।
अतिगण्डः सुकर्मा च धृतिश्शूलस्तथैव च ॥
गण्डो वृद्धिर्ब्रुवश्चैव व्याघातो हर्षणस्तथा ।
वज्रं सिद्धिर्व्यतीपातः वरीयान् परिधः शिवः ॥
सिद्धः साध्यः शुभः शुक्रः ब्रह्मोन्द्रो वै धृतिस्तथा ॥

the fifth happens to be Sobhana. To find the Yoga therefore at any particular time add the distances of the sun and the moon from the origin and divide the result by $13\frac{1}{3}$. The whole number will give the number of Yogas that have elapsed and the next will be the Yoga at that instant of time.

KARANA.

Coming now to the last item of the Panchanga, the Karana, it is nothing but a means of recording which half of the Thithi

we are having: the former half or the latter half. The Karanas are 11 in number, 4 constant and 7 repeating. They are given by the following sloka:—

शकुनि चतुष्पद नागाः किंस्तुग्राह्यं च चत्वारि ।
अथ वव वालक कौलव तैतिल गर वणिज विष्टयः सप्त ॥

The distribution of these Karanas among the thirty thithis is like this: The New Moon consists of two constant karanas preceded and followed by the other two constant Karanas in the order indicated:

The latter half of Bahula 14 will be	
	Sakuni
First half of New Moon	Chathushpada
Second half "	Naga
The first half of Sukla	Kimsthughna

Among the remaining 56 halves the remaining seven Karanas repeat themselves in cyclic order commencing from Bava.

Now, to fix the Karana at sun-rise on the 17th Adi we have seen that $207/12$ gives $17\frac{1}{2}$ giving thus the first half of the 18th day after New Moon or the 35th half-day giving therefore the 34th of the repeating Karanas which is Vanija. We have thus seen that four of the five elements of a Panchangam are but functions of the positions of the luminaries from Mesha Adi. Thus

Nakshatra—Moon's Position

Thithi— Moon—Sun

Karana— Which half of the Thithi, the former half or the latter half; and

Yoga— Moon + Sun

PURPOSE OF THE SEVERAL ELEMENTS OF THE PANCHANGAM.

Now comes the question, what is the purpose of all this? Leaving the question of astrological implications aside, these serve to fix the time of any incident definitely. This

is only an extension of the principle involved in insisting while writing letters on noting the place and date. Any religious or quasi-religious function is preceded by the mentioning of some or all of these details in what is called the *Samkalpam* or the formal declaration of the decision to go through the function. These details, to a very great extent, uniquely determine any epoch.

It now remains only to consider one or two questions more: The non-coincidence of Mesha with Chaitra, Vrishabha with Vaisakha, etc.

THE INTER-RELATION BETWEEN THE SOLAR AND LUNAR MONTHS.

The first set of names Mesha, Vrishabha, etc., denote the Rasi in which the sun appears to be during the month. The names Chaitra, Vaisakha, etc., are given to the lunar months which denote the interval between two consecutive conjunctions of the sun and the moon as observed from the earth. There are more than 12 of these lunar months during a solar year. And in a period of 3 years one of these lunar months is treated as an *Adhikamasa*—its name depending upon the solar month during which the luminaries are in conjunction twice, thereby attempting to make the months under the two systems coincide to some extent at least.

In passing, it may be interesting to note that the Tamil names of the solar months are but corrupt forms of the Sanskrit names of the several lunar months which are close to them. The following table will throw much light upon this fact.

Solar			Lunar
Sanskrit	Malayalam	Tamil	Sanskrit
Mesha	Meda	சித்திரை	சேத்
Vrishabha	Edavam	வைகாசி	வৈசாகம்
Mithuna	Mithuna	ஆனி	ஆஷ்ட [cf. Anuradha the previous asterism]
Kataka	Karkada	ஆடி	ஆஷாட
Simha	Singa	ஆவணி	சுரபண
Kanya	Kanni	புரட்டாசி	மாஹபட also சுரேஷ்டபட
Thula	Thulam	ஐப்பசி	அஸ்வின
Vrichika	Vrichikam	கார்த்திகை	கார்திக
Dhanus	Dhanu	மார்கழி	மார்கசிர்
Makara	Makara	தை	புஷ்ய also திஷ்ய
Kumbha	Kumbha	மாசி	மாச
Meena	Meena	பங்குனி	பாலுன

The lunar months are named after the asterism in which the moon will be seen during the middle day of the month, i.e., the name of the constellation in which the moon is when full during that month.

PLANETARY MOVEMENTS.

One or two more points and we have come to the end of this paper. The positions of the several planets are also given in terms of

their angular distances from Mesha Adi. When they are too close to the sun to be seen by the naked eye they are said to be in *Asthamana* or *Mandya* and when they are just visible after a *Mandya* they are said to have their *Udaya* or rising. When they are in advance of the sun, i.e., to the west of the sun, they appear to rise in the east before the sun when they have their *Pragudaya* and when they are behind the sun they appear in the western sky when they are said to have their *Paschimodaya*.

Another point with regard to the planets is, they have, in addition to their ordinary motion from west to east among the stars, an east to west motion also during some part of the year or other. Then they are said to be retrograde or *Vakruga*.

RESUME.

It has been tried in the foregoing pages to describe briefly the mathematical background

in some portions of Geography and Nature Study. The teacher, by a careful and patient study, should try to understand the bearings of the several school subjects on one another in order that his teaching may be effective and intelligent. Such learning with an eye for the relations with other subjects will always help in fixing in our memories what little we learn and will also minimise the labour involved in memorising what will otherwise be isolated and incoherent matter.

The purpose of this article would be considered to have been more than fully realised if it kindles in the readers a desire to learn more than what they know now and a feeling that what we consider to be abstruse is not really so if only we ponder over its meaning and try to understand it.

A Hand-book of the English Language FOR HIGH SCHOOLS

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WHAT I SAW IN SOVIET RUSSIA IN SUMMER LAST.

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Agra.

(Continued from page 849, Vol. XXXVII.)

APPENDIX.

Summary of the more important dates and data of Russian History to the end of the nineteenth century.

Slav settlements in the basin of the Dnieper, and in the north along the rivers Volga and Oka. Trading centres and towns. Three chief centres of civilization: Novgorod in North-West, Kiev in South-West, Tmutarakan in South-East, coming to the Norsemen.

The Slavs with the help of Norsemen successfully repel attacks of wild tribes. The Norsemen supported by the trading towns and centres extend their principalities, that of Kiev being the most important. The Slavs advance to the shores of the Black Sea and Sea of Azov. The river trading route from Novgorod to Kiev established. Slav settlements in the direction of countries of Arabian civilization. Close relations with Byzantium. Adoption of Christianity and of the Greek alphabet.

The Slavs spread over territory between the rivers Oka and Volga where a number of principalities and towns arise. In the first half of this century the Kiev State clears the South of nomadic tribes. In the second half of the century renewed incursions of other wild tribes.

First collection of Russian Laws (Russkya Pravda) Free-lance, roving retainers of princes (Boyars), settle down as landed proprietors.

Settlement of North-East Russia proceeds. A new centre is formed at Suzdal rivalling Kiev and Novgorod in importance.

Change in routes of world trade from Eastern and Western Europe. Decline of the Kiev State. First mention in Moscow. Struggle for supremacy among the Russian princes.

Capture of Kiev by Prince Andrei of Suzdal, Vladimir. Slav penetration eastwards. Development of the "folk-mote" institutions (veche), legendary poetry and church literature flourish. Rise of Moscow.

Decline of Byzantium adversely affects trade along the Novgorod and Kiev route. Territory around Kiev becomes devastated and from the time of the first Tartar invasion, when the hordes of Jenghiz Khan defeated the Russians at the battle of Kalka, until the 15th century Kiev drops out of Russian history. Other centres in the North-East of Russia assume growing importance, Suzdal, Tver and Moscow. The Novgorod advance North and East to the White Sea and the Urals. Russia is now split up into a number of small principalities.

Invasion of Batukhan. Devastation of South-West of Russia. North-East Russia submits 1237—40.

to the Tartar yoke. Development of popular institutions (veches) in Novgorod. Novgorod, a veche republic with a prince at its head as leader of the military forces. In North-East Russia (Vladimir, Suzdal, Rostovs, Yaroslav, etc.), the princes with the help of Tartars take upper hands over the veches. Swedes advance to Novgorod after conquering Finland. German settlements on the Baltic. Tilhuanian forms an independent State partly on the ruins of South Russia. The Hanseatic League, a union of large trading centres of North-West German (Lübeck, Hamburg, Bermen, etc.) begin to trade with Novgorod.

"Tartars hinder Slav settlement in the South and South-East of Russia. The Moscow prince becomes "the servant of the Khan" and with his support assumes title of Grand Duke. The unification of Russia proceeds. Moscow now the largest town after Novgorod and Pskov rivals Novgorod as centre for foreign trade, especially with southern countries and middle Asia. After many unsuccessful efforts to free themselves from Tartar oppression the Russian princes under Dmitri Donskoi defeat the Tartars at Kulikovo. Church becomes more and more national. Growth of heresy. Break-up of the Golden Horde into three Khanates: Kazan, Astrakan, Crimea.

To the West of Moscow, the newly formed Polish Lithuanian Confederation is a menace. The Navgorodians penetrate to Siberia over the Urals in search of furs,

The Moscow prince profits by the gradual weakening of the Tartar powers and extends his dominion northward. The Kazan Khanate checks this movement in the East. In the North the Muscovites follow the old North-east routes eastwards and cross the Ural Mountain into Siberia. Unable to free himself completely from the Tartar yoke the Moscow prince returns to the old policy of nominal submission and is thus enabled to extend his power over neighbouring territories. Ivan III (1462—1505). Break-up of Tartar dominion. A strong national stock—Great Russian—created. Moscow outrivals Novgorod economically. Riazan and Yaroslav submit to Moscow. Series of wars between Moscow and Novgorod ends by submission of latter. Submission of Tver. Growth of the Polish Lithuanian State Muscovite advance the Finnish Gulf.

Defeat of Lithuanians. The change of Moscow from a principality to a State and the "treachery" of Byzantium in recognizing the Pope's authority give rise to a new politico-religious theory of the State. Church teaches that centre of orthodoxy is now Moscow, the third Rome. In consequence of the marriage of Ivan III with Sophia Paleologue, niece of the last Byzantine Emperor, the Muscovite rulers consider themselves entitled to all the honours of the Imperial dignity. The church becomes their obedient servitor. New growth of heresy. New Codes of Law ("Sudebnik.") Appearance of a new military landed class, nucleus of the future nobility, an offset to the old Boyar aristocracy. South-West Russia falls into the hands of Poland.

The Moscow State now covers the vast territory known later as the Governments of Moscow, Novgorod, Smolenok, Yaroslav, Archangel, Vologda, Kostroma. Moscow one of the largest towns in Europe. Direct relation with England during the reign of Ivan the Terrible. (1553—1584). Moscow drawn into trade between Europe and Asia. Unsuccessful attempt to reach the Baltic Sea. Livonian wars. Expansion eastward and south-eastwards along the Volga and towards Steppes.

1552, 1558 Colonisation becomes regular State policy. Capture of *Kazan*. Capture of *Astrakhan*. Colonisation leads to building of towns and fortresses. State colonisation mostly follows on lines. Settlements made by free Cossacks, run-away peasants and enterprising traders. Expansion beyond the Urals on same lines. Conquest of

1581-2. Siberia by *Ermak*. Aggravation of disabilities of peasants at home helps on colonisation. Growing dependence on land-lords. Efforts of latter to bind peasants more closely to the land. Clandestine fight of peasants to free lands. Advance to South meets with great opposition from powerful Crimean Khan.

1591—1571. Attacks of latter on Moscow State. Moscow in danger. Tartar successes not followed up. Muscovite advance southwards proceeds. The old Boyar aristocracy descended from the ancient Rurik princes and their retainers in endeavouring to maintain and strengthen its privileged position meets with vigorous opposition from the new military caste of land-holders and the trading classes. The *oprichina* of Ivan the Terrible. The Boyar Duma or Council. Significance, Terror of Ivan directed

not only against Boyar but against other social groups holding out for the old order and against the church.

Position of peasantry grows from bad to worse owing to harsh exploitation by the new class of land-lords. Boris Godunov's "reforms." (1) Metropolitan of Russian orthodox church now becomes patriarch; (2) peasantry prohibited from migrating to other lands. Serfdom. Destitution in the central districts. Intensive colonisation of South-West Russia. Brest Church Union as instrument for bringing orthodox peasantry under subjection of Poles (Uniates).

First half of century mostly taken up with internal developments. End of the Rurik dynasty and struggle for throne. First Romanov, Michael 1602—1604. (1613—1645). Terrible famines. Moscow Government takes strong measures to prevent "runaway" movement among peasants and their free settlement in the South.

Troublous Time. Social and economic character of struggle among peasantry, runaways and Cossacks. Imposters and pretenders. Foreign intervention: Poles, Swedes.

1612. Revival of national feeling. Moscow cleared of Poles. Expansion to East. Settlement in Siberia proceeds. First expedition across North-East of Russia and Siberia to Pacific Ocean by the Cossack

1647. *Dejnev* who passed the Strait 70 years, "discovered" by Behring.

