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By **P. V. SESHU AIYAR, B.A., L.T.**
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AND

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HIGH SCHOOL AND INTER-MEDIATE EDUCATION IN THE UNITED PROVINCES

By Prof. P. SESHADRI, M.A.,
Head of the Department of English Studies,
The Benares Hindu University.

QUESTIONNAIRE FRAMED BY THE INTERMEDIATE EDUCATION COMMITTEE.

I.—GENERAL.

1. Do you consider the present system of Intermediate education satisfactory? If not, what changes do you consider desirable and possible within the Intermediate Education Act, 1921?

II.—CLASSIFICATION.

2. Is the Intermediate College comprising Classes III—XII in your opinion satisfactory?

3. If not, what classification would you suggest? Give reasons.

4. Are you in favour of the retention of Intermediate classes in Degree Colleges; if so, on what conditions?

III.—ENROLMENT.

5. Is the maximum of 45 suitable for an Intermediate class?

6. Is the maximum of 35 suitable for a High School class?

7. If not, what maximum would you fix in each case?

IV.—RECOGNITION.

8. Do you consider that the Board has maintained a satisfactory standard of recognition in respect of—

(a) High Schools, and

(b) Intermediate Colleges?

If not, give your reasons with reference to specific cases within your knowledge.

9. What *essential* conditions must be fulfilled by a High School and an Intermediate College before obtaining recognition?

V.—COURSES.

10. Are the present courses for the High School and Intermediate Examinations in your opinion satisfactory?

11. If not, how would you improve the courses?

12. In particular, what in your opinion should be the total number of (a) compulsory and (b) optional subjects for—

- (i) the High School Examination, and
- (ii) the Intermediate Examination?

13. What subjects would you make compulsory?

14. What subjects would you leave as optional?

15. Should the Board prescribe groups of subjects for candidates for the Intermediate Examination? If so, what grouping would you recommend?

16. Do you recommend the introduction of vocational subjects into the High School and Intermediate courses? If so, what subjects?

VI.—EXAMINATIONS.

17. Do you think that the Board has maintained for its examinations the standard set by the School-Leaving Certificate Board and the Allahabad University?

18. Is the present standard satisfactory?

19. What improvements can you suggest in the present system of examinations? Give details.

20. At what stage in the Secondary School course should the first public examination be held?

21. On what conditions should private candidates be admitted to the examinations conducted by the Board?

22. Are you in favour of retaining the 'compartmental' system of examination under Regulation 18, Chapter XII?

23. It has been suggested that at the end of the High School stage the Board should award two classes of certificates—one qualifying for admission to Class XI of an Intermediate College, and the other, of a lower standard, certifying completion of High School education, but not qualifying for admission to Class XI. What is your opinion of this suggestion?

VII.—INSTRUCTION.

24. What difficulties are there in adapting school methods to the teaching of Intermediate classes?

25. Do you think that the teaching of Intermediate classes will, in any way, be affected by the fact that the use of the vernacular as medium of examination is permissible with effect from the High School Examination of 1927?

26. Has the teaching of English and of Science in (a) Intermediate classes, and (b) School classes deteriorated? If so, for what reasons?

Has the standard been affected by the abolition of the oral test in English for the High School Examination?

What steps should be taken to improve the teaching of English?

27. Do you advocate an oral test in English in (a) the High School and (b) the Intermediate Examination?

28. Are the facilities for practical work in the Science laboratories adequate (a) at the Intermediate, and (b) at the High School stage? If not, what improvements would you suggest?

29. Do you think that the measures adopted by the Board for ensuring practical laboratory work in High School classes are adequate?

30. Do you recommend the re-introduction of the practical test in Science for the High School Examination?

31. Can you say from your knowledge as an examiner or teacher whether the standard of attainment of the average Intermediate student has fallen during the last four years as compared with the past? Please give full reasons for your statement.

VIII.—STAFF.

32. What is your opinion of the strength and qualifications of the staff of Intermediate colleges of which you have first-hand knowledge?

How many teachers are teaching Intermediate classes in your college?

How many of these were formerly teaching only school classes?

33. What qualifications would you regard as essential for teachers of Intermediate classes?

34. Should the Board lay down a minimum scale of salaries for teachers of Intermediate classes as a condition to be fulfilled before recognition is given?

35. If so, would you enforce this scale in the case of Intermediate Colleges already recognized?

36. Would you lay down any maximum for the periods of teaching to be done per week

by teachers of Intermediate classes? If so, what should be the maximum?

IX.—INSPECTION.

37. What is your opinion with regard to the present system of inspection of Intermediate Colleges?

38. What changes, if any, would you recommend?

X.—EXPANSION OF INTERMEDIATE EDUCATION

39. Do you consider that the present facilities for Intermediate education are adequate for the needs of this province?

40. If not, what suggestions would you make for the extension of the facilities?

41. Do you think that new colleges should be established: if so, where?

XI.—GENERAL.

42. Have you any further suggestions to make which are not covered by your answers to the preceding questions?

II.

ANSWERS.

I.—GENERAL.

1. While there is nothing radically wrong with the present system of Intermediate education in the United Provinces, there are a large number of defects in the working of the scheme. The aims entertained by the Calcutta University Commission have not been realised, because the reform has been carried out only in part. Suggestions for improving Intermediate education within the Intermediate Act of 1921 are contained in the following answers to questions and also in the memoranda written on previous occasions and enclosed herewith.*

II.—CLASSIFICATION.

2 & 3. I am not sure if the arrangement of keeping Classes III to XII in a single insti-

* See *The Educational Review*, January 1925 and February 1926.

tution is always the best. Where there are a sufficiently large number of students in the Intermediate classes, the experiment of having a separate Intermediate College containing the 11th and 12th classes only may be tried, as in the case of South India. The addition of two classes to High Schools has often been done without an adequate improvement of the institution in equipment, library and staff and there has not been a sufficient recognition of the special needs of Intermediate education which will be possible in institutions maintained separately for the purpose.

4. I should not object to the presence of Intermediate classes in Degree Colleges under certain restrictions. They may very well be allowed to remain in the same institution, where there is a separate Principal or Vice-Principal responsible for them and the accounts are kept separate for the purpose of Government grants. The insistence on separate hostels may be another desirable condition.

III.—ENROLMENT.

5, 6 & 7. The maximum of 45 seems suitable for Intermediate class, but there is no reason why the number should not be extended to 60 or 75, provided suitable tutorial assistance is provided for students in subjects like English Composition and a reasonable number of demonstrators are employed for working in the laboratory. I have no special remarks to offer with regard to High School classes. There may however be no harm in extending the limit to forty at least in the ninth and tenth classes.

IV.—RECOGNITION.

8. It must be said that the standard of recognition maintained by the Board has not

been satisfactory, though it is difficult to say how much of it is a mere perpetuation of the conditions obtaining before the constitution of the Board. The time has however arrived for stiffening up the standard with regard to staff and equipment. As a large number of highly-qualified graduates are available, there should be no difficulty in insisting on a higher standard particularly with regard to the High School. At the Udai Pratap College, which is one of the most well-endowed institutions in these Provinces, and which I have had occasion to inspect, the staff is such that the department should insist on its revision in a number of ways. The proportion of untrained teachers is shockingly large. There are non-graduate teachers teaching certain subjects even in the ninth and tenth classes. Even such important subjects as English are being taught in the lower classes by inferior S. S. L. C.'s, who have no sense of correct English themselves. The acme of laxity is however reached in the case of the High School in the Azamgarh District, which also I had occasion to inspect in connection with the oral test in English, where an Under-graduate is actually the Head-Master. The Board should insist on at least seventy-five per cent. of the teachers being trained and on the appointment of one B.A., L.T., on an average, for each of the sections of the eighth, ninth and tenth classes as in the Presidency of Madras. The Head-Master should always be a B.A., L.T., or an M.A., L.T.

9. A well-qualified, trained staff, well-equipped libraries and laboratories, adequate arrangements for sports, a suitable Managing Committee with a proper representation of the teaching staff, a duly-constituted Provident Fund, and adequate financial stability are among the essential conditions which should

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be insisted upon with greater care than at present.

V.—COURSES.

10 & 11. The present courses must be considered satisfactory though some minor improvements are possible. It is desirable that some knowledge of elementary science must be made compulsory for every student passing through the High School course, though it need not necessarily be a part of the public examination.

12, 13, 14 & 15. While the number of subjects is not unduly large, it is desirable to reduce them into suitable groups particularly at the Intermediate. The present rules allow the most extraordinary combination of subjects without much of educational value and with a distinct leaning to inefficiency. I should commend the practice of the University of Madras which has reduced all the subjects into a handful of groups, each student being allowed to take only one group, besides English and Vernacular Composition or Translation from a classical language which is compulsory. It is also desirable to introduce compulsory test in Vernacular Composition alternately with translation from a classical language in the High School and Intermediate courses.

16. The present provision for vocational subjects in the curriculum is not inadequate, the defect being only their non-introduction into many institutions. Advanced courses in Type-writing and Shorthand and training for clerical and office work may well be other subjects to be introduced into the Intermediate courses.

VI.—EXAMINATIONS.

17. Having been an examiner at the Intermediate Examination for many years for

the Board of High School and Intermediate Education, as well as for the Allahabad University, I can say that at least as far as English is concerned there has not been any deterioration of standards. On the other hand, the revision of the syllabuses has been entirely in the direction of raising the standard. The prescribing of books for non-detailed study, including a play of Shakespeare and some general poems, and the introduction of questions of real literary value, besides those of mere subject-matter, textual interpretation and points of grammar, are steps in the right direction. There is a demand for wider literary knowledge made on the part of the student to-day than in the days of the Allahabad University. It is significant that at the last meeting of the English Committee of the Intermediate Board, it was resolved to raise the standard further by demanding an elementary knowledge of Prosody.

18. There is of course considerable room for the improvement of the standard. In English, for instance, there might well be a greater insistence on Composition, by having two papers devoted to it, one for general essay-writing and exercises in composition and the other for essay-writing based on books for non-detailed study which should be more in number. In the present arrangement, essay-writing is only part of a paper and unseens find only a small place in the text papers. The translation test may be abolished to give effect to these improvements, which will incidentally make the English course self-contained and also eliminate many of the unsatisfactory features associated with the testing of translation from different languages. Much may be done, particularly in the Arts subjects, to raise the standard to the level of the University of Madras.

19. It is difficult to answer this question without a thorough examination of the courses and papers in all subjects. A few general observations can however be made here. It is desirable to improve the question papers in the direction of making them better tests of intelligence than of mere memory. The number of papers assigned to examiners for valuation may very well be less at least in the case of Assistant Examiners. Measures also may be devised for showing at least some slight recognition of the work done in the classes, in the final assessment of the candidates' capacity at the public examination. The introduction of a *viva voce* test in English at the High School and Intermediate examinations is another useful measure of reform. The present percentage of pass-marks is too low and may very well be raised. The principle of giving alternative questions must be extended more freely.

20. There is nothing objectionable in the present practice of holding the first public examination in Secondary Schools at the end of the X class. It is not desirable to hold it earlier, or introduce another at an earlier stage.

21. The practice of allowing private candidates to the High School and Intermediate examinations should be discouraged as far as possible. The number of candidates who get the benefit of the permission at present is very small and very often the candidates merely swell the number of failures and are responsible for ridiculously inefficient papers. The bulk of them appear for the examinations only on the off-chance of being able to pass, depending more or less on their luck, rather than on their knowledge or preparation. Permission may be limited to those who are actually in the teaching profession

and to special cases recommended by Head-Masters of High Schools or Principals of Colleges. The present practice of allowing all who manage to secure the signature of Head-Master or Inspector of Schools to appear as private candidates should be restricted as much as possible.

22. The concession implied in the 'compartmental' system is neither happy nor educationally desirable. It is difficult for a student who is backward enough in a subject to fail to get even the low percentage now demanded for passing, to get 40% the next year in the same subject, even though he is expected to study only a single subject during the year. The proportion of failures among compartmental students is terrible and it will really be an act of kindness in the long run to deny them this concession. Any well-thought-out educational course is intended to draw out, to the full, the intellectual energies of the young student. It is obvious it cannot be done when the student is expected to read only a single subject during the year. He is also not well-qualified to enter upon the higher course, not having kept himself in touch with all the subjects. In the case of failed students whose intellectual capacities are rather poor, one year is a long enough period for forgetting the substantial parts of subjects they have not been pursuing. Many careers have been effectively injured by this so-called concession of the compartmental system. I have noticed the evils particularly in connection with the Intermediate and B. A. examinations, but I have no doubt similar considerations apply to the High School examination also.

23. It is difficult to approve of the suggestion that there might be two certificates at the

the High School course, one certifying completion of High School education and the other qualifying for admission into Class I. The present High School standard in the Provinces is so low that it is not of much value, having a certificate of even a lower standard—which will be the result—indicating completion of a High School course, especially as it is a pass-port to enter the Government services. Hardly any use can be made of a candidate with such qualifications. The experiment has been tried in Mysore where the Secondary School-Leaving Certificate Board has made such a distinction without any advantage. The bifurcation of studies with a view to provide particular groupings of subjects to those who wish to enter upon a University career and others for those who wish to enter the services is however a feasible and useful proposition.

VII.—INSTRUCTION.

24. Even the Calcutta University Commission did not contemplate the adoption, in all their entirety, of the methods of the school into the Intermediate classes. While the student of the Intermediate classes should not be merely lectured to as in the case of members of University classes, he cannot at the same time be merely spoon-fed like pupils at school. The restriction of numbers in each class and the introduction of the tutorial system and library classes should enable the student to get more individual attention under the Intermediate scheme. In actual teaching only a limited adoption of the methods of the school is possible, as for instance, a more expressive use of questioning, revision and examination. The Intermediate courses are too elaborate to permit of any greater adoption of the school-method.

It is however a matter for regret that teachers in Intermediate Colleges have not been able to introduce school-methods even to this extent in the X and XI classes. It is due to a want of adequate realisation of the intentions underlying the scheme and the evil can be minimised considerably by the issue of necessary instructions and by constant supervision on the part of a suitable inspecting agency.

25. Unless adequate steps are taken for the strengthening of the teaching of English in High Schools, the concession of using the vernacular as the medium of instruction and examination at the High School Examination is bound to affect adversely the teaching work of the Intermediate classes. The sudden change of the medium of instruction from the vernacular to English on entering the XI class is too abrupt a transition not to lead to serious consequences. The standard of English is low enough even at present, though all the subjects are taught through English and students find it hard to follow lectures in English on entering the Intermediate classes. There is great danger of a further deterioration of standards unless considerable vigilance is exercised by the authorities concerned.

26. Reference has been made to the fact that the standard has not deteriorated, as far as examination work is concerned, at least in English. But the excellence of teaching cannot be judged entirely by examination results. While coaching up for examinations continues without any reduced efficiency, it would be seen that there has been some deterioration in the breadth of outlook on the subject on the part of the student. It is due largely to the reduction in the quality of

the staff. Independently of examination results, there are differences in the quality and excellence of teaching. There is teaching which stimulates interest and broadens the outlook, while there is teaching which only enables the student to do well at examinations. There is getting to be more of the latter than the former in Intermediate Colleges.

I have no hesitation in thinking that the abolition of the oral test in English was a wrong step. The oral examination served at least to draw attention to the necessity of observing certain standards in spoken English. Besides, there was at least a very useful examination of the written work of pupils in the English classes.

Increased attention to Composition and the improvement of Libraries and their use by pupils are among the two most essential steps necessary for the improvement of the teaching of English. The number of Composition exercises done during the year is extremely inadequate and the correction of even the few which are written is done in the most perfunctory and inefficient manner. There is a tendency to look upon the correction of Composition exercises, even in the Intermediate classes, as work which does not need a trained specialist. The proper maintenance and regulation of Composition work must be attended to immediately. The possibility should be considered of requiring a certificate as in the case of the University of Bombay that the student has written a certain number of Composition exercises in the class, before he is allowed to appear for the public examination. This would be similar to the demand of a certificate that a student has done practical work in the

Laboratory, before he is allowed an examination in Science.

The institution of Library classes, the direction of a tutor, at least in the classes of the Intermediate College, is a useful experiment which should be tried. The most crying need, however, is the improvement of the libraries, the most of which are now in an extremely unsatisfactory condition. The existing Intermediate Colleges should be encouraged to improve their libraries by special grants for the purpose, and recognition should not be granted to new institutions unless a good library is provided for it in all subjects which are taught. The preparation and distribution of suitable lists of books which might be expected in every institution teaching up to the Intermediate standard is another necessary reform. These institutions often find it hard to prepare up-to-date lists of books in each subject suitable for libraries.

27. I am certainly in favour of re-instituting the oral test in English at the High School examination and also of introducing it at the Intermediate examination. It is a great pity the oral test was abolished at the High School examination. The inconveniences connected with it were not insurmountable and the expense was not so great as to justify its omission.

28, 29 & 30. Not being connected with the teaching of Science, I do not wish to answer these questions; but I have a feeling acquired in the course of visits to High Schools here, that compared with High Schools and Colleges in South India, facilities for practical work undoubtedly seem to be less here. It is unthinkable that there could be an efficient test in Science at the High School

examination without a practical test in the subject.

31. I am by no means convinced that the standard of attainment of the average Intermediate student has fallen during the last four years. This is however based only on a consideration of the work at the examination which is not however a comprehensive test of all the qualities expected of a student who has reached this stage of education.

VIII.—STAFF.

32. The staff is undoubtedly capable of improvement, in number as well as in quality, judged by the colleges I have inspected for the Intermediate Board, which are by no means the most backward in the United Provinces. I had occasion to examine three Intermediate Colleges for the Board and I have complaints with regard to every one of them. At the Queen's College, Benares, English work has had to be done by a lecturer who is also in charge of Logic and such an important branch of English as Composition has had to be assigned to the lecturer in Mathematics. At the Udai Pratap College, the qualifications of the staff are extremely poor, in many instances, practically all the lecturers in the College department being B.A.'s and B.Sc.'s, promoted from the High School to do Intermediate work, when the status of the institution was raised. It is all the more surprising as the salaries provided for them could easily have secured M.A.'s and M.Sc.'s in the various subjects. A similar state of things has prevailed at the Theosophical Girls' College, Benares, where also M.A.'s were conspicuous by their absence, and Professors working elsewhere were shown as Honorary Professors teaching at the institution in some of the most important subjects.

33. Good M.A. or M.Sc. degrees with either training at a Teachers' Training College, or some experience as teachers should be the minimum qualification for lecturers of the Intermediate classes. There should be no difficulty in enforcing this demand as, owing to the increase in the number of Universities in the United Provinces and other reasons, there is at present a large supply of such teachers easily available.

34. The Board may very well lay down a minimum scale of salaries for teachers in Intermediate Colleges as a condition to be fulfilled before recognition is given, though there should be scope for departing from it, with the permission of the Board, in the case of institutions conducted by Missions and religious societies.

35. The scale should of course be enforced even in Intermediate Colleges already recognised, due notice being given to the authorities concerned, to prevent any hardship.

36. It is desirable to lay down a maximum for the periods of teaching per week, to be done by teachers of the Intermediate classes. There is now a tendency to look upon them as mere school-masters, though they teach Intermediate classes which work really partakes of the difficulty of University teaching. Eighteen periods a week might well be fixed as the maximum, when the work is entirely in the Intermediate classes, and it may be allowed to be extended to twenty-four only in cases in which the bulk of the work is in the school. Due recognition should be given to the heavy work involved in the correction of Composition exercises by teachers of English and a due deduction made for the purpose.

IX.—INSPECTION.

37. The present system of inspection is extremely unsatisfactory for more than one reason. It is only once in two years, while it ought to be much more frequent, being at least once if not twice a year. It is being done by Honorary Inspectors who take varying degrees of interest in their work. The inspection is not pursued by effective correspondence to ensure improvements being carried out. There is no co-ordination of work done in the various parts of the Provinces with a view to common guidance and control. There is also no scope for developing special experience on the part of the Inspectors concerned.

38. The appointment of two full-time Inspectors, one particularly for Arts subjects and the other for Science would be the most effective remedy. They should also be useful in helping the President of the Board of High School and Intermediate Education in all matters relating to the Board. The relief is likely to be much appreciated as the President is not a full-time officer as contemplated by the Calcutta University Commission, but is also the Director of Public Instruction of the United Provinces with a large volume of other work. As provision for instruction in Science does not exist in every college, it may be enough for the present to employ only one specially for Arts subjects, Professors of Science being co-opted in special cases.

If this is not possible, the present system may be continued with the following modifications:—

(1) There should be an honorarium attaching to the inspection of each institution.

(2) The number of Inspectors co-opted should be less, for instance, two in Arts and two in Science, for the whole Provinces, each pair being in charge of some colleges in four Divisions. The work will not be much, seeing it will be spread over the whole year.

(3) The colleges should be inspected at least once a year.

X.—EXPANSION OF INTERMEDIATE EDUCATION.

39, 40 & 41. The present facilities for Intermediate education in the United Provinces are quite adequate for the needs of the population. There is hardly any need for increasing the present number of colleges and the need on the other hand is entirely in the direction of the improvement of the existing institutions. It is good to build up a small number of efficient institutions with the resources available, rather than dissipate them in running a number of institutions.

XI.—GENERAL.

Such general remarks as I would wish to make on the reform of Intermediate Education in the Provinces are contained in the two enclosed memoranda written by me on previous occasions.*

* See *Educational Review*, January 1925 and February 1926.

THE PROPOSED TAMIL UNIVERSITY.

ANSWERS TO THE QUESTIONNAIRE*
PREPARED BY THE COMMITTEE APPOINTED
BY THE GOVT. OF MADRAS

By Prof. P. SESHADRI, M.A.,
Head of the Department of English Studies,
The Benares Hindu University.

1. (a) It cannot be said that the need for establishing a University for the Tamil districts is very urgent, unless it is going to be of a distinctly higher type than those now functioning in South India. It may be desirable to have a University for every linguistic area, and the Tamil districts have of course reached a sufficient stage of educational advancement to deserve a University of their own. But it is very doubtful, if there is any need for a University merely for the sake of starting a University, without any improved facilities for higher education.

(b) The establishment of the Andhra University does not affect the question of a University for the Tamil districts, except in the following manner: The Tamil districts have got a larger number of Colleges and are more advanced in education and they constitute as distinct a linguistic area as the Andhra districts of the Madras Presidency. It can therefore be legitimately argued that the Tamil districts should have a University of their own. There is, however, no reason why the Tamil Districts should not look upon the University of Madras as their own and why they should be anxious to have a poor University of the type of the Andhra University which embodies a series of undesirable compromises and does not make any appreciable advance in the facilities for higher education. If the Andhra districts are con-

tent to have a mere affiliating University which has yet only duplicated the machinery of examination and administration without any corresponding benefit to the student, there is no reason why the Tamil districts should follow the evil example.

2. The establishment of a new University is desirable, only if the present defects of University education in South India are to be remedied and superior advantages are to be secured to the student. A unitary and residential University with a rich educational atmosphere, equipped with high class laboratories and libraries, and all the features of a superior modern centre of advanced learning is undoubtedly desirable. It would mean the establishment of a real centre of advanced learning, providing a type of *alumni* much superior to those turned out by the Universities of South India at present. There would be real advancement of the bounds of knowledge and the development of the highest ideals of University life.

3. The establishment of a University for the Tamil districts would reduce the sphere of activities of the Madras University to a considerable extent. It, however, only means that the University will have a fewer number of students to examine, and colleges to feel responsibility about. It may be a blessing in the long run, by enabling the University of Madras to develop into a unitary and residential one.

4. The affiliated institutions of the Madras University in the mofussil do not suffer from any serious disabilities, in comparison with the colleges in Madras. The functions of the University are such that colleges in Madras hardly enjoy any facilities more than the colleges in the mofussil. It is true the University Library is only in Madras and many of

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the lectures delivered under the auspices of the University are not available in the mofussil. But these consequences are inevitable in any affiliating University with headquarters at a particular centre, unless it be that the higher aspects of University life are not to be evolved even at one place and all units are to be maintained at a dull level of mediocre uniformity as mere colleges.

5. "The Tamil University" might serve as a suitable name for the University, if it is started. The only alternative is, perhaps, to call it the Dravidian University, which would not be accurate and which would perhaps be less intelligible to the outside world. Tamil alternatives are, perhaps possible, but they seem to be very undesirable, as the name should conform to the general system of Inspection and the nomenclature obtaining in the Universities of India. An English name will have the effect of linking the University with the names of the other Universities in the Empire.

II.

1. As has been pointed out already, the University should be unitary and residential, concentrating all higher studies and research work at one centre and ensuring high class conditions of compulsory residence on the part of the *alumni*, except in special cases. As Cardinal Newman pointed out, excellence and unity always go together and the resources available in the Tamil districts for higher education are not so large as to enable the highest University work being carried on at more than one centre. If the Tamil districts are able to establish a single centre of education and research comparable with the Universities of the West to-day, they should congratulate themselves. Neither the federal nor the affiliating type lends itself

to the evolution of an institution of this type and they should be dropped in spite of the discontent it may cause to some of the outlying districts concerned. There must necessarily be a certain amount of sacrifice of local patriotism, if the districts have to combine to produce a single worthy centre of high class University life.

2. It is too early to think of the establishment of more than one University for the Tamil districts, when even a central one for the whole area has not materialised. The ideal arrangement is to have higher learning in all branches including even technical studies concentrated at one place. It is desirable that students even other than those pursuing courses in pure Arts and Science subjects should benefit by the University atmosphere. If, however, there are special facilities for certain technical subjects of study at centres other than the headquarters of the University, institutions for special purposes may be created elsewhere. If, for instance, the University is located at Trichinopoly, and Madura is found a more suitable centre for certain aspects of technical instruction, there is no reason why a college for the purpose should not be located there. It is possible that Marine Biology and Naval Engineering can be pursued better at places on the coast and if occasion comes for the starting of institutions for those subjects, they would obviously be outside the headquarters of the University. The Tamil districts are so compact and the facilities of railway communication are so great that such institutions would not cause much inconvenience. The ideal of a unitary and residential University may therefore be modified in some measure in the interests of University education.

3. Having expressed such decided preference for the unitary and residential type of University, the question of the relations of the University to the colleges would be simple. The affiliating colleges would be allowed to teach only the pass courses. I should even prefer their being confined to Intermediate teaching but for provoking vested interests, and the University centre will have facilities for higher teaching and research. There would naturally be a representation of the affiliating colleges on the main University bodies.

4. I am certainly in favour of the University undertaking on its own behalf teaching for Honours and M.A., and the guiding of research should be entirely in the hands of the University, as apart from the colleges. It is of course intended that the University should utilize the services of such eminent Professors as may be available in the colleges for sharing in the University work. The guiding of research should be an essential part of the University and every University teacher should be encouraged to take part in the advancement of research. No person can be an effective teacher of the higher classes of a University, unless he is himself taking an active part in the pursuit of knowledge and he is adding to its bounds by his own personal work, as is observed by Lord Haldane, in the London University Commission's report:

"Teaching will, of course, predominate in the earlier work, and research will predominate in the advanced work; but it is in the best interests of the University that the most distinguished of its Professors should take part in the teaching of the under-graduates from the beginning of their University career. It is only by coming into contact with the

junior students that a teacher can direct their minds to his own conception of his subject, and train them in his own methods, and hence obtain the double advantage of selecting the best men for research, and getting the best work out of them. Again, it is the personal influence of the man doing original work in his subject which inspires belief in it, awakens enthusiasm, gains disciples. His personality is the selective power by which those who are fittest for his special work are voluntarily enlisted in its service, and his individual influence is reproduced and extended by the spirit which actuates his staff. Neither is it the few alone who gain: all honest students gain inestimably from association with teachers who show them something of the working of the thought of independent and original minds." "Anyone," says Helmholtz, "who has once come into contact with one or more men of the first rank must have had his whole mental standard altered for the rest of his life. Lectures have not lost their use, and books can never fully take the place of the more intimate teaching in laboratory and seminary, which ought not to be beyond the range of the ordinary course of a University education, and in which the student learns, not only conclusions and the reasons supporting them, all of which he might get from books, but the actual process of developing thought, the working of a highly-trained and original mind."

