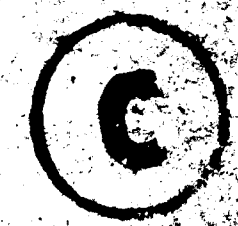


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THE EDUCATIONAL REVIEW
VOL. XXXV NO. 5

MAY - 1929



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THE EDUCATIONAL REVIEW

A Monthly Record for India.

VOL. XXXV.]

MAY 1929.

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சேலம் முனிசிபல் காலேஜ் கண்த் பொதுக்கிரியர், S. சிவராமன், B.A., L.T.
சைதாப்பேட்டை டிசர்ஸ் காலேஜ் கண்த் பொதுக்கிரியர் S. பாலகிருஷ்ண அய்யர், B.A., L.T.,
அவர்களுடைய முனையுடன் கடியது.

Approved as a Text-Book suitable for School use,
vide *Fort St. George Gazette*. Part I-B, p. 545, dated 1-11-27.

(முதல் பாகம்)

பொருளடக்கம்.

I. எண் மானம்; எண் துரிப் பம்:—எண்கள்; இலக்கங்களால் எண்ணைக் குறித்தல்; எண்களின்
சுய மதிப்பும் ஸ்தான மதிப்பும்; கோமன் வழி. II. கோருகாரும் புள்ளிகளும்:—அளவு; அளவு
பெயர்கள்; கோடுகள்; புள்ளிகள்; கோடுகளின் வகைகளும் நோக்கோடுகளைப் பரீட்சிக்கும் விதமும்; புள்ளிக்
குறித்தலும் கோடுகள் இழுத்தலும்; நீள அளவு; டைவரர்களின் உபயோகம்: எண்களை சேத்தல் குறித்தல்.
III. கூட்டல்:—கூட்டலின் அர்த்தமும் உபயோகமும்; கூட்டலைப்பற்றிய ஓர் உண்மை; கூட்டலைப் படத்
தால் காண்பித்தல்; அடைப்புக் குறிகள்; கூட்டல்; பெரிய கணக்குகள்; கழித்தல்; கழித்தலைப் படத்தால்
காட்டுதல்; பலவகை கழித்தல் வழிகள்; கூட்டல் கழித்தலைப்பற்றின சில விதிகள்; கலப்புக் கூட்டலும் கழித்
தலும். IV. பெருக்கல்:—பெருக்கலைப் படத்தால் காண்பித்தல்; ஒரு ஸ்தான எண்ணால் பெருக்கல்; பாக்டர்
களால் பெருக்கல்; எந்த எண்களைக் கொண்டும் பெருக்கல்; பெருக்கலின் குறுக்கு வழிகள். V. வகுத்தல்:—
வகுத்தலைப் படத்தில் காட்டுதல்; ஒரு ஸ்தானத்தால் வகுத்தல்; பாக்டர்களால் வகுத்தல்; 10, 100 முதலிய
வகைகளால் வகுத்தல்; நீள வகுத்தல்; வகுத்தலின் இன்னொரு அர்த்தம்: சில பெருக்கல் வகுத்தல் விதிகள்;
பெருக்கல் வகுத்தலில் சில குறுக்கு வழிகள்; ஒன்பதுகளை நீக்குதல். VI. பல்வின வெண்கள்:—அளவை
வாய்ப்பாடுகள்: காணாய அளவுகள்; சிறை அளவுகள்; நீள அளவு; படித்தல் அளவு; கால அளவு; அநித
அளவு; எண்ணிக்கை அளவு; இனமாற்றத்தல்; பல்வின வெண் கூட்டல்; கழித்தல்; பல்வினவெண்
பெருக்கல்; பல்வின வெண் வகுத்தல். VII. கோணங்களும் அவற்றின் அளவும்:—திசை, திசைமாற்றம்;
கோணம், கோணங்களை ஒப்பிட்டுப் பார்த்தல்; நேர்கோணம்; சதுரங்களும் செவ்வகங்களும்; வட்டங்கள்;
கோணங்களின் அளவு; கோணங்களின் வகைகள்; பரோபாங்களைக் கொண்டு கோணங்களை வரைதல்; ஒரு
புள்ளியிடத்தில் உள்ள கோணங்கள். VIII. டெலிமீட்டர்கள்:—டெலிமீட்டர்களின் அர்த்தம்; டெலிமீட்டர் குறியீ
பில் ஸ்தான மதிப்பு; இரண்டாவது டெலிமீட்டர் ஸ்தானம்; டெலிமீட்டர் குறிப்பு பொது விவரம்; ஒரு டெலிமீட்டர்
ஸ்தானமுள்ள எண்கள்; டெலிமீட்டர் கூட்டல்; டெலிமீட்டர் கழித்தல்; எந்த எண்களையும் கழித்தல்; 10, 100
முதலியவைகளால் பெருக்கல்; ஒரு ஸ்தானமுள்ள முழு எண்ணால் பெருக்கல்; ஒரு ஸ்தானமுள்ள முழு எண்
னால் வகுத்தல்; பல ஸ்தான முழு எண்களால் பெருக்கல்; பல ஸ்தான முழு எண்களால் வகுத்தல்.
IX. உயர்ந்த பொது அளவும் தாழ்ந்த பொது மடங்கும்:—அளவும் மடங்கும்; பொது அளவும் மடங்கும்;
உயர்ந்த பொது அளவும் தாழ்ந்த பொது மடங்கும்; பாக்டர்களால் இரண்டு அல்லது இரண்டிற்கு மேற்பட்ட
எண்களின் உ. பொ. அ. ம. தா. பொ. ம. உம் கண்டுபிடிக்கும் வழி; உ. பொ. அளவைக் கண்டுபிடிக்கும்
பொது வழியைப் படத்தால் காட்டல்; உ. பொ. அ. பொது வழி. X. சமமான பின்னங்கள்:—பல்வின
அளவுகளின் பின்னங்கள்; ஒரு கான்சீட் அளவை இன்னொரு கான்சீட் அளவின் பின்னமாகச் சொல்லுதல்;
சமமான பின்னங்கள்; சமமான பின்னங்களைப் படத்தால் காட்டுதல்; பின்னங்களின் சமத்தனம்; தாழ்ந்த

உறப்புதல்; பின்னங்களை ஒப்பிடுதல்; பின்னங்களின் கூட்டலும் கழித்தலும்; ஒரு சாதாரண பின்னத்தை ஒரு முழு எண்ணைப் பெருக்கல்; சாதாரண பின்னத்தை ஒரு முழு எண்ணால் வகுத்தல்; ஒரு பின்னத்தால் பெருக்கல்; பின்னத்தின் பின்னம்; ஒரு பின்னத்தால் வகுத்தல்; ஒரு எண்ணை ஒரு குறிப்பிட்ட அளவிலே பரீட்சிப்படி மாற்றல்; பின்னங்களைச் சுருக்கல். 1X. வாடிக்கை முறை.—பலமாநிலக் கணக்குகள். பரிட்சைக் குளியிகள். விவரங்கள்.

முதல் பாகம் 5-வது வகுப்புக்கும் 1-வது பாரத்திற்கும், கிரௌன் 300 பக்கங்கள், விலை அண்டு 12.

Approved as a Text-Book suitable for School use,

vide *Fort St. George Gazette*, Part I-B, p. 546, dated 1-11-27.

(இரண்டாம் பாகம்)

பொருளடக்கம்.