1697. Kamchatka occupied by Cossacks. Gradual resumption of lost territories in South during second half of this

century. During the reign of Tsar Alexei (1645—1676) Ukraine breaks away from Poland and becomes integral part of Russia. "Department of Secret Matters" under immediate control of Tsar-germ of the police state. Efforts to establish regular army. Growth of the new aristocracy. More rigorous measures for "attaching" peasantry to land, Code of Tsar Alexei—laws of bureaucratic state based on serfdom. Peasant rising under

1668—70. *Stenka Razin* sternly suppressed by now well-organized army. Church which had regained certain influence during Troublous time again submits to states towards end of century. Schism—old Rivalists or old Believers. Western influence in Moscow. Penetration of technical, political and religious ideas. *Streletsi* the nucleus of the standing army, gets out of order.

Peter the Great (1689—1726). Turbulent *Streletsi* disbanded leads to formation of regular army and fleet on western model. Colonisation expansion eastwards and westwards to Baltic Sea where strong opposition from Swedes has to be overcome. Russians beaten by the Swedes at *Narva*

1700—1709. —beginning of "Northern war." Peter recreates army. Defeat of Swedes at *Poltava*. Landing of Russian troops in Sweden. Stockholm district ravaged. By *Treaty* of Nystadt Swedes cede Livenia, Estonia, part of Finland. (*Wyborg*), Ingria and Karelia to

1721. Russia. Harbours of rival and Riga now Russian. In 1711 he had proclaimed himself, "Emperor of all Russia." Azure restored to Turks. Persian expedition. Expansion to Caspian Sea. Advance to

Khiva, Feverish reforming zeal. Old boyar Duma transferred into Senate with ill-defined functions, legislative, administrative, executive, judicial, military. Police bureaucratic system developed. Division of Russia into nine administrative districts under governors with extensive powers. By establishment of Holy Synod, under a lay procurator church definitely subordinated to State. Efforts to introduce direct individual taxation falling especially on peasants. Planting of factories. First lay schools, Increase of influence of nobles under successors of Peter the Great (Catherine I, 1725-1727; Peter II, 1727-1730; Anne 1730-1740; Ivan VI, 1740-1741; Elizabeth, 1741-1761; Peter III, 1761-1762). They acquired many privileges, educational advantages, freedom from obligatory military service, etc. Extension of serfdom by reason of grants of State lands to the nobility in return for service. General decline in position of peasantry owing to heavy taxation, recruiting and prohibition to leave village. Abolition of the system of local customs duties within the Empire makes for economic unity.

Catherine II the Great. State colonisation progresses south and south-east to shores of sea of Azov, Colonisation of new Russia and North Caucasus. Forward foreign policy: First Turkish war ended by the peace of Kuchuk

1769—74. which gave Russia access to the Mediterranean. Crimea part of Russian Empire.

Second Turkish war ended by peace of Tassy Partitions of Poland.

1787—91 1771. Russia receives white 1793, 1795. Russia most of the Ukraine, Volhynia, Podolia, and greater part of

The ambiguous German policy and especially the aggressive tactics of William I and Bismark against France lead to strained relations between Russia and Germany. *Secret Austro-German Alliance* aimed against Russia. Anglo-Russian conflict of interests in middle Asia. Alexander III's. (1881-1894) plan to keep Russia entirely out of European affairs.

Franco-Russian understanding in 1890 leads to a Military Convention in 1893 and to the *Franco-Russian Alliance*. Home affairs: The Crimean war (1853-1856) shows the complete failure of the old system of rule and of serfdom. "Better" says Alexander II "to abolish serfdom above than to wait until it abolishes itself from beneath." The Russian intelligentsia stand up for Abolition (of the works of Radishchev, Ruskin, Gogol, Nekrasov, Turgenev, Aksakov, Tolstoy, Herzen, Chernyshevski). *Manifesto of Alexander II re. Liberation of the Serfs*. Under the influence of the reactionary nobility the land reforms are carried out unsatisfactorily. Great discontent among the peasantry. The more radical groups of the intelligentsia look forward to a revolution (Chernyshevski, Dobrolinov, Mikhailov). The liberal milicus of the nobility insist on judicial and administrative reforms, on the introduction of local government, and summoning of elected representatives of the whole state. Discontent spreads to the universities and higher schools. Growth of Nihilism (Pisarev). Polish *insurrection* arouses sympathy among Russian liberal and radical milicus. The judicial and administrative reforms. *Zemstvo* local government; system of elementary and secondary schools; press censorship modified;

abolition of corporal punishment, etc., etc. Secret societies and revolutionary movement. Bakatma Neshayev's "Popular Vengeance" (v. "demons" of Dostoevski) Labour strikes in Petersburg (1870). *Statute of municipal administration of obligatory military service* for all in place of old recruiting system—measures already planned in 1864. 1872-3. Famine in the Samara Government.

1873-5. *To the people movement of the Intelligentsia* (v. "Virgin soil" of Turgenev). Severe government repression conflict of public opinion with government. Growth of revolutionary activities.

1878, 1879 Mar. 1, 1881 1881. *Land and freedom and People's will. Terrorism. Assassination of Alexander II. Manifesto of Alexander III (1881-1894) re the unalterable character of the Autocracy. No constitutional reforms to be expected. The reactionary influence of Pobiedonostsev, the procurator of the Holy Synod. "Enforced Protection"—a system of martial law. The Peasant's Bank and the Nobles' Bank established. First Labour Legislation introduced by the Minister of Finance, Bunge. National rights curtailed. Justices of the peace in the villages replaced by Government officials chosen from the nobility. *Yemskie Nachalniki* (district chiefs or heads) with enormous powers of jurisdiction over local peasantry. The Poles deprived of right to be civil servants in Poland or in the western provinces.*

The powers of juries curtailed, *Restrictions of Zemstvo self-government rights*; Government control extended over *Zemstvo* activities.

1890. 1892 1891. *Municipal affairs subjected to greater government control. Construction of the Trans-Siberian Railway started Nicholas II (1894-1917).*

THE WORLD WE LIVE IN.

BY MR. K. VENKATAPPAYYA B.A., B.L., B.ED.
Sullurpeta.

THE world we live in forms a part of what is known as the material universe which is said to be in the form of a disc. Astronomers have divided the material universe into two parts, one the stellar universe, containing the innumerable stars visible either to the naked eye or through the telescope, and two, the solar system, with the sun and the planets with their satellites revolving round it. The stars in the heavens and the planets in the solar system are found to be guided by immutable laws the most important of which is the "Law of Universal Gravitation" by which, as enunciated by Newton, "every particle of matter in the universe attracts every other particle with a force directly as their masses and inversely as the square of their distance which separates them." And the law of Terrestrial Gravitation attracts every object towards the earth and prevents it from flying off into space. The laws governing the material universe are such that there is absolutely no chance of their ever coming into collision with one another.

It has been estimated that about 500 stars can be seen with the naked eye, while thirty to forty millions are believed to be possible of being observed through the telescope. All stars are not of the same brightness. They differ in 'magnitude' and have been classified into six grades, as the stars of the first magnitude, the second magnitude, and so on. This difference in magnitude is due to the relative distance of every star from the earth. It may be stated here that the light from some of the farthest stars has taken

hundreds, nay thousands, of years, to reach the earth. So vast is the space of the universe and necessarily, so imperfect is our present knowledge of it.

The Stellar Universe. The stars in what is known as the stellar universe have been classed under four categories, namely,

(i) Constellations, that is, groups of stars, like the Great Bear, Orion, Sirius, etc.,

(ii) the milky way, or galaxy, that is, a group of countless stars forming a belt round the earth near the south Pole.

(iii) clusters, that is, stars condensing into clusters and often seen as milky patches, and

(iv) Nebulae, that is, irregular masses of soft cloudy light which are nothing but masses of gaseous matter.

It is doubtful whether these stars have any planetary system like the one around the sun, but there can be little doubt that they are still in a gaseous state and that it will take millions of years to cool and possess conditions necessary for the support of organic life.

The Solar System. The phrase came into currency only in modern times. The ancients regarded the earth as the centre round which the sun and the other planets moved. This is what is known as the geo-centric theory. The ancient Hindus who made considerable advance in astronomy believed in this theory, though the writings of Brahmagupta and Varaha Mihira go to show that the Rotundity of the earth, the law of Terrestrial Gravitation, and the Precession of Equinoxes

were not unknown to them. It was Copernicus, who lived about the 16th century, that first propounded what is known as the heliocentric theory in Europe, according to which the sun was considered to be the centre of the system of planets. It is this theory, that holds the field at present.

The solar system is made up of (1) the sun (2) a group of four inner planets *i.e.*, the Mercury, the Venus, the Earth, and the Mars, (3) about 224 smaller planets known as asteroids (4) five outer planets, *i.e.*, the Jupiter, the Saturn, the Uranus, the Neptune and the Pluto—which last was discovered as late as 1930, (5) twenty satellites of the planets, and (6) an unknown number of meteors and comets revolving in very eccentric orbits. The sun is the star nearest to the earth and there are many other suns, like our own, at a longer distance and with a greater magnitude. Our sun, like other heavenly bodies, is bound to cool down in course of time—which can only be counted in thousands of years, when the present source of supply of heat and light to it fails. It is not possible within the short space of this paper to deal in any greater detail with the wonderful system of which our globe forms a part. Suffice it to say that scientific opinion is not unanimous on the question of the habitability of planets other than the earth—most of which are supposed to be still either in a gaseous condition, like the Saturn, Uranus, and Neptune, or though cooled like Jupiter, without possessing conditions necessary for our organic life. Mars, however, is the most favoured planet in this respect. Lying at a distance of 141,000,000 miles from the sun and with a diameter of not more than 4000 miles, this planet is supposed to contain

conditions favourable for the growth of animal life. Some enthusiasts have even gone to the length of asserting that the "martians" are gifted with a higher intelligence than the inhabitants of our planet. Recently, attempts were also made in the United States of America to communicate with the dwellers on Mars!

The Earth. The earth is only one of the minor planets of the sun lying at a distance of 91 to 94 millions of miles from it. The sun is the source of the supply of heat and light which renders possible the existence of life on it. According to some scientists, the earth began to possess essentials of habitability about 2,000 millions of years ago, and man first appeared on it a million years later. Great changes in the configuration of the earth must have taken place even after the conditions of habitability were completed. And the present shape of the earth is the result of innumerable changes in its structure.

The earth is the man's world and for purposes of our present topic may be considered under three heads, namely, the spheres of the earth, animal and plant life on earth, and thirdly man and his achievement.

The Spheres of the Earth. The earth has been divided into three spheres, namely, (1) atmosphere, which envelopes it (2) the hydrosphere which surrounds it, and (3) the lithosphere which forms a part of it.

The Atmosphere. The atmosphere is the most active of all geological agencies. It is heavier as we descend to the surface and rarer as we ascend into the air. The position of this atmosphere has not been uniform from the earliest geological times. The atmosphere which exists at the present day might be considered as the surviving relic of its original

vaporous condition after the other constituents were absorbed by the hydrosphere and the lithosphere. As at present constituted, it consists of 4 parts of Nitrogen, 1 part of Oxygen, together with an average of 3.5 parts of CO₂ in every 10,000 parts of the air. Besides these, there are in it minute quantities of various other gases and solid particles.

The rotation of the earth on its axis exerts great influence upon the movement of the atmosphere. The difference due to the velocity of the earth at the poles and at the equator gives rise to what are popularly known as "Trade Winds." The atmospheric circulation deflected by the earth's rotation influences the circulation of the water in the oceans as well. The winds which blow persistently from the North East on the North side of the Equator and from the South East on the South side of the Equator drive the superficial waters onwards and cause converging ocean currents. Of the vapours which are found in the atmosphere, water is the most important, and it varies with temperature. By condensation, this vapour appears as dew, mist, cloud, rain, hail, snow, and ice and carries other particles contained in the air in these various forms. The circulation of water from the atmosphere to the land, from the land to the sea and again from the sea to the land forms the greatest geological process by which the earth retains its habitable condition and has its surface moulded.

The Hydrosphere. About $\frac{3}{4}$ th or even $\frac{4}{5}$ th of the earth's surface is covered with water. The oceans, the lakes, and the rivers, the snow, and the ice have all their respective influence on the earth. These, aided by the change of temperature, disintegrate the rocks

carrying the broken-up or dissolved matter to the sea. Above the snow-line, more snow falls than melts, and, it descends in the shape of avalanches and glaciers, sometimes causing great havoc. Glaciers are large rivers of ice and are responsible for the formation of moraines, large blocks of stones in position otherwise impossible, clay with stones, scratched and polished rock surfaces, and, probably, lake basins. An instance of the havoc caused by a glacier happened very recently in India when the great Shyok Dam burst causing great loss to the inhabitants on either bank of the Indus. The rivers help to carry the surplus rain water to the sea as also all materials from its basin. Rivers carve valleys in their course from the mountains, cut channels through their course in the plains, and form deltas at their mouth with the help of the alluvia brought down by their current. They also lower the general level of the basin, cutting channels downwards and backwards at their source, convert lakes into alluvial flats, and form bars, mud and sand banks. The sea is the final recipient of all material soluble and insoluble which rivers carry. Its power of desudation is seen along the land margin only. It chiefly occupies itself in communicating and removing the debris brought down to it from the other agencies. Its direct action is limited to high and low water mark. The nature of the sea coast depends upon the nature of the dip of the rock. Strata dipping towards the sea encourages land slips. The sea water has a greater specific gravity and its density varies with the addition of the river water as in the case of the sea near the mouth of the Amazon where for 200 miles the salinity of the water is considerably reduced owing to the huge volume of water poured by the

river into it. The sea also contains many kinds of salts and minerals. The presence of the mineral solution in water explains the origin of a considerable part of the Earth's crust. By evaporation, rock-salt, gypsum, and other minerals are produced. Besides these, aqueous rocks which were first laid are also to be found at its bottom.