5. There are hardly any facilities at present in the Tamil districts for research work. By pooling resources and by very effective state-aid and public support, it is possible to evolve a single centre for advanced work. Subjects like Tamil, Dravidian Philology, South Indian History, Art and Archaeol-

ogy should find special favour at the Tamil University. But it is a mistake to imagine that research work should be confined only to subjects having a special bearing on South Indian life and tradition. The University would be handicapped, if it did not concern itself with research work in many modern branches of Art and Science, other than subjects like these, within the limitation of its own resources.

III.

1. The University should have jurisdiction over all the Tamil districts from Madras to Tinnevely along the coast and should also include North Arcot, Salem and Coimbatore.

2. In view of the fact that the language spoken is almost entirely Tamil in these districts, the question of special provision for bi-lingual districts does not arise. Provision should, of course, exist in the case of compulsory vernacular, for a student to offer his own mother-tongue even when it is not Tamil, or some subject in lieu of it. It is undesirable to mutilate a good University scheme for the sake of a handful of students whose mother-tongue may be different.

3. Trichinopoly would seem to be the most suitable place for the location of the proposed University; in view of the fact that it is in the centre of the Tamil country and has already three first-grade colleges containing the largest number of students of any city in South India, except Madras. Thanks to the efforts of Christian missionaries, there are two well-equipped institutions containing some able teachers in St. Joseph's College and Bishop Heber's College. The National College, Trichinopoly, is another indication of the keenness of the people of the district for higher education. It is also easily acces-

sible by railway from the various parts of the Tamil country. The location of the Workshops of the South Indian Railway at Golden Rocks in the neighbourhood should be an advantage for developing in certain directions of technical education. It is not devoid of historical associations, though they are probably not so much in the direction of learning and culture as in the case of Madura. But the modern developments of the city make it eminently desirable that the University should be located at that centre.

V (a).

1 & 2. Apart from general education, the University should undertake such branches of teaching and professional education and advancement of research as may be possible. In addition to the usual subjects, there would seem to be special facilities in the Tamil districts for the study of Tamil, Dravidian Philology, Indian Philosophy and South Indian History in the Arts subjects, and Ethnology, Marine Biology and Geology in Science subjects. But these are details to be settled when the University starts work and after a knowledge of its financial resources is available.

3. It is desirable to concentrate all subjects at the headquarters of the University, except when there are special reasons for not doing so. The cultural atmosphere of the University must be as rich as possible and this can be secured only by an intimate contact of various branches of learning with one another.

4. There is no need for starting a separate Tamil Academy as the usual bodies of the University can be utilized admirably for the purpose.

5. Tamil should be a subject of independent study up to the most advanced

stage and there should be provision for research work in the subject. Composition in Tamil, including some knowledge of general literature in the language, should be a compulsory subject, of course, provision being made in other ways for those to whom Tamil is not the mother-tongue.

6. While I would give every encouragement to the gradual use of Tamil as the medium of instruction, I should not think it practicable to do so at the present stage. The results of the experiment of the Osmania University which is trying to impart instruction through a vernacular should be awaited, so also the success of the reform in certain provinces of allowing candidates the option of answering questions in the vernacular at the High School examination.

7. The establishment of a chair of Tamil, a number of research scholarships and a well-equipped library are among the primary means for the encouragement of research in the language. Sanskrit should be the other language which should also receive great attention at the University, in view of its great influence upon Tamil and its being at the base of all Hindu culture and civilisation.

8. It is absolutely essential that provision should exist for Technological studies from the very beginning. Some branches of Applied Chemistry, Textile Industry, Mechanical and Electrical Engineering, would seem to be some of the departments in which a beginning should be made at once.

9. The University should start with the Faculties of Arts (including Tamil and Oriental Studies), Science, Medicine, Teaching, and Technology.

10. It is not possible to combine professional with cultural education to the extent

to which this question contemplates. All professional efficiency requires prolonged and intense courses of instruction. It is only possible to include in the general courses subjects which may have a bias towards certain technical professions.

11. There is undoubtedly need for another Medical College in the Madras Presidency, there being only two others at present which cannot be considered adequate for the needs of Southern India. A College of Engineering, specialising in branches other than those now taught at the Engineering College, Madras, would be another desirable institution. If there is no urgent need for adding to the existing number of graduates in Law, there should still be provision for the *alumni* of the proposed University to obtain degrees in the subject without going outside the Tamil districts. All these institutions should be located at the headquarters of the University.

12. It is not feasible at present to institute a degree with Tamil as the main subject and English as a second language. It should be possible only with further advancement in the use of Tamil as the medium of instruction.

V (b).

1 & 2. The constitution of the University should be as simple as possible, containing a set of bodies for academic work and another for administrative duties. Provision should, of course, exist for the adequate representation of academic interests on the administrative bodies and *vice versa*.

3. It would be a mistake to start a separate academic body for Oriental studies. With Boards of Studies properly constituted and with an adequate representation of Oriental scholars by election and nomination

In the Academic Council and similar bodies, there should be no need for separate bodies of the kind proposed.

4. In spite of some defects, the Secondary School Leaving Certificate system must be considered a success and has come to stay in the Madras Presidency. It is best not to disturb this settled fact, particularly as it is an advantage to a University not to concern itself with the Entrance Examination. It enables concentration on the higher and more real work of a University. In fact, the ideal should be the gradual elimination of even Intermediate work from the purview of University education, as has been suggested by the Calcutta University Commission and as has actually been done by some of the Universities in Northern India.

5. The question has been answered in Section (5) of Part I.

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RELATIVITY OF TIME.

By REV. D. FERROLI, S. J., D. SC.,
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Note.—Several friends have asked me to contribute an article on *Relativity* to the *Educational Review*. The matter—as all will admit—is extremely difficult; nor does it readily lend itself to a popular treatment. Anyway, I shall do my best. I cannot leave out Mathematics altogether, but I shall not make use of symbols and formulae beyond the ken of the ordinary B.A. (Mathe.) student.

I.

GALILEO'S PRINCIPLE OF RELATIVITY.

Suppose a man is travelling by train through a tunnel, which runs straight and level, and in which there is no light. Suppose also that the speed of the train is uniform. Then Galileo's principle assumes that *No mechanical experiments performed within the train will enable the traveller to detect whether the train moves or is at a stand-still, i.e., mechanically, a system at rest and a system which moves uniformly in a straight line are equivalent.* Closely connected with Galileo's Principle of Relativity is *Galileo's Principle of Inertia* which Newton enunciated as follows: *Every body continues in its state of rest, or of uniform motion in a straight line, except in so far as it be compelled by impressed force to change that state.*

Loney illustrates the Law of Inertia in the following way: "We never see this law practically exemplified in nature, because it is impossible ever to get rid of all forces during the motion of the body. It may be seen approximately in operation in the case of a piece of dry, hard ice projected along the surface of dry well-swept ice. The only forces acting on the fragment of ice, in the direction of its motion, are the friction between the two portions of ice and the resistance of the air. The smoother the surface of the ice the further the small portion will go, and the less the resistance of the air the further it will go. The

above law asserts that if the ice were perfectly smooth and if there were no resistance of the air and no other forces acting on the body, then it would go on for ever in a straight line with uniform velocity." But the path of the piece of ice would not be a straight line if the sheet of ice were rotating round a vertical axis.

Systems of the same kind as the non-rotating ice or the uniformly moving train are called *Galilean*, and—to a first approximation, obtained by neglecting its diurnal motion—the Earth is a *Galilean system*. If its diurnal rotatory motion is taken into account, the Earth exemplifies a *non-Galilean system*.

The principle of Relativity can now be enunciated more exactly under this form (which we shall call *Law A*): *All the Galilean systems are equivalent with regard to mechanical laws.* To express *Law A* analytically, let $OXYZ$ represent an orthogonal system of Cartesian axes. Let AB represent a train moving uniformly along OX with a velocity v . Let the point C on the train be at a distance X' from A . Then, if the motion is measured from O , the co-ordinates of C after a time t will be

$$\begin{aligned} X &= X' + vt \\ Y &= Y' \\ Z &= Z' \\ t &= t' \end{aligned} \quad (1)$$

where we suppose the axis of the train to coincide with the axis of the rails, and the time measured on the train to coincide with the time measured on the rails.

Equations (1) represent what is called a *Galilean Transformation*; and, as far as ordinary mechanical phenomena are concerned, the equations seem to represent reality.

However, when Transformation (1) is applied to Maxwell's Electro-Dynamical Equations, it breaks down completely. Is it then possible, by means of electro-magnetic experiments (e.g. on the Velocity of Light) to detect the motion of a uniformly moving system for an observer placed within the system? For instance, is it possible to detect the absolute motion of the Earth with respect to the ether by an inhabitant of the Earth?

The experiments seem to be negative (e.g., the famous Michelson-Morley's experiment), i.e., Galileo's Principle of Relativity is not contradicted by experiment, even in the case of electro-dynamical phenomena. On the other hand, how is it that Transformation (1) is utterly inapplicable to Maxwell's equations?

Lorentz first, and then Einstein, suspected that the reason of the disagreement is to be found in the unwarranted assumption of the Galilean Transformation that the time measured on a system in motion is equivalent to the time measured on a system at rest; i.e., $t = t'$.

Let us examine this point more in detail.

II.

MEASUREMENT OF TIME.

Suppose that in the abovementioned train there are two travellers A and B , one placed at A , the other at B respectively, and suppose also that they wish to find out the exact time of two phenomena, one happening at A , the other at B .

Let both A and B be provided with *natural* watches exactly similar to one another—(a pendulum or a tuning fork oscillating in vacuo). How can they know that their watches agree?

If the train were at rest they could walk slowly to M (the middle point between A and B), set their watches, and return slowly to A and B respectively. Then they might reasonably suppose that nothing had interfered with the regular march

f their time-pieces. But, if the train moves, the supposition may be true, though it is no longer justified.

Another way for settling the point is open to the travellers A and B. They may agree to produce—the n th oscillation exactly—two light flashes, which, if perceived by a third traveller M (placed at M) simultaneously, would indicate the perfect agreement of the two watches. But what if the train moves?

Would not then M perceive the two flashes at different intervals however infinitesimal the difference may be?

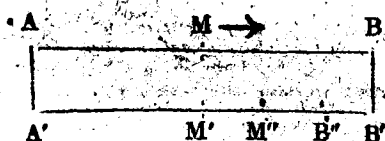
Michelson's experiment answers the question in the negative, i.e., M will perceive the two flashes at the same instant. Hence Law A can be still further generalized as follows:—*All the Galilean systems are equivalent with regard to all physical laws.*

Michelson's experiment, however, suggests another law which underlies the generalization of Law A; and the Law seems to have been confirmed by De Sitter, Tolman and Majorana; though the astronomer La Rosa denies it. The Law is as follows: *The velocity of light in vacuo is independent of the motion both of the light source and of the observer.*—This we shall call Law B.

III.

STARTLING CONSEQUENCES.

Let AB represent, as before, both the two extreme points of the train, and two observers situated at A and B; and let A', B' represent corresponding points and corresponding observers on the railway embankment. M situated midway between A and B simultaneously perceives the two flashes which are simultaneously produced by A and B. If the train had been at rest,



M would have coincided with M', where M' stands both for the middle point of A'B', and the observer

between A'B'. But, owing to the movement of the train M now coincides with M'. Therefore, if M simultaneously perceives the two flashes simultaneously produced by A and B, and if M coincides with M', and if the Law B holds good, it follows that M' perceives B's flash after the flash produced by A'.

This is tantamount to saying that events which are simultaneous for travellers are not simultaneous for persons who are at rest on the embankment—or, in other words, time is affected by motion, and absolute time is a purely mental fiction. The conclusion seems absurd, but is a necessary corollary of Law B.

Suppose now that both A and A' want to measure the length of the train. Let A find

Length AB = Length A'B'.

Will the results of A' tally with this? Let us see:

A' = position of train's tail when A's watch marked n .

B' = position of train's head when B's watch marked $n + \delta$ (where, by a proper choice of units we can make $\delta = 1$).

It is therefore necessary to find B'', the position of the train's head on the rails, when B's watch marked n .

Evidently A'B'' will represent the length of the train with regard to A' or B', i.e., the length of a train in motion will appear shorter to observers who are at rest with respect to it, than it appears to observers who are moving with it.

In other words, both time-dimensions and space-dimensions are functions of motion; i.e., the interval between any two events—whether it be time-interval or space-interval—is something essentially dependent on the relative motions of places and observers.

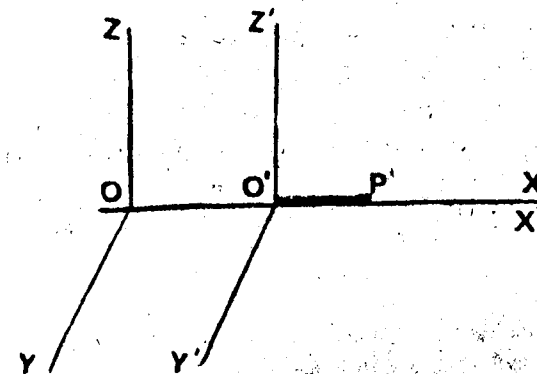
Let us now briefly translate these results into analytical language.

IV.

THE TRANSFORMATION OF LORENTZ.

Let us recall to mind the example which has led us to formulae (1) and, at the same time, let

us not lose sight of the method we have sketched to make sure that our time-pieces agree.



The train O'P' moves uniformly with velocity v along ox . The point O' on the train passes through O, when the train-watch O' and the rails' watch O both mark o .

The train-watch P' marks t' when an event takes place on the train. Also O'P' = x' , units as measured on the train.

If x' , t' and v be given, we are asked to find the corresponding quantities (x , t) with regard to o .

Since uniform movements with respect to the train must be changed into uniform movements with respect to the rails, the transformation is linear. Also when $x = 0$, $x' = 0$, $t = t' = 0$.

Therefore the formula of transformation is

$$(2) \quad x' = \alpha x + \beta t; \quad t' = \gamma x + \delta t$$

where the constants α , β , γ , δ are to be determined.

Taking now into account Law B, and making the velocity of light equal to c , the two train-equations $x' - ct' = 0$, $x' + ct' = 0$ must change into the two rails-equations $x - ct = 0$, $x + ct = 0$.

Making now the substitutions (2) we get

$$\alpha = \delta, \quad \beta = c^2 \gamma,$$

Hence equations (2) become

$$\left. \begin{aligned} x' &= \alpha x + \beta t; \\ t' &= \frac{\beta}{c^2} x + \alpha t \end{aligned} \right\} \dots (2')$$

But O', for which $x' = 0$, is such that after a time t is at a distance x from O, given by the equation $x = vt$.

Therefore we have in the first equation (2')

$$0 = \alpha vt + \beta t; \quad \text{i.e., } \beta = -\alpha v.$$

Hence equations (2)' become

$$\left. \begin{aligned} x' &= \alpha(x - vt); \\ t' &= \alpha \left(t - \frac{v}{c^2} x \right) \end{aligned} \right\} \dots (2'')$$

Solving now equations (2)'' with respect to x and t we obtain α .

Substituting its value in (2)'' we get the Transformation of Lorentz

$$\left. \begin{aligned} x' &= \frac{x - vt}{\sqrt{1 - \frac{v^2}{c^2}}}; \quad y' = y; \quad z' = z; \\ t' &= \frac{t - \frac{v}{c^2} x}{\sqrt{1 - \frac{v^2}{c^2}}} \end{aligned} \right\} \dots (3)$$

which enables us to express analytically, without any formal change, all physical phenomena with regard to all Galilean systems of reference once their analytical expression is known with respect to one of them. Thus the inexplicable difference between mechanical and electro-magnetic laws, resulting from the application of the Galilean Transformation (1) disappears.

V.

COROLLARIES.

1. Let $d' = x'_2 - x'_1$ be the distance between the two points on the train, when $t = 0$, as it appears to observer A. From (3) the distance between the two points, as it appears to A' is

$$d = x_2 - x_1 = d' \sqrt{1 - \frac{v^2}{c^2}},$$

i.e., a body appears shorter in the direction of motion to an observer who is at rest with respect to it.

The factor of reduction is $\sqrt{1 - \frac{v^2}{c^2}}$, where v is the velocity of the body and c is the velocity of light.

Thus, taking the velocity of the Earth round the Sun as equal to 30 Km./sec., an observer at

rest with regard to the Sun will see the Earth's diameter shorter by 6, 4 cm.

2. Similarly it can be shown that the ratio between an interval of time t measured by an observer at rest, to an interval t' measured by an observer in motion is

$$\frac{t'}{t} = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}, \text{ i.e., } t' = t \sqrt{1 - \frac{v^2}{c^2}},$$

i.e., moving time-pieces (even natural time-pieces like vibrating atoms, etc.), move more slowly than time-pieces at rest.

Therefore if a man A could move with a velocity c (velocity of light) with respect to another man B , A would always appear of the same age with regard to B , i.e., A would not get old.

3. Hence it follows that the maximum possible physical velocity is the velocity of light.

4. By simple differentiation it could now be shown that the classic formula for relative velocities ($w = u + v$) changes into the formula

$$w = \frac{u + v}{1 + \frac{uv}{c^2}}$$

5. Since the velocities with which we are concerned are very small in comparison with the velocity of light, it is clear that the terms $\frac{v^2}{c^2}$, or $\frac{uv}{c^2}$ can usually be neglected. Thereby it appears that the fundamental formulae of classical mechanics are *limit-formulae*, quite accurate for systems whose velocity is infinitesimally small with respect to the velocity of light.

VI.

TIME PROPER.

By easy operations on formulae (3) we obtain the relation $x^2 + y^2 + z^2 - c^2 t^2 =$

$$x'^2 + y'^2 + z'^2 - c^2 t'^2 \quad \dots (4)$$

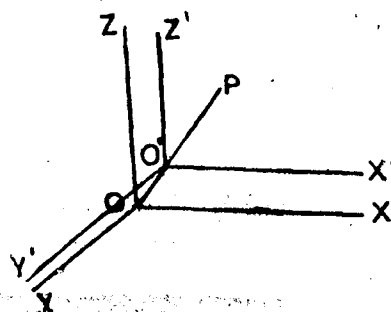
which expresses analytically the law of the absolute constancy of the velocity of light, and is called the *Invariant of Lorentz*.

If the left-hand side member of (4) is written as

$$c^2 - \frac{x^2 + y^2 + z^2}{c^2} \quad \dots \quad \dots (5)$$

and if (5) is positive, we can give to it a remarkable physical interpretation.

When the time-piece which is connected with the frame of reference $O(x, y, z)$ marks 0, let O' start with uniform velocity v from O and move along OP , the co-ordinates of P being x, y, z .



Let the watch mark t when P is reached.

Then $v = \frac{\sqrt{x^2 + y^2 + z^2}}{t} < c$, if (5) is positive.

Let now a second frame of reference be connected with O' , as marked in the figure. Let the relative time-piece mark t' when O' reaches P . Since then $x' = y' = z' = 0$, we have

$$c^2 = t'^2 - \frac{1}{c^2} (x^2 + y^2 + z^2) \\ = t'^2 \left(1 - \frac{v^2}{c^2} \right) \quad \dots (6)$$

The meaning of t' is now perfectly clear. With Minkowski we can call it the *time proper*.

With easy generalization result (6) can be expressed as follows: A point which moves uniformly in a straight line, starting at the instant t_1 from the position x_1, y_1, z_1 and reaching the position x_2, y_2, z_2 at the time t_2 , will take T units of time to describe its path, where the time is measured by a time-piece moving with the body,

and T is given by the expression

$$T = \left\{ (t_2 - t_1)^2 - \frac{1}{c^2} [(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2] \right\}^{\frac{1}{2}} \quad \dots (6)$$

Any one who understands the value of the symbols in equation (6) will not fail to grasp the startling result; i.e., equation (6) implies an objective interdependence of time and space, so that the time or the distance between any two events cannot be determined independently of each other. To know the interval of time that separates event A from event B , I must know also the relative positions of A and B ; and vice-versa.

Hence, not only does space enter into the definition of time, but time and space seem to be so intimately bound together as to constitute the homogeneous dimensions of the medium in which we live, and which not inaptly has been called the *cronotope*. But of this perhaps another time.

SOME ASPECTS OF REFORM IN THE TEACHING OF MATHEMATICS.

By

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INTRODUCTION.

EVERY one is familiar with the popular censure "one mathematician more one man less. Taking their stand probably on this half truth many persons take an unusual pride in their ignorance of mathematics while the less aggressive individuals have a pious horror of the subject. Recently a local educational officer even went to the length of saying that mathematics should be deleted from the school curriculum and I do not know what should have become of us if the hint had been seriously worked out. What is the reason for all this unkind and certainly unfair attitude of the world towards mathematics? The reason lies partly in the innate perversity of human judgment but mostly in the initial faulty presentation of the subject in the school room. Hence the burden of redeeming mathematics from such attacks falls on the mathematics teacher who should employ all his pedagogic art and skill to present the subject in as charming a manner as possible so as to put the pupils in a position to understand the beauties and romance of mathematics, not to speak of its manifold uses and importance in the several activities of life.

It is the object of this paper to show some of the ways by which this aim may be achieved within the four walls of a school.

THE FOUNDATIONS OF MATHEMATICS.

The trivial pages of an elementary mathematical text-book put into the hands of a

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beginner do not sufficiently set forth the real nature of mathematical ideas nor their important applications. Putting a pupil through a dry mass of technical details unilluminated by a general conception is like leading a man with healthy vision blindfolded through a fine landscape, making him experience the pains of treading on rugged stones and pebbles while the pleasures of enjoying the landscape are carefully avoided as being too good for him. This is just what is being done in almost all our schools. Of course, technical facility is an important matter and cannot be entirely ignored, even as the beauties of Shakespeare or Kalidasa cannot be appreciated until one has waded through the necessarily tedious process of learning the alphabet, the grammar and the vocabulary of English or Sanskrit. But it is an error to confine oneself merely to technical processes excluding considerations of general ideas. The students must be enabled to know from the very beginning of their course what mathematics is about and how it helps in the formulation of exact thought in almost all the modern sciences (including medicine).

We cannot do more than point out in brief outline here the most obvious characteristics of the science of mathematics, especially, High School Mathematics, Arithmetic, Algebra, Geometry and Trigonometry, and strongly recommend that it is the duty of the teacher to make the students also notice these characteristics. To take the simplest instance, when we deal in arithmetic with the proposition that one and one make two, we at once realise that it has got an universal application to tastes and states, to angles and angels, to sounds and pounds, to stars and stones, to brawn and bone, to anything and everything, the nature of the thing being

perfectly indifferent. On this account, mathematics is called an abstract science but none the less important to human affairs as we shall see later.

Many of the events such as the falling of an apple, or a strong breeze that we experience around us are inter-connected, and scientists will tell you that these events are but examples of a few general relations called laws. To evolve these laws, the scientist has to disentangle what is permanent from what is transient or transitory and describe these permanent connections between external things in a manner independent of you or me so that they may be the same for the inhabitants of this planet or of any other. In trying to seek such a neutral universal method of description mankind has evolved slowly what is called a mathematical description of the properties of the universe freed from all references to personalities and individual experiences. Dr. Whitehead may be quoted in this connection:

"What was it which underlay my sensation of sight, yours of touch, and his of taste and smell?" the answer being 'an apple'. But in its final analysis, science seeks to describe an apple in terms of the positions and motions of molecules, a description which ignores me and you and him, and also ignores sight and touch and taste and smell. Thus mathematical ideas, because they are abstract, supply just what is wanted for a scientific description of the course of events."

Algebra points out to us the technical convenience of the use of letters for the ideas of some and any, while it must be remembered that until the so-called Arabic numerals were invented the letters were also used to denote a definite number and the growth of algebrai-

cal concepts was thereby retarded. *En passant*, it may be observed that the first algebraists of the world, the Hindus, must have felt the inconvenience of using the letters ambiguously to represent a definite number as well as some or any number and hence devised a system of symbols to denote definite numbers which by some historic irony of fate is now commonly known to the world as 'Arabic numerals.' The idea of the undetermined variable in mathematics is more important than the solution of equations and unfortunately more space is devoted in elementary text-books and examinations to equations than to the study of interesting relations between two or more undetermined variables.

The truths in Geometry again are independent of the particular figures actually used to prove them, these figures being intended only to help the imagination. Geometry like Algebra is thus dominated by the ideas of 'any' and 'some' things and studies the inter-relation of sets of things as in the case of the investigation of conditions for the congruence of two triangles. Failing to perceive the abstract and the universal nature of this branch of Mathematics on account of the distraction of concrete figures used, our boys in schools in proving a general theorem, are unable to discriminate between the accidental and permanent properties of geometrical figures and make more use of their physical eyes than the mental one and make confusion worse confounded.

It is good for our boys to know that Trigonometry was started as a science to help the study of Astronomy. The astronomer is mainly concerned with measurement of time and measurements of angles; for example,

he measures the angle between two stars and the angle through which the earth has turned in a given time, he surveys the heavens and fixes the relative positions of stars and planets by observing the differences in their directions, that is, the differences in angles from time to time. Even in land-surveying the angles are the chief subject of measurements. Thus a general abstract system of ideas about angles and their measure had to be developed, which can have universal application. Gradually as more powerful ideas developed, Trigonometry undertook the study of periodicity through its functions and this gave it a wider application in several branches of Mathematics and Physics, for example, in the theory of infinite series, in the harmonic analysis of tides, and of the motion of vibration of a violin string.

THE HISTORY OF THE GROWTH OF MATHEMATICS AND ITS PLACE IN THE HIGH SCHOOL CURRICULUM.

The discussion of the foundations of Mathematics naturally leads us to the history of the growth of Mathematics. Mathematics is a living and growing subject and its history, therefore, is of very great interest. The teacher must not be led away by the fatal error that it is his mission to present to the beginner the subject as it stands to-day. In order to give the pupils a real insight into the essential features of the processes of the growth of Mathematics, to make them appreciate the enormous time and labour spent in the evolution of the simplest mathematical concepts, such as the concept of the zero and to make them feel a sense of gratitude for all the mathematical ancestors who had made great sacrifices in the cause of Mathematics, a few chapters at least of the history of Elementary Mathematics such as that of David

Eugene Smith should find a place for non-detailed study in the High School curriculum.

The subject will stimulate the student's interest, give him a better grip over mathematical ideas, stir his imagination, and widen his outlook, while the failures and the struggles of the mathematicians who had gone before him, will give him confidence and new strength to tackle his difficult problems. The history will also reveal the comic aspect of mathematics, the ineffectual attempts at solution of mathematical pretenders such as those very humorously reviewed by De Morgan in his *Budget of Paradoxes*.