பரீட்சைக் கேள்விகள். I. டெஸிமல்களின், பெருக்கலும் வகுத்தலும்: "ஒரு" தான டெஸிமல் என்னால் பெருக்கல்; சுமாரான பரிசோதனை; எந்த டெஸிமல் என்னாலும் பெருக்கல்: டெஸிமல்களால் வகுத்தல்; சுமாராய்ச் சொல்லல்; சாதாரண பின்னங்களை டெஸிமல்களாக மாற்றல்; டெஸிமல்களை சாதாரண பின்னங்களாக மாற்றல். II. சராசரி, மேஷ்யா முதலானவை: சராசரி; ரேஷியோ; மாறாத ரேஷியோ; ரேஷியோவின் உபயோகங்கள்; பரேபோஷன்; லாப நஷ்டம்; வருமான வரி; கடன் மிகுதல். III. பாப் பளவு: பரப்பளவு; செட்டங்கிங்; இல்கிலிங் பரப்பளவுகளும் ப்ரொஞ்ச பரப்பளவுகளும்; பரப்பளவு வாய்ப் பாடுகள்; பிளான் வரைதல், அதாவது அமைப்புருவம் வரைதல்; தரையின் பரப்பளவும் நாற்சுவர்களின் பரப்பளவும்; கட்டக் காசித்தத்தின் உபயோகம். IV. பொது எண் காணித்—கணிதக் கோணங்கள்: அங்க கணிதமும் ப்ரீஜ கணிதமும்; சில பெயர் வினகங்கள்; சமீகரணங்கள்; இன அங்கங்கள்; அடைப்புக் குறிகள் கீக்குதல். V. முக்கோணங்கள்: அலுற்றின் பக்கங்களும் கோணங்களும்: முக்கோண விரிப்பு; முக்கோணங்களின் கோணங்கள் பக்கங்களுக்குள்ள சம்பந்தங்கள்; ஒரு புள்ளியிலிருந்து நிகழ்தனைக்கிணங்க மற்றொரு புள்ளி குறித்தல்; இரண்டு புள்ளிகளிலிருந்து நிகழ்தனைகளுக்குக் கிணங்க மற்றொரு புள்ளி குறித்தல், கொடுக்கப்பட்ட அளவுகளைக் கொண்டு முக்கோணம் வரைதல்; வட்டங்களின் சில தன்மைகள்; முக்கோணங்களின் வகைகள்; ஓர் புள்ளியிலிருந்து ஓர் கோட்டிற்கு பெர்பெண்டிகுலார். VI. கோடுகளையும் கோணங்களையும் இருசமபாகங்களை பகுக்கல்: இருசம பக்க முக்கோணங்களின் சில தன்மைகள்; நேர் கோடுகளை இருசம பாகங்களாக்குதல்; கோணங்களை இருசம பாகங்களாக்குதல்; கார்ட்டீனையும் வட்ட பாகங்களையும் இரண்டு சம பாகங்களாக்குதல்; பெர்பெண்டிகுலர்கள் இழுத்தல்; ஸிம்மெட்ரி. பலமாதிபக கணக்குகள்; முதல் பாரப் பாடங்களில் புதிய கணக்குகள்:—கூட்டல் கழித்தல்; பெருக்கல்; வகுத்தல்; பலவின் எண்கள்; கோணங்களும் வட்டங்களும்; டெஸிமல்கள்; உயர்ந்தபொது அளவும்; தாழ்ந்த பொது மடங்கும்; சாதாரண பின்னங்கள்; பலமாதிரி. இரண்டாம் பாரப்பாடங்களில் பலமாதிரிக் கணக்குகள். பரீட்சைக் கேள்விகள். அறுபத்தாம். விடைகள். இரண்டாம் பாகம் 2-வது பாரத்திற்கு, கிரௌன் 208 பக்கங்கள். விலை அணு 10.

இரண்டாம் பாகம் 2-வது பாரத்திற்கு, கிரௌன் 208 பக்கங்கள். விலை அணு 10.

Approved as a Text-Book suitable for School use

vide *Fort St. George Gazette*, Part I-B, p. 513, dated 13-11-1928.

(மூன்றாம் பாகம்)

பொருளடக்கம்.

பரீட்சைக் கேள்விகள் ; அத்தியாயம் I. நூற்றுக்குக் கணக்கிடலும் அதன் பிரயோகங்
களும் ; II. ரூண எண்களும் பீஜ சமீக்கைச் சேர்க்கைகளும் ; III. சமாதாரக் கோடுகளும்
அவற்றின் தன்மைகளும் ; IV. படக் குறிப்புகள் ; V. பரபோர்ஷன்—நோனதும் மாறான
தும் ; VI. முக்கோணங்களின் சர்வ சமத்துவம் ; VII. முக்கோணங்கள், சமாதார நாற்பக்
கங்கள், வட்டங்கள் இவற்றின் பரப்புகள் ; VIII. பருமன் அல்லது கன அளவு ; IX. தனிச்
சமீகரணங்களும் அவற்றிற்குக் கொண்டுவீடும் யோசனைக் கணக்குகளும் ; X. பலவகைக்
கணக்குகள் ; பரீட்சைக் கேள்விகள் ; பலமாதிரிக் கணக்குகள் ; விடைகள் ; பலவின
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The Educational Review

A Monthly Record for India.

VOL. XXXV.]

MAY 1929.

[No. 5.]

All literary contributions, books for review, newspapers or magazines, sent in exchange, &c., should be addressed to the Editor, No. 4, Mount Road, Madras. Articles and communications intended for publication in the succeeding issue should, as far as possible, reach the Editor not later than the 20th of the month. The Editor solicits contributions on all subjects of educational interest. Stamps should accompany the M.S., if the writer wishes it returned, in case of non-acceptance. The Editor can in no case hold himself responsible for accidental loss.

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FIRST let me indulge in some of the usual platitudes about education and the teaching profession. A humorous living writer thus dedicates his book which he calls "The Lighter Side of School-Life": "To the Members of the Most Responsible, the Least Advertised, the Worst Paid and the Most Richly Rewarded Profession in the World." Let us examine the applicability of each of these epithets in turn. If it is true, as the demagogue is never tired of dinning into the ears of the younger generation, that the students in our schools and colleges will become the citizens of to-morrow and that, in their hands will lie India's future, if it is true that, over and above coaching the school-boy to pass examinations, it is the teachers'

paramount duty to shape his character and instil in him high and noble ideals, then it can safely be maintained without fear of contradiction that the teachers' profession is the most responsible in the world. Especially so in these days, when the majority of parents think that their duty towards their offspring ends as soon as they send their sons and daughters to school, and never trouble themselves to enquire about their progress except perhaps once in a year about the time of the promotion examinations. When the parents are so indifferent, it lies with the teacher to make or mar the future career of his pupils, and no teacher therefore would be worth his salt who does not take the most meticulous care to nourish the mind and body of the young hopeful entrusted to his charge, with fostering kindness, and hand him over, when the time comes, as a finished product to the fond, though apathetic, parent. I need not remind you of the ancient Hindu doctrine that the imparting of instruction is

the noblest of all functions—the Guru of old was the most respected of all in society. But alas! the modern teacher has fallen from his high estate, and in the modern social hierarchy there is no one below the teacher. This contempt which the public have for the teacher is not confined to him but extends even to inspecting officials of the department, as is clear from the well-known story of how the Village Munsiff of a certain village got information that the Inspector was to visit the place on the following day, how he worried himself about lodging and boarding arrangements for the expected visitor, until he was accidentally informed that the gentleman was only an Inspector of Schools, whereupon the Village Munsiff is said to have exclaimed with great relief and disgust: “Appah! is it for this fellow I took all this trouble? He is only a *தொண்டியார்*.” The reason for this state of affairs is not far to seek. While even we teachers must admit that to some extent the fault lies with ourselves in not being sufficiently self-assertive, and in allowing laymen to pass as educational experts, still the indignity with which we are treated is the result of our legitimate claims not being recognised by the authorities. The danger which they perhaps anticipate in giving more than the present meagre representation to members of the teaching profession in District Educational Councils and Secondary Education Boards, for example, namely, that a school master is likely to talk shop and will not take a broad and liberal view of things, is much less to be feared than the real and live danger which at present is threatening teachers, *viz.*, that their representative's voice in these bodies is never heard at all. That teachers as a class are ill paid is such a patent fact that I need not

dwell upon it at length. One of the resolutions passed usually at such Conferences as the present one is about the improvement of the salary and prospects of teachers.