The Lithosphere. This is the portion of the earth under the atmosphere and the hydrosphere referred to above. It consists of two parts, the crust and the interior. Let us consider these two separately.

The Crust. The name "crust" is applied to the outer covering of the earth. The crust may have begun to form from the time the earth ceased to be gaseous and began to cool. The density of the crust, therefore, increased as the cooling process went on. The thickness of the crust has been variously estimated, but there can be no doubt that it is not more than 50 miles below the surface. There is considerable evidence to prove that the earth's crust has been subject to great movements from the earliest geological period. These movements in the crust are indicated by an instrument known as the siesmometer which calculates the tremors to which the earth is subjected. Slow depression, upheaval, earth-quakes, and metamorphism of the rocks are the consequences of these movements. The west side of Japan, South of Sweden, the west coast of Queensland, and the western part of the continent of Europe are going through the process of slow depression. The shores of the gulf of Bothnia in the Baltic sea, and the west of Sweden have been subjected to the process of upheaval and it is recorded that there has been a rise of 18½" in a century in the gulf of Bothnia while in the

west of Sweden the rise has been two feet in the same period. The region of the Great Lakes of Canada is undergoing a slow tilt to the south west, the mean rate of its rise being estimated to be 6" in a century. It is possible that similar instances of upheaval or subsidence may be going on in the other parts of the world.

Earth quakes have also been referred to as indications of the movements of the crust. It is probable that they may be due to the generation of steam in the hot interior of the earth when the water of the sea comes into contact with it. The most memorable of the earth quakes in modern times may be said to be the earth-quake which destroyed Lisbon in 1760, the earthquake which caused untold misery to Sicily in 1908 and that which well-nigh destroyed Tokyo and its surroundings in 1923.

A consideration of the earth's crust will not be complete if the rocks composing it are not given their due share of treatment. Indeed, the rocks composing the earth's crust are of the greatest importance to the geologist. For, it is by means of the rocks and the fossils imbedded in them that the history of the earth has become possible to some extent at least. It is true that other forces might, to some extent, affect the importance of the rocks as the recorders of earth's history. But they do not in any way take away from their importance from the point of view of geology. Rocks are generally aggregates of two or more minerals and are of three kinds, the aqueous, the igneous, and the metamorphic. Of these, the aqueous rocks are supposed by geologists to have been the first to form. They are so called from their being first laid at the bottom of the sea. The Alps and the Himalayas are of this type. They are composed of small

particles derived from the wearing away of other rocks or from granite material. They contain fossils which are of great use in studying the plant and animal life in the earliest periods of the earth's history. Igneous rocks were once in a molten condition and do not contain fossils. The texture of these rocks differs from that of the aqueous and depends upon the rate of cooling. They are divided into two kinds volcanic or solidified at or near the surface. If the theory of the molten condition of the interior of the earth is true, these rocks should have been the earliest to form. The mountains of Auvergne in France and the rocks in the plateau of the Deccan belong to this category. Lastly, metamorphic rocks are those which have undergone some amount of change since their original deposition or solidification. Also new compounds formed by the physical changes are given this name. The external surface of the rocks becomes weathered owing to various forces such as oxygen, carbonic acid, and changes of temperature. By these various forces, the bare rocks get covered with loose and disintegrated material and this material forms the ground-work of the soil on which things grow. Decaying vegetable or animal matter is still more suitable for plant life.

As regards the interior of the earth, scientific opinion is divided as to the nature of the material comprising it. Whether it is metallic or some other variety, there is no doubt that the interior possesses a very high temperature. This is evidenced by the existence of volcanoes, hot springs, and the heat which one experiences in digging mines or boring tunnels. It is computed that the temperature of the interior increases at the rate of 1° Fahr. for every 50 or 60 ft. that we descend.

Plant and Animal Life. The fossils in the rocks are the only traces of the original plant and animal life on the earth. It is not, however, easy to determine the exact form of life in the earliest geological times on account of denudation, metamorphism, and inaccessibility to which the rocks have been subjected in subsequent ages.

The present life on our planet differs from that evidenced by the fossils in the following among other respects:

- (i) Many kinds of animals have become extinct,
- (ii) Changes of detail in the range of various genera and species have occurred, though there is general agreement, and
- (iii) the present natural history regions are not to be found in the past ages.

Present climatic and geographical conditions as also the happenings in the past account for the range of species. That life in the earliest ages was all alike and that changes in it were due to some catastrophe, like the Deluge in the Bible, have now ceased to be believed in. It was Charles Darwin who first exploded this theory by his doctrine of Evolution propounded in 1859. Darwin held that the present life on the earth is directly descended through successive modifications from some simple form of life though the records of early life have become obliterated. This is due to what he called "Natural Selection" which has thus been briefly described: "The young of every species, both animal and vegetable, while resembling their parents in a general way, yet differ from each other in almost every respect; some of the variations giving the individuals an advantage and the

others a disadvantage in their powers of procuring food, withstanding weather, defending themselves from their enemies, and so on. While this is to be considered, the fact that the young are produced in very large numbers and that the earth is quite unequal to the task of rearing and supporting them all has also to be borne in mind. Hence in the severe competition which takes place, the weakest go to the wall, and transmit to some extent their advantages to their progeny."

This principle no doubt accounts for the disappearance from the earth of the gigantic

animals which roamed the earth in the dawn of the earth's history. It also accounts for the disappearance of certain races of men, like the Tasmanians in the past, and of the gradual extinction of the Red Indians at the present day. The craze for hunting among the 'civilized' races of the West is completing the work of natural selection as many a fine specimen of wild life, like the giraffe is being swept out of existence.

The researches of Sir J. C. Bose into plant life reveal the astounding truth that plants also manifest the various activities of life as any other animal on the face of the earth.

FORESTS AND FOREST FOLK OF TRAVANCORE.

BY MR. K. P. P. TAMPY,

Trivandrum.

THE charming State of Travancore characterised by its "primeval forests and palm-fringed shores" is famous for its "exuberant natural beauties, its old-world simplicity and its arcadian charms." The beauty and grandeur of the forests of Travancore are most picturesque and defies description. Along with their lovely lagoons, marvellous mountains, mighty rivers, wild rocks, precipitous activities, shady and pleasant valleys, stately trees, charming bowers of nature, creepers that put forth a variety of beautiful blossoms, and the carpeted undergrowth of ferns and flowery shrubs, the forests of Travancore reveal an inexpressible grandeur which is sure to relieve the ordinary prosaic mind, of the dull and dreary monotony of every-day life and fill it with sweet and ennobling visions, glorious and great thoughts of real bliss. The forests of Travancore are remarkably supreme for their unlimited luxury. The extensive flora and fauna of Travancore is diversified. It is said that there are no fewer than 700 kinds of trees, 350 species of birds, 67 varieties of snakes and innumerable insects, in the vast and wonderful forests of Travancore. Travancore forests afford much interest to the keen and clever sportsman and are the most advantageous sphere to the student of study and research. From time to time Travancore has been the centre of attraction of travellers and great personages, all of whom have extolled in lofty and eloquent tones, its picturesque scenery. Sir M. E. Grant-Duff has described Travancore as "one of the fairest and most interesting realms Asia has

to show." Lord Connemara has called it "a fairy land." The talented pen of Mr. J. D. Rees has given a very striking account of the forests of Travancore. He has said thus: "In the morning hours one might well call these forests the mysterious temple of the dawn."

Such in short is the glory of the forests of Travancore. The inhabitants of these forests are familiarly known as hill-men. There are about twelve to fourteen hill tribes in Travancore, numbering about fourteen thousand souls. They consider the forest as their natural home. They are very dark in complexion and have short noses and thick lips. Strange to say the hill-men are still in the lowest rung of the ladder of civilisation and are quite contented to be so. They are unusually strong, sturdy and well-built. They are best fitted to live in their wild surroundings.

The hill tribes subsist mainly on agriculture, fruits, roots and game. They make periodical migrations from place to place. They are a set of interesting folk best suited for the forests and possess a very rare and remarkable power of scenting wild animals in whose midst they live most friendly and happily. They are perfectly at ease in the midst of frightful wild animals. The hill tribes are well accustomed to the habits of wild animals and as such they are masters in preventing danger and harm from the wild beasts.

These people dwell together in clans and each such settlement consists of a large

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number of small huts, some on the ground and some on tree tops. The huts are made of reeds, bamboos and leaves, all got in plenty from the forests. The safety huts on tree tops serve as a protection against wild elephants that roam about the forest in large numbers and cause great harm to life and cultivation. The "Mootha Kani," as he is called, is the patriarchal chieftain of the hill tribes. He is the uncrowned monarch of his tribe. He is the lode-star of his tribe and as such exercises enormous powers over the people in his tribe. His powers are so vast and unchecked that some of the most autocratic rulers would feel envious of the Mootha Kani. He is the supreme director and dictator of the social, religious and agricultural affairs of the tribe. A village council of elders, which is presided by the Mootha Kani, is the final court of appeal in all matters connected with the tribe. Thus the government of the forest folk is simple and forceful.

The forest tribes live in the inaccessible wilds. They are attached to the Forest Department and collect and supply some of the forest produce. The hill folk surpass civilised men in honesty, integrity trustfulness, simplicity, modesty and hospitality. Once in a way, they come to the capital to pay their respects to H. H. the Maharajah of Travancore. They bring with them presents to the king, such as honey, rare fruits. The king amply rewards them with good food, cloth, money, salt, tobacco and the like. With gay hearts the hill-men return to their homes.

It is a noteworthy fact which is to the credit of these uncivilised people, that they have acquired very remarkable and wonderful

skill in the use of the bow and arrows. Their chief weapons are bows and arrows, bill-hooks and knives. When out of their homes, they make it a point to carry a cane bag always on their back.

They prefer the aboriginal method of producing fire by rubbing two pieces of wood. The wood used is *Isora Corli Folia*. Their dress is simple and consists of a loin-cloth and a head-dress. They grow their hair long and adorn their bodies with beads, shells and pendants of brass, iron and lead. Around every hill-man's waist, one would notice a number of strings tied. The age of the Kani is ascertained by counting the number of strings. Every year a string is added on.

Their songs are mostly prayers and are sung by their priests. The priests are held in great respect and awe by the simple people of the forests. They try to cure diseases by songs, prayers and incantations and fully and firmly believe in the power of these. Their musical instruments are a metal tube and an iron rod. They are highly religious though their worship is entirely pagan in character. They believe that the summits of the hills are the home of their gods. Their prayers are in the forms of petitions and entreatings, wishing immunity from disease, sufficient food and happiness. Some of the magicians and medicine-men practise weird sorcery.

The customs prevalent among the hill-men are curious and interesting. The following marriage custom of one of the tribes is only one of the many curious and interesting customs long common among the forest people.

For the purpose of marriage ceremonies, a large circular building is made of leaves. The bride is ensconced inside this hut. All the young men of the village who are eligible for marriage assemble and form a ring around the hut. The bride's father, or in his absence the nearest male relative, sits at a short distance from the hut and sounds a tom-tom. Others play on musical instruments. The whole place is very noisy. The young men are armed with a bamboo each. When the music begins, they dance round and round the hut into which each of them thrusts his stick. This dance and uproar continues for one full hour. By the time, the bride in the hut seizes one of the many bamboos eagerly breaking inside. The owner of whichever bamboo she seizes be-

comes the fortunate husband of the concealed girl. A feast then follows and the ceremony is complete.

The hill-men are supposed to be the original inhabitants of the country. They speak a corrupt form of Tamil and Malayalam—two of the important Dravidian languages. Their delicious dishes are bamboo plantains, bamboo joints holding honey of different varieties, and fruits. They grow tapioca in abundance and relish much baked and roasted tapioca. By birth as well as by breeding they are the true children of nature who are in perfect health and happiness. The so-called civilised man has indeed much to learn from the simple and unassuming hill-man.

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AN EDUCATIONAL PROGRAMME.

BY MR. R. G. NALLAKUTTALAM PILLAI, B.A., B.L.,
Sriwilliputtur.

1. Percentages of pupils under instruction have not in recent years kept pace with the increase of population; the percentage of illiteracy is therefore increasing in spite of a larger number of pupils attending schools.

2. Management of educational institutions is a costly affair; public grants do not meet even half the salaries of teachers employed; private Teacher-Managers of Lower Grade Elementary Schools are not in most cases able to collect any fees, not even standard fees; they are therefore forced to have recourse to bogus teachers and pupils even for a semi-starvation existence; they may not run their schools when they are not able to make any living out of them; the aided system cannot, therefore, possibly work long and that efficiently.

First Grade Elementary Schools that collect fees from pupils over and above standard rates, and schools under missionary and philanthropic societies stand on a different footing; but their number cannot but be very small.

Teacher-Manager schools cannot as said above stand competition with other schools. All schemes of compulsion should therefore take their possible collapse into account and make adequate provision for the merger of their schools with schools under public management.