The golden mean should not however be forgotten, the history should not be overdone. If it should go beyond the mathematical level of the pupils, they would have no correct understanding of it and it would be a barren form of training. For instance, indications may be given of the way in which the several points, *e.g.*, notation, place-value, the parallel axiom, have historically arisen. History ought to keep pace with those aspects of mathematics that are real to the pupils taught and place those aspects in a true perspective.

By introducing the study of the history of Mathematics, we will be introducing the human element and factor. Mathematics then takes a place in the pageant of our world's history. From a study of the history the student realises how first impulses came from practical need, how ideas extended and developed from the concrete more and more to the abstract and how necessary it is to have besides thought a compact and adequate system of expressing it. History has besides a moral value. It teaches us modesty. It reveals to us that the amount of mathematical knowledge of the world to-day bears

after all a very small proportion to what remains yet to be investigated. For example, despite the labours of the most learned mathematicians, we have no better method for saying whether a large number is prime or no, than a tentative one involving long and laborious calculations. This shows us how very little progress science has made on these questions which appear quite simple and how modest we ought to be when we compare the slight extent of our knowledge with the immensity of things about which we are ignorant.

It must not be construed that I am here advocating the over-burdening of a curriculum which is already considered very heavy by the inclusion of several multifarious subjects. I only suggest that a more intelligent study of Mathematics may be adopted and that the students get some general knowledge as regards the nature of Mathematics, the history of its growth, and something about the extensive mathematical literature. It is not necessary that the pupils should be prepared to undergo a rigorous written test in these additional matters but it is necessary and urgent to make the pupils gradually familiar with the great names, the interesting facts in mathematical history, the long struggles, the frequent blunders, the final success of mathematicians in building up the science, to rouse the pupils' sympathy by making them note the value of international and inter-racial co-operation and emulation in this grand task. Generally, if a subject is included in a curriculum, the popular idea is that the pupils should be coached to answer a set of academic questions bearing on the subject, and what generally happens is that the students mug up unintelligently a set of prepared answers for expected questions and re-produce them in their own way according to the

relative strength of their memory. The students waste nearly the whole of the time in their school year and make feverish attempts in the last one or two months before the examination to cover the whole portion. Some of them naturally break down under the strain while others who get through, soon forget their hastily picked-up knowledge. Such knowledge gained in such a manner has hardly any value, cultural, disciplinary, or informational. It is high time that something is done to prevent this sorry state of things, that the students study evenly throughout their course, that the knowledge gathered is duly soaked in their brain and transformed into the very tissue of their cortex. The knowledge gathered should be permanent and made the student's own—unforgotten and unforgettable. This requires a triple reform—reform in the curriculum, reform in the methods of study and teaching, and lastly reform in the examinations.

MATHEMATICS FROM THE UTILITARIAN POINT OF VIEW—PRACTICAL WORK—

THE MATHEMATICS LABORATORY.

We have so far dealt with the curriculum. We shall now take up the methods of popularising mathematical instruction in schools.

In Gulliver's Travels, we read of mathematical tailors who measure the heights of their clients with a quadrant and deduce their other dimensions by ruler and compasses and finally produce a suit of very ill-fitting clothes. The majority of our mathematical pupils are as bad on the practical side of their work as Swift's mathematical tailors. It is the teacher's duty to give the pupils a more fruitful course of training in the mathematical laboratories than what is obtaining to-day. The kind of practical work that is being done

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at present is nothing but mere fumbling with ruler and compasses. Further we have hardly any mathematical laboratories worth the name.

It is not enough if we know the theoretical solution of a problem. The concrete application of the problem is more important and it is subject to certain definite practical limitations. Only in the laboratory can these limitations be actually realised and methods of analysis and calculation devised to effect the solution to the required or possible degree of accuracy.

The laboratory should provide experience in direct computation involving the compilation and use of different kinds of mathematical tables, such as tables of factors, prime numbers, squares, cubes, square-roots, etc., the use of the slide-rule and the multiplying machine. The laboratory can also provide graphical and arithmetical methods of elucidating abstract mathematical theories, and thus quicken and stimulate the mathematical interest of students who would otherwise be classified as stupid. Students whose interests are initially dead to certain mathematical ideas such as limit, maxima and minima, or continuity of a function will suddenly become alive to them in the course of their graphical experience in the laboratory. A little of Nomography and the graphing of statistics and methods of interpolation and extrapolation will infuse with flesh and blood the dry bones of pure mathematical technique.

In the study of Geometry, the mathematical laboratory can be of great use in testing the relative merits of alternative constructions, in discovering their inapplicability in certain situations and in suggesting various modifications and simplifications to which the pupils

[Aug. 1926.]

would otherwise have been blind. The theoretical methods will be tested by being put to practice and the practical situation will suggest and open new lines of enquiry for further discussion. The ingenuity of the pupils will be roused, their interest will be quickened, new confidence in their own powers generated, initiative developed and helpless and slavish dependence on the text-book or the teacher will disappear.

Having explained the need for the laboratory method of teaching mathematics, we shall now take up the question of the equipment of a High School mathematical laboratory. The apparatus required for mathematics is of the simplest kind unlike the apparatus for the physical or chemical laboratory, and the equipment is therefore less costly and within the reach of every ordinary school. The first essential is a good library which should include a number of up-to-date text-books and popular books on the history and literature of mathematics, magazines, and journals dealing mainly with elementary portions of mathematics, such as the *Mathematical Gazette*, and the *School Science and Mathematics* and the *Mathematics Teacher*, and various tables, such as tables, squares, square-roots, etc. The next in importance are the black-boards, spherical black-boards, hinged black-boards, to illustrate the dihedral angle, black-boards forming a trihedral angle, etc. Then we must have mathematical models, many of which may be prepared by boys themselves in the laboratory—models of geometrical solids and their sections; lastly slide-rules for logs, for solving quadratic equations, Nomographic charts for purposes of calculation, and some of the simplest calculating machines such as the Addiator and the Multiplier, and surveying instruments, such as the quadrant

and the sextant, the eidograph and the pantagraph, in addition to the several sets of the usual mathematical instruments, the "T" square, graduated metre and yard-rules, foot-rule and compasses, dividers, set squares and protractors of sufficient number to provide for all the students who may be engaged simultaneously in mathematical work. With a well equipped laboratory, there are ample opportunities for providing individual work to pupils, for assigning work to each pupil suited to his capacity and rate of progress. In other words, to Daltonise mathematics, *i.e.*, to release pupils from the fetters of the class-room and the time-table.

THE DALTONISATION OF MATHEMATICS.

It has been remarked that "Teaching is simply like taking the horse to water: it can no more make the pupil learn than the leader of the horse can make him drink." In the ordinary class-room teaching, the teacher is supposed to adjust his instruction to the level of the average boy's comprehension. But the average boy is a fiction and in fact, never exists. The usual complaint against Mathematics teachers is that they are understandable, *i.e.*, they teach above the heads of the majority of pupils. There is of course, some justice in the complaint, for the teacher is easily carried away by the appreciative nods of the few bright pupils sitting in the front benches and soon neglects the silent majority who mechanically copy down the steps written on the board for leisurely assimilation, intelligent or otherwise. If the teacher on the other hand, should come down to the level of the most ignorant boys in the class then again, the lesson becomes a bore to another set of pupils who have to sit idly and waste their time. The best remedy for

such a state of things is to divide the class into smaller groups, roughly according to their mental ability and assign for each group work suited to its capacity. While the teacher is engaging one group in the class room, the rest may work at their assignments in the laboratory. Of course, it is not possible to have as many small groups as one would like to have. It will, however, be convenient to divide a class of, say, 45 boys into three groups corresponding to the maximum, the medium, and the minimum capacity and teach each group separately. On occasions, the whole class also may be assembled for such general advice and instruction, discussion or test as will not suffer on account of the difference in the mental level. In this way we can secure all the advantages of team work as well as individual work. There is considerable scope for the bright boys to develop their originality and initiative unhampered by their less-gifted brethren, while the duller boys will progress at the rate congenial to their mentality without being paralysed by the teacher's speed in exposition. In the laboratory, there should be freest exchange of thought and assistance not only between pupil and pupil but also between pupil and teacher. Thus an atmosphere of increased happiness and industry can be secured within the school, while the proper democratic feeling can be developed amongst pupils through their co-operation and mutual help and there will also be cordiality and love between the teacher and pupils.

MATHEMATICAL DIVERSIONS AND PASTIMES: THEIR PLACE IN THE TEACHING OF MATHEMATICS.

Every teacher knows that it is his fundamental duty to evoke the pupil's interest and that without interest, no attention can be

maintained and all his teaching becomes futile. Hence no stone should be left unturned to provide this interest in various ways. It may be worth-while to mention a few of them here.

In the first place, there are a number of results arising from simple mathematical operations which strike us by their peculiarity. These may be used to rouse the child's curiosity and give him a taste for calculation. To give an example—Give a child a sealed envelope and tell him that he should not open it until he has carried out the following directions:—

1. Write down any number of three digits, say 369.
2. Write it in the reverse way, thus 963.
3. Subtract one from the other, *i.e.*, $963 - 369 = 594$.
4. Reverse this number again, *i.e.*, 495.
5. Add the last two, *i.e.*, 1089.

Now ask the child to open the envelope, in which he will find a paper in which you have written this number beforehand. The remarkable property is that you will get the same result whatever number of three digits you choose, provided the digits in the first and third places are different and the difference also contains three digits.

I shall describe to you another instance of mathematical sleight-of-hand.

Here are five slips marked A, B, C, D, E, each containing a set of numbers, and I shall ask you to think of a number thereon. Now if you hand me all the slips in which the number is written or merely read out the marks on those slips, I can readily tell you the number in your mind.

This is one of the interesting devices which afford plenty of practice in rapid and accurate mental addition.

- A. 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31.
- B. 2, 3, 6, 7, 10, 11, 14, 15, 18, 19, 22, 23, 26, 27, 30, 31.
- C. 4, 5, 6, 7, 12, 13, 14, 15, 20, 21, 22, 23, 28, 29, 30, 31.
- D. 8, 9, 10, 11, 12, 13, 14, 15, 24, 25, 26, 27, 28, 29, 30, 31.
- E. 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31.

Questions on Compound interest furnish another kind of remarkable diversion. Suppose one of our ancestors about four hundred years ago had conceived the brilliant idea of placing 1 Rupee to our credit at 5% per annum compound interest. It would have grown to-day to the enormous value of 100 million or 10 crores of Rupees and we should all be millionaires now.

Thus we can indulge in mathematical dreams and fancies which are more exhilarating than those arising from draughts of opium. To quote some instances:

Some of you are probably aware that a prize of 100,000 marks has been established for the first proof before 2007 A. D. of a famous unsolved problem in Mathematics known as Fermat's Last Theorem, *vis.*, that the equation $X^n + Y^n = Z^n$ cannot be solved in positive integers when n is greater than two. History tells us that the great mathematician Fermat, who announced this theorem, knew how to prove it but did not take the trouble to write the proof down for lack of marginal space in his copy of Diophantus. An American mathematician indulges in a queer speculation whether he would really stand to gain if he should send credit for a

dime back through the ages to Fermat and thus secure this coveted proof, if it actually existed. Calculation, however, shows how disastrous the speculation is. For, if Fermat had brought on credit a dime's worth of paper even during the year of his death 1665, and if this bill had been fetching 6% compound interest per annum, it would now amount to more than seven times the prize in question.

I shall give you again another interesting mathematical speculation based on very simple calculation, which we owe to a French mathematician.

Allowing three generations to a century and presuming nonconsanguineous marriages, one can estimate that each existing individual of one's nation to-day would have in his veins the blood of twenty millions of contemporaries of 1000 A. D.; and if you calculate from the first year of the Christian era, the ancestry of a man of to-day will represent a total of eighteen quintillions. But what are twenty centuries to the time of the life of man! From this we may infer the remarkable theorem that there is no absolute individuality and that the mind is as much a composite of souls as the body is of cells.

A very good incentive to learn geometric progression is furnished by the following story concerning the sale of a two-storied house with a flight of seven steps leading to the ground-floor and a stair-case of nineteen steps leading to the first floor, on the following terms:—The house is offered to one who will put one pie on the first step, two on the second step, four on the third, doubling thus at every step, until the end of the stair-case is reached. Under these conditions the price of the house went up to about 3½ lakhs of Rupees and the story goes that the face of the

innocent buyer who agreed to the conditions lengthened remarkably at this discovery and ever since he has insisted that each of his children should be taught what a progression means.

SOME ANOMALIES AND MISFITS IN THE PRESENT CURRICULA AND TEACHING.

In Arithmetic, many of our boys work very mechanically, following closely the working of the model sum. They are shy to try any question on its own merits, to exercise their reflection and common sense. Mere dexterity in computation without the exercise of one's reflection and common sense ends in great disaster. This is one of the reasons why even good students of optional or additional Mathematics fare very badly in Elementary Mathematics, especially Arithmetic. To take a simple example, if a tailor cuts up two yards each day from a piece of stuff ten yards long, in how many days will he have cut up the whole piece? A want of thought coupled with the habit of mechanical calculation will lead to the answer five, while common sense will dictate four. A good instance of this habit to run into the groove is afforded by the answers to a question recently set by me to the S.S.L.C. students. When they were asked to factorise $a(b^2 - c^2) - b(c^2 - a^2) - c(a^2 - b^2)$, every one mechanically observed that the function was symmetrical in a, b, c , and jumped from one correct factor $b - c$ to the two incorrect factors $c - a$ and $a - b$ on the false analogy with the kindred expression $a(b^2 - c^2) + b(c^2 - a^2) + c(a^2 - b^2)$. Mental alertness is a desirable quality to cultivate, and Mathematics affords the greatest scope for its cultivation.

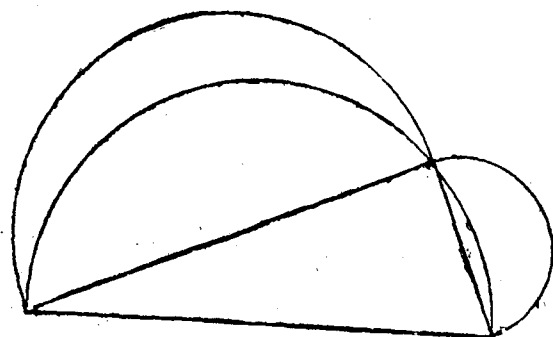
The habit of mechanical calculation is aggravated by the traditional classification of

the different problems of Arithmetic in different chapters according to the subject-matter of the problem and not according to the different types of arithmetical principles employed. The fundamental arithmetical principles are only few and if these be once correctly grasped and mastered, the rest is merely an application of them to different problem situations which may be infinitely varied—indeed as varied as the numerous business transactions of the world. What is wanted therefore in Applied Arithmetic is a little bit of common sense coupled with a certain familiarity with the nature of the material transactions to which the calculations refer.

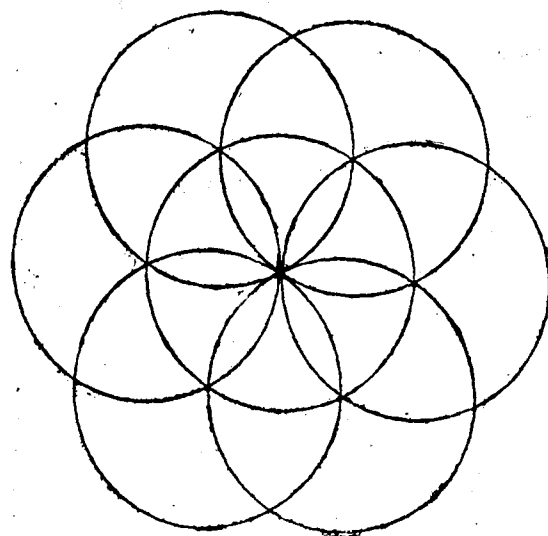
Next, the picture and the concrete objects which can appeal to the pupil's sight are important factors in making mathematical work amusing and instructive, in riveting the student's attention, in fixing in his mind the essential truths, without which he may be obliged to trust to his memory of obscure phrases. Seeing the truths and making them as it were with his own hand is infinitely superior to any verbal process of learning which unduly complicates simple things. Take for instance, the proof of the Theorem of Pythagoras. How much inferior from the pedagogic point of view is the academic demonstration due to Euclid, to the picturesque exposition of the famous Hindu mathematician and astronomer, Bhaskara, who cuts up a square into pieces in two different ways and asks his students to 'behold.' The method of dissection should play a large role in the teaching of Geometry, especially in teaching theorems on areas and the transformation of figures. The games of cutting card-board or paper have sometimes been called brain-puzzles. This is very unjust, because, used properly, they

can prevent much puzzling of the brain in the future by dint of teaching through the eye.

The classical exercises in the construction of triangles and quadrilaterals, a long drill in which soon becomes very boring to both the teacher and the taught, may often be varied with the drawing of interesting geometrical patterns, such as crescents and roses, commonly given in books of geometrical drawing. These patterns are easily traced with the help of compasses and they furnish interesting work tending not only to develop accuracy but also to cultivate an æsthetic taste for forms.



Witness, for example, (i) The crescents of Hippocrates, a Greek geometrician of the fifth century B. C.



(ii) Roses and petals.

By removing various parts in these diagrams we get interesting configurations. The pupils may be impelled to vary these forms using their own imagination. In due time they will emulate each other in the drawing of beautiful figures, take pride in forming them and bestow not a little time and attention on them.

Our school and college mathematical curricula devote an astonishingly small amount of time to the study of Solid Geometry, say, one month in a long course of mathematical education extending over eight years. No wonder, it is considered a bug-bear by many of our students in view of the small amount of time spent on it as well as the late stage at which it is taken up. We are not living in a space of two dimensions (only, the other day Mr. S. V. Ramamurthy was telling us that space inside atom is two dimensional and we are not certainly living within any atom) but in one of three (possibly of four if we may believe in Einstein) and there is no meaning in making our pupils slaves to two dimensional geometry and causing their sense of the third dimension to atrophy by not training them to form correct pictures of three-dimensional configurations. Solid geometry is more real and concrete than plane geometry, affords good training in the power of space-intuition and forms the necessary link between theoretical geometry and its practical applications. So it is desirable that the geometry of the common solids such as the cube, the sphere, the cone and the cylinder, be included early enough in our curricula, at least as part of the Practical Geometry course and the pupils trained to handle these solids, construct them with paper, clay or wood, dissect them, observe their properties, and discover for-

mulae for the areas of their surfaces and volumes.

Many of us can very well recollect the first introduction of graphs in our schools about 20 years ago and teachers were trained to undergo special courses of instruction in this subject which was expected to produce such a revelation in mathematical outlook at the Secondary School stage and enlarge the mathematical horizon of our pupils. Let us review now, *i.e.*, after 20 years, what has really happened.

One visible effect of the introduction of graphs in schools is that it has raised the market for squared paper and our boys want squared paper for every blessed bit of drawing. Obvious roots of trivial equations are obtained incorrectly by elaborate graphical methods. No student has any idea of choosing a good scale or selecting points systematically with due consideration of the intervals. There is an excessive and absurd concentration on the one matter of finding graphically when a magnitude has a given value, ignoring the host of other, more valuable, quantitative information, such as, when the magnitude is greater or less than a given value, when it lies between two given values, when it is maximum or minimum, when it changes from continual increase to continual decrease or *vice versa*, and whether it is growing more and more rapidly or otherwise. The qualitative significance, the interpretation of the shape of the graph, which is of vital importance, is entirely missed. Thus the graph is neither realised as a visual representation from which one can read off rapidly and effectively the underlying peculiarities of a sequence of changes relating to important phenomena, nor as an algebra without calculation, *i.e.*, as a device for

getting results without recourse to tedious calculation.

If you ask any of our boys to describe what the graph is, I fear, he will give some such definition as this: "Graph is an alternative method of obtaining results approximately without any reasoning or understanding by plotting points on squared paper and joining them in some arbitrary manner so as to get a straight line or a smooth curve." It is necessary therefore that the first approach to graphs be made through problems which can be solved best by graphical methods alone. In this connection, I may be excused for putting in a little anecdote which is absolutely true.

Long, long ago, during an International Science Congress, a number of distinguished mathematicians, some of them of world-wide reputation, were dining together. At the end of the meal, Edward Lucas, the French mathematician (1842-1891), who was perhaps the man who in his day, understood better than any other the science of numbers and whose merit had been singularly unrecognised by his contemporaries and this perhaps contributed to his untimely death, proposed the following problem:—"Suppose that each day, at midday, a packet-boat starts from Havre to New York and that at the same time a similar boat belonging to the same Company leaves New York for Havre. The crossing is made in exactly seven days, in either direction. How many of the boats of the same Company going to the opposite direction will the packet-boat starting from Havre to-day at midday meet?" Some of the distinguished audience answered foolishly "7". Evidently they only thought of the ships about to start and forgot those

on the way. This question is a good illustration of the extreme usefulness of graphs as the best means of solving such problems and shows us how the physical eye is sometimes a very useful corrective for the mental eye. It is the duty of every mathematics-teacher to develop in his pupils the proper attitude towards graphs and to make them realise that graphs form another interesting mathematical tool not merely for solving problems of the above type but also to visualise quantity and number and make them speak to the mind through the eyes.

CONCLUSION.

I have indicated in the preceding pages how there is a great deal of scope for interesting work even in the range of the High School mathematics, how the fundamental notions of mathematics can be presented to the pupils in a real and living manner at once clear and convincing, how it is possible to make the pupils enter into the spirit and true nature of mathematics, how mathematical history can not only inspire them with wonder and amazement but also with a sense of gratitude at the amount of work

turned out already by the great devotees to the science and give them fresh zest to make attempts to follow in the foot-steps of the great mathematicians to whom they owe such a priceless inheritance, and lastly how we can set up a mathematical workshop, which will be a veritable beehive of industry and in which every one will have work suited to his taste and capacity and realise the practical importance of mathematics and see clearly the link between mathematics and life. This is no Utopia nor a far-off ideal but a necessary and urgent reform that can easily be brought about in the cause of sound mathematical instruction. And when we reflect that teachers in Secondary Schools are men of good attainments, devoted to their task, conscientious to the utmost limit of their power, we have the brightest hopes for the future of mathematical education in this country and it will not be difficult to realise the full implications of M. Emile Borel's remark that a mathematical education at once theoretical and practical can exercise the happiest influence over the formation of the mind.

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(With four illustrations.)

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BY

K. R. R. SASTRY, M.A., L.T.,

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THE DALTON LABORATORY PLAN.

By Mr. V. K. RAMA MENON, B.A., L.T.,
Headmaster, Paliam High School,
Chendamangalam.

IT is absolutely necessary that a teacher should be acquainted with all the up-to-date methods of teaching. But he should not blindly follow a method, simply because it is altogether new and original. To condemn what is old and adopt what is new has become the prevailing fashion. No doubt, the existing method of education has its own defects and how to remedy them is a question that should engage the serious attention of every body connected with the work of teaching. "The Dalton plan," it is said, "solves the problem satisfactorily to the great benefit of the students by a proper distribution of initiative and responsibility between the teacher and the taught." It is well, therefore, to examine this method carefully.

The system is more or less of a recent growth. It is not accepted formally or nationally in Great Britain or Europe. It is popular only in America, and even there it has a place in the Department of Education only with other systems equally advocated and advertised. As such it is risky, difficult and irresponsible to try this method here.

This system, if at all the best of Western methods is yet to be proved the best for our soil too. There is a vast deal of difference between the educational methods of America and England and of India. Those who have invented this method are such educationists of America as have no knowledge of Indian conditions, environments and needs. Those who advocate the system here are, I am afraid, blind admirers of everything foreign

and have not, I am sure, studied this method practically or experimented it in the actual crucible of a real class room. So, unless and until this is done, this new method is, in my opinion, a leap into the dark and certainly for the worse—at least in the near future—for some years to come.

Even granting that the method will suit our soil, where are the necessary equipments for its proper working? There are no good laboratories, nay, no specialists or experts in any line and unless such a vast and costly equipment is provided, it is not conceivable how the students will be inspired to ask questions and otherwise cultivate and develop their mental and imaginative faculties. Even if by chance, some gifted students come forward with nice and satisfactory doubts, where is the source of clearing their doubts and promoting their instincts of curiosity in any practical manner? Further, the present cadre of teachers are all only the products of the Madras University where the system of teaching is poles different from the Dalton Method. Under such circumstances, how can one hope to try this method at all with any sense of responsibility in one or with any feeling of sympathy for the school-going youngsters?

Lastly, the worth of our work is now gauged by the number of passes a school secures in public examinations. Adverse criticisms and ill opinions have not been rare from the Inspecting officers here about a school which produces but poor passes in the public examinations. These public examinations also are being conducted with due consideration to the candidate becoming eligible to join the University classes. Then as long as our University has its present methods, our public examinations must be on

much the same model as they now are and consequently the instructions we impart to the students in our schools must be to make them come out successful in the public examinations which latter are, by the way, not only stepping-stones to the University career but also a necessary minimum for getting even a low-paid start in life.

If these arguments of mine do not seem convincing and if the advocates of this method still persist in the adoption of it in our schools, I humbly suggest that such advocates practically conduct a few lessons in our schools and get it certified by those who are veterans in the field of education and whose words must therefore be the final say on the point.

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SCHOOL OR COLLEGE UNIONS AND THEIR PLACE IN STUDENT LIFE.

AN ADDRESS

By Mr. S. SRINIVASAN, B.A. (Hons.), B.L.,
Chitaldrug.

THE subject is not one that gathers round thoughts and ideas as years advance and that luckily saves me from being pronounced as too antiquated. In my own school and college days, we had these Unions also, and I think with much the same objects. I participated in them keenly enough and the only trace that is now left in me of it is that I look back to those times as the pleasantest in my student life. To my young friends yonder who, like many of my old class-mates, have not yet taken kindly to Union activities, I have a warning: that they will rue the day and the opportunities they have lost in holding back from participation in the life of the Union.