2. As regards the last characteristic—the most richly rewarded profession—some of you may have doubts as to whether the author is right. But I can assure you that even for the school-master, life has its compensations. Leaving out of account the small minority of students that in after-life, not only will not allow any credit to their teachers for having made them what they are, but even go to the extent of saying that they are what they are in spite of the teachers, I believe the majority of those who sat at our feet in their school-days and are now occupying good positions in life have got a warm corner in their hearts for their old teachers. And so far as present students are concerned, even the refractory elements in a class entertain a feeling if not of love at least of that which is akin to love, *viz.*, pity towards their teachers. The good and enthusiastic teacher with original ideas, of course, feels his work as a teacher, a joy and a boredom.

3. Before proceeding to refer to the questions with which we are immediately concerned, I wish to say a few words to you, fellow-teachers, about our responsibilities, as I think there is a tendency in us to lose sight of them in our clamour for our rights and privileges. My remarks may not be to the taste of some of my audience, but I cannot refrain from giving expression to some thoughts of mine on this matter, even at the risk of offending some of those gentlemen whom I would like to have on my side. Apart from annual Conferences of this kind and meetings which are sometimes held at more

frequent intervals, it is my considered opinion that Teachers' Guilds ought to do something substantial to improve methods of teaching. न हि सर्वः सर्वं जानाति. “Everybody cannot know everything.” Each of us may have something to learn from our fellow-teachers and may have something to impart to them. I cannot see why sectional branches of the Guild should not be organised for each of the important subjects in the school curriculum, each section to arrange for periodical discussions of the best methods of teaching its own particular subject and for model lessons. Though there may be practical working difficulties in the materialisation of this scheme, I believe the difficulties are not insuperable. I offered to do what I could to help in the formation of such sections in other districts, but I regret to say that my appeal to the teachers there was in vain. I am glad to find in the announcement in to-morrow's programme a Model Lesson in English and I have promised myself a most interesting half-hour in that connection. I do not mean to imply that discussions about hours of school-work, school dress of students, and such practical matters are useless, but at the same time I would draw the attention of teachers to the desirability of having meetings to consider matters of the kind I have suggested. Now coming to the individual teacher of the school, I wish to touch on one point which has come within my experience. An assistant-master is too often apt to think that his work at school is satisfactorily performed if he goes regularly and punctually to his classes and does his teaching work according to the school time-table. He is supremely indifferent to the fact that there are extra-scholastic activities connected with the school in which he is expected to assist the Headmaster or be

his deputy. In my opinion, the teacher's life at school is enjoyable only if he takes a willing part in all the activities of the students. Of course, there are honourable exceptions but for whose hearty co-operation the head of the institution will be greatly handicapped in his efforts to make the boys' stay at school as interesting and instructive as possible. But I am afraid the majority of assistant-masters in a school unless they are assigned a specific piece of work by the headmaster, do not voluntarily come forward to assist him, not to speak of themselves organising meetings or entertainments for the students or the staff. I would earnestly request assistant-teachers to take more interest than they now seem to evince in extra-scholastic activities. When a meeting of the Literary Association is announced, it is very often a common sight to find the President on the dais with an audience composed of the Secretary of the Association, and the lecturer only. Teachers will do well to move freely with the students and make the latter feel that, when they are in difficulties, they can always go to their teachers for advice and help, with the full confidence that the teachers will readily and willingly give them what they want. As I am afraid I am likely to be misconstrued as having turned my address into a homily for the edification of the teachers, some of whom perhaps can lay claim to more teaching experience than myself, I beg leave to stop here and go on to the main business to transact which we are all assembled here to-day.

4. Though, as I remarked in the opening paragraph, some of you may think that I have had nothing or next to nothing to do with Secondary Education and as such I am not competent to contribute anything useful towards the discussion of the problems with

which we are going to deal, I still venture to make a few observations on the various topics in the hope that, though you may be unwilling to admit me into your ranks, you will at least pay some consideration to them as coming from one, who is not entirely an outsider, but on the border land between Secondary and University education. You may be at least curious, if not anxious, to know what a collegian's impressions are about High School work, and about the capabilities of the students who enter the portals of an Arts College after about ten years of study in the school classes. Once again I apprehend a fierce onslaught on myself from some of you if I do not confine my remarks to the subject in which I am supposed to have specialised, on the principle *ne sutor ultra crepidam*. But my only excuse for encroaching beyond my legitimate domain is that, ever since I took up the profession of a teacher, I have not been confining myself to my special subject, but have been taking an equal interest in other subjects of study as English, History, etc. Some of you may perhaps be surprised to be told that I have taught English for some years to both High School and College students. (I hear whispers from the audience: "Pity upon those unfortunate students"; but I do not intend to be intimidated by such commentaries). I find, and I am supported by the unanimous verdict of English lecturers, that the majority of students who come up for a College course cannot write two sentences together in correct English. There may be different opinions about the reason for this; the fault may lie with the teachers, with the text-books prescribed or with the examination system; but there is no disputing the fact. This is deplorable in view of the extraordinary

amount of time spent for teaching English in the school classes. I believe, but I speak subject to correction, that the present craze for vernacularisation has not a little to do with this state of affairs. If a thing is worth doing at all, it is worth doing well. If you think our boys should learn the English language, let them learn it well. Half measures are worse than useless. They are positively harmful. It is a well authenticated fact that the South Indian surpasses all others in India in his capacity to pick up a foreign language, and pre-eminently the English language. A retired Madras Civilian, while referring to a play written in English by a Madras gentleman, first says: "Considering the medium is a foreign language, it is a respectable production," but, in the same breath corrects himself by remarking within parentheses: "If English can be called a foreign language for the educated South Indian." Such being the case, I do not see why greater attention should not be paid to the teaching of English. Let me not be construed as supporting the claims of English as against the mother-tongue; I have not the slightest objection to the teacher devoting an equal amount of time and trouble to improve the pupils' knowledge of the mother-tongue. But I must protest against the present tendency on the part of some nationalist teachers to regard the teaching of the English language as only of secondary importance. There is no use of importing sentiment into the matter. I should just like to put one question to these teachers, namely, 'Do you or do you not feel that you would have missed a good deal which you could not afford to miss if you had not learned the English language, and not studied English literature?'

5. I am afraid, gentlemen, that I have already taken up much of your valuable time; on this account, and also because you are going to discuss them thoroughly at your meeting to-morrow, I propose to make only brief references to the various topics with which we have to deal now. The S. S. L. C. curriculum is in the melting pot, and what ingredients have to be taken out and what have to be put in in their place are questions which cannot be settled easily. All of you here are more directly concerned with this matter than myself, and so I shall leave you to form your own conclusions. But everybody seems to think that the proposed syllabus is very ambitious, especially in such subjects as Elementary Science and Geography, and if so, it is incumbent upon every one of us to take steps, before it is too late, to keep the syllabus within reasonable bounds. As regards the recent by-law passed by the University, notwithstanding a good deal of opposition, that no candidate who has gained less than 40% of the maximum in English will be admitted to a University course, from my remarks above about the proficiency in English of students coming to a college, you might have inferred that I wholeheartedly support the action of the University in this matter. It was urged by those who were against the by-law that Principals of Colleges were not bound to admit everybody whose name was in the eligible list, and could use their discretion in the matter of admissions. Speaking for Government Colleges, I must say that the exercise of the Principals' discretion is greatly restricted by two factors—the Selection Committees and the complaints from parents. Under these circumstances, Principals' hands are practically bound, and ultimately every student who has been declared eligible by the

University gets himself admitted into a college by hook or by crook. And the result is that college lecturers have to get on with boys, seventy-five per cent. of whom are entirely unfit for a college course.