3. Universal free and compulsory education should be early introduced and if any satisfactory progress is to be made the local panchayat board or Municipal Council should be made responsible only for a fourth

of the expenses, the rest being borne from Provincial and Imperial funds. The first stage of compulsion should cover standards 1 to 5 and it should be extended to standard 8 in the course of a few years.

4. The mother-tongue should be a compulsory subject in all elementary and secondary schools and in all other cases where a language is a subject of study. Elementary Mathematics, Elementary Science, Nature Study and Gardening, Civics and Rural Economics, Music, Drawing and Modelling, Games and Sports should be compulsory in all secondary schools and elementary schools above the third standard. English or any one of Hindi, Urdu, Sanskrit and Arabic or any vernacular of the district other than the mother-tongue should be taught as the second compulsory language in the said schools.

5. Courses in schools should be such as to fit the pupils to agricultural pursuits. Dignity of labour should be very much impressed on them. Religious and moral instruction should be given in a cosmopolitan spirit a few hours every week. Education of the heart and development of character should form the most important part of teachers' work in schools. Students should always be encouraged to observe, think and decide for themselves. Sports and Games and the Scout Movement should be given their proper place in every school; all students of Diploma and University Courses and teachers of all schools and colleges may interest themselves in social service activities and all adult males further in military training.

6. The education that is imparted in schools and colleges should be purposive. The school readers may abound in useful information regarding plant and animal life, beauties of nature, improved methods of agriculture, biographies of national leaders, healthy ways of living, etc. Most of the sums the students are required to work out may have a bearing on the several agricultural operations. Pupils should be taken often to fields and topes and impressed with varying success of the traditional and modern methods of plantation and cultivation.

7. The studies should be specialised even in secondary schools and the several stages should be comprehensive in themselves and inter-related to others. There should be Medical High Schools in populous centres, Agricultural High Schools in agricultural centres, Commercial High Schools in commercial centres and similarly Teachers' High Schools and Weaving High Schools, Engineering High Schools, Technical High Schools and University or General High Schools in other convenient centres. Histories and Science can be taught in University schools; similarly other special subjects in the special schools intended for them. Physiology, Hygiene, Sanitation, Causes and Cures of ordinary diseases, vaccination, and prevention of epidemics, first aid and dressing, compounding and preparation of medicines according to the various systems may be taught with advantage in Medical High Schools. Students of any secondary schools who complete their course with English as the second language may be eligible for public services provided they satisfy other conditions imposed by the Services Commission and students of special schools will be further eligible for the special posts for which they are trained in their secondary course. This specialisation reduces naturally the requirements of girls to University or General High Schools, Teachers' High Schools and Medical High Schools as far as their secondary education is concerned.

8. There may be special Diploma Schools in agriculture, engineering, commerce, medicine, health and midwifery open respectively to students of special High Schools

and a Music Diploma School open to students of all High Schools.

9. The University courses again may be divided into purely technical courses of Agriculture, Engineering and Medicine and the general courses of literature, Science, Law, Teaching and Commerce. The present Intermediate may continue as the connecting link between secondary schools and further University courses. The general courses for the degree of Bachelorship may be three years completing the special subjects taken by them in their Intermediate course by that time. There may be a further course for the degree of Mastership.

10. Public examinations should be reduced to a minimum; oral examinations, if any, should be given greater value than the written examination. The intelligence of students and their practical applications should be the proper criterion and not their cramming power. Questions should therefore be so framed as to test the capacity of students in the practical application of their studies and they may be allowed to answer with books. The papers should be valued by two persons in the examination centre itself and the result announced in a fortnight. The failed students must be allowed to appear in failed subjects alone within the next three months that is before schools and colleges reopen for the next term.

11. Holidays and working hours should be made to conform to the agricultural conditions of the country. All schools and colleges excepting commercial schools may be closed for long vacation during November to January and thus students and teachers enabled to take part in the farming operations of their own lands.

12. Adult education should be taken up early and earnest and serious efforts made to diffuse general knowledge of the world and up-to-date information on improved methods of agriculture, organisations of farmers in all advanced countries, healthy and cheap ways of living and the Three R's by means of personal instruction, lectures, leaflets, lantern slides, cinemas and dramas.

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THE POET—THE PROPHET.

BY MRS. N. B. DE.

Amritsar.

"Clap thy hands, hail the stranger !
Fill thy hands with fragrant flowers ! Lo !
In the east smiles Aruna with Usha !"

The east smiles, the east blushes ; ah !
The smile, the blush ! They fill the azure
sky. The sky greets Usha, welcomes
her auroral loveliness !

Indeed, ever since the dawn of creation
nature, the sombre, the fantastic, the
fickle, the majestic, has played her game
of hide and seek with the human mind.
The mind bewildered, puzzled, fretted and
fumed, fumbling for Truth. The Goddess
of Dawn unveils her beauty to the
amorous Sun-God, who pursues her all-
day across the sky and embraces her at
even-tide. But alas ! The Sun-God is
Prajapati and his daughter is Dawn !
The gods around, in shame, conceal their
bright faces. The God Rudra, in wrath
attacks the amorous couple with his
invincible arrow. The guilty lovers
embrace and die. The funeral pyre is
arranged. All mourn for the dead.
Darkness spreads around. The gods'
countenances are darkened, and night
sets in. When night is over, the same
drama of love and death is acted again.
The spacious firmament, eternal in vast-
ness, is the abode of gods. There is
Jehovah, thunder in hand, seated on his
high throne of royal state ; there is
Rudra with his fiery visage, trident in
hand, ready to destroy. There is Indra,
the god of gods, always anxious to

preserve his royal dignity and posses-
sions. There is no end of gods and
presiding deities. A nymph dances in
the dancing brook ; her sparkling teeth
you can see, her rippling laughter you
can hear. There is the echo of a wanton
satyr's steps in the solitary woods ; an
angel's smile in a flower, a cherub's face
behind a star. Vidyadhara hands are
profuse in hailing with a shower of
flowers and garlands ; the arrows of the
Bow of Blooms ever ready to pierce
hearts with flower-shots ; Kinnara voices
are ready to sing praise. Apsaras' dance
is wafted with the spring-breeze. Kailas,
Olympus, Elysium—'Mandara' 'Pari-
jata,' 'Amrita ! The world according to
the poet should be an Abode of Bliss !
In this Paradise of Paradises live in
peace, says the poet. The prophet in
him says the contrary. The prophet
behind the poet beacons us towards the
Ideal ! He says—Life is empty, life is
an eternal gap, life is a sorrow, until
and unless man pursues the Ideal ! The
Ideal is eternal, the Ideal is absolute ;
the Ideal is far far away ; it recedes as
we advance. Deep down in the heart is
the Adored of the adorer ; in the solitary
depth of the wood is the sylvan deity—
in the fathomless depth of the sea is
hidden 'amrita' ! Dive deep in the sea
of sorrows, rise to an eagle height—float
the raft of life halcyon-like !

The great poet and prophet in one, following the Ideal, he wished to leave Krishna-Dwaipayana gave us a prophetic truth when he did not complete his great day at the end of the battle of Kurukshetra. He belonged to the east, the mystic east! He had seen life, and loved to philosophise on life. Clerk Ganesa at the dictator's bidding had to write several subsequent chapters, whether he thought them superfluous or unnecessary he has been wise enough not to tell posterity, and we have no inkling into his thoughts. Krishna-Dwaipayana while dictating his chapters on the Kurukshetra and the victory of the Pandavas let his mind wander far far away beyond his topic. His eyes were

in record for ages to come. And what was that Ideal? Truth—we play a losing game in life, we win a loss. When Krishna was killed, the royal ladies were captured and carried away, the Gandiva and its bearer stood motionless—neither had the power to move; An unforethought idea, an unforeseen event! And yet it was true. The Pandava-victory was a defeat in disguise. Life is a meaningless mass of facts and phenomena. Life is a vast sheet of sorrow. To follow the Ideal is the only meaning, only consolation, only chivalry in life!

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SRINIVASA VARADACHARI & CO., 190, MOUNT ROAD, MADRAS.

THE TORCH OF WISDOM.

BY 'WALKER.'

The philosopher is he to whom the Highest has descended and the Lowest has mounted up; who is the equal and kindly brother of all.

Man is, properly speaking, based upon Hope, he has no other possession but Hope; this world of his is emphatically the Place of Hope.

Great men are the inspired (speaking and acting) texts of that Divine Book of Revelations, whereof a chapter is completed from epoch to epoch and by some named History.

Law and arbitrary power are in eternal enmity.

It is a contradiction in terms, it is blasphemous in religion, it is wickedness in politics, to say that any man can have arbitrary power.

Matter is not the mere naked empty capacity, which philosophers have pictured her to be, but the universal mother, who brings forth all things as the fruit of her own womb.

There is nothing in the world; no glory, no prosperity. The gods toss all into confusion; mix everything with its reverse, that all of us, from our ignorance and uncertainty, may pay them the more worship and reverence.

He who would be saved must have good friends or violent enemies; and that he is best off who possesses both.

Beauty is the signature which the creator stamps upon his works when she is satisfied with them.

Beauty and her twin brother Truth require leisure and self control for their growth.

No imperfection is so absolute
That some impurity does not pollute.

—SHAKESPEARE.

That a lie which is half a truth is ever the blackest of lies,
That a lie which is all a lie may be met and fought with outright,

But a lie which is part of a truth is a harder matter to fight.

—TENNYSON.

But we are more than flower or Sun,
Our life begins when theirs is done.

—G. A. SIMCOX.

For the love, from life that's flying,
Lives ever with the dying,
And the stains of it are purged by 'scape of breath!

—J. PAYNE.

There's no standard
In Heav'n above or Hell beneath, o'er which,

A woman's soul may not predominate,
May not aspire to, or degrade itself.

—O. M. BROWN.

To passion no stop is,
When true love has sinned.

—O. M. BROWN.

Love's kingdom is not won by watching;
Heaven

Is slowly scaled by toil and tears and blood.

—ALFRED HAYES.

Better dwell in the midst of alarms,
Than reign in a horrible place.

—COWPER.

Death lays its icy hand on kings.

—SHIRLEY.

Beauty must be scorned in none,
Though but truly served in one.

—T. CAMPION.

PLACES OF EDUCATIONAL INTEREST.

XV. KUTTALAM WATER-FALLS.

BY MR. L. N. GUBIL SUNDARESAN,

Trichy.

Ootacamund, the "queen of hill stations," and Kodaikanal in the Madura district are two well-known summer resorts of the white population in India. These places were not famous before the advent of the Europeans in the country. The Indian from time immemorial has been characterised by his desire to bathe which became a daily necessity under the injunctions of religion, and no place could be a resort to him if it were not at the same time endowed with facilities for bathing. Rivers thus acquired a certain amount of sanctity and healthy localities in the neighbourhood became health resorts for the Indian. Varkalai with its mineral springs and Periyar on whose banks the famous Sankaracharya was born, became famous as health resorts. In the same way, the river Tambraparni in the Tinnevely district also became famous and the various cascades in the course of one of its tributaries, Chitranadi by name, became health resorts for the people of India. The Kuttalam Falls, the most well-known of these cascades can, without doubt, be called "the finest fresh-water bathing place in the world."

The topography of Kuttalam deserves particular notice. The river Tambraparni is 75 miles long and has been, for more than 2000 years, the nursing home of the hoary civilisations of antiquity culminating in the Chola, the Chera and the Pandya civilisations in various periods of mediæval history. In this short note, we are concerned only with one of the many cascades

which adorn the beautiful tributary of this great river, most aptly called "Chitranadi" or the beautiful river. The cascades along this small stream are, some of them at least, the most beautiful in the world. And the Kuttalam Falls, one of these, is perhaps the finest health resort in the whole of India. This quiet and secluded place is easy of access too. Tenkasi and Shencottah, one in British territory and the other in Travancore territory are both neighbouring railway stations on the South Indian Railway. Tenkasi is the terminus of the newly opened Virudhunagar-Tenkasi Chord line and the last but one station on the Tinnevely-Shencottah line. Shencottah is the northern terminus of the Travancore Railway. At either of these two stations, one can find taxis, jutkas or even bullock-carts in abundance to take one to and from Kuttalam. The distance is very short being only three or four miles.

The Kuttalam cascade descends about 200 feet and that by two stages. The moment one approaches the place, one begins to inhale the exhilarating air so refreshing and so delicious. The waters falling from above, though shelved by a huge black rock, appear sparkling like diamonds in the rays of the morning sun. An opening of the Ghats allows a mild breeze to blow on for ever and this with the drizzling rain fills one with joy, ethereal if not heavenly. To stand beneath the Falls and enjoy all the delights of a most invigorating shower-bath will be a rare experience which one can never forget.

There is another place about five miles up from here which is still more gloriously beautiful. In the midst of the most enchanting mountain scenery, from behind a place which has not been accessible to man, the waters flow leaping merrily over the rocks and finally leap over a high cliff, some 200 feet at least in height, in one great plunge. This scene has been truly described as a wonderful place of Nature. The doves and other white birds flying about high above the water add to the beauty of the scene. This has got a most appropriate name, "Thên Aruvi" or "the Honey Fall." Most wonderful indeed, how our ancestors had the knack of giving suitable and beautiful names to places and things?