The class-rooms and lessons train the young and qualify them to pass examinations successfully. It was that at any rate a decade and a half ago, and I suppose it is still the same more or less. Passing examinations, a very worthy and necessary object by itself, forms but a small part of one's education. As an amateur, not in the educational line, I venture to offer the opinion that we have not yet advanced very much beyond looking on schools and colleges as instruments that help us in success at examinations. Conditions being what they are, for a long time, perhaps, we cannot help the position, however unfortunate and regretful it be. But if our young men should have an all-round growth, not merely an examination success, we have to maintain some other activities as supple-

mentary to what the school or college classes impart. The Boy Scout movement of our schools which did not exist in my school or college days has been very rightly made a permanent fixture of our student life. It holds a place of importance equal to study and class-room exercises. It is a movement, as we all know, which aims at and is eminently fitted to draw out, all the great and noble impulses of service and sacrifice. It helps character building. In the education of a decade or so ago, this emphasis on character was non-existent. In our school and college days all that mattered was the rank, or the prize which one scored. Physical education was confined to an hour's exercising at the gymnasium and the authorities being very considerate, we could get exemption on a number of grounds. One of them was that a student was enrolled in one section or the other of the games provided for in the college. I am speaking with reference to the colleges in Madras and Bangalore where I have studied, but I think they were general. But even these obligations with regard to physical exercise were not enforced. The complaint then was that very few colleges and schools had even play-grounds and even those that had them neglected to give physical training the proper place in a student's education. I think it is much the same even now but we are fast moving on to better times. A few days ago the Madras Government issued an order making for the compulsory medical examination of school children and our own University in the State has proposals on tapis to force every student to take part in some physical exercise or other. Thus while our ideas of education have considerably changed, as demonstrated by the wide-spread popularity of the Boy Scout movement on one

hand and finer appreciation of physical education for school and college students on the other, the institution of college or school Unions is coming down to us as of old. These Unions have also a very distinct purpose to fulfil in the scheme of an all-round education, because they are the meeting places for the students where to develop their oratorical powers and tastes, exchange valuable thoughts on many an interesting topic and where they rub off their angularities and shyness or mis-placed modesty. Under the guidance of their school and college Professors, our young friends are able to discuss hot and spicy subjects with a freedom of thought and language for which, without that privileged place and position, anybody would be sharply called to order. In this connection I recall particularly the discussions of the Mysore University Union of last year or the year before and would urge on the young friends here who are about to participate in the privileges of the School Union that has also to begin work for the new term, to bear in mind that opportunities lost can never be recalled. In later days when they will hark back to times gone by, they will realise that the days spent at the Union were by far the pleasantest in their school and college life. For instance, I can never forget the debate that I participated in about 20 years ago and at a discussion presided over by Mr. Arthur Mayhew, now the Educational Adviser or so with the Government of India. I forget the subject but there were ten of us chosen to speak, five for and five against the proposition, by the headmaster of the school, (then Mr. now) The Rt. Hon'ble V. S. Srinivasa Sastri. I remember I said something that stirred the house to laughter because the argument involved the assumption of a child to

one of tender years. You will pardon me, gentlemen, for these personal references but I only mention them to impress on our young friends here what unique opportunities may be lost to them if they keep back from the Union. To be laughed at or rather to cause merriment and to laugh or joke at others is the pleasant privilege, I think, of the young. Once out of the school these liberties are gone for ever. The Oxford Under-graduate, who banged out on a solemn occasion of investiture, that virtue was kneeling before vice, was indulging in a peculiarly youthful joke for which an elder in another place would have got a slap on the face or been hissed out of the hall. Another service rendered by the School and College Unions is that they bring the great and big men of the place in contact with the young. You remember, gentlemen, that not very long ago, our late Dewan, Sir A. R. Banerji, was delivering a very learned discourse at the Madras Presidency College Union. There was a Secretary friend of mine whose great ambition in the school was to go about pressing into service all the big men that he could get at, either to deliver an address for the Union or preside over one of the debates of the Union. He thereby came to know the great men and he himself became very popular and valued among his friends and fellow-students.

Some College Unions have built up great traditions and high reputation; for example, the Oxford and Cambridge Unions. They have been the nursery grounds of orators and statesmen who have played a great part in the public life of England. To have been a debater at one of these Unions is an honour which is still very much valued. The Reuter's News Agency, some of you may have noted, flashes across the wires, now and then, the debates conducted

by these Unions on subjects of public interest. Only last year it wired out to us the vote of the Manchester or Leeds University Union (I just now forget which), on the subject of self-government for India. Some of you may remember the passage-at-arms which the late Sir Surendranath Banerji had on the floor of the Oxford University Union years ago. The incident is thus narrated: He was once invited by the University Union to move a resolution in favour of the National Congress. Lord Herbert Cecil in opposing the resolution twitted at Indian aspirations and contrasted India's backwardness with the superiority of Western civilisation. It called forth from Surendranath a spirited retort: "The noble Lord, the member for University College," said Surendranath, "has been good enough to attack not merely India of which he knows nothing but that particular section of India of which I am proud to confess myself a native and of which he knows less, in terms in which some present might fairly consider difficult to reconcile with the dictates of hospitality. On that I will not venture an opinion, but when he ascribes to every Indian and more particularly to every Bengali a perpetual incapacity for political reform, a sombre darkness in which he has been engulfed and from which he never can emerge, let me remind this most enlightened house, that my country has set before a world which has never since ceased to wonder at it, a system of philosophy and a wealth of political principles evolved at a time when the noble Lord's ancestors were swinging by their tails from tree to tree."

School and College Unions are also helpful in discovering and developing the hidden faculties and tastes of the young men. Last December, Mr. Srinivasa Rao, the Head-

master of this institute, gave us an idea on the school day, of the excellent musical and histrionic and oratorical talents of some of his young pupils. Those of you who were present will agree with me that that was splendid material in young boys, and the display was admirable. I was told that the opportunity to discover these came at the meetings of the boys in the Union. An old boy of this very High School, the late Mr. Nataka Siromani A. V. Varadachar, discovered his metier and developed his talents for drama and music through the Central College Union. The distinguished gentleman who has taken to-day's chair and who was also a class-mate of Mr. Varadachar both in this school and at the Central College was telling us how it happened. The Central College Union gave Mr. Varadachar the opportunity to show off his tastes for music and drama but it afforded him not, naturally enough, the full scope that he wanted. It was the Union that helped him to know his abilities and put him in the way

which has taken him to pinnacles of glory and greatness in his own line. Mr. Varadachar is the maker of the modern day Kannada theatre and who dare say that he has not done all that is humanly possible for this great institution. If you will examine incidents like this, you will see the great influence that School and College Unions exert on the education of young men.

Gentlemen, I have said more than I ever thought I would be able to do within the short time which I have had before me. It only remains for me to hope that this High School which held up in its embryo such distinguished men as the learned Judge that has so kindly taken up the chair this evening and a dramatist of the reputation of Mr. Varadachar will send out, with the help of the activities of this Union, many more great men who, in the fulness of time, will blossom forth as great public servants, orators and scholars and thereby bring glory and name to this institution as a whole.

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THE DANGER OF MULTIPLICATION OF UNIVERSITIES— A PSYCHOLOGICAL STUDY

By PANDIT V. S. R. SASTRI,
Hon. Rector, Vedic Academy, Myslapore.

DISCONTENTMENT:—ITS GENESIS.

A DISCONTENTED middle class is the vision that comes up before the mind's eye when one hears the cry for more Universities.

Why discontented, dissatisfied with what, and how discontented, is the series of questions that rush forth in quick succession. In the words of Carlyle, the Universities "polish pebbles and dim diamonds" and yield forth annually a large number of well-polished, round pebbles of a single pattern fit only to wield the pen in the service of Government. The products of our Universities would die of starvation if they were stranded on Robinson Crusoe's island. Steeped in the literature of the freedom-loving West, the graduates of the University find an irreconcilable difference between the world of ideas from which they had drawn their mental nourishment, and the hard world of facts of the work-a-day life. The educational policy of Lord Macaulay still holds the field, and the supply of graduates is more than the need. University degrees and diplomas have become so cheap that they have lost their charm and value; and who would like to be classed as of little utility after years of laborious and patient toil in one of the best literatures of the world?

THE DANGER AHEAD.

Yet the fact is such. To what end this state of affairs may lead is a problem to be looked into. The discontented lower strata of the society or the masses of the population have brought into existence Bolshevism whose

very mention suffices to strike terror in the hearts of capitalist nations. If the unintelligent brute force of society is capable of such a growth, to what sort of 'ism' may not the discontented middle class of India, most of them Brahmins, intellectual by heredity, give birth when it is goaded to despair?

SUGGESTED SOLUTIONS.

Captain J. W. Petavel of the Calcutta University suggests the scheme of Educational Colonies for the existing woes, the Economic Road to Freedom as he tersely calls it. Sir Albion Banerjee advocates technological studies, and advises the students to enter the High School course with a calling of their own choice or chosen for them by their parents or guardians; and this suggestion the *London Times* applauds as "characteristic statesmanship." We beg to differ. Poor regard has the Dewan paid to the psychology of Indians. A little thought would have enabled the administrator of one of the leading Indian States to see if it is possible, nay advisable, for boys of tender age to attempt a solution for the problem of bread which defies the most cunning of intellects, and whether the choice of profession by others will not land them in circumstances similar to the choosing of wives by other eyes.

Mr. J. C. Ghosh, Principal, School of Chemical Technology, Calcutta, is of opinion that the educated middle classes should undergo some sort of technological training through short and intensive courses just to enable them to carry on their propaganda work of teaching the illiterate millions.

UNEMPLOYMENT: PSYCHOLOGICAL ASPECT.

This view comes nearer the psychological aspect of unemployment discussed below;

Now, employment is the utilisation of one's own talent or capacity. Each man is born with a certain, definite knack or aptitude to do a particular thing with much ease or facility, which none else can do so well as he, and is thus an organised unit of the society. This natural inclination or bent of mind in each individual should be discovered and developed and ought to direct him in his choice of profession. But, now, Western education has ignored this basic and fundamental cast of mind in man, and has moulded every variety of talent after one pattern. The Universities are huge manufacturing corporations turning out numberless brain patterns suited to the carrying on the work of administration on distinctly Western lines. The result is the walks of life are over-crowded, and one finds it hard to get a living.

A TYPICAL YOUTH.

In this struggle for very existence brought about by an artificial system of education, the Brahmin is, perhaps, the greatest sufferer. Let us take the case of a typical youth, and see how it is with him. Mostly he has had a University career, and is a graduate. His collegiate and secondary courses have, probably, absorbed all his ancestral acres. With aged parents, a young wife, and a number of brothers and sisters, all dependent on his earning, he enters the world with his degree only. Very often he is crowded out, and if fortune favours him with a pittance, he finds it an Herculean task to feed so many. Morally, he is bound to support them all, for they have sacrificed all their belongings, nay their happiness too, at the altar of his culture of the West.

HIS NATIVE TEMPERAMENT.

Thus his income and outgo refuse adjustment; very often his income is nil, and the

wolf stares him in the face. He finds he cannot rest until he has fought his way to his own loaf. Wants torment him, and sting him to the quick mercilessly. They refuse to be argued down, and in his attempts to satisfy them, he undergoes a world of worries, and does a great deal of thinking. At last he is rewarded for his troubles, and finds out his natural temperament.

WHAT AILS HIM.

But his cares do not end here. The discovery of his native determination makes him miserable still more. It becomes like pouring oil on to the burning flame. He cannot use his talent which is long lost. First, it is to be unearthed, and secondly, it is to be shaped agreeably to the conditions of life in which his lot is cast. Two things, therefore, he has now to look after, instead of the one he had when he began his life, namely, the necessities of daily life, and growth of his natural gift.

HIS IDEAL.

He cannot lose sight of either, and very much he would like to have a patron who, finding his inherent worth, would keep him above want, and allow him to develop his inborn inclination which savours more of involution than evolution. Then he would involve and involve until he finds his well-being in communion with the Highest. This, of course, is the purpose of life, and towards which the whole creation moves consciously or otherwise. Government, education, legislation, politics, arts and sciences and handicrafts, press, platform and pulpit, agriculture, trade and manufacture, in fact every kind of activity, evolve continuously only to involve in the end. This ideal, he would gladly realise in the actual. In other words, he would see the Kingdom of God on Earth.

THE PRESENT CONDITIONS.

But the circumstances that govern the present-day life would not let him sit with folded hands, and concern himself with the involutional process, however laudable it may prove in the end. The doctrine of evolution is preached from the house tops, and involution is either disregarded or cried down as day-dreaming. In fact, its very existence even as a scientific theory is yet to receive recognition. Intellect is a whore, and she is enjoying her game with the evolutionists. Till she feels exhausted, and the return journey begins, the youth cannot hope to find any patron in his economic struggle. "Every man to himself" is the dictum of the dry intellect, and he will have to fight through or evolve, without, however, releasing his hold on involution. In other language, his evolution should be so regulated as to land him in involution.

THE COMMUNAL FACTOR.

In his attempt to have two birds with one stone, he is not without a rival. The reign of intellect is admitting in the field all sorts and conditions of men; in truth, it runs riot, and men in power or the apostles of evolution, without a due sense of the capable growth of intellect and its goal or consummation in involution prefer other communities, however limited their intelligence may be. Not that we mean that other classes are less intellectual than the Brahmins, but their evolutionary process is distinct from the latter. The one should not be mingled and confused with the other, but should be allowed to grow quite apart in harmony, talents being different.

EDUCATIONAL QUALIFICATIONS.

This rivalry is not the only factor he has to contend against; his own intellectual achievements prove often an encumbrance to him. They have created in his brain so many impressions tending evolution infinite, which pull him violently away from any of his attempts at involution. It is no easy task to shake off all the acquisition of Western thought got after many years of hard mental labour. As much time and labour would it require to be quite free from the effects of the purely evolutionary culture. By temperament he is an involutionist; by culture, an evolutionist.

Thus he is pulled to and fro by these two warring principles, evolution and involution.

THE AVENUES OPEN.

In his search after a reconciliation of these two seemingly opposite laws, he finds the ministerial line congenial to his culture and temperament. He can supply his bodily wants by the fruits of his labours at the desk, and devote his spare hours to his hobby. But it often happens that he is worked hard in the office, and feels incapacitated to spare any energy for his recreation. The teaching profession, especially the professorial line, has some attraction for him. But the authorities are pleased to have a select few, and the field is limited. Other learned callings as law, engineering and medicine have also their fascination; but either he has no means to equip himself for these walks of life or success in them is problematical. Business has no leisure, so is out of tune with him, and must be ruled out.

THE WAY OUT.

Under these conditions no clear-cut way can be marked out for him. He must try to find expression in the way best suited to the growth of his natural calling. This can be well found out by his own insight aided, of course, by his search after truth. In such a vocation he will evolve to the full development of his powers, and then involve completing the circle he has begun. He attains the aim of his life, and finds that the two apparently contradictory laws have one common factor. Thus is harmony established, and he is at peace with himself and the world.

Then is the realisation of the ideal sought after only by philosopher-statesmen — as many Universities as there are homes, or every home a University, not an empty dream to be brushed aside in haste, inasmuch as every human being is a psychological unit, and unique as Nature herself.

(To be continued.)

IN THE CHILDREN'S WORLD. II—
THE TEACHING OF THREE R'S
AND OTHER SUBJECTS OF
SCHOOL INSTRUCTION

By MR. S. JAGANNADHAN,
Kindergarten Assistant, Teachers' College, Saidapet.

INTRODUCTION.

IN my first article I pleaded for the institution of a Kindergarten in all our households, the necessity for Infant Schools as a preparation for a good training in a Primary School, and in that connection chalked out several materials, which would satisfactorily bring about the desired responses from children. Having thus established a fairly good surrounding for the child and having created an incentive to do, to see and to learn, we shall now consider how we can develop in him an aptitude for the Three R's, Drawing, Games and occupations. In so doing, we all have to devise certain devices and some extra materials that will really help the children in their difficulties and derive knowledge without the high strain which we generally create under ordinary circumstances. The chief subjects of instruction are Reading, Writing and Arithmetic and I first begin to deal with language teaching in which reading and writing form a prominent part. In talking about writing, I would have necessarily to deal with the importance of drawing as also a chief factor of child training in developing good writing.

LANGUAGE TRAINING.

Training in language consists not only in reading and writing but also in the use of good expressions and in the enriching of the child's vocabulary. In the early training, I have made mention of the importance of Nursery Rhymes, Prayers, etc., in the enriching of the child's vocabulary and training in memory. Herein also I propose to give some more

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examples of good rhymes, songs and prayers: These impart new ideas to the child about things in Nature which he has seen, and provide a stimulus to know what he has yet to see, learn and hear. The educator's task consists in unfolding the child's mind to those things in Nature which he has no occasion to come in contact with. The rhymes are so full of meaning, that they are a necessity in the early training of the child.

PRAYER SONGS.

These lines are generally taught in pial schools and houses and many of the children also learn them in imitation of their parents chanting these lines in their daily worship at home or in the temple.

A. To God Vinayaka :

பாலும் தெளி தேனும் பாலும் பருப்பும்
இவை என்னும் கைத்துணக்கு என் தருவேன்
—கோலஞ்செய்

துக்கக்கிரமத்துத் தாமனியே
நீ எனக்கு சங்கத் தமிழ் முற்றுத் தா.

B. To Goddess Sarasvathi (Goddess of
Learning) :

வெள்ளைக்கலையுடுத்து வெள்ளைப் பணிபுண்டு
வெள்ளைக் கமலத்தில் வீற்றிருப்பான்—வெள்ளை.
அரியா சனத்தில் அரங்கோடு என்னை
சரியாசனத்தில் வைத்த தாய்.

Both these are considered very important inasmuch as we believe that by invoking the aid of God Vinayaka, we get on without the least difficulty and by invoking the Goddess of Learning, we shall be able to sip from the fountain of knowledge with great ease so long as we possess Her divine grace.

In the previous article I have also referred to the importance of story-telling and the use of picture-books, the former to cultivate the power of speech and develop it and the latter to make the child acquaint himself with sound symbols or letters. By naturally

looking at the picture and the word under it, the child will at some time learn the sound symbol underneath the picture or at best will have the inquisitiveness to get to know what those symbols are.

EXAMPLES OF MORE STORY RHYMES.

One point that generally struck me with regard to these nursery stories and rhymes is the change that they undergo in their use from family to family according to the wishes of the story-teller. This is after all not a difficult point to be overcome. Another feature suggested to me is that sometimes we see the use of some one or two expressions wholly unsuited to the child, expressions of such a nature that they should neither be used in talking to him nor used by him.

காக்கா காக்கா எங்கே போனாய்?

இரை தேடப் போனான்.

இரை என்ன எடுத்தாய்? வைக்கோல் எடுத்தேன்.
வைக்கோல் என்ன செய்தாய்?

மாட்டிற்குப் போட்டேன்.

மாடு என்ன கொடுத்தது? பால் கொடுத்தது.

பால் என்ன செய்தாய்? பாட்டியிடம் கொடுத்தேன்.

பாட்டி என்ன கொடுத்தான்? கரி கொடுத்தான்.

கரி என்ன பண்ணினாய்? கன்னாவிடம் கொடுத்தேன்.

கன்னா என்ன கொடுத்தான்? தோண்டிகொடுத்தான்.

தோண்டி என்ன செய்தாய்? கிணற்றில் போட்டேன்.

கிணறு என்ன கொடுத்தது? ஜலம் கொடுத்தது.

ஜலம் என்ன செய்தாய்? பூச் செடிக்கு ஊற்றினேன்.

பூச் செடி என்ன கொடுத்தது? பூக் கொடுத்தது.

பூ என்ன பண்ணினாய்? சுவாமிக்குப் போட்டேன்.

சுவாமி என்ன கொடுத்தார்? பட்டு கொடுத்தார்.

பட்டு என்ன செய்தாய்? அம்மாளிடம் கொடுத்தேன்.

அம்மா என்ன கொடுத்தான்? முத்தம் கொடுத்தான்.

or

பங்குணம் கொடுத்தான்.

A number of new words are learnt, new ideas are gained, the uses of things are taught to them and in general they, who are put in this way of catechetical teaching, are ready to receive any number of questions put to them

and answer them as far as they can do satisfactorily at that age. For non-Tamil readers, I give below in short the idea contained in the above lines:

Crow, crow, where did you go?

In search of prey.

What did you find? Straw.

What did you do with the straw?

Gave to the cow.

What did the cow give? Milk.

What did you do with the milk?

Gave it to grand-mother.

What did she give? Charcoal.

What did you do with the charcoal?

Gave it to the copper-smith.

What did he give? A pot.

What did you do with the pot?

Dropped it into the well.

What did the well give? Water.

What did you do with the water?

Watered the flowering plants.

What did these give? Flowers.

What did you do with the flowers?

Gave them to the God in the temple.

What did He give? A silk.

What did you do with the silk?

Gave it to my mother.

What did she give? Kisses, cakes.

In another funny story rhyme, I give below, we see that there is neither a beginning nor an ending but all the same it provides the child some amusement and teaches him how best he can meet some situations in life.

கதை கதையாம் காரணமாம்

காரணத்தில் ஓரொழக்காம்

ஓரொழக்கில் ஈரொழக்காம்

உழுது வந்த மாட்டிற்கு வைக்கோல் போடப்போனாய்

வைக்கோலுக்குத் தேடி பாம்பு (or கரி, கிடந்ததாம்

பாம்படிக்க தடிக்குப் போனாய்.

தடியெல்லாம் சேறாய்க் கிடந்ததாம்

சேறு அலம்பத் தண்ணீருக்குப் போனாய்

தண்ணீரெல்லாம் மீனாய்க் கிடந்ததாம்
மீன் பிடிக்க வலைக்குப் போனாய்
வலையெல்லாம் பொத்தலாய்க் கிடந்ததாம்
பொத்தல் தைக்க ஊசிக்குப் போனாய்
ஊசியும் தட்டானும் உருண்டோடிப் போனாய்.

leaving the first three lines and the last line, the sense of the other lines is something like this:

A man went to the hay-stack to get some straw for the ox and in the hay-stack there was a serpent (or a jackal) hiding and so he ran to fetch a stick to make away with the serpent. But the stick was all smeared with mud and to clean the stick he went in search of water, and while the water was all full of fish, he went in search of a net and while it was torn, he went away again to fetch a needle.....and so on.....

A THIRD STORY.

This is a story about a crow and a sparrow. While these two were digging in a rubbish heap, the crow found a ball of clay, while the sparrow got a ball of gold. The crow built a house of clay and the sparrow of gold. Unfortunately the crow's house was completely destroyed by wind and rain during a night of unceasing showers and very strong winds. Having been left homeless, the crow appealed to his brother sparrow to give him shelter in his house, which the friend readily consented to. One day, both of them went to a tank to bathe and fetch water for cooking, drinking, etc. The sparrow took a mud pot while the crow carried a basket. As soon as the sparrow finished off her bathing, she filled her pot with water and returned home. But the crow was trying and trying his best to fill the basket with water. But no sooner he took the basket out of water than all the water came down and thus not even a drop of water remained in the basket.

By this time, it was getting dark and there was thunder and lightning which forebode the coming of a heavy downpour and in a moment the poor crow was caught in the rain. Disappointment after disappointment came in his way. So he carried the empty basket and came to his friend's house. It was shut. So he knocked at the door.

Sparrow: I am just cooking. Please wait.

Crow: காற்றடிக்கிறது

துள் பறக்கிறது

மழை சொரிக்கிறது

கள்ளி மரம் கண்ணிலே குத்துகிறது

அக்கா கதவைத் திற.

The wind is blowing

The rain is pouring

The shaking branches pierce my eye.

Please open the door.

Sparrow: I am just having my dinner. Please wait.

Crow: (Repeats her prayer.)

Sparrow: I am just cleaning my vessels. Please wait.

Crow: (Repeats her prayer.)

By this time it was dark everywhere. The sparrow opened the door and went away straight to her bed. The crow searched for something to eat, and to his great surprise, found very many cakes which his friend had prepared. He had a sumptuous feast leaving nothing to the sparrow. At once he flew away. At the end the sparrow was deceived.

READING.

Having given the child a good training in these rhymes and stories, we shall consider as to the best method of teaching Reading. Writing and reading go together. Drawing which should precede writing should also be made inter-related to reading and writing. Thus we see that there should be a com-

plete co-ordination of subjects, and correlation also whenever it is possible for us to do successfully. Some of the occupations as stick-laying and bead-work will be found to aid writing and reading also, which will be evident to the readers in the following pages. At a certain stage in the child's development, the child likes to read and write his own name or the names of things in and around the house, takes to his father's books and tries to imitate him irrespective of the language, be it his own mother-tongue or a foreign language, and desires to express the contents of a post-card read by his father, or pretends to make out the contents of an advertisement, etc. This is the child's way of doing things. But what we ordinarily do is to compel him to learn the Alphabet and then the words from any Balasiksha Reader.

The Alphabet method is not in any way criticised. Because there is a deviation from the old way of doing things, the modern methods too should not be viewed with suspicion and prejudice. The Alphabet method aims at systematising letters before words, which is quite the opposite of the child's way. The twig bends this way or that way or in any direction according to the wind but always looks up to the sunlight for its growth. So also the child is amenable to any method, but we should adjust our method to the well-ordered growth of the child and this is the method of sunlight that we term as fundamentals of child-education. Our lessons and books should be viewed from a psychological point of view rather than from a logical point of view. What is logical from the adult's point of view may not suit the child if viewed from the latter's point of view. If for instance, a child says the following:—Bed, pillow over the bed, and

head over the pillow; or the cow gives us milk, the baby drinks the milk, the calf follows cow; we have to infer that the child likes to learn the words by establishing a connection between them. He has formed a story and out of the story he has learnt some important words.

The present-day books endeavour to give a list of words unknown and unsuited to children. The words are chosen with great effort so that each letter in the Alphabet may have at least two words for it. The words are of so abstract a nature that if the child should ask what is meant by *பூகம், மதியேனம், தெனவித்திரன்*, it would be very difficult for us to explain these to him and satisfy him.

The educator or the parent should first draw up a list of words familiar to the child and then introduce them whenever there is occasion for so doing or in revision lessons. For example, the child should be acquainted with the names of the parts of the body, vessels in the house, vegetables and eatables, articles used in cooking, clothings and ornaments, metals, furniture, his closest relatives, the days of the week, the months of the year, the different workmen he comes across with, read the prayer-songs he has memorised and nursery rhymes he has been taught, the easy advertisements he gets or his father presents him, the names of Railway stations, the posters in Post offices, roads, etc. In this way, we must arouse his curiosity to read anything and everything that he is interested in or that draws his attention to. If a boy should say that he has read only fourteen lessons and that he cannot read the fifteenth lesson, I believe it is due to the mistake of the method. Except perhaps some of the difficult expressions used, he

could certainly read the passages. It should not be made as a lesson to the parrot.

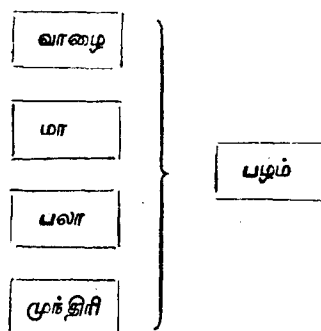
By introducing a difficult letter in a number of known and easy words, the several words as well as the letters composing the words will be learnt very easily and quickly. For example, in the following words two consonants *வ* and *ய* are used frequently,—

கால்	வால்	பால்	
காய்	வாய்	பாய்	நாய்

A child of nearly three years old, sitting with a child of 4 years learning these, is able to make out *வ* and *ய* from any printed book. The sounds have caught his ears well through the use of the familiar words and through the frequent occurrence of these two sounds *வ* and *ய* in them. Having *ய* on the right-hand side and having asked the child to make that into *பாய்*, the child has to pick out *பா* from a group of letters *கா, பா, மா, தா*, etc. In learning to recognise *பா*, he has first to cast away what is not *பா* and then by a process of elimination and by the impression which he has formed in him, he has to recognise *பா*. If the impression, e.g. *பா*, has been well formed, he immediately picks it out without any hesitation as in the first instance; so whenever we teach words, we should give plenty of exercises in the use of letters in familiar and easy words. It will be superfluous at this stage to take difficult letters, for example, *பென, நென, சென, த், ஞா*, etc., and find out words for these since in that transition stage when we are going to give the child the complete Alphabet, he will be sure to catch these things easily. If we want him to write *அரிசி* he writes *அ* first and thinks about *ரி*. He remembers he has come across with it in *இரி* and then is reminded of the image of that letter which he eventually writes on the slate and then as for *சி*, he asks whether it is the

same *சி* which occurred in *விசி* and so on. If he does not know how to write *ரி* he thinks about and says 'should I not write *ப* first and then add the sign which I see in *மி*?' and so on.