It is matter of common knowledge that the physique of our school-going population is not all that could be desired, and it is gratifying to find the Government bestirring themselves in the matter. As things at present stand, in my opinion, the day's school work is too long and too heavy for the boys to be able to take part with anything like enthusiasm in athletic activities in the evenings. The number of hours of school work should be curtailed and there ought to be some interval between the close of the school work and the beginning of the athletic games. I dare say this Conference will consider this question with special reference to the Beasley report and form its own conclusions. One more point about the health of the students I should like to refer to. I have to complain about the almost criminal indifference of parents to the medical inspection cards sent to them. Very often it is found that parents do not take any steps to remedy the defects pointed out by the Medical Inspector, so that the medical inspection so elaborately carried out in schools and colleges becomes a waste of time and energy. It is hoped that the parents who are the most interested in the matter will become more alive to the importance of the medical inspection.

I now pass on to the most important question, in my opinion, namely, that of stability and security of tenure of teachers as well as their pay and prospects. On both these heads it must be said that Government servants enjoy advantages which are denied

to teachers in private institutions: under 'private,' I include quasi-public schools like Municipal and Board schools. A teacher who enters Government service on a salary, say, of Rs. 60, can hope to rise to at least Rs. 300 before he retires, and he has the satisfaction of knowing all the time he is serving that he will never be asked to go unless he is guilty of grave delinquency of conduct. On the other hand, a teacher who enters private service, even if he starts on the same salary as the Government teacher, he does not know first, whether he will be allowed to stick on to the same employer, and secondly, even if he so sticks on, whether he can hope for a reasonable rise in his salary commensurate with the length of his service. It amuses one to find Presidents of District Boards and Chairmen of Municipalities who are M.L.C.'s interpellating Government about the pay and prospects of teachers, and advising Government to improve them, while in their own Districts or Municipalities, they are slow to earmark funds for educational purposes. Their defence perhaps will be that the funds at the disposal of Local Bodies are limited as compared with the unbounded financial resources of Government, but so far as a person like myself, who has never sat on a Municipal or District Board, can guess, it seems to be more lack of will rather than lack of resources that is responsible for this state of things. In my opinion, local bodies, if they find that they cannot cope with the demands made on their purses by the different departments of activity under their control, will do well to starve, if necessary, any other department rather than the Educational. In committee and individual-managed schools, a somewhat similar state of affairs subsists though there are some

excellent institutions of this type in which the teachers are much better off from every point of view than their *compeers in schools* managed by local bodies.

As regards the vexed question of the relations between managers and teachers, it is to be regretted that there seems to be now an unnecessary and unjustifiable amount of interference on the part of managers in matters like promotions of the students, timetable, etc., which ought to be left entirely to the Headmaster and his staff. On the other hand, one sometimes hears of teachers who bow down to the managers in season and out of season, and surrender their own individualities to the will of the managers, caring only for their pay and goodwill of their masters. I have come across cases where a teacher in a school went and carried tales about his colleagues on the staff to some of the members of the managing body and set both teachers and managers by the ears. It is to be hoped that such managers and teachers will become rarities in the future if not wholly extinct. Before concluding, let me once more thank you all for having asked me to preside on this occasion, and also thank you for the patient hearing you have given me. To go back to the theme with which I started, we all require to be more self-confident and self-assertive. We have got our own self-respect to preserve unsullied. Kalidasa, the great Indian poet, says in his 'Malavikagnimitra':—

लघ्वास्यदोऽस्मीति विवादभीरोः

तितिक्षमाणस्य परेण निन्दाम् ।

यस्यागमः केवल जीविकायै

तं शानपणं वणिजं वदन्ति ॥

'A teacher who is glad that he has got a job, and for fear of losing it does not want to take part in any controversy, and pockets

every insult offered to him lying down, and whose learning is of no other use to him than to give him his bread, is no teacher in the highest sense of the term, but a merchant who deals in items of knowledge.' So let us join hands, and by our actions, try to remove the stigma which is now attached to the name of schoolmaster, and show to the world that we, no less than members of other professions, have a stake in the land, and that we, as belonging to the most responsible profession, will contribute our own share, however humble, to the solution not only of the educational problems which now confront us and with which we are immediately concerned, but of those world problems of peace and universal goodwill which are now taxing the intelligence of all the civilized nations, both, Eastern and Western.

स्वस्ति प्रजाभ्यः परिपात्यन्तां

न्यायेन मांषेण महीं महीशाः ।

अध्यापकेभ्यः शुभमस्तु नित्यं

लोकाः समस्ताः सुखिनो भवन्तु ॥
॥ ओं ॥

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court-yards (மன்றம்)! Tie the *tuhil* creepers, etc., over terraces and gateways! Do everything proper in all the temples—from those of Śiva to those of the Bhūtas in the street-junctions (சந்திப்புத்தம்)! Teachers of *dharma*, preach it in bowers and in halls! Controversialists, engage yourselves in discourses in the halls of learning! Let none entertain anger or hate!"

The Indra festival was celebrated with great *acalat*. But there was one glaring defect in it. The great courtesans Mādavi (Kōvalan's mistress) and her daughter Maṇimēkalai did not make their usual appearance in public and contribute to the jubilee. The citizens noted the blank with sorrow and wondered why. A friend of Mādavi, Vayantamālai by name, was then sent to her by her mother* with this news and with the purpose of bringing her over to the arena. But Mādavi refused to go. She had taken refuge in the Buddhistic faith at the instance of the teacher Aravaṇi Aḍigaḷ. She had expressed to this teacher her poignant sorrow at the tragic death of her lover at Mādura and, consoled by his expoundations of the philosophy of the fourfold truth and the fivefold conduct, sought refuge in the Buddhistic convent. Nor was she contented with her own retirement. She was for infusing such a profound resignation in her beautiful daughter that she also would be desirous of becoming a nun.

Now, it happened that Maṇimēkalai was a listener to the sad tale of her father and her 'mother.' Her mind was then agitated by an un-endurable agony. Born in the family of professional courtesans, she however gave way to a grief and desolation unusual to her birth, her clan and her life. An un-fathomable void

seemed to open around her; and she who was the embodiment of beauty and the favourite of fortune, found life all at once a colourless blank, an un-ending misery. She sank down, and bathed the flower garland she was then making with her tears.

Now, the garland was intended for the monastery and it was made impure by the stain of Maṇimēkalai's tears. Her mother's gentle voice therefore spoke to her, asking her to go to the city garden and fetch new flowers. On hearing this, Sutamati, a companion of the lady, dwelt upon the alluring charms of Maṇimēkalai and the danger that would befall her in case she went alone. She said that she herself had been the victim of such a folly. The wife of a Brahman of Śānpai, she had gone to the city garden to fetch flowers, when a Vidyādhara snatched her away to desert her afterwards! A trip to the Ilavāṇlikai* grove would be indiscreet as it was frequented by the king's men. The Uyyāna (உய்யனா) was equally dangerous, as it was guarded by the Bhūtas. The parks of Sampāti and Kavēra (Kāveri's father) were infested by evil spirits. The only garden to which she could go was that where there was, in the crystal maṇḍapa, the *padma-piṭha* of the Buddha's feet. Unripe flowers placed on it would not only at once fully blossom, but be fresh and green even after the lapse of years! Bees would not touch them! The worshipper of any deity would be reasonably gratified by offering flowers to it; for the flowers placed on it would miraculously reach the desired destination! They would, on the contrary, stay there if sprinkled without any bias. The *piṭha* had been constructed by the divine architect Maya with the purpose of

* The profession of the courtesans was, it is obvious, hereditary. Notice the fact that all the women who figure in the poem bear Sanskrit names, e.g. Mādavi, Sumati, Vasantamālai, etc.