Even in a very short note on Kuttalam, a word or two about the Shrine of Champaka Devi has to be written. The central cataract of the Chitranadi is at a place midway between Thên Aruvi and Kuttalam. Here there is a shrine of Champaka Devi said to be ruling over the forests and mountains round about. In a huge rock, man's patient industry has dug out a cave-house with two rooms in one of which is an image with a light burning in front of it besides which sits a devotee in an attitude of contemplation chanting prayers. The position of the image, the solitary light and the presence of the hermit make the solitude of the whole place awe-inspiring. The perennial woodnotes of the denizens of the forest and the sound of the falling waters are striking indeed.

Such is Kuttalam, a place of beauty, health and sanctity. Here man is free from the cares of the world, in company with God and enjoying the gifts of nature. Princes and peasants flock to this place in season time to be rid of their worries, to get refreshed in body and in mind and to go back once again to their duties in

health and fresh strength. Once in a way a tragedy breaks the monotony of the place. Who knows not the tragic death of some people in the waters of Kuttalam while attempting to save young girls and boys from drowning? Yet the happiness arising from a visit to Kuttalam eclipses the grief due to such accidents. Truly, as Keats said, "A thing of beauty is a joy for ever."

TYPICAL TAMIL BOOKS FOR MODERN TAMIL HOMES

BY

E. S. SUNDA, B.A., B.L., F.A.U.
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THE MANSION OF THE MUSE.

(AN OLD STUDENT'S TRIBUTE TO HIS SCHOOL).

BY MR. T. S. THIAGARAJAN,

Dharapuram.

I

O Perfect Muse ! if those impulses high
 With thunder's force that thrill my every nerve
 Be true, and, if the bond in which our tie
 Of Love is shown,—Ah, God, do not observe
 By mental vision mine, the puny I,
 Quite blameless Love?—let Reason say,
 My heart is not entitled to array
 These words of joy and sigh;—
 The thoughts I felt and feel in lasting lay
 Of praise to pray, and thankfulness by way.

* * * *

II

The child, well-wrapt in innocence, ere tries
 To learn of "That Imperial Palace whence
 It came," no world doth know, in ease but lies
 In wonder's fairy womb; no use of tense
 Is known by it, but all the time's the same.
 To love and to be loved by one and one alone—
 The only face of beaming light and love,
 Well-known by it, whose name
 Is all his love,—remembered to atone
 For faults in Father's book is all his vow.

* * * *

III

And so I know Thee, Mansion of the Muse !
 When'er before mine inner eyes I saw
 Thy glorious form, it did me much amuse
 To give Thee life and raise a hosanna.
 Amuse ! O, no ; but took my vision far
 To regions not yet have been discovered,
 O, World, take out my heart, where you will find
 Aeolian songs that mar

SEPT. 1932.]

THE MANSION OF THE MUSE.

Our paltry strife ; they have me enamoured.
 In our God's name, wouldst thou be still purblind ?

* * * *

IV

Behold a thousand ships, that strive to pass
 Beyond the coast of life, but, strongly bound
 Behind by potent chains, that all these cause
 To laugh at the luring mirrors set around,
 And though these ships be built to sail or trade,
 Their Captains yet in despair leave the shore.
 No life it is at all that shuts the door
 Of Hope ; not being cared,
 She wanders far, long smothered all her lore,
 And love of place wherefrom that lore she bore.

* * * *

From the Authors. *The Mansion of the Muse.*

Madras University.

B.A. Degree Examination (Revised Regulations) 1934.

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NEWS AND NOTES.

FOREIGN.

UNITED STATES OF AMERICA.

Glencoe Elementary Schools, which had been shut after the Christmas holidays, have been reopened again on condition that the teachers accept a 10 per cent. cut. Teachers of Lake Forest and Springfield have also undergone a cut of 10 per cent. The 2,500 teachers in Seattle have been given the choice between a horizontal 10 per cent. cut with at the same time abolition of the automatic increments (\$100 a year), or a flat cut of 15 per cent.; this means an economy for the city of from \$600,000 to \$800,000 respectively. On January 1st, in Philadelphia a reduction of from 10 to 17 per cent. came into force.

IN Lawrence, MASS., the cut is as much as 20 per cent. The Waukegan High School Board imposed cuts averaging 20 per cent. on teachers employed for 1932-33; they range from 5 per cent. on salaries of less than \$1,500 to 28 per cent. maximum. The saving on next year's budget will be \$52,575.

The Portland Board has passed a cut of about 25 per cent. to come into force next autumn. Further, from now on the credits allowed for teachers acting as substitutes for those on sick leave have been suppressed; they will be paid out of the salary of the absent teacher. No new teachers are to be employed; classes are increased in size often by 40 per cent.

Atlanta has reduced expenditure on education by 27 per cent. Teachers in Madison, Montana, were obliged to take a week's unpaid holiday in order to save the city some \$27,000. The 1,200 teachers of Memphis have preferred to contribute a month's salary per year to the unemployment relief fund instead of undergoing a cut of 15 per

cent. for three years; their salaries will however be further reduced next autumn.

Alabama and Texas teachers are paid in scrip. The South Carolina Education Authorities are one million dollars in debt to their teachers, and the sum is increasing. Cuts have been carried out in Philadelphia, Detroit and Cleveland varying from 10 to 20 per cent.

Teachers in several of the smaller cities in upper New York State have already received a 10 per cent. wage cut; this is being used as a threat against the New York City teachers. The City Administration has moreover discovered that the banks will not make any further loans, which means the stopping of all City appropriations for unemployed or emergency relief, and with it deferring the appointment of the 600 out of the total of 10,000 unemployed teachers who had been slated for appointment at the beginning of the Easter Term. Protest against this has been sent by the E. W. I. to the City Board of Education and to the press.

CANADA.

Winnipeg, Manitoba, teachers, who are getting from \$65 to 100 a month, suffered in February last a temporary reduction of 10 per cent. in salaries above \$800 a year. The total saving will be between \$175,000 and \$200,000.

In British Columbia teachers agreed to contribute to the unemployment relief fund from September 1931, rather than receive a salary cut. Owing to the reduction in Government grants for teachers' salaries, School Boards have once more appealed to the good-will of the teaching staff. The Saanich school teachers, for instance, who already contribute \$1,400 a month to the relief fund, underwent in February last a graded cut of from 5 to 15 per cent., which means a saving of \$7,500 in a full year. From June, 1932,

when teachers' agreements with the School Board terminate, there will be no doubt a straight cut of 10 per cent., already proposed in February. In order to wipe out the remaining deficit in the Budget, the Saanich Board passed cuts in practically every possible direction: they reduced the appropriations for medical service, nurses and dentists from \$3,500 to \$2,500; the grants for building from \$25,500 to \$21,000; the expenditure for furniture by 25 per cent., etc.

At the end of January, 1932, the Toronto, Ontario, School Board voted a general cut of 5 per cent. in the salaries of all Board of Education employees, which will save the tax-payers about \$100,000, as against \$220,000 first expected by holding up the annual increments. The lower paid teachers are however better off than if the increments had been suspended. The superannuation allowance is automatically affected. Women teachers of Toronto have already voted one per cent. of their salaries to keep their unemployed fellow-teachers from starvation. Conditions of work have been aggravated by the increase in the size of classes during the last few years: classes which should be 30 are often 40 or 50. The inducements to students to enter the scholastic profession will be still further curtailed. Similar cuts appear to have been made in other centres of the Province.

CEYLON.

LOSS OF THREE MONTHS' SALARY ON TOP OF CUTS.

In 1931 the salaries of teachers, particularly in the Vernacular Schools of the Buddhist Theosophical Society, have been six or eight months behind (in one case even fourteen months). Only in April last the Minister of Education obtained from the Government—whose generous subsidies for the development of key industries, etc., are well-known—Rs. 80,000 to pay the salaries in arrear. This sum being insufficient, salaries

from June to September, 1931, will be ignored and allowed to drop.

Salaries of teachers in Ceylon have never been able to compare with the salaries of the other branches of the Civil Service. Moreover, teachers in aided schools have been singled out last year by an increase in the units of attendance and in the number of working hours, along with a reduction of staff. The majority of them draw 20 per cent. less than teachers in Government schools, who have also the benefit of security of tenure, free passes, house allowances, widow's and orphan's pension funds, special medical facilities, etc.

From February, 1932, the salaries of all Government servants, including the teachers of aided schools, were cut from 2½ per cent. to 10 per cent., calculated after the deduction of 4 per cent. towards the pension scheme. This cut is said to help the parents by reducing taxes, but in reality it will serve to meet the deficit in the Budget.

NEW ZEALAND.

THE ATTACK ON SALARIES.

The 10 per cent. cut forced upon teachers in Spring 1931 resulted in a total saving of £274,709. Since then a certain number of teachers have been singled out by the abolition of the remote allowances bringing the 10 per cent. cut up to 20, 25 and even 30 per cent. In December 1931 the Government decided that in future teachers' annual salary increments—in the case of the primary school generally £15—will be only given subject to the approval of the Minister of Education, i.e., ultimately to the arbitrary opinion of the inspectors. Further, a series of the most exploited layers of the teaching profession are entirely unpaid; no probationers, no assistants for large classes are appointed for 1932; leaving music teachers are not replaced; itinerant physical instructors, organising teachers,

part-time commercial instructors in district high schools are dispensed with

The present Economy Commission proposes a further 10 per cent. cut in Civil Service salaries, and, moreover, a saving of £75,000 on the salaries of primary school women teachers, by the violation of the principle of equality, placing them on a 4:5 salary ratio to the men, as is already the case in secondary and technical schools; a saving of £3,000 by the adjustment of over-scale salaries originally agreed upon in order to ensure that the country schools would not suffer; a saving of £5,800 by the abolition of special allowances to teachers for performing extra work.

INDIAN

THE PUNJAB.

Arrangements for the holding of the Eight Conference of the All-India Federation of Teachers' Associations at Lahore are being made. The Secretary of the All-India Federation of Teachers' Associations has already circularised Secretaries of the Affiliated Associations calling on them to send their first nomination for the presidentship of the Conference.

The Assistant Secretary of the Punjab Geographical Association took a party of about 36 students to Kangra, Dharmasala and Mandi Hydro Electric Works. The tour lasted five days, 12th to 17th May, 1932.

DELHI.

It is understood that in the month of June several bungalows situated in the old Viceregal Estate have been handed over to the authorities of the Delhi University. The Law College and its hostel have been shifted to the Viceregal Estate. It is understood that the question of the other constituent colleges, moving out to the estates is engaging the attention of the authorities.

Acting on the recommendation of the Superintendent of Education, the New Delhi Municipality have decided to raise their Girls' Middle School to a High School.

THE UNITED PROVINCES.

Universities Committee Report.—This is now out. It recommends that the Vice-Chancellor may either be honorary or be paid such remuneration as may be determined. This recommendation expresses the view that the University should not be bound down to one course and the law should be elastic. It is remarkable that the note of dissent sent in by Dr. Ganganath Jha, the present Vice-Chancellor of the Allahabad University, protests against the proposal that the Vice-Chancellor should be honorary. It also argues in a very dignified manner that if the Bar should run the High Court, teachers should run the University. This is a reply to the clamour of non-teachers who think that there are too many teachers on the governing bodies of the Universities and a very telling reply too.

Untrained Teachers.—In 1927 the Department of Education issued a circular that those teachers who were on permanent staff before December 1925 would be considered trained for purposes of employment. This was the result of agitation carried on by Teachers' Conferences during the previous five years. The authorities had told the Managing Committees of Anglo-Vernacular Schools that trained teachers alone should be employed. This had led to the situation that if an untrained permanent teacher had had to sever his connection with the school where he was employed he had no chance of getting another permanent employment elsewhere because he was untrained. The Department tried to solve this difficulty by issuing the circular of 1927. Now this solution was certainly no solution at all. And the U. P. Secondary Education Association had, year after year, at its

annual conference adopted resolutions suggesting several ways out of it. So far, the Government had not agreed to any one of them finding one flaw or other in every one of them. The main contention of the Association was that either the untrained teachers should be allowed to appear at the Training College examination as private candidates or they should be awarded some sort of certificate. The Government felt that unless teachers worked under the supervision of training college teachers for the full term of nine months no certificate could be given nor could they be allowed to appear as private candidates. Now it is reported that after due deliberation the Government has arrived at the conclusion that teachers who were on permanent lists till 1930 should be exempted from training and certificate to this effect will be given individually to all such persons; and that those who have been in service since 1930 onwards would be asked to give 12 lessons at the training college, would be exempted from the theory examination and would be awarded a newly created certificate of A.T.C (Acting Teachers' Certificate). It is hoped that if really all this comes true it would be very much welcomed by everybody concerned.

Games Teachers' Allowance.—Some time back the Director of Public Instruction had caused a sensation here by his circular that no allowance should be given to games teachers out of the games funds. In private schools games teachers had been getting an allowance of Rs. 5 or 10 for the extra work of supervising and arranging the games. The Government schools had a grievance in this respect for there no such allowance was given. It is understood that the circular referred to was issued in response to an appeal by Government school teachers asking for the allowance. The circular was very much resented and the columns of *The Leader* were almost daily flooded in with representations

and resolutions of branches of the U. P. Secondary Education Association all over the province. Whether it was the effect of the pressure of the agitation or the result of the usual due deliberations, the Government have now ruled that the allowance that may be given to games teachers may be between Rs. 15 to 25.