In this connection I have to suggest some simple material for word-making and recognising letters. We must have fourteen covers and in each cover we must have all the letters of the Alphabet sorted. In one packet we have *க, ப*, etc., in the second *கா, பா*, etc., in the third *கி, பி*, etc. and so on; one for each series. They must have a sign written over the packet which should lead the child to pick out the desired letter. If he sees *ர* sign on a packet he learns that the series *கா, பா*, etc., can be found in that packet, or in a packet with the sign *கே ர*, he could easily get the series *கோ, மோ*, etc. When we ask him to pick out a word, say *பொக்கல்*, he picks out *பொ* from *கே ர* packet, *க* from a packet with the sign of a big dot and *ல* with the signs *க, ல* over it and again *வ* from the packet with the big dot over it. Thus he forms the word. In the beginner's stage when we do not want him to learn a list of words but merely to impress in him the forms of letters by introducing them in easy and familiar words, this exercise would be found of immense value. Another exercise that I suggest is this: The child is taught to say different kinds of fruits he has come across. Plantain, guava, mango, jack fruit, cashew-nut, etc. I have a card over which is written *பழம்* and different cards over which are written the words *வாழை, மா, பனா* and *முந்திரி* respectively:—



Now if I say, 'pick out பலாப்பழம் from the above' the child should pick out பலா and place it near பழம். The connecting consonants ப in பலாப்பழம் and ம் in மாப்பழம் are also written on small pieces of card-board. Now take off பலா, ப and substitute முந்திரி, ப: what fruit is this?

In this way I have made 16 packets and over the packets are written மாம், பழம், காய், பருப்பு, கிழமை, கிழங்கு respectively and a card on which these are written also finds a place in the packet. The names of trees excepting the suffix 'tree' are written on separate pieces of card and kept in the packet. The names of the days excepting the suffix 'day' can be found in the packet marked 'கிழமை' (day). This provides a very good exercise for reading. What is more is that a dictation lesson after such a lesson clearly shows how the child has been sufficiently impressed as to the forms of the letters and how the clear image of the word itself has formed in him. By constant practice in seeing, handling, taking it out of the cover and putting it again, he is able to visualise the whole thing much better. What then are the necessary considerations that should weigh with us in the preparation of a suitable book? They are picture and word method, picture, word and story method, revisionary words introduced in the form of play, coloured and outline pictures for free conversation, advertisements preferable in coloured papers,

and Nursery Rhymes learnt at home. The words should be also written in colours: The Dale's system of colouring the long and short vowels and vowel signs in two different colours may be adopted. But the present-day ideals of a parent, a publisher and a teacher in the matter of a text-book for the child are poles apart. The parent wants a cheap book, full of words, no matter whether they can be mastered by the child or not, the publisher aims at a book which would find an immediate sale in the market, meeting the demands of the parents almost and to a very little extent of the teacher. The teacher with all the ideals and who is really in need of a good text-book has his place nowhere amidst these conditions. So I believe that in the lower stage a manuscript reader which fully blooms into a book only at the end of the course is the best solution. Each lesson after it has been taught to the child should be written in a separate book kept for the purpose. These could be written preferably with brushes using water colours or with coloured pencils. By writing once in the manuscript book, a second time on pieces of cardboard and putting them into packets, and a third time in a big Alphabet chart that is nailed to the wall, the child will perceive the exact way of writing and try to imitate us.

To sum up, the special materials for teaching reading and writing are—

1. A manuscript reader to be made up of lessons as we proceed daily.
2. A big Alphabet chart also to be filled in only with letters used in the lesson, and eventually made to grow into a complete Alphabet chart.
3. Fourteen packets of cards for word-building.

4. A set of covers which I have suggested here, viz., naming of different kinds of fruits, flowers, etc.

5. A sand tray for writing.

6. Brown paper, cardboard, paint box and brushes.

7. Words written on thick paper with a gum-brush and sprinkled over with sand when wet. For example, take the word மாம்

ம ம ம

The word is written with a brush dipped in ordinary gum and nice sifted sand is sprinkled over it and close by the words appears a picture of a tree. The picture suggests the word, practice leads to the analysis of the word into ம, ற, & ம respectively. The letters are well-formed. The child can trace over them. The roughness of the sand as felt by the child in the course of his tracing, leaves an impression of the letter. This is a suitable adaptation for Montessori's sand-paper letters.

WRITING AND DRAWING.

As I have already said that drawing should precede writing, I shall sketch below the method of teaching drawing. Scribbling for the child is the first exercise in writing. In scribbling he imagines various things, and after his scribbling, if we ask him what he has written, he would say the name of something which he has imagined. He will call a big zero a ball, a wheel, a rupee, etc. Suppose we suggest to him to draw a railway train, he draws long lines from one end of the pial to the other, with a number of wheels underneath the lines. If we next suggest that smoke comes out of the funnel in the engine, he wants our help in drawing smoke or sometimes draws something which he terms

as smoke. Then by showing some object: a lock, a candle, a ball, a ladder, a clock, if we ask him to reproduce in outline the object before him he does so to the best of his ability. Then I suggest some drawing from newspapers, say a motor, a cycle, spectacles, etc.; he sees those drawings and draws a resemblance of these on his slate or black-board. In this way I believe and hope that we could develop writing. Whenever he asks for help we must help him and at the same time provide him with the necessary things for creating an interest in drawing. I suggest about 40 pieces of card-board (each 4" by 4") where the following drawings could be drawn and given to the child. The names of the objects could be written boldly in the child's mother-tongue and the whole series may be numbered at the top. The child could take any of these and draw one on the blackboard. This exercise of copying from the outline should follow the several exercises which I have outlined already. Some of these can be drawn with the help of any drawing-master to show accuracy or got from magazines or newspapers.

List of drawings:—

- | | |
|-----------------------|------------------|
| 1. Ball | 2. Wheel |
| 3. Bat | 4. Watch |
| 5. Slate | 6. Mirror |
| 7. Kite | 8. Table |
| 9. Chair | 10. Bookshelf |
| 11. Ladder | 12. Staircase |
| 13. Saw | 14. Fan |
| 15. Top | 16. Motor |
| 17. Train | 18. Lantern Post |
| 19. Chimney | 20. A Tower |
| 21. A Temple car | 22. A house. |
| 23. A window | 24. A Flowerpot |
| 25. A pot | 26. Lock |
| 27. Key | 28. Brinjal |
| 29. Mortar and Pestle | 30. Bell |
| 31. Balance | 32. Bottle |
| 33. Flag | 34. Basket |
| 35. Umbrella | 36. Candle |
| 37. Well | 38. Cat |
| 39. Crow | 40. Leaf. |

Without restricting the child to the above, he should be given free scope to draw whatever he likes.

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I also suggest the use of brush and a paint-box. We could give him outlines of a slate, a plantain, a pot or a leaf and ask him to paint the outline with the respective colours which we can keep in a separate dish. The method of holding the brush and carefulness to paint within the outline should be the two features which we aim at, at present. In this connection, I suggest some good drawing books available in some companies, probably costly. Dean's canvassed painting-books contain outlines on one side and on the opposite page contain the same outlines filled with colour. Before we ask the child to use the book itself, we can give a specimen of the same outline on a separate piece of paper and help him to colour the same, using the necessary colours. Another kind of drawing-book available is one with black paper inside, one side is filled with drawings and the opposite page is left blank, which is provided for the child to draw by seeing the outlines against this page.

Some of the child's occupation materials provide a medium for showing him models of good writing. A child used to sticks and beads can say that if two sticks are put together thus $_$, it looks like $_$ and if three sticks $_ _$ are put together it looks like $_ _$ and so on. A child after having seen $_ _$ this drawing for a chair and seeing the latter $_ _$ says that this is *an* $_ _$ (i.e.) a $_ _$ resembling a chair turned downwards. Thus the child makes some association of these letters with either drawings or objects. This is only in the very first stage. In writing difficult letters we have to help him and here the traditional way of writing on sand is much to be resorted to. By holding his fore-finger if we help him in writing the difficult letters, he carries this sense impression of touch with him and is able to write satisfactorily after repeated practice.

(To be continued).

COMMERCIAL ARITHMETIC

FOR SECONDARY AND COMMERCIAL SCHOOLS

Prepared in accordance with the S. S. L. O. Syllabus

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OPINION.

Mercantile Miscellany, April 1926:—The enterprising firm of Messrs. Srinivasa Varadachari and Co., Mount Road, Madras, have sent us a copy of Commercial Arithmetic for S. S. L. C. students which they have published. The book is a very useful addition to the existing literature on the subject and bids fair to be regarded as a Standard Text-book on the subject on this side. Needless to add that the book being written with a Commercial bias it should prove invaluable to all youths aspiring after commercial or business career. We congratulate the author, Mr. T. V. Subramania Iyer, and the Publishers for the neatly got-up little volume before us.

D. Cr. 8vo. about 200 pp. Price Re. 1-4-0.

SRINIVASA VARADACHARI & CO., 4, MOUNT ROAD, MADRAS.

Aug. 1926.]

THE STUDY OF SANSKRIT.

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THE STUDY OF SANSKRIT.

By Mr. P. ANANTHASWAMY,
Teacher, Trivandrum.

INDIA is essentially the land of religion, philosophy and literature. Even from the dawn of civilisation, we Indians have been known to be a people of wonderful spirituality, keen subtlety, and acute vigour of intellect which, though essentially dialectic, self-introspective and rather unpractical, has been no less a puzzle and an enigma to Western savants. We can therefore contemplate with pardonable pride the work of our ancestors in the intellectual activities wherein their forte lay. Look where we may in the literature of the world, we shall find that no nation has displayed such originality and sublimity of intellect as are abundantly manifest from the great Sanskrit literature which they have bequeathed to us. I propose in this paper to make a small attempt to see the study of Sanskrit taken up by a far larger number of students and with far greater zest than now. Already signs are not wanting of a healthy curiosity among some of our educated people to understand and appreciate the peculiarly beautiful thoughts and the lofty truths which have found their embodiment in the unfortunately defunct language which forms my theme.

The Indian Renaissance, which is now a *fait accompli*, is noteworthy in several ways. It is, as observed by a talented South Indian scholar, like the warm breath of spring which spreads about us a renovating freshness and fragrance with its sudden wealth of leaf and bud and bloom and fruit. This Renaissance, unlike the Renaissance of Europe, is concerned with a literature and art which, on account of their being bound up with the

religious observances of everyday life, are decidedly less moribund. The modern art of Europe has "to trace its origin to the dead stories and ideals of ancient Greece and Rome," and to revive them in order that it may awaken the sense of beauty in moderns and thereby fill them with joy. But Indians are happily circumstanced. "Their stories and ideals are living, and living with fulness and abundance of life" and meet them at every turn whether they will or not. Who can deny that Sanskrit is a great and potent force for preserving the real treasure of our souls and our individual and national life from being seized and carried away or subdued, as the case may be, by aggressive and over-powering agencies?

A keen and sincere pursuit of Sanskrit helps us to understand aright, the sharp and subtle intricacies of the religion of the Hindus. The web of Hinduism has been woven together by sages and seers who had attained self-realisation and God-realisation. This religion is so catholic in its conceptions and teachings, though not in the observances that it prescribes, that it affords plenty of scope for mental uplift and spiritual illumination to all those who are inclined to draw upon it, whether they be within or without its pale. It has a universal appeal and is of unfailing interest. Men of all creeds, all callings and all ranks all the world over, can draw valuable inspiration and help from it. It is a never-failing fountain from which the measure of the water that can be taken is simply the measure of the drawing-pot. It gives a rational enough solution to those obstinate questionings of the human soul, heavy and weary with the weight of this unintelligible world and of the altogether unknown world which is to succeed it. And

it makes us conscious of our ties of relationship with

"That Light whose smile kindles
the universe,
That Beauty in which all things
work and move."

Thus a study of Hinduism tends to satisfy all our aspirations as best they might be and to sanctify our lives. To present-day Hindus, such study is indispensable, considering how completely and woefully ignorant they are of the meanings of even their daily prayers. The absurd, mechanical and parrot-like way in which they reproduce those prayers ought to make them heartily ashamed of themselves.

The moral value of the study of Sanskrit is supreme. The Ramayana, the Mahabharata, the Bhagavata and the other Puranas and works on literature bristle with lessons which, by uplifting the imagination and cleansing the emotions, bring us into touch with the Infinite. They are a real medicine for all the ailments of the soul and they lead us step by step and after a gradual and preparatory course of inner discipline and expansion of the spirit of love to the very lotus-feet of God. The Gods and goddesses of the Hindu pantheon whose miracles are recorded in our scriptures, the heroes and heroines who figure in our great and holy Puranas and other works of literary art are all calculated to chasten our hearts and purify our souls. He or she most indeed be dull of soul if devoted wives like Sita and Savitri, ideal mothers like Kausalya and Gandhari, impartial step-mothers like Sumitra and Kunti, dutiful and obedient sons like Rama and Bhishma, truth-loving souls like Dasaratha and Yudhishtira, do not solace and stimulate him or her.

The philosophical aspect of Sanskrit cannot be too strongly emphasised. The most eminent of the achievements of the Hindus was in the realms of philosophy and poetry. The Aryan sages were out and out Vedantins and they considered the flesh or body as a mere nothing and God and the Spiritual as the only real and true. The Upanishads form the crown-jewel amongst the many priceless literary treatises composed by the Rishis of old. "As you look through the philosophies of Germany, you recognise the potent logic of Eastern thought reappearing in Western garb." There is no study so elevating and ennobling as the study of the Upanishads and the immortal Gita—books in which Schopenhauer found his greatest inspiration. Vedanta kills the giant of ignorance and emancipates our souls from the thralldom of worldliness. There is thus no pleasanter or easier road leading to the discovery of the philosophy of the Hindus than a thoughtful and intelligent study of the effulgences shooting out of the starry lights of Sanskrit philosophy and literature.

Sanskrit has a wonderful and abundant scientific literature. Our forefathers cultivated the experimental sciences. The Indian medical science is of wonderful antiquity and singular beneficence. A part of its ancient glory still survives. Notwithstanding the disintegrating influence in the past, it can hold its own to no mean extent, against all foreign rivals. According to Dr. P. C. Ray, some of the chemical processes described in ancient Sanskrit works are so accurate and scientific that they may be transferred *in toto* to the pages of modern books on Chemistry. Again, the mathematicians of India devised tables of *sines* and *versed sines* and were also acquainted with the principal theorems

of spherical trigonometry. Bhaskara invented the art of placing the numerator over the denominator in a fraction. He also invented the radical sign. The movement of a falling body the ancient Hindus attributed to gravity and they ascribed this to the attraction exercised by the earth on a material body.

Similarly, the sixty-four *Kalas* have their own literature—at once rich and abundant. Law also engaged the close attention of our ancients. It has been rightly observed that the first condition of the attainment of civilisation by any class of people is an organisation for the due protection of the lives and properties of its members. It is hence very gratifying to find that this most important condition engaged the full attention of sages like Manu and Yagnavalkya. A study of Sanskrit thus enables us to dive deeper into the works of learned sages and authors who flourished in ancient India and to carry on research work and in this way, add to the sum-total of human knowledge.

The success achieved in Sanskrit poetry is marvellous to a degree. The dreamy, mystic and speculative Hindus had greater fascination for poetry than for anything else. And they employed Sanskrit poetry as a vehicle for almost every subject under the sun. In every department of poetry, lyric, epic, dramatic and didactic, Sanskrit literature is admittedly great. Kalidasa's *Meghadutam*, Bilhana's *Chaurapanchasika* and Bhartrihari's *Satakams* and many other lyric pieces are gems of perfect beauty. They are marked by classic dignity and distinctiveness and are but synonyms for melody itself. Kalidasa's *Sakuntalam* and *Vikramorvasi*, Sudraka's *Mrichchakati* and Bhavabhuti's *Uttararamacharita* are standing monuments

of Hindu dramatic achievement. Prof. Monier Williams' opinion on *Mrichchakati* may not inaptly be applied to some of the best Sanskrit dramas. "The dexterity with which the plot is arranged, the ingenuity with which the incidents are connected, the skill with which the characters are delineated and contrasted, the boldness and felicity of diction, are scarcely unworthy of our own dramatists. The asides and *aparte*s, the exits and entrances, the manner, attitude and gait of the speakers, their tones of voice, their tears and smiles and laughter are as regularly indicated as in a modern drama." No wonder therefore that the renowned German poet and dramatist, Goethe, launched forth into the following ecstatic praise of *Sakuntala* :—

"Wouldst thou the young year's blossoms
and the fruits of its decline,
And all by which the soul is charmed,
enraptured, feasted, fed?
Wouldst thou the earth and heaven itself in
one sole name combine
I name thee, O *Sakuntala*! and all at once is
said."

Coming to *Kavyas*, the Ramayana deservedly occupies the foremost place. In point of restraint and classic dignity, acuteness of observation and accuracy of description, *curiosa felicitas* of words and sweet and haunting melodies, this great book might well challenge comparison with the *Iliad* and the *Odyssey*. Kalidasa's *Kumara-Sambhava* is famous for its chiselled workmanship, its striking similes, wealth of illustration and vividness of description. Such terse and thrilling descriptions as those of *Uma* in her mountain home and of the *Vipralambha Sringara* attest the poet's imaginative insight and compelling genius. Bharavi's *Kiratarj*

juniya with its beautiful imagery, Magha's *Sisupalavadha* with its metrical niceties and striking thoughts, and Sri Harsha's *Naishadham* which reveals the wonderful versatility of the author and which has been rightly designated *Vidvatoashadham*—these will live and rouse up genuine interest.

Sanskrit or *Devanagari* (the language of the gods) has a vast literature and no other literature has such an ancient history as Sanskrit. Hence the study of such a language by the student of comparative philology and comparative religion cannot but be beneficial. It will enable him to solve interesting and important scientific questions connected with the origin of the language and of the human species.

The influence of Sanskrit on the vernacular is immense. Sanskrit is the Himalayas from which the Ganges of the Indian vernacular literature has descended. Those who have at heart the promotion and improvement of the vernaculars—and this is one of the pressing needs of modern India—must acquire a sufficiently familiar command of Sanskrit which, as Monier Williams truthfully observes, is “the only repository of the *Veda* or ‘knowledge’ in its widest sense; the only vehicle of Hindu theology, philosophy, law and mythology; the only mirror in which all the creeds, opinions, customs and usages of the Hindus are faithfully reflected; and (if we may be allowed a fourth metaphor) the only quarry whence the requisite materials may be obtained for improving the vernaculars or for expressing important religious and scientific ideas.”

Sanskrit helps the social reformer in more ways than one. Social reform in India can be effected easily and without much

friction, if it be made the corollary of the historic and traditional past. There is a fatal hiatus between the modern man's conception of society and reform and his orthodox and conservative brother. Various social subjects such as widow re-marriage, early marriage, foreign travel and the like are discussed with great gusto and some of our leaders of the extreme radical wing are making frantic and almost farcical attempts at legislation. In order to arrive at a satisfactory settlement of these matters, we have to appeal to the *Sastras*. No social reformer can ignore completely the religious ideal of a people, when he proposes any change in their social system; for, the Hindus know no dividing distinction between what is social and what is religious. He must see how far the *Sastras* are, or are not, in favour of his proposed reforms. For this, he must give the right interpretation to the *Sastras* and it can be done only if he has a sound knowledge of Sanskrit.

The last but not the least claim of Sanskrit upon our attention is that it helps us to know more of the past history of India. A study of this language has enabled eminent historians like Mukherjee, Law and Seal to reconstruct the early history of India. Much research work has yet to be done and, without a knowledge of Sanskrit, nothing like success can be achieved. A study of this language will “breathe life into drying and decaying forms which perish in mouldering temples, in limbless statuary, in fading pictures in misunderstood music and in misinterpreted dancing.”

It will be clear from the above that the importance and usefulness of Sanskrit are immense and have, of late, been acknowledged by all and sundry. But those who

have actually applied themselves to the noble task of reviving the study of Sanskrit are but a handful. This, I take it, is due to the present denationalising and godless system of education. Whatever blessings the present system of education has conferred upon us, the fact must be told that it has done little or nothing to make us realise in practice, the true pathos and sublimity of life. It has impoverished and emasculated us. It has sterilised our minds to religious thoughts and emotions which alone can and will interpret life for us and sustain us through fair weather and foul. Then again, the present system has proved so intoxicating in its effect that we have grown to overstate the importance of Western literature and heartlessly consign our Sanskrit to the limbo of oblivion. This frame of mind is obviously unbecoming; and unless we dehypnotise ourselves out of the belief that the English language is the only treasure-house of knowledge and wisdom and that all the other literatures in the world are but fatuous frivolities, the chances are nine to one that we shall become nationally obsolete. As if the present lamentable lack of interest shown by ourselves were not enough, our Universities too have been wilfully winking at the neglect. The short shrift which they have given to Sanskrit is positively prejudicial to its progress. It is unfortunate that an Indian is labelled and ticketed a graduate, although he is ignorant of the very Sanskrit alphabet. Even Sanskrit *patasalas* are becoming thinner and thinner day by day. Ceaseless efforts should be made betimes to make the study of Sanskrit compulsory in all schools and colleges and to adopt rational and up-to-date methods for teaching it. The much-maligned *Pandits* should be paid

handsomely, as they alone can generate in students a genuine passion for ‘light, more light.’ If only the Government and the public would treat them as an integral part of the staff and not as a sort of obsolete and more or less outside and superfluous annexe, they would undoubtedly serve as efficient and valuable instruments in effecting the recovery and rejuvenation of the fading vitality of Sanskrit. Let us clearly remember that Sanskrit is the feeder of the numerous Indian vernaculars, that it affords the best means of getting an insight into the manners, the customs, the civilisation and the ideals of life prevalent in ancient India; that it is the most perfect vindicator of Hindu culture and its chiefest exponent; and that, above all, its clarity and compactness and precision, the richness and copiousness of its vocabulary and the even greater richness of the suggestive portion thereof, its sonorous and thundering dignity, its mild, persuasive and ravishing sweetness, and its harmonious and modulated and highly-evolved rhythms, have secured for it universal admiration and affection. Let us, therefore, re-animate its study and re-seat the glorious Sanskrit language and literature in its ancient seat of glory. Only thus shall we, the denationalised Hindus of to-day, regain the treasure-house of Divine Wisdom and enjoy in the daily round of labour and care as well as in the supreme and crucial moments of our lives, an unstinted share in “the teachings which inspire, the consolations which soothe, the faith which can move mountains and the hope which endures to the end” and find, as Wordsworth did in Nature:

“The anchor of my purest thoughts the nurse,
The nurse, the guide, the guardian of my heart,
Of all my moral being.”
and soul

THE UNIVERSITY OF BOMBAY: CONVOCATION ADDRESS

By RAJATANTRAPRAVINA
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IT is my first duty to thank the authorities of the University for having honoured me with the invitation to deliver the address to this Convocation. A feeling of diffidence, hesitation, and tremor is natural when I contemplate the vast and distinguished assemblage before me, but as a priest in the Temple of Learning, grown grey in service, I am too conscious of the solemnity of this academic ritual, if I may call it such, to indulge in any immodest display of personal modesty or a rhetorical flourish of faltering diffidence. An academic ritual I have called this ceremony, for there is a ritualism, an institutionalism, as it were, in the University as in the Church. No doubt, Convocation Day has different associations of hilarity or solemnity in different academic traditions. To the Indian mind, it appeals as a Parishat or Sangam of Learning, a Convention of the World of Letters, and it appeals by the magic of its symbols, its graces, its oaths and its processions. It is not a mediæval mummery, not a quaint passing show; it exercises a spell over the youthful Indian mind, and amidst much of the old world that is passing away, it is good for us to conserve the magic potency of some of the old-world symbols and old-world arts of life which may lift us from the passing hour and help to cure the present generation of its querulous unfaith, its restless turmoil, and its mad obstreperous strife.

As the Vice-Chancellor of another Indian University, to which the call of a new

academic ideal, in the storm and stress of the Indian life of to-day, has come as it has come to you, I may perhaps be pardoned if I devote the greater part of my address to our common University problems and the abiding realities and generalities of the Indian educational world, instead of passing in review the operations of your own particular campaign of University reform.

An All-India point of view has indeed been latterly emerging more and more. And with the multiplication of small regional and city Universities all over India, which has till now been the one practical result of the monumental labours of the Sadler Commission, the need of co-operative effort for achieving common tasks which are beyond the efforts of a single University has been strongly realised.

The Inter-University Board in India is an organisation for such concerted action, but an organisation in the nature of a Conference or League, of which the decisions are not binding unless they are voluntarily assented to by the constituent members individually. And it is not only in this country that the Universities are drawing together in the effort to re-orientate their policy to the general world-movement of our day. During the last decade, the Universities of the British Empire have been meeting in Conference and Congress, in spite of being divided in constitution and tradition. British Universities also sent missions in 1918 and 1919 to America, France and Belgium. All this is part of that post-war reconstruction of education which is one of the most vital and insistent factors of world-building and world-rebuilding to-day.

This world-wide reconstruction of education has certain new aims. The old Hellenic ideal

of *mens sana in corpore sano*, or that British beau ideal, 'a gentleman with the virtues and accomplishments of his class,' no longer satisfies, no more than the Indian ideal of Brahmacharya and Brahavidya. Knowledge for knowledge's sake, the humanist's motto, is no more satisfying than the æsthete's cult of art for art's sake. Again, the educating of a free personality, of free self-expression with the stamp of native individuality, is no doubt a sovereign aim,—so also is, the civic sense or conscience, but something more is needed.

It is that new aim or new emphasis of which I shall first speak.

THE FIRST EMPHASIS IS ON THE SOCIALISATION OF EDUCATION.

Man is no doubt the child of Nature, and as a child must be brought up in Nature's nursery, but man is proximately the offspring of society. And all education must be socialised, not only in its aim, but also in its machinery. We have thus the Community School, which trains the individual in and through a study of the concrete life and environment of the community, and this is followed up in the University by social and economic surveys as well as by studies in Social Psychology and the group-consciousness. Prof. Geddes, I understand, sought to implant this in your University, but whether it took root in the soil is more than I can say.

THE SECOND AIM IS THE NATIONALISATION OF EDUCATION.

The University is something more than a 'social' institution; it organises and directs 'national' education, which is but the efficient training of the nationals or citizens of a State to take part in the international struggle. The University is the chief agency in this mobili-

sation of the cultural resources of the nation for the paramount purposes of national expansion and progress.

This spirit manifests itself in various ways. First in State equipment for scientific research. For the latter-day conquests of Science are extensions of man's kingdom over Nature, and the new Nature-power is harnessed to the nation's service. Not Nature only, but History also is become a handmaid to Patriotism. The Empire issues an imperial brand of History. History, even as Science, is a science of values, and value is meaning or use. And there is no higher use than national use. History is doubly made, once made by the hero on the world's stage, and then remade by the historian. And not History only, but Education itself as a Science, nationalises. Fascism, as may be seen in the Italian Professor's Theory of Education, makes the Science of Education itself a propaganda in the Absolutist Theory of the State. It only remains to annex Art.

THE NEXT EMPHASIS IS ON INTERNATIONALISM.

For University education in its post-war reconstructions has struck this new note, that of international amity and concord. The British University missions to America, France and Belgium were no doubt redolent of the war-time alliance, and were not followed up, but where the official hierarchy failed, the students' brotherhoods in the Universities of the world have pressed forward with the olive branch. The Strasbourg International Confederation of Students, a hardy plant, has off-shoots in every country of Europe, National Unions of Students, seeking to link up the life and activities of the various Universities of the world. The University women have responded warmly to

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the men's call, and have their own International Federation. Lastly, a system of Exchange Professorships and Touring or Travelling Studentships has carried this idea into the machinery of University organisation.