* The passage gives a clue to the importance of water gardens and orchards in ancient town-planning. The poet's description of these is unsurpassably charming.

showing the necessity and potency of heartiness in offerings. Sutamati concluded that it was to that grove only that Maṇimēkalai* should go, and she herself accompanied her to it.

The news of Maṇimēkalai's entry into the *Uṇṇavaṇa* reached the ears of Udayakumāra, the king's son. He had been returning in his chariot after subduing a mad elephant, when he learnt about it in the street of the courtesans. He now resolved to go to the garden and make Maṇimēkalai adorn his car. Long had he been desirous of winning over that miracle of beauty and grace. His longing for her had been infinite, ineffable; and naturally so as she was unrivalled in the loveliness of the body as well as the soul. He had heard of her queer religiosity, of the strange contrast between her and her environment or association, and openly expressed his desire to bring her back to her natural world, the world which looked upon life as a round of gaiety. He was therefore soon within the gates of the park. The very sound of his car had made Maṇimēkalai aware of his arrival, and she hid herself within the crystal bower. Udayakumāra saw Sutamati alone; but almost immediately saw his beloved's form reflected in the crystal wall, but could not go inside! He then learnt the story of Suta-

* The description of the crystal bower is inimitable in beauty. It was the only safe place because it was too sacred to be profaned by ordinary men. The graphic description of the street scenes during Maṇimēkalai's journey to the grove is a master-piece and quoted in a later chapter.

† The poet's reference to the amusement of a noble visitor to the street of the actresses, and his incapacity to play on the *yāl* on account of the emotion caused by the deportment of Maṇimēkalai, is characteristically informing.

‡ There can be no doubt that the idea regarding Maya's crystal bower and Udayakumāra's

mati's life,* and thought it wise for the time to return to his palace.

Meanwhile, Maṇimēkalai herself had not been unaffected by the prince's love. She realised with wonder that, in spite of her disgust with the world and of her religious pursuits, she felt attracted to the prince. She did not feel his overtures abhorrent as she ought to have felt. While distracted by this doubt, the Goddess Maṇimēkalai, who was desirous of saving Maṇimēkalai from the risk of inconstancy to her vow, came there in the guise of a juggler woman and, after worshipping the *Buddhapīṭha* and narrating the story of the *Chakravāḷakkōṭṭam*, the Buddhistic symbol of the world, near the burning-ground of the city, in order to demonstrate the helplessness of the human-kind against death and birth, took advantage of the deep slumbers of Sutamati to carry away Maṇimēkalai, by way of the sky, to the island of Maṇipallavam, 30 *yōjanas* off. After carrying her thither, the Goddess returned once again to Kāvēripumpattanaṁ, woke up Sutamati and told her: "I, Goddess Maṇimēkalai, came here to see the Indra festival and have now taken Maṇimēkalai (who was named after me, the tutelary deity of her family) to Maṇipallavam as she is just fit to embrace the cult of the Buddha. She will learn there the knowledge of her previous births and return in seven days, under miraculous circumstances. Tell this to Mādavi who has been already informed of this in a way at the time when Maṇimēkalai was named after myself." Sutamati who took refuge in the *Chakravāḷak-*

difficulty therein was taken from the *Mahābhārata* (the *Sabhāparva*).

* This story illustrates the bias of poet Śāttan against the Jains. It is one of the glaring instances which show how different the mental outlook of Śāttan was, when compared with that of Ilankō-aḍigaḷ. It is referred to in the next chapter.

kōṭṭam for the night, was also assured by a deity presiding over one of the figures there that Maṇimēkalai would return in seven days. At the faint flush of the dawn-light, she went to Mālavī and told her of the miracle; and both were plunged in grief at Maṇimēkalai's separation, though they had no other alternative but to resign themselves to the situation.

When Maṇimēkalai woke up—for she had been carried away at night—she was distracted by perplexity and grief at her strange environment. But presently she saw the Buddha-piṭha of the place and was instantly and unconsciously transported to the realm of joy and knowledge. The mere going round the sacred feet thrice was followed by the rising up of all matters connected with previous births in her memory. Long ago, there had ruled over the great kingdom of Gāndhāra,* which had Idavayam for its capital, a king named Attipati (Hastipati). The Buddha was then born as his brother-in-law Brahma-dharma. While teaching him *dharma*, the latter said that in seven days' time there would be an earthquake as a result of which that Nāḍa, together with 400 *yōjanas* of Nāganāḍa, would disappear in the sea. The king and his people accordingly left that country for Avanti in the north, and encamped on the banks of the Kāyaṅkarai on the way. All were edified by the expoundations of Brahmadharmā whose prophecy was fulfilled to the very letter. At that time Attipati's son Rāhula† and his daughter-in-law Lakshmi (she was the daughter of King Ravi-

* The geographical terms used by the poet in this passage seem to be, as elsewhere, capable of being mistaken for historic facts. The reference to the submergence of the land beyond Nāganāḍa is however interesting and can be compared to similar references.

† Note the names used by the poet. He is simply saturated with Buddhistic legendary lore.

varma of Yaśō-laranagara) were among the listeners. The teacher then prophesied that Rāhula would die of a Dr-līṭiṣha's bite in 16 days; that Lakshmi would ascend the funeral pyre; that the latter would then be born at Kāveripūmpattṇam and that she would be taken to Goddess Maṇimēkalai to Maṇipallavam and converted, after the worship of the Buddha's feet, to the true *dharma*. Maṇimēkalai learnt that she was the Lakshmi of the story, and that Udayakumāra was none else than Rāhula. She now understood why she had felt a weakness in his presence. Maṇimēkalai also learnt from her divine namesake that her mother and her friend Sutamati had been her elder sisters in her previous birth. These ladies had been given in marriage to King Duchchaya of Kacchayanagara in Aṅganāḍa. Once on the banks of the Ganges they had listened to the teacher Aravaṇa Aḍigaḷ* and at his instance worshipped the Buddha's feet, the impression of which had been left by the Buddha himself. It was then that they were born as Mālavī and Sutamati.

Maṇimēkalai was not only enlightened with the capacity to read the past, but endowed with the capacity to metamorphose herself, with the aid of which, into any form she chose, to fly along the sky and to feel no hunger. The deity Maṇimēkalai gave these powers in order to facilitate her becoming a full-blown Buddhist nun.

One other acquisition Maṇimēkalai had at Maṇipallavam. She learnt from Dīvatilakai, the Indra-appointed guardian of the Buddha's feet, that, every Vāśākha-Sūdhā-paurṇami (the Buddha's birth-day), there would arise an *Akshaya-pātra*† named Amṛtasurabhi from within the holy

* Aravaṇa Aḍigaḷ is Dharmapāla. The name has given rise to some interesting speculation in chronology. See next article.

† One is reminded of the *Akshaya-pātra* episode in the *Aravaṇa* of the *Mahābhārata*. The poet might have been aware of it.

tank of Gōmukhi in the vicinity of the shrine. Proceeding thither, Maṇimēkalai had the fortune (as the reward for feeding a Cbāraṇa on the eve of her husband's death in her previous life as Lakshmi) to see the vessel deposit itself in her hands. She could now feed as many as she liked!