Lucknow University.—Dr. R. P. Paranjpe, ex-Principal of the Fergusson College, Poona, (1902-1920), Minister of Education, Bombay Government (1920-1923), and a member of the India Council, London (1927-1932), is by the Executive Council of Lucknow University, unanimously elected its Vice-Chancellor in place of Pandit Jagath Narain, who has resigned.

BENGAL.

1. The Senate of the Calcutta University has passed the New Matriculation Regulations. The most important innovations are:—

- (i) Making Physics and Chemistry compulsory after first five years;
- (ii) Making vernacular as the medium of instruction and examination in all subjects except English;
- (iii) Providing separate syllabus of studies for girl students;
- (iv) Opening a register for teachers of English;
- (v) Making Physical instruction and Vocational training compulsory; and
- (vi) Abolishing age restriction.

The Regulations now require the sanction of Government which, it is expected, will be obtained.

2. Indian State Broadcasting Service at Calcutta has arranged for educational lectures by well-known educationists for school and college students.

3. Government has effected a 10 p.c. cut in grants to schools and colleges.

4. The Calcutta University has offered the Chair of Bengali Literature to Dr. Rabindranath Tagore, which the great poet has accepted.

5. It is understood Lt.-Col. Sir Hasan Subrardy, the present Vice-Chancellor, has been re-appointed Vice-Chancellor for another term of three years.

BOMBAY.

The annual Convocation of the University of Bombay was held on the 17th of August when Sir C. V. Raman addressed the new graduates. As usual the Syndicate has published its annual report to be submitted on this occasion. If all the graduates (Bachelors and Masters) of the last examination season present themselves for receiving their degrees they will make a small crowd of 1800 persons ready to launch their ship of life into the world which is every day assuming a more threatening

aspect. Of them 1,821 will be B.A.'s, 323 B.Sc.'s, 224 LL.B.'s, 75 B.T.'s, 46 B.Com.'s, 66 B.E.'s, and 68 M.B.B.S.'s. Of the rest 75 will be M.A.'s, 19 M.Sc.'s, 6 M.Ag.'s, 1 M.E., 2 LL.M.'s, 4 B.Hy's, 3 M.D.'s, and 6 M.S.'s. This shows great progress during the last ten years but in its annual output of graduates Bombay is probably still behind Madras and Bengal.

At the last Matriculation Examination, of the 15477 candidates registered 5806 or 37.5 per cent. passed. Last year the percentage of passes was 57.2. This University allows candidates at the Matriculation to answer their (Indian) classical language and history papers in their mother-tongue. This permission was first granted in 1926 and advantage of the option is taken by the students every year in increasing numbers. The figures for the last examination are given below.

Number of candidates who answered in

Subject	Total appeared	English	Mother-tongues	Marathi	Gujarati	Kannada	Urdu	Sindhi	Portuguese	Hindi
Sanskrit	...	574	962	2612	1728	712	170	...	...	2
Pali	...	23	9	17	16	1	...	...	...	...
Persian	...	1141	1045	96	...	67	...	18	11	...
Arabic	...	35	25	10	...	...	10	...	...	...
History	...	15252	5196	10056	4601	3594	564	39	1245	11

N.B.—Candidates can answer their papers only in the recognised languages of the Presidency and they are the seven mentioned above.

The organisation of Post-graduate instruction and research has been for some time past a much debated problem. That Post-graduate work needed greater supervision and guidance everybody accepted, but opinion widely differed on how this could be achieved. Some suggested the usual method of affiliation even for Post-graduate

work; others held that affiliation for Post-graduate purposes was not contemplated under the new Act and that the University could control Post-graduate work only by recognising qualified persons to do the work. A reference was made to the Chancellor and his ruling has been in favour of the latter group. An army of

University teachers (about 225 out of a total of about 550 college teachers) are recognised in all parts of the Presidency and many more will be added to the list when the names of University teachers in Medicine are announced. This means practically every one who was doing some kind of Post-graduate teaching in the past will hereafter have the new designation of "University teacher." Whether this mere change in designation brings about the desired improvement or whether it only tends to create a new division among Professors and proves a source of friction can be ascertained only with the lapse of time.

The political conflict in the country is to some extent noticed in local bodies where elections are often held with candidates flying political colours. And whenever the Congress party has the majority, trouble peeps its head up although it must be admitted to the great credit of both the local bodies and Government, that this has seldom presented itself in an acute form. One of these rare cases is that of the Municipality of Broach. It seems in 1930, not liking the ways of the Municipality Government withheld its grant-in-aid for education and the Municipality in its turn retaliated by not paying the teachers for about ten months. It is difficult to distribute the share of guilt. Both the Municipality and Government are probably wrong and in their fight the innocent teachers are being crushed.

MADRAS.

1. The special convocation of the Madras University to confer Honorary Doctorate Degrees was held on the 3rd August. His Excellency Sir George Frederick Stanley presided.

On the following day the annual Convocation of the University was held. The Hon'ble Dewan Bahadur S. Kumaraswami Reddiar, B.A., B.L., M.L.C., Minister of Education and Pro-Chancellor of the University of Madras, delivered the

Convocation Address. His Excellency the Chancellor presided. 1247 graduates and Diploma holders took their Degrees and Diplomas in person while 588 were allowed to take their degrees in absentia. It is noteworthy that as many as 259 ladies took their Degrees at this Convocation.

2. The teachers in the employ of the Corporation of Madras are running an Educational Camp at Red Hills on the 13th and 14th instant. Mr. D. S. Reddy, Deputy Director of Public Instruction (Elementary Education), is the camp officer.

3. Sir C. V. Kumaraswami Sastri, it is understood, has been required to deliver the Convocation Address at the coming Convocation of the Mysore University.

4. It is understood that the Director of Public Instruction, Madras, is not in favour of permitting withdrawals from the Provident Fund account of teachers employed in aided schools for paying the premia on life policies. The Director, it is said, is of opinion that it will lead to several difficulties as the scheme of Provident Fund for teachers in non-government aided schools is different from the General Provident Fund, from which withdrawal for such a purpose is permitted.

5. The Mysore Government is reported to be contemplating a big reduction in their annual contribution towards the Indian Institute of Science, Bangalore.

TANJORE DISTRICT TEACHERS' GUILD.

The first meeting of the Tanjore District Teachers' Guild for 1932-33 was held at the Municipal High School, Mayavaram, on Saturday, the 27th instant, at 3 P.M., Rev. N.G. Pooniah presiding. There was a good gathering and the S. S. T. A. was at 'Home' to the Guild.

Mr. T. K. Duraiswami Aiyer, M.A., L.T., of the Government College, Kumba-

konam spoke on the "Educational Implications of Democracy."

The gist of his thoughtful lecture is as follows:

In the coming democracy, the role of the educator is supreme, as inspiration is to come from below. There should be proper appreciation of the place to be filled by the elementary school teacher. While, in ancient India, there existed a high public opinion of the teacher, the place accorded to the teacher nowadays is very unsatisfactory which state of things is cutting at the future of India.

The secondary school teacher has higher responsibilities than the teacher in a University where students are thrown on their own resources.

The difficulties of teachers are much greater and the problem of education is more taxing than in any other country.

The University education is highly unsatisfactory for two reasons: (a) quality has been sacrificed to quantity; (b) education is divorced from life, while, in other countries, it is in close compact with life.

The next item was the opening of a discussion on 'The teaching of English' by Mr. V. Mahadeva Aiyer of the Native High School, Kumbakonam. He admitted that there is a fall in the standard of English in secondary schools. The vernacular medium in the teaching of non-language subjects might perhaps, to a slight extent, account for the set-back in English. However, he advocated the adoption of the vernacular medium, in which case he pleaded for more hours for English.

Though direct method is condemned, he thought that it had not been given a fair trial.

Text-books should be in simple, modern, conversational style and contain dialogues and dramatic pieces written in the language of every-day life.

In the lower forms, we should be less ambitious, give more drill and have very little poetry. The boys should be made to memorize not only poetry but also good prose passages. He strongly disapproved of the use of non-detailed books in the lower forms. He thought that the use of the dictionary in the lower classes need not be insisted upon, as it does more harm than good.

There should be no grammar in the lower forms and grammar should be taught in the upper forms only for the sake of the discipline it affords. Special stress was laid on the importance of translation. Essays should not be thought of in secondary schools.

He remarked that the teaching of the vernacular has much to do with the efficiency in English and therefore it should be greatly improved.

The following resolutions were passed at a meeting of the Tanjore District Teachers' Guild, held at Mayavaram on the 27th instant:—

1. The Tanjore District Teachers' Guild, while appreciating the motives behind it, regrets the recent memorandum of the District Educational Officer Tanjore, governing admissions into secondary schools, as it interferes with the powers of the Headmaster.

2. The Guild appoints a committee to draft a memorandum on the necessity for the formation of a Managers' Association for each district and the part the Guild should play in it.

3. The Guild prays that a uniform rate of interest at 5 per cent, may be allowed on the Teachers' Provident Fund, instead of the privilege of investing it in the postal cash securities and that changes, if necessary, be made in the G. O.

4. This Guild recommends to the University of Madras that the 'Vidwan' Title Examination in Oriental Learning may be instituted in the Hindi language also as in Tamil, Telugu, Marathi, etc., to enable the school authorities to select only Oriental Title Holders in Hindi for the appointment of the Hindi Pandits in schools and colleges in this presidency.

The Range Elementary Teachers' Association, Ammanabrolu, Guntur District, extended its hearty welcome to D. S. Reddy, Esq., B.A. (Hons. Oxon), Deputy Director of Public Instruction, Madras, during his tour in the Guntur District, on Tuesday, 26th July 1932, at 2 P.M. at the Travelers' Bungalow, Velampalli. On behalf of the Deputy Director, the President, District Educational Council, Guntur, M.R.Ry. P.V. Krishnayya Chauduri Guru and the District Educational Officer, Guntur, Janab Abdus Salaam Sahib Bahadur, B.A., kindly carried on the proceedings of the evening. The District Health Officer, Guntur, and the Local Fund Assistant Engineer who was on special duty in the construction of the Gunalakamma Bridge were also kind enough to attend the meeting. There was a good gathering of teachers on the occasion.

Prayer was offered by Sangeetha Vidwan D. Subba Rao, teacher of Garlapaud. The Deputy Inspector of Schools, Ammanabrolu Range, Mr. M. Venkatramayya Pantulu

Garu, B.A., B.Ed., introduced the audience in general to the guests of the evening, and explained the purpose with which they had assembled at the spot. Verses were then read by the poet Mr. B. Sitharamiah of Brahmana Nidamanur School. Mr. V. Venkateswarlu, B.A., Secretary, read his address in Telugu, a translation of which is published below. The honoured guests of the evening said that they came to have a free exchange of ideas, and some of the teachers, Mr. R. L. Narasimham, Headmaster, B. H. G. School, Uppugundur, Mr. V. Venkateswarlu, B.A., Headmaster, B. H. G. School, Ammanabrolu, and a few more represented the grievances of the teachers at large. The practical difficulties that are facing the administrative authorities in respect of enhancing the pay or grant of the petty schoolmaster were clearly explained, and they said that attempts were being made to better the prospects of the teacher as far as possible. It was also said that a higher grade teacher though untrained can alone handle satisfactorily the classes of an elementary school, but an average lower grade teacher, though trained, cannot do full justice to his work. Hence no encouragement was given to a lower grade trained man, much less to an untrained. There was no use of the present night schools, for they could not aim at the imparting of adult education as contemplated by the Government. Such points were fully explained to the teachers, and the Association felt highly thankful for the opportunity it had in openly discussing with and frankly expressing its ideas before the distinguished guests of the evening. A Vote of thanks and the National Anthem then brought the meeting to a successful termination.

The Boy Scouts of Brahmana Nidamanur Board Muhammadan School have to be thanked for, for their immense service at the function.

There was never in the annals of the Association such a happy occasion as this. The petty elementary school teachers to come in contact with the District officers and the Deputy Director and exchange ideas openly on an equal basis, is really a boon for the Association.

We wish it and its sister associations also a frequent occurrence of such happy occasions, for the sad lot of the elementary school teachers would soon melt away by direct contact with the officers in whose hands their fate is sealed, for they would otherwise not know the inexpressible agony that they, the teachers, ever feel.

ADDRESS TO MR. D. S. REDDY.

Most Respected Sir,

We, the members of the Ammanabrolu Range, Elementary Teachers' Association, most humbly beg to extend our hearty welcome to you, our revered guest of the evening.

Remembering your former love towards us as the District Educational Officer, Guntur, you, though at present occupying the highest position as the Presidency Officer, have, without the least hesitation, accepted our humble invitation, gladdened our anxious hearts with your honourable presence, and been our revered guest at this auspicious moment. Here do we place the sacred flower of our hearty welcome at your lotus feet. Pray, accept it.