That marvellous creation of Rabindranath Tagore's brain, Visvabharati, at once Indian and universal by its name, has placed India in the vanguard in this movement of International Universities. The Geneva Committee of Intellectual Co-operation is also a cognate effort, and its world-brotherhood vindicates the fair name of Science and Knowledge from the slur cast upon them by their association with the spirit of war.

But if the University as an institution has been thus socialised, nationalised, internationalised, there is another movement which makes for the opposite direction—I mean the movement of *regionalism*, in other words, adaptation to the region or the environs concerned. A regional University is one that adapts its studies to the utilisation of the man-power as well as the nature-power of the region. It may also explore the social tradition and inherited cultures of the component masses of the population to map out their future line of advance.

Regionalism began as a method of investigation in the social sciences, and has since been applied to the organisation of institutions in the domain of practical sociology.

The economic interpretation of history has immensely strengthened this movement, as also the biological interpretation of all social phenomena.

Every University on this view should develop a regional side. A University like yours, under the regional impulse, would link up its cultural activities with the environs. It

would reach the masses, the labour population in the slums, through welfare movements and through University extensions and missions to the people. Two developments easily suggest themselves in this direction: (1) a University Extension Movement with regular courses of evening lectures and continuation classes for the half-educated proletariat, especially in civic and social subjects, and in applied science followed by examinations, certificates and prizes, and (2) a University Mission to the working classes in the city and suburbs, using the vernacular as medium, and the lantern and cinema as enlighteners, and working in conjunction with the Servants of India Society and the Sahitya Parishats.

The latest arrival in the world of education is *vocational adaptation*, which is the application of the regional principle to the individual. The capabilities of the individual must be cultivated, no less than those of the region; and the individual must be fitted to his place in the social economy. A proper machinery of intelligence tests and vocational tests must be devised, and applied more and more to regulate the individual's choice of study, training and employment. Vocational tests together with intelligence tests are destined to play the part which examinations do now in the regulation of University studies. Our written examinations, even when supplemented by oral and practical examinations, are a poor substitute for the vocational tests of the future. And based on these vocational tests, vocational training in a comprehensive sense is bound to be a *sine qua non* of the finishing stage of the University in the coming era. And it is not merely the individual's aptitudes and interests but also the needs and opportunities of the various social classes and functional groups that must be kept in

view. The different grades and stages of education, literary or scientific, vocational, professional or technological, must be adapted to the variety of functions and interests in the social economy. The University in one word is to be a complete replica of the social life, for it is only life that can generate life. Farewell to the cloisters, the quadrangle and the academe!

Finally, as regards mass education, there is a general movement for extending the compulsory age upwards from 14 to 18, in other words, for making secondary education, and not merely elementary instruction, universal and free. This is the goal; in the meanwhile, there would be half-time continuation schools to carry the pupils over the apprenticeship period between 14 and 18. And even beyond this, the American States are providing State Universities for a free or practically free University education. The goal, as yet a distant one, is a free and universal education (including University education) with compulsion up to and inclusive of the secondary stage.

Such are some of the broad trends and tendencies of the post-war educational reconstruction in the Western world. But the question for us is—what meaning have these movements for us in India, governed as our own course must largely be by the social and national history of our own people? For education is a social function, and Western culture will remain an exotic unless it is grafted on the indigenous stock, and adapted to our physical environment as well as our social milieu.

I will therefore give a bird's-eye-view of the indigenous Indian educational ideal, organisation and history which must be power-

ful forces in determining what directions socialisation, nationalisation or internationalisation may take in the new India of our day. The arts of life and of social reconstruction in India to-day are difficult and complex ones, for we are at a confluence of the two cultures and civilisations, the Oriental and the Occidental; and fundamentally a richer synthesis, a more universal type of man, is being evolved in India than in any other country, Western or Eastern. India is the melting-pot of humanity in a wider sense than even America, North or South, and this supreme fact was announced by the Time Spirit at the very threshold of Modern India by the advent of Rammohan Roy, the prototype, precursor and prophet of the Universal Man.

THE INDIAN EDUCATIONAL IDEAL.*

The soul of India has through the ages gone on creating a synthetic culture, in which Nature and Man have been comrades, all sentience has had its kinship recognised with reverence and homage, and the group or communal consciousness has been the nursery and school of the individual conscience. The essential stamp of the Genius of India is seen in many features of this indigenous education—in the out-door or open-air study in intimate touch with nature, in a corporate life or residence which weans the young from the home for initiation into the greater family of the academic corporation, in long and leisurely years of scholastic study, and above all, in the rule of Brahmacharya, the rule of the student life comprising three great vows, the vow of chastity, the vow of poverty, and the vow of labour. The vow of Brahmacharya embraced not only abstinence from luxury

* This and several other passages in this address are quoted from my previous speeches and writings.

and from all impure excitements, not only temperance in mind and body and speech, but also the obligation of Rita, the truth. The vow of poverty abjured all covetousness and money-getting so that the private purse of the student, prince or beggar that he might be, was cut down to the barest minimum. The vow of labour imposed on the Vidyarthi, the seeker of knowledge, menial duties for the Gurugriha and the student brotherhood, not omitting building and household economy and conservancy, and made honourable even begging for the maintenance of the Gurukula. The educational ideal was two-fold in character; in an individual reference it was Atma-vidya, or Brahma-vidya, the knowledge of the Self, or the vision of the Absolute as the Self, the ultimate goal to which every soul must press forward in the cycle of births and rebirths; in a communal reference it was the conservation and transmission of the tradition of culture and learning, of the arts and sciences, from generation to generation, a debt which the individual owes and must repay to the Rishis, the Fathers of the Race.

THE OLD EDUCATIONAL ORGANISATION.

One characteristic mark of the educational organisation was this:—Education was organised as an integral element in a man's social status. The social and communal (village) systems on which the educational organisation was based ordained a practically free and compulsory higher education for the Brahman, Kshatriya and Vaisya classes, and a well-nigh universal primary education for the village communities. This social and communal status not only socialised education, it ensured that the theoretical instruction, whether elementary or higher, was supplemented by vocational training in and

through the Upavedas, and later on, through the Vidyas and Kalas (sciences and arts)—though there was a retrogression in the latter-day Chatuspathis and tols.

In the mediæval tols, the curriculum was narrowed down and there grew up special schools for literature, grammar, law, Nyaya, Vedanta, medicine, mythology, Tantric rituals, etc. Lexicology, grammar and the elements of Belles Lettres and Rhetoric were common to all the schools, and would be studied for a period varying from five to seven years or more. The specialisation would then begin. "Advanced literature (including grammar, lexicology, rhetoric, poetry and the drama) would take about five years, Logic, Metaphysics and Theology from ten to fifteen years, Law (the Smritis, the Sangraha and the commentaries with elements of Mimamsa) ten years, Mythology (the Puranas) and Tantric Rituals, four years." The course of study often lasted, as Dr. Thomas noted, for twenty years, from the tenth to the thirtieth year.

The curriculum of study in the Arabic muktab would include Etymology, Syntax, Rhetoric and Logic in the first three or four years, and subsequent courses of (1) Literature (for three or four years), (2) Jurisprudence or Tradition (for five years or more), and (3) Logic, Natural Philosophy, Geometry, Algebra and Astronomy (for five years or more).

Let us not superciliously dismiss these studies as 'learned lumber.' The Astronomy and Mathematics were not less advanced than those of Tycho Brahe, Cardan and Fermat; the Anatomy was equal to that of Vesalius, the Hindu Logic and Methodology more advanced than that of Ramus, and equal to Bacon's; the physico-chemical specula-

tions on combustion, heat, chemical affinity, clearer, more rational, and more original than those of Van Helmont or Stahl; and the Grammar, whether of Sanskrit or Prakrit, or of the Semitic tongues, the most scientific and comprehensive in the world before Bopp, Rask and Grimm.

THE SPREAD OF EDUCATION—STATISTICS.

Even in the dark first decade of the 19th century, after a hundred years or more of rapid decadence and decline, darkest India showed a fairly illumined chart of literacy, witness the census of 1815, witness also Munro's minute on indigenous education and Elphinstone's on the Dakshini grants of the Peshwas. Even in that *fin de siècle*, not less than 30 per cent. of the boys were at school, and not less than 1 in 600 or thereabouts (as compared with Scotland's proud climax of 1 in 500 twenty-five years ago) were receiving in the tols and muktab an advanced instruction in Grammar, Rhetoric and Belles Lettres, in Logic, Law or Astronomy, in Therapeutics and Medicine, roughly corresponding to the University grade in our days. But when the new learning from the West installed itself, the gentry and the priestly classes disdained to pay court, and the figures show with great probability that of every hundred who had devoted themselves to the Higher Learning in Pre-British India, only 16 had betaken themselves to the New Learning by the end of the 19th century, *i.e.*, till so late as three decades ago, and the residue had diminished by 36 per cent. The total number of persons engaged in advanced studies had been actually diminished by a third. It is only since the advent of the new movements of the Teaching University and the smaller regional University in the India of the last two decades that in

the University grade of education our generation is beginning to push on to the point to which mediæval India had carried us before. But a school to every village is yet a far cry. The village communities of old organised such things better, for theirs was a growth from within.

Such was National education, the genuine Swadeshi commodity.

The Indian educational ideal to-day must be a living expression of this Indian mentality, a new construction of the Indian genius in response to the moving forces of the Time Spirit and Universal Humanity.

For *historic continuity* cannot be broken with impunity; our statistics of illiteracy and village decadence and destitution bear witness to the results of violently upsetting an old historic organisation without heeding the principles of organic growth and adaptation to environment, a fatal blunder which Sir Henry Maine and Sir Alfred Lyall have alike deplored.

At the same time, we must march abreast with Universal Humanity and fall in a line with its serried ranks.

Fortunately, our Indian civilisation, amidst much that is crude and obsolete and destructive of healthy social tissues, has in its essentials been one of the great civilising forces of human history, as an age-long priest of Humanity and Culture to more than half the human race; and in particular the Indian *educational* ideal and organisation, which was worked out in consonance with this civilising mission, had all the essential elements of progress, so that it is not for us a difficult task to reconcile the demands of the modern spirit, of modern ideals of education, with fidelity to the genius of India,

I will illustrate this in detail.

First, take the essentially modern idea that education is a form of community service just like conservancy and sanitation. The Indian village community also made it a communal service, and the village school-master was common as common land and common water. It is no wonder that so late as the end of the eighteenth century India gave England the first hint of Elementary Schools for the masses, for, as Macaulay's school-boy knows, the Lancaster system was of Madras origin.

Or, again, take that distant vision of a free and universal secondary education, an idea which has travelled very far from the old English prejudice, now happily obsolete, that secondary and higher education was a luxury, and more or less the monopoly of the rich. The Hindu social system, as we have just seen, was based on a compulsory and practically free secondary or higher education for Dvija or twice-born classes (including, be it noted, merchants and traders) irrespective of wealth or social position, so that to the poor Dvija learning became his portion in life. What was however wrong with the old system was the blindness to the fact that every man is a Dvija, twice-born, being born once of Nature and once again of the Spirit.

Or again, take socialisation, that modern panacea for the evils of overweening individualism. I have already pointed out that in spite of the Hindu's individualistic concept of Moksha (liberation) and Atmavidya (self-realisation)—and even in this matter there was the struggling idea of Sarvamukti, the liberation of all creatures at the same time—education itself was organised as an integral element in a man's social status (his Var-

nashramadharma). With the Hindu, social solidarity was supreme; Lokasthiti (social stability), Lokasangraha (social solidarity), Mahajana-pratyaya (social consensus), and Mahajana-sampradaya (social continuity) were stressed in the life of the individual as a member of society. But the equally essential element of social equality suffered, and accordingly when we orientate our University education in such a way as to illumine it with the light of social ideals, we must stress the ideals of social equality and social justice so as to redress the balance. Islamic culture exemplifies social equality, and latter-day Hindu revivals have also been imbued with it as an ideal, probably from Islamic contacts.

Under British rule, our Indian Universities, like our Indian Law Codes, have more or less fostered individualism—this was necessary in the first instance as a revolt against the Indian tendency to subordinate the individual to the family or the community—and even though the aims of University education have been utilitarian, they have been frankly pursued not for social service but for the individual's betterment in society, but now it behoves us to stress social education just as it is necessary to stress social legislation, the concept of society itself being enlarged and corrected so as to comprehend social equality and social justice as much as social solidarity and social stability. For this it is essential that every University should have a Board of Social Science, just as it should have a theatre, a museum, and a play-ground. Lectures and courses as well as sociological surveys should be organised to bring every subject of study in the University, whether humanistic or naturalistic, into intimate and vital relationship with the social life of the country. Besides, a Social Service Mission,

a Mission to the workers and the depressed classes in the slums and environs of the city, is a primary obligation of the University. For it is the University that has created the gulf between the classes and the masses in India, a practical cleavage in place of the old human relationships that bound them close, and it is primarily the duty of the University to socialise education in order to re-create solidarity on the new basis of social justice and social equality.

Next take the national note in education.

The Nation State was no doubt a late arrival in the history of political organisation, but 'nationalism' in the West rapidly grew into a religion, which now chants Pauline hymns of love and in ecstasy takes up the cross, and now chants Berserker hymns of hate and in frenzy lifts up the sword. And to-day, this nationalism has blazing altars of sacrificial worship raised to it in the East, and its chief temples are the schools and the Universities.

But how to nationalise education in India is the problem. Is it to be by the State endowment of scientific research to equip the nation for the international competition? Is it to be by the compulsory military training of every University student to equip him for national defence? Is it to be the training of national volunteers in the University for the service of the Motherland?

But in truth the idea of Nationalism itself has to be critically adjusted to the Indian position, and as the Universities have been the great purveyors of nationalism to Indian youth, it is the Universities that must clearly conceive the goal, and so nationalise the education imparted in them as to set their *alumni* on the right path.

Ancient India did not develop a sense of historic nationality or the desire to expand

herself imperially beyond her boundaries by schemes of military conquest or colonisation. In this she differed from Greece and Rome. But she had a cultural nationality which was not territorial or historic in character, and which yet she stamped in greater or less degree on the primitive Indian tribes and stocks. And Greater India, comprising the Asiatic Continent as well as the Eastern Archipelago, is a witness to these peaceful methods of cultural conquest and colonisation. For a merely cultural nationality without historic or territorial implications seeks only this cultural inter-penetration.

There is a precious element of truth in this concept of nationality which we must not lose in the strife and turmoil of the hour. Nationality is a stepping-ground to Internationality, to Universal Humanity, but Nationalism of an aggressive and exclusive type will block the path. It will continue to complicate international problems. The world must cultivate a cultural nationalism, and that of a synthetic type, in order to move to a pacific internationalism. And India is fitted by her faith in Unity, by her synthetic vision, and by her age-long gospel of Ahimsa and Maitri, to make material contributions to this synthetic cultural nationalism and to international concord and pace.

In another respect this Indian tradition supplies modern India with a needed correction and guidance. A composite nationality like that in India, of which the proximate units are not individuals, but communities sharply divided from one another by creed, custom and history, must cultivate the national sense, the sense of the national whole, above everything else. But if clash and collision among the congeries of communities is to be eschewed, nation,

alism in India should stress the duties and obligations of the units to one another, and of each to all, more than the rights of each against each, or of one against all; in other words, should stress *dharma* more than *adhikara*. In relatively homogeneous societies like those of Europe where there are no intermediary communities to intercept the allegiance that is due from the individual to the State, the cause of human freedom and human progress is helped rather than hindered if each individual unit defends and guards its own rights, thinking in terms of rights against other contending units, rather than in terms of duties to fellow-members, though even here, with the institution of organised classes and unions, class war is apt to emerge. European democracies have trod this path. They do well to preface their democratic codes with a declaration of rights. But in a composite or heterogeneous nationality where communities intercept the allegiance of the individual that is due to the nationality as a whole, nationalism would be wise to take the relation of the units to one another by the handle of duties rather than by that of rights. The ancient Indian national polity which evolved to suit a composite society was a polity based on Dharma, social duty, and not on Adhikara or right. The old concept of Dharma failed because of its compartmental tendencies and its rigid stereotyping character; our new *dharma*, the national *dharma* of the new age, must be based on social equality and social justice, but it is this binding force of mutual duties and obligations (including duties to the Self, the *Atman* in every person or group), rather than the divisive and militant concept of rights, which must be the special message of the gospel of nationalism to a heterogeneous and composite society. No

doubt, every duty implies a correlated right, and every right has its correlated duty. It is the method of approach that is in question. If Indian nationality to-day threatens to dissolve into mere *dissecta membra* of clashing and repellent units, it is fundamentally due to the fatal blunder of importing concepts from one social order into another without the requisite adjustment and orientation.

It is only the University that can in India thus nationalise and internationalise education. A new tradition of humanism has to be created, a new interpretation of History, which will heal all schisms and discords, and dispose us to national harmony and international amity.

Indeed, the evolution of a composite man and a composite civilisation is the central and abiding fact of Indian History. In physical or cultural types, in folk instincts and social postulates, in styles or conventions of art, in myth, tradition and dogma, even in the very language that is the vehicle of thought, and in the structural form of that thinking itself, India offers the grandest example of ethnic and cultural fusion, though the experiment has not always been successful, witness the bitter communal feuds of to-day, and the physical segregation or isolation of certain primitive stocks and cultures that have not been yet successfully assimilated. To the man of science, India offers transitions of culture in all this blend and fusion, and presents the strata with sufficient distinctness to study the dynamic process of man and his culture in the making. To the historian, this supreme fact of a composite culture lays down the ground-plan, the pattern, of Indian History. A mere side-view of that history—Brahminical, Buddhist or Jaina—Hindu, Mahomedan or Christian—Aryan, Dravidian

or Kolarian—Rajput, Moghul or Occidental—is no history at all. The epic of Indian History, must, like the Ramayana, tell the story of a great co-operation between North and South, between East and West, between Aryan and Dravidian, between Hindu and Mahomedan, between civilised and jungle man, for a great consummation, and this story will point the way to the greater epic of humanity. To turn back now on the entire course of Indian History, to take a stand on that separation and segregation, which are the rejected bye-products, the unsuccessful experiments of Nature, in this vast continental laboratory and museum which is India, is to be untrue to the past and the future of India and of humanity alike.

INTERNATIONAL OUTLOOK.

Indeed, no University to-day can be national without being also international in cultural outlook and organisation. Accordingly every Indian University must develop organs of international contact for first-hand and intimate experience of other systems of social culture and social values. Every University should institute international courses in Comparative Civilisation, beginning with Comparative Religion, Comparative Art and Comparative Philosophy, and passing on to Comparative Sociology, Comparative Economics and Comparative Law. Exchange Professorships between India and the dominions of Canada, Australia and South Africa, for example, and bands of travelling post-graduate students to and from these countries, can do more to promote the cause of international amity and good fellowship between India and the rest of the world than any amount of political propaganda, and perhaps concerted and co-operative effort through the agency of the Inter-University

Board may succeed where individual resources fail. But this is not all. A National Union or Unions of Indian University Students like the Indian Scout Associations and the Indian Leagues of Youth, are a great desideratum, and such Unions should affiliate themselves to the World Union.

I have so far shown how our Universities can be made fit instruments to harmonise the Past and the Present, and how they may set about creating a new synthetic culture which will lead the genius of India out of the old Viharas and Ashramas, the old Muktabs and Majlises, to the pilgrimage of pilgrimages, the Sacred Confluence of Universal Humanity.

From the contemplation of these ideal world-forces shaping the education of the future, I will now turn to the main constructive lines of policy on which our Indian Universities are to-day building their schemes of reform and re-organisation. I will select three or four of the fundamental base lines for brief and rapid survey.

The first problem that confronts the University organiser or re-organiser is the type and constitution he should choose for the University.

THE TYPE AND CONSTITUTION OF A UNIVERSITY.

Universities may differ in structural or in functional type. The University may be located in one centre or many, there may be one or more constituent colleges, these are matters of detail, but the fundamental question is that of the relation of the University to its colleges. From this point of view, a University may be affiliating, federal, synthetic, or unitary, according to the degree of intimacy between the University and its constituent colleges. By a Unitary University in

this connection I mean not a University with a single geographical centre or a single constituent college, but one of which the colleges are incorporated and integral parts, being under the financial and educational administration of the University. On the other hand, where the University and the colleges are separate corporate entities, but are so far welded together as to utilise their resources for a common task, we have the synthetic type, and this was the type recommended by the Sadler Commission. Again, in a Federal University, the colleges are independent and autonomous bodies which come together to form the governing body of the University. Lastly, an affiliating University affiliates external bodies by a sort of adoption or recognition, and these bodies are usually unconnected with one another except through the University. In this type, the measure of control of the University over the colleges, and of the representation of the colleges in the University, may vary. Of these four types, a Unitary and a Federal University have no doubt certain advantages, and accordingly the smaller City Universities which are to-day springing up in the country with the rapidity of the oriental gourd prefer them, but the three big Presidencies have a long affiliating history and tradition, and they must continue to be affiliating in the main, with some synthesis of fund and staff in under-graduate work, and with either a federal or a unitary plan in the post-graduate or research work, if not also in the Honours Schools.

Universities also differ in function, according as they are examining or teaching bodies, or mainly research institutes either for pure science or for technological and industrial purposes. Ordinarily, a University combines all these functions.

But the fundamental question of a University constitution is deeper than all this.

A University chartered by the State is really a corporation on which the State devolves its powers of legislation, within the limits of the State paramountcy, in the sphere of the higher national education. And the State must also assign definite financial resources, definite ways and means, the sinews of war, to enable the University to carry out the delegated functions. Now the principal function, the function of teaching, is a creative activity, a plastic art having human stuff for its material. And like art and religion, teaching flourishes in an atmosphere of freedom. The Academic Council of Teachers in the University as a teaching organisation will therefore exercise freedom in their own vocation. But so far as the University exercises powers of educational legislation delegated to it by the State, there must be a general Court, a widely representative body, which will control the general policy, educational as well as financial. And, finally, there must be a small executive body, a sort of Cabinet for this statutory legislature, entrusted with the administration of affairs.

Now, as regards this tripartite body, the first question is—is the constitution to be unitary or plural? Is the supreme authority of this corporation to be vested in a single body, call it a Senate or a Court, or to be divided and distributed between the several corporate bodies? In other words, are these three bodies, the general Court or Senate, the Academic Council, and the Executive Council or Syndicate, exercising functions more or less separate in their nature—are they to be statutory bodies with co-ordinate powers and jurisdictions, with perhaps a limited general supervision on the part of the general Court, or should there be

one supreme governing body, the Senate, of which the Academic Council should be an agent or delegate, and the Syndicate or administrative body a mere Executive Committee? Both constitutions are possible, and both can work under suitable conditions. But the composition of the three bodies will differ according as we have the plural or the unitary type. In a plural constitution with several co-ordinate authorities, the Academic Council will be primarily academic in composition, the Court or Senate widely representative of the various public interests, and the Executive Council mainly a business body, though of course liaison must be secured by inter-representation and inter-relation among the bodies themselves. In a unitary constitution, however, there will be less differentiation of functions, and the Senate will be more composite in character. In fact, the Academic Council will be more or less an Academic Committee of the Senate, and the Executive Council its Executive Committee. That would be their real character in a unitary constitution, even if they should be statutory bodies with defined, but not delimited jurisdictions.

Then there is the constitution of the University in relation to the Government. Whether you call the University a chartered corporation or a statutory legislature, the State paramountcy will remain. But there should be no executive interference with the internal autonomy of the University.

University Acts will lay down general lines of policy. And there should be also a minimum statutory annual grant to each University, which should be supplemented from time to time by special grants for special purposes. The Acts should moreover lay down provisions for State audit, and reserve to the Government powers of general review and general direction

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of the financial situation. Besides, the Government should be represented on the general Court or Senate as well as on the Executive Council; and, finally, Commissions can always be appointed by Government to reconnoitre the general educational position for the purposes of University reform or of fresh University legislation.

A wide-reaching social business like education should always be entrusted to a body representative of all the enlightened interests of the society whose business it is. There may be—in my view there ought to be—separate but inter-connected Councils or Boards entrusted with the organisation of the different grades and stages of education, the primary, the secondary, and the higher. And the State will be there to link up and co-ordinate, and in a general way to control, these bodies or Councils, through a Minister of Education and a Board on which they will be represented. In the end, it may be noted *en passant*, a constitutional machinery like this will bring home to local bodies their obligation to contribute to the University funds, especially for regional developments, a feature of University finance which is being more and more emphasized in the West.

From constitutional issues I turn to cultural ones which pertain to the proper business of a University. I will first give a brief and rapid sketch of a sound scheme of liberal education, in other words, the essentials of modern culture for building up *vitality, efficiency, personality*, this being the first charge on a University.

GENERAL SCHEME OF LIBERAL CULTURE: A BRIEF VIEW.

In the earlier or pre-University stage, any sound scheme of liberal education should

comprise, besides physical culture and *school clinics*, the education of the senses, and more especially of the hand and the eye, drawing, sketching from nature, manual training, with some cultivation of the voice in elocution or music. On the linguistic side, it should comprise at least two languages, *viz.*, the student's own vernacular and a world-language, in our case English—and in the case of the non-technical (humanistic) student, also the classical language to which his vernacular or his culture-tradition is filiated. On the side of object study, it should comprise, through object lessons and Nature study, an elementary knowledge of matter, its constitution and general properties—of living things, their essential structure and functions, and of man, his making, history and habitat. On the side of method and discipline, it should comprise the use of those two keys to all precise and methodised knowledge, Logic and Mathematics. And finally, it should comprise lessons, and also training, in Hygiene and Civics without these being made examination subjects.

In the next stage, the University stage proper, there should come a bifurcation into a predominantly humanistic and a predominantly naturalistic course, but not exclusively either; and the scheme should correlate and co-ordinate, as all modern culture must, cognate studies or branches of knowledge in groups of two or three. This is the principle of grouping, and this completes the foundation or base. And there should be Honour Schools to suit the higher grades of mental capacity and calibre. This is to be followed by a higher graduate stage, the M.A. and M.Sc. courses, of which specialisation of study is the keynote. Research follows next in the Doctorates, which are the crown and apex of a

University. For it is not mere conservation and transmission but *constructive culture* which is the motto of the day; and without active participation in constructive culture or research and the advancement of the bounds of knowledge, a University cannot even teach as University courses must be taught.

Such would be a sound scheme of modern culture for building up vitality, efficiency and personality. The general form of the above scheme is given in the principle of gradation—the successive emergence, in ascending stages of the various devices such as essentials, optionals, bifurcation, grouping and correlation, specialisation, and finally research.

The above brief sketch suggests a multiplicity of reforms in our existing cultural organisation, both in the pre-University and the University stage.

THE LINGUISTIC QUESTION—GOVERNING FACTS.

First, take the linguistic question.

The outstanding fact which must be borne in mind in the organisation of studies is that the linguistic capacity in a man's psychological outfit, is a quantum which can be strengthened within certain limits, but which is not very elastic, not capable of an indefinite expansion. Another outstanding fact is that this linguistic capacity is very unequally distributed in individuals and races. A third fact of vital import to the educational organiser is its unequal distribution relatively to other units of mental capacity, such as capacity for judgment or balance, power of observation, mechanical dexterity, inventive aptitude, objective interest; in fact, except for some types of super-normal mental ability or intelligence, there is a more or less marked negative correlation between the gift

of the gab and many of these other units of capacity.

No educational organiser in an Indian University to-day can intelligently handle his tools if he is ignorant or neglectful of these governing facts of the situation.