With her highly precious possession, Maṇimēkalai returned by air to Kāveripūmpattṇam and joined her people. Her divine mentors at Maṇipallavam had advised her to seek the great teacher Aravaṇa Aḍigaḷ and learn various things and truths from him. She accordingly resorted to him. She learnt from him that Mālavī and Sutamati were the Tārai and Vīrai of previous births and that they owed their Buddhistic fervour to their worship of the Buddha's feet then.* Aravaṇa Aḍigaḷ added: "In the present day, the Buddha-dharma has dwindled and sin increased. I am teaching the dharma so that it may not die altogether. This is known to the gods at *Chakravālakkōṭṭam*. At their request in year † 1616 the Lord will leave the *Tushita-lōka* and be born in this world. That day will bring all sorts of happiness to the world. As for yourself, I shall expound the dharma to you after you render some service to the world. Feed the poor with the *Amṛtasurabhi* you have now got."

The history of the *Amṛtasurabhi* was dilated upon by the teacher. Once at Vāraṇasī there was a Brahman teacher of the Vēdas, Apaṇchika by name. His wife Sān, though *ex oriente*, started on a pilgrimage to Kanyā Kumari, in order to wipe off the sin of irregular behaviour! On the way, she abandoned her new-born child! A cow took pity upon it and suckled it for seven days. The child was eventually taken up and brought

* The poem gives the legend in detail.

† The significance of the passage is pointed out in detail in the next chapter.

up by another Brahman named Pūdi, a native of Vayanaṅgōḍu. Years after, the boy rescued a cow which was about to become the victim of a sacrifice. A fierce controversy arose between the sacrificers and the boy, and the latter poopooed his adversaries.* He was chastised with excommunication. Reaching South Madura, Aputra (for that was his name) made his sojourn in the *ambalam* of the temple of Chintādēvi.† Bowl in hand he begged food, fed all those who were hungry and ate the remnant. Once a number of hungry people came to him at night for food. The generous soul felt heavily its incapacity to satisfy them. Goddess Chintādēvi thereupon placed an *Akshaya-pātra* in his hands. From that time onward, Aputra became the beloved reliever of men, birds, beasts, so that there was no such thing as hunger at all in the place! Highly gratified, Indra‡ came to him in the guise of a Brahman and offered him any boon he chose! Aputra however regarded the possession of the feeding vessel, the pleasure it afforded him, as higher than any boon he might get, and expressed himself to that effect. In anger, Indra showered rain and plenty so that there was no need for the use of the vessel! Wherever he went, Aputra could now get none to avail himself of his charity. Everybody was rich and laughed at him! Learning that Sāvaka-nāḍu (Java) was suffering from famine and many were dying of starvation,

* Sāttan here shows his prejudice against the Brahmanical system of sacrifices. His contrast between the orthodox Brahmins and Aputra is striking and shows the sectarianism which characterises him. Aputra indulges in some good retorts, e.g., were not Tīlōttama's sons sages?

† The significance of the reference to this deity is pointed out in the next chapter.

‡ Indra is said to have understood things from the way in which his white robes shook!

Āputra took ship for that island. The vessel stopped for a day at Maṇipallavam. Left there by mistake by his fellow-travellers, Āputra felt keenly the uselessness of the vessel and preferred to die of hunger. Before doing this, he worshipped it and deposited it in the Gōmukhi, requesting it to appear once a year and eventually go into the hands of one whose mind was broad enough to cover all the world of poverty and need for relief! Āputra was then born to a cow (it was none else than the cow he had originally rescued) of sage Dhavaḷagiri in Śāvakam, on *Vaiśākha-sūddha-purnamī* as the Buddha had done. Many miracles happened then. Āputra was eventually adopted by Bhūnichandra, the local king; and the country was ideally happy to possess a prince who was the incarnation of charity.

Such was the history of the sacred bowl which was in Maṇimēkalai's possession. She now had occasion to use it; for the Chōḷa country was, in spite of the fulness of the Kāveri, in need! Assuming the garb of the Bhīksuṇī, Maṇimēkalai passed on, amidst a wonder-struck populace,* into the streets for carrying out her noble mission. She first received *bhīksā* from Ādirai, an ideally chaste lady,† so that the begging bowl would be never exhausted—for it was the hand of a chaste lady alone that had that power. Maṇimēkalai's first act was to remove the disease of eternal hunger from which Kāyachandikāi, the wife of a Vidyādhara, suffered in consequence of a curse from sage Vṛschika. She had spoiled the fruit intended for him—a fruit which appeared only once in 12 years and which was his sole food during that period. Hence her life as a

deformed, disease-struck, ever hungry wretch. Giving her relief, Maṇimēkalai entered the *Nakamagiri*, the ever-open public resort at *Chakravāḷikkōṭṭam*, inviting all to be fed by her.

Hearing that Maṇimēkalai had embraced the life of the Bhikkuni and entered the *ambalam* on charitable mission, Chitrāpati, her grand-mother, summoned all the women of her profession, spoke to them about the ridiculous behaviour of her grand-daughter, and after pointing out that it was not the duty of her caste to commit Sati or do anything likewise, that they were exactly in the position of a *yit* which never followed its deceased owner, vowed to see that Maṇimēkalai gave up her begging bowl and monastic robes and ascend the car of Udayakumāra. Proceeding to the palace, she told the prince that his sweetheart was just then in the *ambalam* feeding the poor, and that it was a good opportunity for him to win her over. Udayakumāra proceeded there eagerly, and on seeing Maṇimēkalai, asked her why she had assumed that strange garb and life. Maṇimēkalai, after paying the obeisance due to her husband in a previous life, explained that birth, growth, disease and death were all miseries and that resignation was the only method of salvation. Going then into the temple of Sampāti (which was there), she transformed herself into the figure of Kāyachandikāi by the potency of the *mantra* which had been taught to her by her tutelary deity and namesake, and went on with her philanthropic work. Udayakumāra who did not know this metamorphosis and who thought that Maṇimēkalai was still within the temple after sending Kāyachandikāi to perform her task, proceeded to the temple and prayed eagerly to Sampāti, vowing to lie down there for days unless he was favoured with the sight of Maṇimēkalai once again. To his great surprise the prince then heard one of the paintings there speak to the effect that his efforts were bound to be futile and that he should forget her. Perplexed at the

disappearance of Maṇimēkalai and the voice of the painting, Udayakumāra resigned himself to his ill-luck and returned to his palace.

Maṇimēkalai continued to be in the form of Kāyachandikāi so that she could avoid the prince's importunities. Proceeding everywhere, she devoted herself to the feeding of the poor. Once she entered the city prison and fed the unfortunate, starving criminals there. The warders who saw the marvel of a deformed, disease-struck woman feeding numerous people from a single vessel, carried the news to the king. The latter then had the strange lady brought to his presence and, on learning from her that she was a Vidyādhara in human form and that her begging bowl had been ceded by a deity of the city to feed the starving, however innumerable they might be, the king showed his admiration and gratitude by listening to her advice and converting the prison-house into a house of dharma, a place where all sorts of good actions were designed and executed!