Sir, you are the embodiment of western education, a master of economics and its sister

sciences, an esteemed statesman, and the Chief Examiner for University degree holders. Upon the least application do you unhesitatingly lavish your immense love on all those that seek your aid. At one side of you hang numerous teachers and such other helpless scholars, ever desirous of drinking the nectar of your fountain head with a view to secure decent passes at the University examinations. At another side are the ever-engaging affairs of Universities of different provinces. And, not to speak of the incessant uproar of the poor, and your private business, is there the responsible burden of office routine demanding your full attention without a moment's leisure. Thus are you ever busy with your high office, but, in spite of this, you always cast your kind look at the ill-paid, helpless and miserable elementary teachers sailing in a sea of troubles 'unhonoured, unsung and unwept,' with a view to cheer them up and remove their sad lot sealed on them. Nay, you would go a step further, and sincerely endeavour to secure means for their salvation. Your generosity to those is immense indeed! What a pole star you are to us all! Instead of a single district enjoying the fruit of your sympathy, the presidency as a whole is given the benefit of getting under the sacred shunshine of your limitless love. Is not this the fortune of the brother-masters at large?

In the recently established range fairs, are started eight Central Class Associations. They assemble once a month, and discuss educational topics of utmost importance. In this tender age alone, we have formed into a Range Association. It has, under the presidency of the District Educational Officer, Guntur, celebrated two Conferences and one

educational exhibition on a grand scale, and we have desired to convene our third Conference and Second exhibition most probably in August next. Our Range consists of teachers of great precocity. Here are teachers who take active part in the Ongole Taluk Board and Municipal, and Guntur District Elementary Teachers' Conferences every year. Amongst us are master-poets, distinguished scholars of ancient puranic lore, experts in musical and histrionic talents, teachers of lower elementary grade that have through school-study improved their technical qualifications, and crowning all, those of secondary grade who through private study as bonafide teachers speedily got through University examinations, and secured degrees in an easy and creditable manner. Added to this, there are many amongst us who have dispelled the demon of caste and sex feeling which molests the villagers to a great extent, and have contributed most satisfactorily to the admission and education of non-Brahmin boys and girls in our Hindu Schools. We have also started Scout troupes, and wherever feasible, introduced modern physical activities in our schools.

Now pray, turn your sympathetic look for a moment to the dark side of our picture, our inexpressible monetary calamity. Having taken up the choicest profession, and being responsible for the future mould of the country, that we, the elementary school teachers should struggle in vain in the fetters of poverty and untold difficulty, is really deplorable. These hardships are really unbearable, and unattributable to us. We therefore humbly request that you will be pleased to enhance the petty grant of aided school teachers, sanction special grant towards house rent of school buildings, and to make adequate

provision for compensatory grant towards loss of fee income from pupils. We further implore that you will create proper facilities to our Ongole Taluk Board so as to enable it to give the Board school teachers enhancement of salary, to adopt Government scale, to sanction duty and such other allowances to the deserving teachers, and to allow adequate contingencies to all schools under its management. We further beg that in order to make the pupils and their parents evince good interest in education and attach importance to it, you will kindly put into force free and compulsory education as early as possible all through the presidency, and to create satisfactory value in the certificate issued in elementary schools.

Sir, we submit that this humble welcome we extend to you is, from start to finish, erroneous. Pray, wink at these faults, as you would at those of your dear children.

May God Sadasiva, embodiment of kindness, ever shower His choicest blessings on you, the tender-hearted and the most exalted guest of this evening.

The third Anniversary of the Students' Literary and Games Association attached to the Board Higher Grade Elementary School, Ammanabrolu, and the first Anniversary of the Central Class Teachers' Association, Ammanabrolu, were held in the premises of the said school on 20-8-32 at 2-30 P.M. under the presidency of Janab Abdus Salaam Sahib Bahadur, B.A., District Educational Officer, Guntur. Messrs. M. Venkatramayya Pantulu, B.A., B.ED., Deputy Inspector of Schools, Ammanabrolu Range, Ch. Narasimhamurthy Rao, M.A., L.T., Dy. Inspector of Schools, Ongole Range, D. Satyanarayana-murthy, B.A., L.T., Headmaster, Government Training School, Ongole, and K. Ramakrish-nayya, B.A., Sub-Registrar, Ammanabrolu, kindly attended the same. There was a good gathering on the occasion.

Prayer was offered in chorus by a few girls of the school. M.R.Ry. V. Venkateswarlu, B.A., Headmaster of the School, in his Welcome Address spoke of the importance of anniversaries, and the benefits that the teachers and the taught derive from the combined celebration of their functions in the presence of the parents and the officers. After verses, the distinguished President spoke in his introductory remarks about the significance of the combined celebration of the anniversaries of the students and teachers, and proceeded to the other items of the programme. Mr. N. Venkatakrishnayya, Secretary of the Students' Literary and Games Association, read his report where he stated the history of the Association and its activities. The Secretary of the Central Class Association, M. R. Ry. V. Venkateswarlu, B.A., then read his report, where he dealt with the constitution of the Central Class Association, and its activities under the kind supervision of the various Inspecting officers. There was next a fine dramatization by lads of lower classes, coupled with chorus of Mahamadan and Hindu boys. An Adi-Andhra girl also sang a sacred 'Gitam.' Next a lecture was delivered by M. R. Ry. D. Satyanarayanamurthy Garu, B.A., L.T., on 'How to secure pupils' attendance at school.' He also spoke about the duties of the teacher and addressing a few words of advice to the pupils, requested the parents to heartily co-operate with the teacher for the good progress of their children. After this, the students of the high standards staged a few scenes from 'Madhuseva' to the entire satisfaction of the audience. Prizes were given to the students that emerged out first in the various classes in the last annual examination, to those that had good histrionic and musical talents as had been found in the dramas enacted and to those that were good at games such as Volley Ball, Badminton and Chedigudu. Then M. R. Ry. D. Satyanarayanamurthy Garu, B.A., L.T., gave a nice magic lantern lecture about 'Aeroplanes and the various stages of inventions in this regard, Sindbad the Sailor and his Voyages, and

Sivaji the mountain rat and his admirable achievements.' The distinguished D. E. O. then delivered his concluding remarks in a most beautiful manner (in chaste Telugu, as in his introductory remarks, so as to make the audience directly understand and enjoy the bliss of his talk), and kept the audience in rapt attention. He spoke about the central classes and their importance, and asked the teachers to make use of their libraries and to put to practise what all they learnt at the central classes. He said what a teacher ought to be, and every lay man is not fit for that profession. The pupil is more or less a photo of the teacher, and so, he said, if the boy is to be perfect, the teacher should inevitably be flawless. He exhorted the teachers to set up, with the appliances they secure, a museum in each school, and spoke about its significance at great length. Next he turned to the pupils and gave a fatherly advice to them regarding their duties, etc. He exhorted both the prize-winners and the non-winners to work hard with increased enthusiasm to secure prizes next year also. He then cast his kind look at the parents of the boys, and deplored the present state of India which does not contain even 10% of educated people, while so many of the advanced countries are having a large percentage, such as 90 and above, of educated class, and said that the parents in general are to a large extent accountable for the same. The teacher cannot be wholly held responsible for the education of the boy. The parent is also an indispensable factor. He hoped that the parents would visit the school as often as possible, and associate with the teachers in all their activities connected with the school, and thus contribute to the progress of the future generation as best as they can. He felt glad that the parents here at Ammanabrolu evinced good interest in the school, and encouraging the teachers and the taught to celebrate their anniversaries with accelerated enthusiasm resumed his seat.

A Vote of thanks was then given, and with the singing of the National Anthem, the meeting came to a successful termination.

THE REVIEWS AND NOTICES.

MODERN INDIA THINKS, BY K. R. LUCKMIDAS, WITH A FOREWORD, BY K. H. VAKIL. D. B. TARAPOREVALA SONS AND CO., BOMBAY. Price Rs. 6.

This is an interesting compilation of extracts and sayings of reputed authors and statesmen. The book is divided into twelve parts to deal with civilization, culture, religion, aesthetics, ideal education, work, wisdom, character, etc., and well chosen "literary cuts" are aptly laid in each part. We commend this illuminating volume for "an after-dinner reading."

THE CABULIWALLAH AND OTHER STORIES, WITH NOTES AND EXERCISES, BY A. BHATTACHARYA, B.A. MACMILLAN & CO., LTD. Pp. 214. Price Re. 1-4.

Nine very good short stories have been collected in this book, from authors like Tolstoy, H. G. Wells, and W. W. Jacobs. The stories are edited with ability and care, attention being drawn both to the ideas and the special features of the language in them. The exercises and notes prepared are very thorough. The book should be found suitable for the Matriculation class.

THE ADVENTURES OF HAJJI BABA OF ISPAHAN, BY JAMES MORIER, ABRIDGED WITH INTRODUCTION AND NOTES, BY J. S. ARMOUR. MACMILLAN & CO., LTD. Pp. 153. Price as. 12.

This abridgement must serve to introduce the great travel classic to young readers.

LITERATURE, OLD AND NEW, PROSE READERS FOR JUNIOR SCHOOLS, BY K. AND E. J. S. LAY. MACMILLAN & CO., LTD. BOOK I, 144 Pp., Price 1s. 9d. BOOK II, 192 Pp., Price 2s. BOOK III, 224 Pp., Price 2s. 3d.

These books provide selections from the work of recognised writers for children. The selec-

tions are graduated in their difficulty and each book has different groups, of fairy story, realistic story and drama. Language exercises are provided for each lesson. The printing is excellent and illustrations are also to be found.

STORIES OF THE OLD GREEKS, BY W. H. D. ROUSE. MACMILLAN & CO., LTD. Pp. xii + 136.

This book written in attractive language for young readers presents the principal periods and events of Greek history and legend in separate chapters. The book will form an excellent introduction to the understanding of the value of Greek culture.

PRACTICAL PHYSICS, BY BOWER AND SATTERLY. UNIVERSITY TUTORIAL PRESS, LONDON. (THIRD EDITION, 1932). 7s. 6d.

The present is a thoroughly revised and slightly enlarged edition of the popular publication, which has been a standard guide in laboratory work for well-nigh over 20 years. The new edition reflects the revolutionary changes that have come over laboratory practice and appliances in recent years even more than the second edition (1922) and consequently is likely to prove more beneficial to laboratory instruction.

For the Intermediate student of the Madras and the sister Universities the volume is a perfectly reliable guide for Physics Practical, supplying the indispensable theoretical information under each head in easy stages. Practical work which is the mainspring of sound instruction therefore need not necessarily proceed *paripassu* with lectures. The carefully executed diagrams, the complete numerical data furnished under each experiment, the tabular form for recording results showing the methods of calculation and the degree of accuracy expected of each experiment and the graphical representation of results in a few cases should prove

invaluable to the student and the demonstrator, as these are the distinguishing marks of a modern manual on Practical Physics. One noteworthy feature of the later editions is the special Home Course. By adopting it the student could economise his work at college by devoting himself exclusively to experiments involving more costly apparatus. The book may usefully be continued to the B. A. stage also and should serve as a fitting introduction for the B. A. Subsidiary Physics students.

THE THAKUR'S JEALOUSY, BY F. R. SELL (THE OXFORD UNIVERSITY PRESS, 1931). PP. 150.
DURGA DAS, THE RAHTORE, AN HISTORICAL ROMANCE (MACMILLAN & CO., 1930). PP. 168. RE. 1.

These two small books indicate a welcome departure in the field of our book-production, as they are devoted to the portrayal of historical episodes of the Rajputs, the flower of Indian chivalry, one of the 12th century, and the other of the 17th century. The former treats of an episode in the great feud between Chauhan and Chandel, one face of which is detailed in the epic of Chand Bardai, *Prithvi Raj Rausa* and the other has been portrayed in the *Alha-Khand* which tells the story from the point of view of Chandel and Gahadvala and has been rendered into English ballad verse by Waterfield. The Mahoba war section of the epic of Chand has been first described by Colonel Tod in his *Annals and Antiquities of Rajasthan*. The author, Professor Sell, follows a line of his own in the romance in which he gives Thakur Mahil, the villain of the piece, and brother-in-law of Raja Parmal of Mahoba, is given a more complex character, with more light and shade. Alha and Udal Rai, the two brave brothers, are also brought out prominently; and Mira Talhan, the Sayyad, is made to come out, as well as the

Banaphars. At the end of the tale Mahoba is seen deserted, conquered by Prithvi Rai and entrusted to Thakur Mahil the Parihar, and the land of the Chaudels was divided—a sure sign of Rajput rifts and the impending onslaught of the Muhammadans. The story goes on in rapid evolution and the epilogue of the crash of Rajput independence and empire is well told.

The second of the books is from an anonymous pen and deals with the heroism of Durga Das, who was the saviour of the Rahton House of Jodhpur from humiliation and even extinction at the hands of Aurangzib and bore Ajit Singh, the infant heir of the Marwar throne, to safety and to future revenge against the Mughal house, how Durga Das roused the Rajputs to fury and indignation against the Emperor and continued to sow dissension in the Imperial family itself. The writer would elevate his hero, Durga Das, to the height of Shivaji, twin stars of the first magnitude in the Hindu horizon of Aurangzib's time. The later tragedy of Durga Das's life is not brought into the narrative, as it would only serve to bespatter mud on the Rajput name.

We recommend these two books to all our school libraries and students.

THE HOW AND WHY SERIES (1) THE GREEKS BY ROSALIND MURRAY, WITH A PREFACE BY GILBERT MURRAY—A. & C. BLACK, LTD.—LONDON, 1931. PP. 96. 2s. 6d. net.