Besides, the acquisition of knowledge through an unrealised or vaguely realised set of foreign linguistic symbols in early life leads to mal-assimilation and a disturbance of the whole mental system. Such knowledge does not result in any direction to the will—it lacks the power of initiative, the power of construction, in one word, the power of reproduction.

This is notoriously the disease from which most University-educated Indians suffer to-day. Knowledge does not lead to the appropriate action—Reason and Will are divorced—the Indian lives in two worlds, a world of ideas which are impotent and a world of habits which are blind.

POSITION OF ENGLISH—THE VERNACULAR AS MEDIUM.

Admittedly, the position of English in the curriculum, as our world-language, and as the (*de facto*) *lingua franca* for the educated classes, cannot be shaken; but the question of a common all-India *lingua franca* for the classes and the masses remains to be solved, if of course it has to be solved, or if it can at all be solved. Next take the question of the medium of oral instruction and text-book study. Here also, admittedly, the vernacular, if it is fit and ready, is in the early plastic years the natural medium. I believe the vernacular—at any rate, any of the vernaculars which we here need keep in view—can and should be used for certain subjects such as Indian History, Geography and the Elements of Science in the schools, and gradually, as it

becomes fit and ready, for History, Economics, Politics, Logic, and Educational Science, in the colleges. But all this is on the assumption that only one vernacular is in evidence. Where there are several vernaculars for the school-going population, the difficulties are well-nigh insurmountable. For a single vernacular cannot be used in such a case as a medium of oral instruction or text-book study, and a High School or College cannot arrange for them all in teaching staff, text-books or equipment. English as a medium, under such polyglot conditions, is the only refuge and resource. In the primary or lower secondary stage, however, it is always possible, owing to the large numbers and the elementary stage of instruction involved, to use the child's own vernacular as the medium;—or perhaps it may be that for developing a common mind and character as the basis of a common nationality, the vernacular of the majority in particular areas and population has to be adopted by the State.

Now I come to another vexed topic, the value to be assigned to English in the examination schemes and curricula. The main fact to be noted in this reference is that owing to the peculiar distribution of the linguistic capacity in individuals and races, and its non-correlation, as I have already noted, with the mathematical or the inventive turn of mind or with the powers of observation and judgment, no amount of drill and grinding without a habitual social medium of speech can teach the facile and correct use of a difficult foreign idiom like English to a considerable portion of otherwise intelligent and alert people whose natural parts may enable them to become very useful and efficient members of society. The ardent Anglicist fails to understand that the political necessity of learning to speak and

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write English correctly or fluently cannot be made a ground for disqualifying a considerable section of Indian youths altogether for University studies, and therefore in the actual circumstances, for all studies in Physical, Natural, Mathematical Science, and all openings, technical or professional, like medicine, engineering, chemical technology, etc., for which they may have very special talents which they may use to their own benefit, and to the benefit of the community. Besides, one may read a foreign language to some purpose without being able to speak and write it correctly and fluently, especially in the exigencies of an Examination Hall. I should therefore have three standards in English, for admission to different courses or departments in the University:—first, for the literary or Arts courses (including law and teaching) a strict standard based on higher English literature, but with greater leaning to contemporary literature than at present;—secondly, for the Science courses (I. Sc. and B. Sc., including the passport to medicine) a somewhat less exacting standard based in great part but not exclusively on the literature of Science;—and thirdly, for the technological or professional departments (excepting law, teaching and medicine) a standard of business or practical English. A scheme like this is urgently called for, if we are to meet the elements of a complicated and outstanding problem.

VOCATIONAL AND REGIONAL ADAPTATION—A SCHEME OF TECHNICAL EDUCATION.

But a liberal education so conceived does not answer to the whole code of man, for it fails to discipline the whole life. The University of to-day, like the State, is as wide as life, and a vocational and regional adaptation of the University organisation to the

vital needs and instincts of the folk, as well as to the resources and capabilities of the region, is now our first concern in the universal debacle that has overtaken it. This is no time for the Universities to recount their memorable trophies, those splendid administrative services and learned professions they have trained for generations for the uses of social life and governance. There is no use pointing with pride to the gay plumage while the bird itself is dying—unless you happen to be the hunter! How to deliver the land from the bogey of unemployment and under-employment, the unsettlement of the social economy and the consequent unrest, is the problem before us.

Not that the conditions of the problem make it insoluble. There is no reason in the nature of things why there should be a universal under-employment of our rural and industrial masses, and the attendant if not consequent chronic unemployment of the middle class. It is sufficient to point out that India supplies a great part of the raw material needed for the world's industries, and that the natural supply of calory, sunlight, etc., in the Indian sub-tropical climate, gives a relative advantage in certain vital matters.

This social problem, the rescue from the present impasse, can be attempted only by a joint attack, the co-operation of all the social classes in a co-ordinated plan of campaign. In the existing social and economic structure with its differentiated ownership of land, capital and labour, the Temple of Prosperity must be built four-square, on the four bases—the land-holding class, the capitalist-banker, the intelligentsia from the Universities, and the artisans and cultivators in the workshops and fields. It is the business of the University to

train the intelligentsia to become captains of industry, entrepreneurs, openers-up of land, technological researchers, fit to take their place in this great co-operative army for exploiting the nature-power as well as the man-power of an immense continental region.

But a mere scheme of technical or technological education will not do. We must take care that the educational aspect and the business aspect are harmonised. And we must plan the minutest details as in a military campaign. The technical institutes, for example, must comprise, as departments or sections, more or less detachable and independent workshops on a semi-commercial basis. Cartels or consumers' leagues, and distribution agencies, may have to be established to give a favourable start to the trained industrials. Unless the various steps are planned with foresight, technical education would be even more of a failure than liberal education has been.

Again, as regards technical and vocational education in School and University, we must have clear ideas as to the nature of the problem and the conditions of its successful solution. The average Indian of the bhadralog classes is wanting in mechanical aptitude and inventiveness; some sections are also lacking in industrial capacity, commercial instinct or business interest. The problem is to create mechanical aptitude, industrial interest and business ability in those classes, and this cannot be done merely by building up an edifice of technology in the University unless we lay, in the earlier school discipline, a solid foundation of sense-training, manual training, and the cultivation of resourcefulness and individuality. For these essential purposes, what is primarily needed is a

reform of the entire school course to give a due place to sense-training and manual training, to *real* studies side by side with literary studies, and, at the terminal stage, to some optional vocational courses for imparting a vocational bias and pre-vocational training to the large body of students whose means or capacities do not allow them to go up to the University, and who are therefore obliged to enter on callings in life, or whose interests and opportunities impel them to betake themselves to technological or professional studies within or without the University. This will also help to create a much-needed diversion of the volume of demand as well as of output from the overcrowded courses in pure letters and pure science to more useful ones in applied science and technology.

With these introductory observations I will proceed to sketch in brief outline a general scheme for the organisation of 'technical' education in all its grades and stages as an accompaniment or supplement to corresponding grades and stages of liberal education.

There should be three grades of 'technical' education, the Primary, the Secondary and the University grade, filiated respectively to the three corresponding grades of general (or liberal) education.

The Primary grade of 'technical' education is intended to train the factory operative, the agricultural labourer, the handicraftsman or the artisan, working, if need be, with machine tools. This ought to be preceded, in a sound national system, by general (or liberal) education of the primary grade comprising the Three R's as well as the training of the hand and the eye, the senses and the observing and active powers. Where the primary

grade brings the pupil up to the age of 14, the handicraft or trade school can immediately take him up, but where the primary grade stops at 11 or 12, there ought to be at least continuation classes (to which field work, in the case of rural schools, may be profitably added).

The Secondary grade of technical education trains for such industries or industrial processes as require in the worker some intelligent appreciation of the scientific forces or agencies that are manipulated therein. This ought to be preceded in a sound national system by the secondary grade of general (or liberal) education, which, on its 'real' or 'applied science' side, should provide a good grounding in the elements of the 'basic' physical and natural sciences with Mathematics as a 'key' science.

The University grade of 'technical' or what is called technological education, often embodied in Technological Institutes or in Research Departments of a University, comprises training in the highly specialised mechanical, chemical, electrical, bacteriological and other physical or biological processes entering into the industrial exploitation of any regional or natural resources and materials. This University grade also comprises training in the highly specialised forms of commercial and administrative activity necessary for the maintenance and improvement of the social or national organisation. This technological or professional form of University education must be preceded by correlated University studies on the liberal side.

It may be noted that if we take the main heads, agriculture, industry and commerce, we shall find that, in every national or State system of education, there is room, under each

such head, for technical schools or institutes of all the three grades. The same is the case with Engineering, Medicine and Sanitation.

FILIALION OF TECHNICAL TO LIBERAL EDUCATION.

What is principally to be borne in mind in organising a State system of education is that the primary grade of general education should lead up, either to the primary technical training, or in the case of those who have the means or the aptitude, to the secondary grade of general education; that this last, again, should lead up, either to the secondary technical course, or in the case of those who have the means or the aptitude, to the under-graduate grade of general education; and finally, that this University under-graduate grade should lead either to University Technological or professional training or to post-graduate training in pure Science or Humanities. It is also necessary to bear in mind that the last year (or last two years) of every grade of general education, whether the Primary, the Secondary or the University grade, should comprise as optional courses certain special technical (or vocational) studies or mixed courses which may be preparatory to the next following grade of technical education.

A national system of education so organised can alone complete that regional and vocational adaptation of a University which the movement of regionalism demands. Every cultural institution—and a University is a cultural institution *par excellence*—must take into account three factors: first, the organic factor, in other words, the physical and psychical equipment of the folk—secondly, the extra-organic factor or environment in which the folk is placed—and thirdly, adap-

tation of the inner to the outer, in the struggle for existence.

I may perhaps be pardoned if I turn to one particular feature of this regionalism, which we are attempting to introduce in the State University of Mysore. In the under-graduate stage, or, to be more exact, at the Intermediate stage we are contemplating to introduce diploma courses in Technology, which would comprise the two years' Intermediate Science curriculum in the basic sciences concerned and a supplementary course extending from one to two years, as the case may be, giving both theoretical and practical training, the latter in farms, factories and workshops. These diploma courses will be opened in Applied Chemistry or Chemical Technology, in Engineering Technology, Civil, Mechanical as well as Electrical, in Textiles, and in Agriculture, the industries chosen being such as a regional survey of existing resources, facilities, and capabilities indicates as essential to the development of the region.

The main idea is to have an intermediate grade between the vocational courses in the High Schools on the lower rungs of the ladder, and the highly specialised graduate or post-graduate courses in Applied Science or Technology on the topmost rung. In these intermediate courses, we have to provide a proper grounding in the basic sciences, and supplement it with a practical training, not merely in the college laboratory, but also in farms, factories and workshops. We require a large body of trained intermediaries, as we may call these diploma-holders, if we desire to establish a variety of agricultural and industrial pursuits in the country. It is as clear as the day that scientific agriculture, chemical industry, engineering technology, whether civil, mechanical or electrical, will be

among the constructive forces that will build up the Indian nation of to-morrow. The capitalist and the landlord, no less than the State, will employ an army of trained men in their various enterprises, and a mere handful of graduate or post-graduate researchers and analysts or other high-class technicians cannot serve the vital needs of this immense country. In agriculture, for example, the three thousand-year-old Indian practice, often so beautifully adapted to the peasant's actual resources, must be now newly orientated, and given a scientific basis, and it is only if large numbers of our trained youths go back to the land and take to horticultural and agricultural pursuits, and serve as intermediaries between the raiyat at the plough and the Agricultural Department at the model farm, that the conversion of an unscientific into a scientifically based agricultural practice will become possible.

The need for such intermediaries is equally pronounced in Engineering Technology as well as in Chemical Technology.

For these diploma courses it is necessary to keep also in view certain smaller scientific industries, having for their object the manipulation of raw products of the country, which may be carried to a finished or a half-finished stage, or again, the utilisation of waste or of by-products of industry. Such industries have to be selected from among those that satisfy the following conditions:—they must be such as require only small capital, simple machinery or tools, and the employment of unskilled or half-skilled labour, and there must also exist a *considerable* demand for *cheap* goods of the class concerned, an easy access to raw materials and to the market, and, if possible, some *corresponding firms*, for the practical training and apprenticeship,

under commercial or market conditions, of those who receive their technical training in the laboratory, workshop or farm that may be attached to the college.

Apart, therefore, from the large-scale industries in mills and factories, there are a number of smaller agricultural and industrial pursuits which call for such treatment. To take only a few instances, indigenous dyes, chrome tanning, ferments and enzymes, preservation of fruit, horticulture, agriculture, fodder ensilage, manure, sugar and molasses, lacs, gums and resins, fibre extraction, paper pulp, ceramics, tiles and bricks, paints, polishes and varnishes, country soaps, essential oils, oils and fuels, indigenous drugs, pharmacy, engravings and prints, some branches of commercial analysis, these are among a number of smaller chemical (or technological) industries which, up to a certain stage, satisfy most of the above conditions—and accordingly, the organisation of vocational and technical departments, with college laboratories and workshops in connection with Intermediate Colleges and with the scientific departments of the University, for teaching a selection of these subjects and varying them from time to time in consideration of the output and the demand, must be taken in hand to secure regional developments in the University. In fact, they will be Polytechnics in the University.

For we cannot hope to attract our Indian youths in sufficient numbers, and certainly not the brighter and more capable of them—and we want the very best for the country's economic salvation—if the Industrial Diplomas are dissociated from University courses. In India a liberal status can be conferred only by a liberal education. This has been ingrained for thousands of years in the Indian mind, and to-day the University is the Mecca

of such liberal education. Besides, an Intermediate certificate, which will be preliminary to such a diploma, will be something to fall back upon as a general passport to higher cultural and professional studies, and thus breed confidence which is so necessary to give a favourable start to new experiments.

That the Diplomas in these Technological courses should be University diplomas following on the I. Sc. Certificate is therefore essential, but it is equally essential for another reason. The scientific training necessary to an intelligent scientific practice is provided only in the Universities, nor can it be acquired through the medium of a foreign language by an Indian student much before the normal age for the Intermediate Certificate.

NATIONAL IMPLICATIONS OF A REGIONAL UNIVERSITY.

It will be seen that all such regional developments tend to nationalise a University, and they accomplish their purpose best when we can assume a co-operation between the University and the departments of the State. For, Development Departments like those of Agriculture, Forestry, Geology and Mining, Public Works, Railways, Industries and Commerce are store-houses of power for working or developing a State's resources, just as much as a regional University. And this seems to be the vantage-ground of a State University in an Indian State:—it allows a pooling together of the resources that lie ready to hand in the State farms, the State workshops, and State power-houses; and it can thus harness a vast amount of power to the production of men and not merely things.

But there is no reason why, with increasing nationalisation all round in British India,

the same solidarity between the University and the Development Departments should be wanting in British Indian Provinces. The paramount need of their co-operation cannot be gainsaid; for one thing, the Report of your Reform Committee shows that given co-operation with the Royal Institute of Science you can make a decent beginning with a University Technology Department on the basis of a lakh recurring and five lakhs non-recurring, whereas without such co-operation you are doomed to the perpetual sterility of a paper scheme of three lakhs and a half recurring and forty-five lakhs non-recurring. And it is not merely a question of cost—such filiation or alliance, however you may put it, between the University and the State departments will allow to the post-graduate students opportunities of research and training in the practical problems of the country's development which would be of inestimable value to the nation.

Enough of the University, enough of organisation and machinery. The educational organiser is a humanist above everything else, and his highest technique is that liberal humanism which is above and beyond all other techniques. For he sits with the congregated human mind, the youthful mind, during its golden quinquennium of glowing hopes and generous enthusiasms. Indeed, what is a University but an installation of youth, a Temple of Truth where the eternal Universe of ideas first dawns on the youthful imagination, nay a Temple of Life in which youth first beholds Isis, the Mystery of Life, unveiled.

The educational organiser, then, is above all a humanist. But what is humanism to-day? Who is the humanist?

XXXII—67

To-day it is no longer the crabbed old Philologer of the Renaissance, like Brown-ing's Grammarian, purblind and stone-deaf and bent double, who is the apostle of humanism. His funeral was celebrated long ago.

To-day the cult of humanism is the cult of youth. It is the youth of the world, youth the dreamer of impossible dreams, the seer of sightless visions, the youth that just now deployed before me—they are the apostles of humanism. I, a humanist teacher, hail them as my teachers.

How shall I then, at this the Convocation of Youth, admonish, counsel, warn them as to the conduct of life, when Youth the guileless instructor is their friend and companion. The golden maxim of the conduct of life—and the foundation of all true education—is to be true to oneself, true to one's Svadharma as the Bhagavadgita puts it:—that, then, is the discipline to which you, young men, are called, the discipline of youth, if only you knew it—indeed a world-discipline to-day. Who rules the home to-day? Youth. Who rules the school? Youth. Who is the schoolmaster's schoolmaster, Montessori's Montessori? Youth. And perhaps Youth, if it had a chance, might make a much better show of the governance of the world than the world's custodians, the world's sapient old masters, have done of it. *Si monumentum requiris*, I am tempted to say,—if you are looking for a monument to the sapience of age, look round. Look to the world crumbling all around you. Look to the reeking fumes of blood and fire and lust that from East and West, from North and South, rise, like the dark Djinn from the depths, rise perpetually and stain the stainless cerule of the eternal skies. Is there to be no deliverance from the body of this Death? What power will transform this world when old wisdom has failed? But is it not written that

wisdom speaketh out of the mouth of babes? One power we all know or have known—all except the cynic, the man born old, if there should be any so unfortunate among us—one power, the power of Youth which for us transfigured the world, indeed made of our common Earth a figured flame transcending Jove or Mars? Have we, has the world, lost the secret of Youth, this vision splendid, this transforming magic power? What if young men were to rise all the world over, and take a vow of *perpetual Youth*—declare that they would never, never, cease to be young—and the Earth would be free!

Serene will be our days and bright,
And happy will our nature be,
When love is an unerring light
And joy its own security!

But what is Youth? Youth that must take this vow of perpetuity to save the world from itself? Let me, an old man, answer the question as Youth taught me to answer.

Youth, above everything else, is young: it is its duty to be young. Call it the *dharma* of youth, the law of its being.

This *dharma* is the worship of life. Youth lights its lamps to adore the Lord of Life. And if architecture has its seven lamps, Youth has its five, its Pancha Pradipas, in the ritual of its worship.

The first Pradipa or lamp is its subjectivity, its freedom from the law of the object. As yet, the great hard world of the objective fact does not hold the young soul in its iron grip—the iron has not entered into the soul. Youth dares to be original—custom, convention, the Philistine's idol, goes to pieces like Dagon before the *mantram* of Youth. Youth dares to be free. An authority that is not vouched for by the inner self, a dogma that does not satisfy the individual judgment, a code that does not attract willing obedience, does not exist for it.

The second Pradipa or lamp is its Romance, its exalted sensibility. For Youth is but Adam born over again in each one of us, looking with Adam's eyes over this big blooming kaleidoscopic world—in all its first wonder and novelty, its bursting freshness and variety. The flame of life burns intense, burns white, burns pure, on the altar of Youth.

The third Pradipa or lamp is its creativeness, its power of conjuring up a world of its own, and by its own *dhyana*, its own concentration on the image, making the image real. It confesses, it imagines, it creates. This is Youth's thaumaturgy or magic. Youth is indeed a world-builder. And it builds with *any* material or stuff, however intractable and unpromising. It transmutes the basest metal into its own gold. Such is Youth's alchemy.

Its fourth Pradipa is its invincible optimism, its perennial spring of joy and song, of hope and adventure. Youth, like a thing of beauty, is a joy for ever. Youth has an inexhaustible store of songs and tunes like Apollo's golden harp. Youth has heard the song of the Sirens, and not closed its ears with wax like self-mistrusting Ulysses. Youth has climbed Everest and dived into the bottomless sea, has traversed Darkest Africa and reached the Poles, has come to the secrets of the moon and the stars, in the beginningless yore—Youth, the great Adventurer in all adventures that were, are, or shall be—the great traveller beyond bourne, beyond Land's End into perilous seas in fairy lands forlorn.

And the fifth Pradipa, that burns brightest in Youth's *Arati*, that adoration with the lamps, is its immortality, its sense of an inextinguishable, irrepressible life. A thing of palpitating life, what should it know of death? And so Youth alone is capable of Love, for there can be no love without an assured conviction that that love is immortal. And youth is capable of self-immolating service with a smiling countenance, because such service is natural to one who knows that both the giver and the receiver are deathless.

And all the five Pradipas, these five lamps, converge into one central light, but it is a light that never was on sea or land—a light which shines only in the circumambient ether that encompasses and engulfs this bounded isle of existence.

My young friends, this is the canticle of Youth which Youth taught me, and I repeat it to you in my old days so that you may repeat the same to those who come after you. In the name of the world's age, I hail the world's Youth that in you deploys in procession before me.

Reviews and Notices

MOVEMENTS IN EUROPEAN HISTORY, BY D. H. LAWRENCE. (OXFORD UNIVERSITY PRESS). Price 4s. 6d.

This is the first illustrated edition of a work which was first published in 1921. The title appears somewhat high-sounding. But when one goes through it, one feels that it is a book more fit for the beginner than for the advanced student of European History who is already in possession of the facts of that history and who wants to establish some causal relationship among these facts and events and to understand them as movements of particular periods brought about by certain forces of accountable origin. As the author has it in the Introduction, it is a book "intended for adolescents, for those who have had almost enough of stories and anecdotes and personalities, and who have not yet reached the stage of intellectual pride in abstraction." We can say that the author has achieved this purpose in a very practical way.

This small book is very well adapted for this transition stage. If there are a good many descriptive passages appealing to the heart, there are also many thoughtful passages appealing to the youthful head. The description of early Christianity confronting Paganism in the days of the Empire: the description of the Huns and their leader Attila: of Peter the Hermit and the First Crusade: of Savonarola and Florence are a few of the many excellent pen-pictures that we have in the book.

At the same time the book is not without its appeal to the thoughtful side of the youth, though this aspect is purposely held subordinate to the imagination. For instance, speaking of the removal of the capital from Rome to Constantinople in 334, the writer says "It was the end of the old Rome, and the beginning of Europe. The Byzantine Empire belongs to the East rather than to Europe. Constantinople looks to Asia. Europe

was left alone, confused, violent, turbulent, disordered, to face the darkness of her Middle Ages. The real light of culture and civilisation was withdrawn, lapsing back to the East. The West would have to struggle through a long obscure twilight, into her own day, the day of modern Europe."

Again speaking of the Reformation: "It was the north, the northern Teutonic race that had defied the Cæsars of Old Rome, which was now finally to break the power of the Roman Papacy. The Germanic temperament all through our course of history has reacted against the old social forms, gradually breaking them down and making room for a wider individual liberty. From the south come the impulses that unite men into a oneness; from the north come the strong passions which break up the oneness and shatter the world, but which make in the long run for a freer, more open way of life." There are several such thoughtful passages in the book, passages which do not require much of abstraction.

It is a creditable performance on the author's part to have brought in to such a small compass "all the surging movements which rose in the hearts of men in Europe" from the time when Romulus founded Rome in 753 B.C. to our own day when "Germany and Russia step from one extreme to the other from absolute monarchy such as Britain never knew, straight to the other extreme of government, government by the masses of the proletariat, strange, and as it seems, without true purpose: the masses of the working people governing themselves they know not why, except that they wish to destroy all authority, and to enjoy all an equal prosperity." The author has done this without making the subject dry as it should otherwise be if it had been planned as a concise history of Europe covering the same period limiting itself to the same size. Far from being dry, the beginner in European history will find it full of life, full of emotion and full of sustaining interest written into imagination in a

vigorous appealing style. It will be a good idea if in the Intermediate course of our University, we do real Modern History, instead of the so-called modern history which has resolved itself to be British history again after being done once in the School course. If such a course of Modern History should be introduced into our Intermediate classes, a book of this kind will serve as an excellent text-book.

A CONCISE HISTORY OF BRITAIN, BY CYRIL E. ROBINSON. (PUBLISHED BY METHUEN AND CO.). Price 5s. 6d.

This is an abbreviated version of the author's History of England in four volumes. But when one goes through it, one does not feel it so concise or abbreviated as summaries of larger works usually are. By the help of a due sense of discrimination, the author has been able to produce a book which is at once a summary and an elaborate text. Topics and reigns which are unimportant are treated very briefly and those topics and reigns which are important and which are difficult to understand are treated with sufficient fulness and detail. For instance, difficult topics like Wolsey's Foreign Policy or Elizabeth's, or the Reformation in England, are treated in a very explanatory manner. Another good feature of the book is that the social and economic side of British history receives equal attention with the political. The nineteenth century has been deliberately treated at greater length than others, and that is the period where our students require sufficient help. The style of the author is again an attractive feature of the book.

The book would have been more useful if the author had given paragraph headings in bold type and analytical summaries for each chapter, without these the student is apt to feel some difficulty in finding his way through the book, concise and abbreviated though it be.

BRAHMARSHI KESHAB CHUNDER SEN, BY MANILAL C. PAREKH. (ORIENTAL CHRIST HOUSE, RAJKOT, 1926).

A perusal of the present book leaves one with the feeling that a significant contribution has been given to the true understanding of the genius of Keshab Chunder Sen.

The author, who already is known as joint-author of a book about Mahatma Gandhi, besides several books in Gujarati, has been extremely successful in giving a vivid picture of the spiritual growth of one of the greatest of Indians through a number of carefully-selected extracts from the speeches and writings of the man himself.

The dedication of the book is interesting and significant, and those that know the author through his many lectures delivered in many places all over India and Ceylon will find it characteristic of his own point of view too: "To that ever-increasing number of people who begin to believe Christ Jesus to be the fulfilment of all that is good and true and noble in Hinduism and who thus form the Hindu Church of Christ in Hindustan, this work is lovingly and reverently inscribed."

The preface contains a strong criticism of the views held by Dr. Farquhar in his book, "Modern Religious Movements in India," concerning the understanding of Keshab Chunder Sen. And after having followed the connected picture the author gives, backed up by quotations from the words of Keshab Chunder Sen himself, one has to admit that his criticism is right, and that he himself has succeeded in giving a deeper and truer interpretation and a more correct valuation of the significance of the genius of Keshab Chunder Sen.

MODERN ELEMENTARY MATHEMATICS: BOOK I FOR FORM I, BY MR. S. NARAYANA AIYAR, B.A., L.T., MADURA COLLEGE, MADURA.

This is written in accordance with the modern principles of pedagogy. The general treatment is good and the examples interesting and real. In-

stead however of using unknown or unfamiliar Sanskrit terms in place of English, familiar terms of Tamil origin may be substituted wherever possible; and in other cases the English terms themselves may be written in Tamil. For instance, instead of translating a tenth as *தசம்சம்*, the familiar Tamil word *பத்திலென்று* may be used and instead of using "*வியாஸம்*" for diameter, the word diameter itself may be written in Tamil. This latter system will prevent English terms in an advanced age from appearing totally strange to the boys. The chapter too on Vulgar and Decimal Fractions and Practice which consists only of 27 pages may be expanded as it is among the most important of the new portions done in the I Form. The chapters on Practical Geometry are particularly able.

THE BUILDING OF EUROPE, BY J. S. HOVLAND. (OXFORD UNIVERSITY PRESS, 1925). Pp. 176. Price 2s. 6d.