Meanwhile Udayakumāra proceeded to the '*Udhavaḡari*' in the hope of meeting Maṇimēkalai on her coming out of her supposed hiding place. To that very place there came Kāñchana, the Vidyādhara, in search of his wife Kāyachandikāi, as the period of twelve years' curse had expired. Both of them now, as fate would have it, entered into cross purposes. Kāñchana mistook Maṇimēkalai (who, we know, had assumed the form of Kāyachandikāi in order to mislead Udayakumāra) for his wife and tried in vain to make her rejoin him. Innocently indifferent to his overtures, Maṇimēkalai paid attention to Udayakumāra and expounded to him, after pointing to a ripe, decrepit, diseased old woman, the evanescent and unreal character of youth and pleasure, the necessity on his part to give up his mad hunger for a physical allurements. The Vidyādhara came to believe that his wife was turned

faithless; and therefore deliberately hid himself in the temple with a view to take a sanguinary revenge on his supposed rival. Udayakumāra, on his part, happened to see the surreptitious behaviour of a stranger; and coming to suspect that it was Maṇimēkalai, after all, that was in the guise of Kāyachandikāi and that her mysterious ways suggested a secret intimacy with the stranger, returned to his palace with the resolution of going to the temple once again at night and probe into the matter. Thus it was that, when that night, Udayakumāra proceeded to the temple, the bitter and savage Vidyādhara who had been waiting for him leered down with ferocious mockery at him and, falling upon him unawares, stabbed him to death. The fanatical lover was then about to take the supposed Kāyachandikāi by force on his aerial car, when he was thunder-struck by a message from the *Kandīḡpāvai** (*கந்திழ் பாண்டை*) of the locality. She spoke to the effect that the real Kāyachandikāi had been, after the cure from the disease of eternal hunger, unwise enough to fly over the Durga-presided Vindhya and that, as it was the custom of Vindhya-gaṭika, Durga's servant, to chastise such disrespectful persons by catching them through their shadow and then absorb them in her personality, the unconscious intruder had lost her existence. The deity added that the pseudo-Kāyachandikāi was in reality Maṇimēkalai. It concluded with the statement that, though Udayakumāra was only the victim of fate and *karma*, still the Vidyādhara had been rash and precipitate in killing him and would be chastised for his guilt by being eternally pursued by the evil results of his evil deed! Kāñchana slunk away to his heavenly city much wiser, but extremely unhappy.

Meanwhile, Maṇimēkalai had seen the tragic end of the prince with a heart which leapt into

* Like Sampāti she figures prominently in the poem.

* The poet here compares Maṇimēkalai to Yaṅgandharāyaṇa of the *Vasavadatta* romance. See next article.

† The story is given in the article on Tamil Customs.

her mouth. Shocked and staggered, she could neither move her lips nor her eyes for a time. With tender pity she mourned the horrible death of her lover. "In our previous lives as devoted husband and wife," she said mournfully, "you died of a *Drshṭivisha*'s bite! Unable to endure life without you, I followed you through fire! My heart went over to you at our rendezvous in the park. But at that stage, my tutelary deity *Maṇimēkalai* appeared before me, explained the details of my past birth as well as yours, and carried me away to the true life. But alas! that I, so fond of you and desirous of bringing you to true life, should have been the instrument of your tragic death!" Overcome by her poignant grief, she approached the mangled remains of her lover. But at this stage the local deity, the *Kandī-pāvai*, restrained her. She said in an unmistakable voice that *Maṇimēkalai* should not be untrue to her vow because of the marital bond in a previous birth. The connection had not been confined to the past life alone. It had existed throughout a chain of lives and deaths! It had been a drag on emancipation from birth and death! Why blindly mourn for her lover now, when her mind was for the first time far advanced in the road of wisdom and freedom? *Udayakumāra* could not have avoided his tragic end. "In a previous birth, you and your deceased lover lived on the banks of the *Kāyankarai* as the disciples of a teacher *Brahma-dharma-muni*. Desirous of feeding the Buddha, you ordered your cook to prepare things early. But he was tardy; and *Rāhula* in anger killed him on the spot. It was this that brought about his death from serpent-bite in that life and from the *Vidyā-dhara*'s sword in this! None can escape the relentless fruits of *karma*! Therefore, don't grieve! Further, listen! You will have strange experiences in the days to come. You will be put in prison by the king, rescued by the intercession

of *Aravaṇa Adigaḷ* with the queen *Kāsama-dēvi*, and then go to *Śāvakam* (Java). With *Aputra*, its king, you will visit *Maṇipallavam*. The sight of the Buddha's feet in this place and the wisdom of *Dīvatalakai*, the guardian spirit, will make *Aputra* acquainted with the events of his past lives, and he will then return home. In the guise of a recluse you will then go to *Vaṇji* (*Karūr*), and become acquainted there with the doctrines, of different religious and philosophic schools. Knowing that *Kāṭchi* was suffering from drought and famine and that you were badly needed there by *Aravaṇa Adigaḷ* and others, you will go there and save all lives from death by starvation. Many miraculous happenings will lend eventful glory to your presence there! You will then discuss with *Aravaṇa Adigaḷ* the tenets of the different sects which you learnt at *Vaṇji* and listen to his glorious expoundings of *Dharma* and his resolve to be born and die, whatever might be the number of such transmutations, in that very city as an expounder of *Dharma* till the advent of the Buddha (சத்த குருகுலத்தோடு). You, for your part, will spend your days till death at that city, doing all *dharma*s and charities in accordance with his teachings. You will be rewarded with a number of births as a *man* and as an expounder of *Dharma* in the holy land of *Uttara Magada* itself, the accumulations of the reward of which will eventually elevate you to the rank of the first disciple of the Buddha and enable you thereby to obtain *Nirvāṇa*, freedom from desire and bondage." * The deity concluded with the narration of the reason why the deity *Maṇimēkalai* took *Maṇimēkalai* from the city garden to *Maṇipallavam* and the temple of the Buddha's

* The Buddhistic church regarded woman as a drag in the realisation of *Nirvāṇa*. Unless we remember that later *Mahāyāna*ism regarded the *Bōdhisattvas* as half-way Buddhas, we would see a hopeless confusion in *Śāntan*'s statements regarding the advent of the Buddha.

feet. An ancestor of the lady, distinguished for purity and charity, had been rescued from a sea-grave by Her grace; and ever since she had constituted herself the guardian of the family and its virtues! Further, *Maṇimēkalai* herself had in a former birth fed the Buddha, and she had to be fitly rewarded.

These words of wisdom, knowledge and prophecy consoled *Maṇimēkalai* and helped her to shake off the weakness which had momentarily seized her. She saw that she had seriously run the danger of becoming a despicable distortion of herself, of sinking into that very illusory worldliness which she had renounced. She rubbed off, with a new courage and a new resolution, the tears which, in spite of herself, had soddened her face, and became once again the holy vision before whom people bowed, the sure guide to the peace of the hereafter. She was now free from that miasma of doubt and earthly longing which had for a trice blurred and darkened her judgment, and awaited with calm determination the immediate vicissitudes which had been divinely revealed to her.