The aim of this new series of which the book under review is the pioneer, is to build up a library of general knowledge and culture, simple enough to be understood by the English child of ten and attractive enough to draw the attention of even elders who desire to enlarge their mental horizon. This book has been written by the daughter of Prof. Gilbert Murray who declares that Greece appeals to the cultured

mind for two characteristic reasons; viz., (1) she shows human nature, the soul, singularly free from mere trappings and upholstery; and (2) their books are the most beautiful that can be found. Miss Rosalind Murray points out why a study of the ancient Greeks and their life is more important than a study of other ancient nations and goes on to explain the coming of the Greeks, their heroic age, colonisation, religion, etc. She maintains that a great many of the earliest Christian ideals were Greek and that the Jews found in the new religion of Christ too much Greek heresy to make it acceptable to them.

Greek life was more a whole than modern lives; and Greek religion was not a thing apart from ordinary life, as it has been often in later times. The *hybris* of Athens was punished by the *Ate* of the Peloponnesian War. The author hurries on the narrative after this war and comes down to the epoch of Alexander who was "a real Greek at heart" and took with him Hellenism along with Greek and Macedonian soldiers, to Bactria and India. She well shows how Athens was the school of Greece which, in turn was the school of the world.

Books useful for Intermediate and B. A. Degree Examinations.

A HISTORY OF INDIA, by C. S. Srinivasachariar, M.A., and M. S. Ramaswami Aiyangar, M.A. Part I—HINDU INDIA, with six maps. (<i>Prescribed as a text-book for the Intermediate Examination of the Andhra University</i>)	RS. A.	2 8	INTERMEDIATE CHEMISTRY, by P. Lakshmi Narasu, B.A., Professor of Physical Science, Pachaiyappa's College, Madras. 3 8	RS. A.
			INTERMEDIATE PHYSICS, by the same author	
Part II—MUHAMMADAN INDIA—by the same authors	3 0		LECTURES IN LOGIC, by Rao Bahadur S. Mangesh Rau, B.A.	2 8
INTERMEDIATE GEOMETRY (Theory and Practice), by M. Satyanarayana, M.A., L.T., and K. S. Patrachariar, M.A., L.T. 4th and Revised Edition	2 8		STUDENT'S HAND-BOOK OF PSYCHOLOGY, by the late Dr. S. Sathianadhan, M.A., LL.D. (2nd Edition)	1 0
THE STUDENT'S COMPANION TO GEOMETRY, for the Intermediate Examination of the University of Madras, by K. Deva Rao, B.A., L.T.	0 8		QUESTIONS AND ANSWERS ON ELEMENTARY LOGIC, by M. Macmillan, B.A. 1 0	
EXAMPLES ON TRIGONOMETRY, containing the F.A. Trigonometry Papers for 15 years, 1888 to 1902, with Solutions of all the Problems, by P. A. Subramania Aiyar, B.A., L.T.	0 8		THE ELEMENTS OF HUMAN PHYSIOLOGY, by G. S. Ramasami Aiyar, B.A.	1 0
EXAMPLES ON ALGEBRA, containing F.A. Algebra Papers for 17 years, 1889 to 1905, by the same author	0 8		B. A. EXAMINATION ENGLISH LANGUAGE, LITERATURE AND COMPOSITION PAPERS of 1881 to 1906 (both inclusive)	0 5
			F.A. MATHEMATICS—ALGEBRA AND TRIGONOMETRY PAPERS, with Solutions and Notes from 1901—1903, by B. Hanumanth Rau, B.A.	0 4
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THE EDUCATIONAL REVIEW.

We congratulate the authorities of the University of Lucknow on their having been able to secure the services of Prof. R. P. Paranjpye as their Vice-Chancellor. A distinguished mathematician and educationist of considerable experience, Prof. Paranjpye is among the best persons available for the office in the whole of India and it was a happy thought to have gone out of the local talent available the University and brought him out from his retirement in Poona. Prof. Paranjpye has the great advantage of also having been a Minister of Education and a Member of the Secretary of State's Council in England and we trust his regime will prove of great service to the University. The University started well with a Veteran Indian educationist at its head, Rai J. N. Chakravarti Bahadur, who was succeeded by Dr. M. B. Cameron who was Principal of the Canning College for decades. But its reputation reached its lowest ebb two years back, when owing mainly to internal squabbles among the staff, they had to elect as their Vice-Chancellor a lawyer whose experience

was confined to the criminal courts and who could not pretend to any University or academic associations. We are glad the University has now an opportunity of retrieving its lost reputation and we wish Prof. Paranjpye a long and successful term of office. It must also be some solace to him, after the recent domestic bereavement he has had, to find an appointment so congenial to his tastes, and past experience.

Important modifications have been introduced into the courses of study at Calcutta, of the Matriculation Examination of the University. One of the essential features of the new scheme is the provision for the use of the vernaculars as the media of instruction and examination in all subjects except English. This innovation cannot perhaps be delayed long in most of our Universities and the tendency in that direction is irresistible but we confess to some sympathy with those who pleaded in vain that subjects like Mathematics and Science may continue the use of English for some time to come. Vernacularisation

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tion is alright, but there can be no harm in proceeding slowly and consolidating the ground already acquired. It is doubtful if, at the present state of the development of Indian languages, subjects like Mathematics and Science can be taught efficiently in the vernacular; we also regret to find that the experiments made till now in various parts of India at the introduction of the medium of vernaculars cannot yet be pronounced a great success, either in making a knowledge of the subjects effective or in making English teaching sounder by finding more time for it, because of the saving of time effected by the teaching of other subjects through the vernaculars, though it is one of the arguments usually advanced in favour of vernacularisation.

In spite of the very generous endowment of the late Sir Sir C. V. Raman. Jamshedji Tata and the encouragement offered to the enterprise by the Government of Mysore and the Government of India, it is a notorious fact that the working of the Indian Institute of Science at Bangalore has never given any satisfaction to the Indian public. There have been committees of enquiry from time to time, but the essential lack of the institution seems to have been of an energetic and patriotic scientist anxious to utilise the facilities available for the advancement of the country. The need has now been supplied by the appointment by Sir C. V. Raman as the Director of the Institute. He will take charge from the 1st April next year and we

hope that under his auspices, the Institute will advance in reputation and fulfil the great aspirations of the generous Parsi philanthropist. Sir C. V. Raman has spent the best years of his life at the University of Calcutta, working also at the modest laboratories of the Indian Association for the Advancement of Science, in one of the most crowded localities of the city and it will perhaps be a wrench to him to leave his old associations. But he will now have admirable facilities for the pursuit of his scientific investigations. We have no doubt that his translation to Bangalore will lead to his greater distinction as a scientist.

We congratulate the Government of the United Provinces on their appointment of a committee with a view to improving the status of the depressed classes. It will be an advisory committee, on all matters concerning the education of the depressed classes, and will consist of the Deputy Director of Public Instruction, two members of the depressed classes elected from among themselves by the non-official depressed class members of the Legislative Council and three members of the depressed classes nominated by the Government. We commend the example to the educational ministries of other provinces.

If the recent Convocation Address delivered to the graduates of the University of Madras by the Hon. Diwan Bahadur S. Kumaraswami Reddi

Education of the Depressed Classes.

Madras Convocation.

was not particularly brilliant, it contained some useful sentiments which, we trust, produced an impression on his audience. He pleaded for more technical education in the country and argued rightly that it was not derogatory to the dignity of a University to think of making its graduates earn their livelihood. He protested against the undue importance shown to examinations and he drew special attention to the development of rich and forceful personalities while at college. Towards the conclusion of his address he also warned his hearers against the passive acceptance of the existing state of affairs and exhorted them to adopt a spirit of enquiry and deliberate revolt. We heartily endorse his appeal to the educated classes to realise their responsibilities and do something for the advancement of the masses.

"In relating your conduct to the great responsibilities of that position, I would ask you to regard as the first and foremost of your duties the task of rural reconstruction, which, as I have already indicated, is the most urgent need of the country to-day. It is to this noble task that you, the educated young men and women of our country, should apply yourselves with the utmost devotion and thereby render back to the community at large some at least of the wealth of knowledge which you have acquired with the aid of its resources. It was the village that formed the cradle of Indian civilisation in the past; and in the future it will undoubtedly be the village that will serve as the centre from which must radiate the light and life of a greater India.

"At no time was our country so much in need of a band of selfless workers as it is to-day; and

believe me when I assure you how deeply and gratefully our countrymen are beginning to appreciate such services. Turn to the great missionary organisations around you, and you would, doubtless, be struck by the simplicity and self-sacrificing spirit in which they work, be it for education, health, religious revival or mass uplift. May it not be that some at least of you will be fired by the same missionary zeal and dedicate your lives to the service of your fellow-men?"

We are glad to find that the authorities of the Madras Christian College are pushing forward with their scheme for the establishment of a fully-equipped residential college at Tambaram near Madras by transferring all their educational activities to the new centre. The main feature of the new enterprise will be the re-organisation of the college on the basis of teaching and residential halls. This will also mean increased facilities for the introduction of the tutorial system for which there is such crying need in this country. Another interesting feature is the merging of a number of Christian institutions in the establishment of the new college, Wesley College in Madras and the Bishop Heber College in Trichinopoly, both of which, we presume, are to be abolished, joining hands with the Christian College. We are told the halls will be more than hostels. They will have teaching, tutorial and disciplinary responsibilities, some lectures for instance, being given in one or other of the halls, rather than in the central college buildings and the idea is thus to make them resemble

the colleges in Oxford and Cambridge as much as possible. We wish the enterprise all success and trust that the realisation of the scheme will imply a distinct advance in the educational conditions obtaining at present in South India.

There is very great need in India for increased attention to the problems of health of school children and

Medical Inspection of Pupils.

it was a good idea that the Medical Inspectors of the Madras Presidency had occasion to meet at a recent Conference. It is a pity that the necessities of retrenchment should lead to a curtailment of any of the existing facilities for medical inspection of pupils in our presidency. The Conference was opened by the Chief Minister and was also addressed by the Minister of Education. Papers were read on various branches of the subject and we have no doubt that the Inspectors went away from the Conference with a deeper realisation of their responsibilities. It was something to have an assurance from the Education Minister that he was not opposed to an efficient system of medical inspection. We hope he will utilise the proceedings of the recent Conference for urging in the quarters concerned the necessity for more attention to the subject. It would be unfortunate if instead of extending the facilities now available, the Government will in the name of retrenchment abandon the scheme altogether as has been threatened.

XXXVIII—87

One of the most interesting tributes paid to Sir Rabindranath Tagore in honour of his 70th birthday anniversary was the recent academic reception given to him by the Calcutta University. Welcoming him on behalf of the University, Sir Hassan Suhrawardy, the Vice-Chancellor, said: "To-day we are gathered together to receive and accord our welcome to a distinguished son of Bengal who has been acknowledged by the world as one of the greatest men of letters of our day. Of the few persons who have made the culture of India understood and appreciated by the world at large, Rabindranath is perhaps the most brilliant and outstanding exponent. He has helped considerably to dispel the darkness of ignorance about the country and our culture, and we cannot adequately express our admiration of and the feelings of indebtedness to him. I am proud to feel that while politicians are struggling for dominion status or independence for India, the genius of Rabindranath has won recognition from the nations of the world regarding India's intellectual fitness for freedom. The ideal which he has set up is freedom of mind and spirit and universal peace and good-will by a true understanding between the peoples of the East and those of the world at large."

The proceedings of the recent meeting of the Educational Experts of the League of Nations constitute interesting reading. Though they have

India and the League of Nations.

not yet been released for general publication, it is known the Sub-Committee recommended closer association among the institutions of the world engaged in the study of international relations. It also emphasised the importance of educational films and pleaded for efforts at utilising the cinema for the promotion of international understanding. The circulation of the publications of the League and the revision of text-books so as to eliminate traces of racial bitterness were among the other subjects discussed. We hope that sufficient attention will be paid in this country also to the following resolution passed at the last meeting:—

"The Committee of Experts for the revision of school text-books is of the opinion that the League of Nations should recommend to the Governments that they assure themselves that the text-books in use in their country contain no passages prejudicial to mutual understanding between nations.

"Without wishing to intervene in any manner whatsoever in questions concerning teaching within the different countries, it considers itself justified in recommending the following measures, among which a choice may be made:

"(a) In countries where the choice of school text-books is a matter for decision by the Government, the latter shall entrust a Committee or official organisation with the duty of ensuring that none but school books containing no passages of a nature to prejudice international goodwill shall be used.

"(b) In countries where the choice of school text-books does not concern the Government, this choice shall be entrusted to groups of teachers, under the responsibility of the school authorities.

"The Committee is further of the opinion that educational museums and national centres of educational documentation should possess collections of instructional text-books compatible with the lofty spirit in which educators should conceive their duties."

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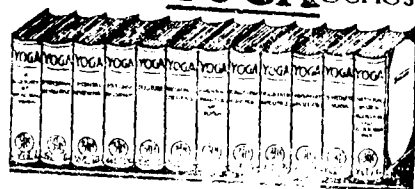
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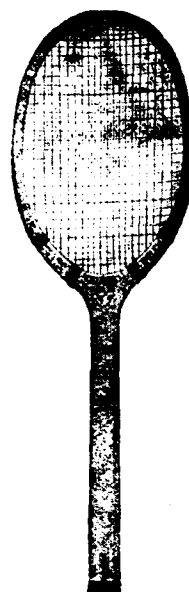
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