This is a brief and clear account of the growth of civilisation from its earliest beginnings on through the Middle Ages into the present times. We are given rapidly succeeding impression pictures of the Phoenicians, the Greek Polis and the growth and decay of Rome, whose culture provided the essential frame-work of civilised life for a very long period of time. Then the author likens the start of the Middle Ages to the position of the Prodigal Son when he came to himself among the hogs and the swine. There was then hope for Humanity only in the Church and Church alone which kept the lamp of learning alight and taught that a better way of life was possible. Separatism which had been once savage and anarchic tribalism had now to emerge out as insurgent self-seeking nationalism in the latter part of the Middle Ages; and the story of modern times is essentially a story of separate national movements; and we are treated not merely to the story of the growth of important nations like France, England and Germany, and their expansive colonisation, but

also to an account of the chief makers of European History from Alexander the Great to Count Cavour with the constructive ideas which they represented. The illustrations are very attractive and varied and contain realistic pictures of European life in all its stages.

A HISTORY OF INDIA, PART III: INDIA UNDER THE COMPANY AND THE CROWN (A HISTORICAL SKETCH), BY DR. L. F. RUSHBROOK WILLIAMS. (LONGMANS GREEN AND CO., LTD. 1926). Pp. 308. Price Rs. 3.

This is the completing part of the series of textbooks on Indian History published by Messrs. Longmans Green and Co., the first of which appeared several years back from the eminent pen of Professor K. V. Rangaswami Aiyangar of Trivandrum; and the second part dealing with the Mussalman period was published a few months back. It is now very gratifying to note that the series has been completed and the profound clarity that marked the treatment of the first part has been kept up, particularly in the case of the book under review.

The author, for some time Professor of Modern Indian History in the University of Allahabad and later Director of Public Information for the Government of India, has been enjoying a great reputation as the chronicler of India's Reformed Parliament and the compiler for some years past of the annual statements of Indian progress, presented to Parliament; and he has indicated in this small manual that his grasp of the general trend of modern Indian History is marvellous and at the same time clear. He analyses the chief symptoms of decay, which were mainly traceable to administrative defects, that caused the break-up of the Mughal Empire—as well as a secondary set of factors which he would label as political and which produced a Hindu reaction in several parts of the country as against Muhammadan domination. The physical and geographical factors

in Mughal decay, he cleverly weaves into the new phenomenon of sea-power which has enabled the Europeans for the last four centuries and more by which the destinies of the country have been linked up with the control of the oceans around.

The beginnings of British enterprise in the country, the ruin of French ambitions, the growth of the British Empire and the evolution of a regular Indian administration, are all traced succinctly; while an account of some outstanding Indian personalities of the 18th century like Madhava Rao Scindia, Hyder Ali and Tipu Sultan supplements in its own way the value of the general narrative. The progress and evolution of India in the last hundred years have had as their aim the breaking down of "the boundaries which separated the bureaucracy from the people"—though the degree of successful achievement has been differently estimated by different schools of thought. We have a good account of the political and constitutional changes in this century to which the attention of the usual type of historian is but scantily drawn. We wish however that it had been possible for the author to have given us a more fruitful and detailed account of the Indian nation-builders in the different departments of life than in the short epilogue which he has supplied. The get-up of the book is attractive; and some of the illustrations are inviting, being reproductions of rare pictures and sketches.

EXERCISES IN PARSING:—By K. V. PHALKE, M.A., CANNORE.

Now-a-days grammar is generally a neglected subject in schools with the result that parsing has become a bugbear to students. The booklet is therefore welcome as furnishing a series of sentences illustrating the uses of the Infinitive, the Gerund and the Participle. We recommend the book to all those who may desire to know the various uses of the infinite forms of English verbs.

PROGRESSIVE EXERCISES IN DIRECT ENGLISH COMPOSITION, BY AN EXPERIENCED HEAD-MASTER, PARTS I & II, PUBLISHED BY SAHITYA SADAN, CANNORE.

It is really interesting to find school books coming out now and then with schemes of lessons for practice at conversation on the lines of the Direct Method. The booklets before us contain exercises suitable for beginners learning English.

We are asked to publish the following:—

Reply of the D. H. H. School Teachers' Association, Tirupati, to the Chittoor District Educational Officer's Circular.

With reference to your Circular B. O. C. No. 1055/26, dated 31-7-26, we are asked to send the following resolutions of the Association passed to-day.

That this Association suggests the following scheme for Adult Education in Urban and Rural Areas:—

I. The formation of small Committees of local gentry to arrange for:—

- (1) Magic lantern exhibitions at various centres.
- (2) Periodical lectures on religion, science, etc.
- (3) Appointment of Readers in the existing Reading Rooms and Libraries to read for the masses newspapers, journals and books.
- (4) Periodical exhibitions of agricultural, industrial products, implements, etc.

II. The sanctioning of liberal grants:—

- (1) To the Reading Rooms and Libraries.
- (2) For the purchase of Magic Lanterns and Slides.
- (3) For giving honoraria for the Readers and Lecturers.
- (4) For paying actual expenses for conducting these lectures in the Urban and Rural Areas.

III. The Association has no faith in honorary work.

19-8-26.

THE SECRETARIES,

MADRAS UNIVERSITY LIBRARY. NEW ADDITIONS.

Year-book, No. 24 (1925), of the Carnegie Institution of Washington.

International critical tables of numerical data, V. 1.

Transactions of the American Mathematical Society, V. 1-8 (1900-07).

Mathematische Zeitschrift. B 1-21 (1918-24), and B. 24- (1926-).

Researches of the department of terrestrial magnetism, V. 5. (Carnegie Institution).

Zeitschrift für Physik. B. 1-30 (1920-24).

Allen, A. H.: Commercial organic analysis. V. 4. Bulletin of American Palaeontology. V. 1-31 (1895-1909).

Carnegie Institution of Washington: Contributions to palaeontology:—Papers concerning the palaeontology of the pleistocene of California and the tertiary of Oregon.

Mineralogical Magazine and Journal of the Mineralogical Society. V. 1-14.

Comere, Joseph: Les desmidees de France.

Thuret, Gustave: Recherches sur les zoospores des algues et les antheridies cryptogames.

Arbeiten aus dem zoologischen Institut zu Graz, B. 1-9 (1888-1911)

Carpenter, Thorne M.: Human metabolism with enemata of alcohol, dextrose and levulose.

Berdoo, Edward: The Browning cyclopaedia.

Brooke, Stoford A.: The poetry of Robert Browning.

Ballard, Philip Boswood: Group tests of intelligence.

Ballard, Philip Boswood: The changing school.

Findlay, J. J.: The foundations of education, V. 1.

Findlay, J. J.: History and its place in education.

Nunn, T. Percy: Education: its date, and first principles.

Wodehouse, Helen: A survey of the history of education.

Yale University Graduate School, 1926-27.

Jochelson, Waldemar: Archaeological investigations in the Aleutian Islands.

Annual Report of the Mysore Archaeological Department, 1925.

Pirenne, J. and Vauthier, M.: La legislation et l'administration allemandes en Belgique.

Renouvin, Pierre: Les formes du govt. de guerre.

Hirst, F. W. and Allen, J. E.: British war budgets.

J-zz, Gaston: Les depenses de guerre de la France.

Lheritier, Michel: Tours et la guerre, etude economique et sociale.

Nogaro, B. Prof: et Weil, Lucien Lieut: La main-d'œuvre etrangere et coloniale pendant la guerre.

March, Lucien: Mouvement des prix et des salaires pendant la guerre.

Truchy, Jauri: Les finances de guerre de la France.

Holjer, Olof: La solution pacifique des litiges internationaux avant et deperis la societe de nations.

Allabad University Studies, V. II.

Herbertson, A. J.: Outlines of physiography.

Gregory, J. W.: The making of the earths.

Murry, Sir John: The Ocean.

Four lectures on general anaesthesia (Dental Board of the United Kingdom).

Medical Dept. of the U. S. Army in the world war, V. 8. Field operations.

Rowbotham, J. F.: The epic of God and the devil.

Carr, H. A.: Psychology.

Burt, Cyril: The young delinquent.

- Report on higher education in the state of New York for the school year ending July 31, 1924.
- Fairgrieve, James: Geography and world power, 5th imp.
- Bruce, W. S.: Polar exploration.
- Dickson, H. N.: Climate and weather.
- French, F. G.: Indian Empire, Pt. 1 and 2.
- Mill, H. R.: Guide to geographical books and appliances.
- Brooks, L.: A regional geography of the world.
- Thurston, S. S.: An economic geography of the British Empire.
- Unstead, J. F. and Taylor, E. G. R.: General and regional geography for students.
- Dodwell, H.: A sketch of the history of India from 1858-1918.
- Bradley, A. G.: Canada.
- Chirol, Sir Valentine: India.
- Proceedings of the Legislative Council of Bengal, V. 1-20.
- Proceedings of the Legislative Council of Burma, V. 5 (1926).
- MacNeill, J. G. Swift: Studies in the constitution of the Irish free state.
- Briggs, M.: A text-book of economics.
- The Chambers of Commerce atlas.
- Jones, David T.: Rural Scotland during the war. (Carnegie Endowment).
- Clay, Henry: Economics.
- Halsbury: Laws of England, Suppl. 16.
- Matsunami, N. Br.: The publication of "Immunity of state ships" and its consequences.
- MADRAS UNIVERSITY LIBRARY:** The number of readers and the number of books issued during the month of August 1926, were 3234 and 4408 respectively. The corresponding figures for the last year were 1885 and 2433.

EGMORE, } S. R. RANGANATHAN,
1st Sept. '26. } Librarian.

LIST OF LATEST ADDITIONS TO CONNEMARA PUBLIC LIBRARY.

- Boynes, N. H.: The Byzantine Empire.
- Bhattacharyya, B.: Ed. Sadhanamala.
- Bower, F. O.: Plants and Man.
- Brown, R. G.: Burma as I saw it (1889-1917).
- Childe, V. G.: The Dawn of European Civilization.
- Cousens, H.: The Architectural Antiquities of Western India.
- Douglas, C. E.: Rice, its cultivation and preparation.
- Dutt, B. B.: Town Planning in Ancient India.
- Farnell, L. R.: The Attributes of God: the Gifford Lectures delivered in the University of St. Andrews in the year 1924-25.
- Farrington, O. C.: The Moon.
- Glotz, G.: The Aegean Civilisation.
- Griffith-Jones, E.: Providence: Divine and Human. A Study of the World-Order in the Light of Modern Thought.
- Vol. i. Some Problems of Divine Providence.
- Hampton, F. A.: The Scent of Flowers and Leaves: Its Purpose and Relation to Man.
- Hirananda Sastri.: Bhasa and the Authorship of the Thirteen Trivandrum Plays.
- Koop, A. J.: Early Chinese Bronzes.
- League of Nations, Geneva: Records of the Sixth Assembly.
- Longrigg, S. A.: Four Centuries of Modern Iraq.
- Lauffer, B.: Tobacco and its use in Asia.
- MacElwee, Dr. Roy, S.: Fort Development.
- Modern World Series:
- Germany, By G. P. Gooch.
- India " Sir V. Chirol.
- Ireland " S. Gwynn.
- Norway " G. G. Hardy.
- Russia " N. Makeev and V. O'Hara.
- Moyer and Westrel.: Practical Radio.
- Morse, H. B.: The Chronicles of the East India Company Trading to China, 4 Vols.
- Muirhead, J. H.: Ed. Contemporary British Philosophy. Personal Statements. (Second Series.)
- Nichols, H. W.: Soils.
- Pearl, R.: Studies in Human Biology.
- Pope, S.: Hunting with the Bow and Arrow.
- Simpson, J. Y.: Landmarks in the Struggle between Science and Religion.
- Whitehead, A. B.: Science and the Modern World.

EGMORE, } F. H. GRAVELY,
24th August, 26. } Principal Librarian,
Connemara Public Library.

The Educational Review.

Sir Brajendranath Seal, the learned Vice-Chancellor of the University of Mysore, gave a very thoughtful address at the recent Convocation of the Bombay University. He took a comprehensive view of the educational situation in India in the higher stages and made valuable observations on the aims of true University education. While he pleaded for nationalism of the true type, a nationalism which will recognise not merely the *adhikara*, but also the *dharma* of the various communities living in friendship and concord, he also appealed for the recognition of internationalism as a definite ideal for Universities. The detailed suggestions he made for the development of the spirit of internationalism are worth special attention. It is interesting to note that they are almost on the same lines as those indicated in these columns sometime back:

Indeed, no University to-day can be national without being also international in cultural outlook and organisation. Accordingly every Indian University must develop organs of international contact for first-hand and intimate experience of other systems of social culture and social values. Every University should institute international courses in Comparative Civilisation, beginning with Comparative Religion, Comparative Art and Comparative Philosophy, and passing on to Comparative Sociology, Comparative Economics and Comparative Law. Exchange Professorships between India and the Dominions of Canada, Australia and South Africa, for example, and bands of travelling post-graduate students to and from these countries

can do more to promote the cause of international amity and good fellowship between India and the rest of the world than any amount of political propaganda, and perhaps concerted and co-operative effort through the agency of the Inter-University Board may succeed where individual resources fail. But this is not all. A National Union or Unions of Indian University students, like the Indian Scout Associations and the Indian Leagues of Youth, are a great desideratum, and such Unions should affiliate themselves to the World Union.

Sir Brajendranath had some remarks to offer on the place of English in the educational curriculum of India, a subject which has been causing considerable controversy in the country. He would have three kinds of English in our Universities: one for the literary or the arts courses (including law and teaching), a strict standard based on higher English literature, but with greater leaning to contemporary literature than at present; secondly, another for the science courses (I. Sc. and B. Sc. including medicine), a somewhat less exacting standard, based in great part, but not exclusively on the literature of science, and thirdly, yet another still for technological and professional departments a standard of business or practical English. It may however interest Sir Brajendranath and others to know that some of this measure of reform has already been accomplished in some of the Universities in Northern India. We should like to dwell on the five 'lamps' of youth drawn attention to by Sir Brajendranath. The great qualities of youth are according to him; *subjectivity*, the objective world not yet

beginning to trouble youthful vision and aspiration; *romance*, an exalted sensibility, responding to the finest impulses of adventure and beauty; *creativity*, a kind of youthful alchemy transmuting baser metal into gold; its irrepressible *optimism* and its *immortality*. "And all the five *Pradipas*, 'these five lamps' said Sir Brajendranath, "converge into one central light, but, it is a light that never was on sea or land—a light which shines only in the circumambient ether that encompasses and engulfs this bounded isle of existence."

The Indian Social Reformer of Bombay has published some interesting details with regard to the operation of the Compulsory Primary Education Act in some parts of the Western city. In two wards only 32% of the total number of school-going children were found to be at school before the introduction of compulsion. It was undoubtedly a sad thing that out of a total number of 17,613 children, only 5,663 should have been at school. Within five months, however, of the introduction of the new steps, the number of pupils under instruction increased to 12,000. If there are some people even now who do not believe in compulsion in matters of primary education, it is hoped that this example will open their eyes. Another useful measure which has recently come into effective operation in the city of Bombay is that of the medical inspection of the pupils in the Elementary Schools of the Corporation. As usual, startling re-

sults were noticed by the medical inspection. On an average about 60 per cent. of the boys were found to be affected by some disease or other, while in the case of girls, the percentage reached the disastrously high figure of 70! Medical inspection is of course useful by itself and in many cases, the guardians are likely to take steps on receipt of the information from the institutions, to get the defective children treated. But in view of the poverty of the people from whose ranks children are drawn to our elementary schools in cities, the establishment of school-clinics is absolutely necessary. It should be possible for the Corporation to run a Central School-Clinic for the whole city, making arrangements for subordinates to go out periodically to the various schools for the treatment of the children. If we are not mistaken, arrangements for a school-clinic exist in the city of Colombo and such a reform should not be beyond the reach of the Corporation of Bombay.

The fate of the so-called National Schools started under the auspices of the Non-Co-operation movement may be said to have been settled long ago and for sometime past the only thing noticeable in their connection has been the irreparable loss inflicted on the careers of many bright young men who were called upon to leave their studies in educational institutions, in the name of patriotism and the motherland. A Committee recently appointed to consider the future of these institutions has come to

the conclusion that they have all declined as a result of the decline of the Non-Co-operation movement, but it has unfortunately recommended that they should be continued as "an experiment in national education." The Committee has also made some suggestions for improving the present state of affairs which must also be considered futile. Compulsory spinning is recommended. It is of course well-known as a panacea for all ills recommended by Mahatma Gandhi, but that anybody should believe seriously that compulsory spinning can have anything to do with University education, should have a curious mentality indeed. Another brilliant suggestion is that music should be introduced as a subject of study. We have always stood for the teaching of the Fine Arts, but by themselves they can only be a poor substitute indeed for all the intellectual instruction one expects at a University centre. Incongruously enough, with an ignorant and pathetic belief in the efficacy of the *Charka*, the Committee has recommended the introduction of science. As if all the present waste of money and energy has not been enough, some more expenditure is proposed to be incurred in providing these institutions with laboratories, apparently because science is not taught well in the existing colleges of the country and the sponsors of these institutions are to be the harbingers of a new state of affairs! Capacity to benefit by unfortunate experience does not exist in all quarters—otherwise, we should have seen the few existing institutions closed down, without leading the miserable

existence they seem to be doing to-day, languishing for students and subsisting on a system of education which is a negation of all healthy and active intellectual growth. The waste of educational energy in this land and the working of people at cross-purposes is often very depressing.

The presence of a large number of languages in this country has been a great handicap in educational work, particularly in the direction of using vernaculars as the media of instruction. In many parts of the country, specially in the bigger cities, the pupils of a school speak many languages and there is difficulty in hitting upon a common medium. The problem has received special attention in recent weeks in the Presidency of Bombay, where as many as six different vernaculars are spoken by the people Mahrathi, Guzerati, Sindhi, Canarese, Urdu and even Portuguese. While the consensus of opinion in India has been in the direction of recognising vernaculars as the media of instruction at least up to the Matriculation standard, the University of Bombay has just resolved that English should continue to be the medium, particularly in view of these circumstances. Neither Guzerati nor Mahrathi is spoken in any exclusive area, each unfortunately counting a number of people, who speak the other. The University Committee appointed to consider the matter went even further and laid down the proposition that effective teaching in subjects like science is

The Problem of Vernaculars.

possible to-day only through the medium of English! These proceedings should serve to convince those who are zealous believers in the vernacular medium that the problem is not quite so easy of solution as is sometimes wrongly imagined.

We congratulate Mr. C. R. Reddi, the Vice-Chancellor of the new Andhra University, on the sentiments expressed by him in a recent address at Government College, Rajahmundry. He denounced the evil of communalism and exhorted his young hearers to judge everything from the national standpoint. In recent years communalism has unfortunately played havoc on South India, invading even the atmosphere of schools and colleges which should ordinarily be exempt from its pernicious influences. With Selection Committees instructed to choose students on considerations of caste and not of academic fitness and with members of the teaching staff, at least in Government Colleges, chosen on the same principle, things are in a sad plight indeed. There have been feelings expressed in some quarters that the University of Madras has also succumbed to such influences. With the inauguration of the Andhra University, the fears were expressed that communalism was only going to find further scope for its operation in the new institution. We are glad to find that Mr. C. R. Reddi has repudiated the policy of communal preferences and divisions and we trust he will be able to enforce his ideas in the administra-

tion of the University. An academic institution reared on communal hatred can only spell disaster to everybody concerned.

The recently-inaugurated Geographical Association of Madras has done a useful piece of service in pleading strongly for the establishment of a University School of Geography in Madras. The Science of Geography has progressed so much in recent years that no centre of higher learning can afford to ignore its usefulness and educational value. In an interesting article contained in the first bulletin of the Association which has just been published, a strong case has been made out for the purpose and we trust it will receive adequate attention at the hands of the authorities concerned. An account is also given in it of the provision for the study and teaching of Geography which now exists in the Universities of the West. Geography is included among the optional subjects of the Civil Service Examination and there are departments of Geography in the Universities of London, Edinburgh, Aberdeen, Glasgow, Liverpool, Leeds, Durham, etc., to mention only a few among a large number. The Working Council of the Madras Geographical Association have proposed a very modest scheme, costing only about rupees six thousand a year, for the establishment of a School of Geography at the University of Madras, and we have great pleasure in supporting the recommendation. We

A School of Geography for Madras.

reproduce the Budget estimate below :—

One Reader in Geography on a monthly salary of Rs. 250	3,000	a year.
Photographic and artist's work, by contract system or salary system	600	"
A draftsman on a salary of Rs. 40 per mensem	480	"
A combined shorthand-typist, clerk and librarian on a salary of Rs. 35 per mensem	420	"
A peon on Rs. 16 per mensem	192	"
Scientific instruments, photographic and drawing appliances and materials, charts, maps, etc.	1,000	"
Books, journals, etc.	200	"
Total	5,892	"

Or in round figures, six thousand Rupees, approximately.

The University of Madras has not been distinguishing itself by any policy of energetic and progressive administration and we are rather sceptical of anything being done in the near future, but we should like to have the satisfaction of having done our duty in drawing attention to a very necessary development in modern University education.

Ruskin lays special emphasis in his *Seven Lamps of Architecture* on the principle of obedience which may be explained as

loyalty to accepted national styles of architecture. Associated with it is the principle of unity which must always attempt at preserving the architectural

manner of a particular locality without introducing incongruous specimens of building. The University of Madras has not taken the public very much into confidence with regard to the plans and designs of the new building which is to house the University Library and which is to cost the large sum of Rupees ten lakhs. It is however necessary to sound a note of warning at this stage against the style of architecture which is proposed to be employed for the purpose. The new building is to be to the north of the present Senate House of the University as is of course very proper. Its location so near the present University buildings should be a great advantage and there are not many spots in Madras so delightful as the narrow strip of land adjoining the Marina. But unfortunately the new building is to be in a style which will be very incongruous with the adjoining buildings like the Senate House and the offices of the Board of Revenue (the old palace of the Nawabs of Arcot), both of which are, as is well-known, in the Indo-Saracenic style of architecture. It is intended to make the new building a specimen of a peculiar style of mediæval Hindu architecture, in imitation of the palace of the old Rajas of Coorg at Mercara. The general appearance of the proposed plan is by no means displeasing and as a building by itself, it should be attractive enough, though it is perhaps not particularly suitable for the purposes of a library, and the ornamentation is too heavy and extravagant for an educational building in a poor country like India. But it is likely to jar on the

aesthetic sensibilities of the spectator in association with the neighbouring buildings which are in the Indo-Saracenic style. Will people interested in securing a building of the proper style for the University Library, which should really be the centre of University life, bestir themselves in the matter and see that something is done before it is too late?

Another serious objection to the proposed plan is that it could have been a more spacious and majestic building dominating the entire surroundings, seeing that such a large sum as ten lakhs of Rupees is to be spent on it. We are informed that the building has been deliberately dwarfed, by depriving it of an upper storey and a proposed tower, lest it should seem more important than the Senate House itself! Because the Senate House is the centre of an annual Convocation function at which the *alumni* get their degrees, some of our Syndics seem to have argued that the Library building *shall not* assume more importance. We cannot but regret this dog-in-the-manger policy which will not take full advantage of the entire money available to produce the best effect in the circumstances. May we tell them in the words of Ruskin that "every

increase of magnitude will bestow upon a building a certain degree of nobleness"? It shows a poor appreciation of the part played by libraries in modern University life to grudge them greater prominence than the office buildings or even the Convocation Hall. As Carlyle has said: "The true University in these days is a collection of books." Stephen Leacock has recently been telling us that if he was to start a University, he would start with a dining hall and a collection of books and think of appointing some professors only if some money was still left over! But of course the Syndics of the University of Madras know better. They will not allow a Library building to be spacious and majestic, because it will overshadow the importance of a building built decades ago and used only on one day in the year. We forget however that the Syndicate members meet in the present building and how can anybody have the temerity to suggest a taller building in the neighbourhood, reducing their importance, though a Library is intended only for the mighty minds of old; for the relics of the saints without imposture, "and that vast assemblage of uncrowned kings who stand silently beckoning to us"?

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One of the most important of modern developments in this science is that made through the observation of individual differences. Although education is a social process and children are social in nature, yet we cannot deal with them too much in groups without doing great injustice to matters in which they are unlike. Studies made in Europe and America have their value for Indian teachers, but observations made in India, as Miss Gordon's have been, are of great value in enabling us to ascertain the similarities and differences with children of other countries, and the differences among groups and individuals here. Miss Gordon has not only given the result of her own observations but—what is even more important—she has shown teachers and others how they may observe for themselves.

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Education (Allahabad), March 1925.

The distinguished author of the book under review is one of the few enthusiasts in India who have taken to a systematic study of child-nature. The book embodies the results of close study by the author, not merely of the existing literature on the subject, but of the actual mental and physical growths of children, as witnessed by her in several schools in Britain and India where she has had the opportunity to work. Within a brief space of 200 pages, the author has contrived, in her plain, matter of fact, and at the same time, engaging style, to elucidate the various topics connected with child life such as the sense perception, play, the service of Hand in Mental Development, fatigue, exceptional children, measurement of Intelligence and the Kindergarten system; touching the various theories on these topics and supplementing them by her own views based on personal study and investigation. We would especially commend to our readers the beautiful and inspiring chapter on the Kindergarten system in which without going into technical detail, the author has surveyed the basic principles of the system and pleaded in accordance with these principles for the Indianisation of Indian education. We are sure that this little book will prove an excellent handbook for teachers as well as parents and others interested in the subject and kindle in them a deeper interest therein. It has been already recommended by the Academic Council of the Madras University as a suitable text-book for the students appearing for the L. T. Examination and we hope that other Universities will soon follow suit. We congratulate both the author and the publishers on this valuable publication and recommend every teacher to secure a copy thereof.

The Madras Christian College Magazine, January 1925.

The study of child-nature is exceedingly important for both of the sciences of Psychology and Education. Its importance for Psychology is from the genetic point of view. In the child one is able to observe in simpler forms many of the processes at work which in adult experience become so complex as to make them difficult of analysis. Its importance for Education is too obvious to need extended notice, and yet there are some who are so short-sighted as to neglect it. Here in South India there are a great number of schools in charge of teachers who do not know the elementary facts about child-nature. But with the progress of education the time will surely come when it will be considered as dangerous to employ a teacher who is ignorant of child-nature as it is to employ a man for a physician who knows nothing of anatomy and physiology. Such a book as that which Miss Gordon has written will serve a useful purpose in hastening that day by putting teachers in possession of a primer which contains the fundamentals of the subject in a readable style. It is the type of book which we would like to see translated into our South Indian vernaculars, because it not only includes the principles of the science, but states them with special reference to the needs of Indian teachers.

A personality is the outcome of forces which are both hereditary and environmental so that child study must take account of both sets of factors. Much more is to be gained by teachers through the study of children for themselves than the mere perusal of books on the subject, however authoritative they may be. The trouble with so many students of other things as well as of child-nature is the evident desire to be spoon-fed. They desire to get their information at second-hand rather than take the trouble to study for themselves. In many instances teachers have not the technique necessary to observe intelligently. Very valuable, then, is Miss Gordon's chapter on 'How to Study a Child,' particularly for those who are beginners in child study, and it is a matter of vital concern as much for the parent as for the teacher.

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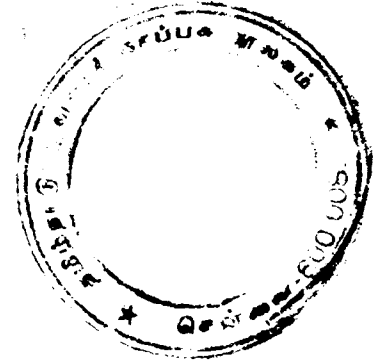
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