At the break of the next day, the worshippers of *Kandī-pāvai* and *Sampāti* saw with horror the mangled body of the prince and communicated the fact to the sages who were in charge of the *Ohakravālikkōṭṭam*. They learnt everything from *Maṇimēkalai*, who was now in her own form there, and carried the news to the king. With commendable delicacy they prepared the king's mind for the unhappy tragedy by narrating stories of previous royal delinquents chastised with the extreme, but just, type of corporal punishment by their very parents. "King, in days of yore, when *Paraśurāma* * was, in accordance with his crusade against born kings, about to attack *Kānta*, the

* It is clear that poet *Śāntan* was aware of the legend concerning him; but it is not clear that he regards him as an *avatār*.

ruler of this city, the latter, who learnt from *Durgā* that the time was not auspicious for him, placed the city under the rule of *Kakanda* (ககண்ட), a good soldier (who was on account of his birth immune from *Paraśurāma*'s campaign) and went away in disguise on a pilgrimage to *Agastya*'s abode. When *Kakanda* was ruling the city—which thereby acquired the name *Kākantī*—the youngest of his sons became enamoured of a Brahman lady who was returning from a bath in the *Kāvēri*, and made overtures to her. Now, the woman, surprised at her own lack of resentment and power to be above men's sordid thoughts, entered the temple of the *Bhūta* at *Pūlaśidukkam* and prayed to be enlightened as to why she was so un-Brahmanical in power. She learnt that her failure to burn evil-thinking minds (which, like causing rain, pure women could do) was due to her own moral fall—to her proneness to listen to false stories and to sallies of wit, and to her desire to visit temples and festivals for the sake of the round of music, dance and festivities they afforded. The deity concluded with the statement that, if the king did not chastise the criminal in seven days, then it would itself do the task. *Kakanda* did do justice by tearing his parental affection out of his life with ruthless hands and himself putting his erring son to the sword. On another occasion *Kakanda*'s eldest son entertained a similar passion to *Viśākai*, a beautiful *Vaṇika* girl, who had wedded herself to a life-long spinsterhood, and was about to take off his garland in order to put it on her shoulders; but the power of her chastity was strong enough to paralyse and disable his arms. They seemed to have become two heavy logs of wood! This erring prince too was chastised with death by his father."

The shrewd *Chōḷa* asked for the reason for the narration of these stories and then learnt the details of *Udayakumāra*'s love pursuits and his tragic death. The king loved his son but loved

justice more. It was the lodestar of his line and himself, and in pursuing it, he was for turning neither to the right nor to the left. He therefore rejoiced behind his gnawing heart-ache. At the same time he ordered the arrest of Maṇimēkalai.

The arrest of Maṇimēkalai did not satisfy Rāja-Mahādēvi* the queen. The feeling of sorrow at the death of her son rankled in her heart and kindled the passion for revenge. She resolved to torture Maṇimēkalai under a veil of kindness. Pretending to feel no grief at the deserved fate of her son, she talked to her lord about the purely spiritualistic pursuits of Maṇimēkalai and had her set free. She then devised a series of diabolical means to harm her. She administered poison to her with a view to make her brain deranged; but Maṇimēkalai, being an expert even in the knowledge of other births, hardly ran the danger of becoming insane. The queen bribed a raka to scandalise Maṇimēkalai's character and intrude into her residence, but the saintly victim disappointed the conspirators by metamorphosing herself for the moment into a man! The queen thereupon confined her in a solitary air-less cell on the ground of her suffering from a peculiar disease which killed all appetite; but Maṇimēkalai kept death from starvation off by her mantric skill.

When the queen saw that all her efforts were futile, her heart was suddenly torn with remorse; and she felt a repentance which, she believed, did not suffice to atone for her recent conduct. Acknowledging to Maṇimēkalai that she was a criminal of the deepest dye and had palmed off, in the intensity of maternal love and despair, an ignoble and cruel duplicity upon her, she went prostrate on her knees to her. Maṇimēkalai was

not taken aback. She had known everything. She had subjected herself willingly to the queen's machinations simply to teach her the *dharma* and rescue her from her blindness, her passion and her bondage; otherwise, she would have flown away or assumed a different form and been beyond the reach of her designs and instruments. Maṇimēkalai then narrated to the queen the details of their past lives, won her over to the *dharma* by her teachings, and showed her respect for age and position by also falling down prostrate in reverence to her.

At this stage, Chitrāpati came to the queen and told her of the necessity to respect and revere Maṇimēkalai for her own sake. She narrated how, formerly, the Goddess Maṇimēkalai has foretold the submergence of the city of Kāveripūmpaṭṭaṇam under the sea for the failure to perform the Indra festival and how the ill-treatment to her favourite and namesake might precipitate the catastrophe. Aravaṇa Aḍigaḷ too came to the queen, sermonised to her on the nature of birth and death and the 12 *Nidānas*, and persuaded her to part with Maṇimēkalai.

Free again, Maṇimēkalai passed through all the adventures already foretold by Kandī-pāvai. Before sunset she flew away to Nāga-pura, the land of Puṇyārāja, son of Bhūmi-chandra and descendant of Indra himself, after whose birth his kingdom knew no drought, disease or barrenness. The king and queen were then in a suburban garden listening to the teachings of the sage Dharmasavaka*. Maṇimēkalai was introduced to them. She told the king that the very miraculous vessel she had in her hands had once been his; that he had lost it on account of his infatuation with wealth; and that he could get real knowledge by proceeding to the holy Maṇipallavam and worshipping the Buddha's feet there. Asking him to come over there, she flew off,

* Literally, the sage of Śāvaka (Java).

before sunset, to that land and had the delicious pleasure of perambulating round the Buddha-piṭha (புத்தபிடிமை) and paying worship to it. Her face, already wondrous and grave with the wisdom of past lives, became much more so after the contemplation of the Lord of Dharma.

Some time later, Aputra who had become disgusted with worldly life and longed for a life of resignation and retirement, was persuaded by his mother Amarasundari and his minister Janamitra (who told him how his birth had auspiciously put an end to a twelve-year drought and its grim effects) to be contented, for his people's sake, with a month's pilgrimage to Maṇipallavam. Reaching the island, he was taken round it by Maṇimēkalai. He saw the Holy Feet of the Buddha and realised that he had hitherto lived in a mist of illusion in which the realities of life, past and present, had been completely blurred. A fresh light came into his mind and he saw the past, no longer a sealed book but clearly laid to its view. He saw then that the *Amṛtasurabhi*, the precious possession of Maṇimēkalai, had once been given to him by the Goddess Chintā-dēvi, whose praises he now uttered. He was then staying on the banks of the Gōmukhi, when Dīvatilakai, who came to know of his arrival, came thither and said: "O great soul! The reliever of numerous souls from hunger! In days of yore, you had been left here unawares by a few merchants. On their return to take you, they found you dead! Unable to endure their grief, they gave up their lives! Here are their bones! Here also are the bones of all those who had been fed by these merchants and who preferred to follow them beyond the grave! See your own body, the sheath of your former life, buried in the sands under this *puṇṇai* tree!" The king was naturally shocked and startled. He fell into a passion of grief and his faculties were in a state of confusion. But Maṇimēkalai consoled him, initiated him into all the doctrines of *dharma* and sent him off to his country and people.

Meanwhile, Maṇimēkalai understood from Dīvatilakai that the city of Kāveripūmpaṭṭaṇam had fallen a prey to the waves of the sea. The reason was this. Some time previously, the Chōḷa king had met a beautiful girl on the beach and entered into wedlock with her. She was in reality the daughter, Pīlivaḷai by name, of the king (Vaiyaṇaṇ) and queen (Vāsa-mayilai) of Nāganāḍu. Her star had designed this connection with the solar line; but it had also designed that she should part with the king! As days passed, she became the mother of a son. With her child she had come, sometime before the visit of Maṇimēkalai and Aputra, to Maṇipallavam in order to pray to the Buddha-piṭha. At that time, a Kambala Chettī* happened to visit the island in the course of his trading voyage. Pīlivaḷai handed her son over to him, revealed his parentage and asked him to restore it to the Chōḷa king. The merchant took charge of the prince. But alas! the ship was wrecked on its way to Kāveripūmpaṭṭaṇam. The few that escaped, carried the sad news to the king. Staggered and prostrated with this blow of inscrutable destiny, the king lost his sense of duty in the intensity of grief, and neglected the Indra festival, as he was busy searching for his son. Goddess Maṇimēkalai thereupon cursed the city to be swallowed by the sea! The king removed himself elsewhere. Aravaṇa Aḍigaḷ and others had gone away to Vañji.

When Maṇimēkalai came to know of this event, she resolved to go to Vañji. Flying thither, she visited the temple of Kaṇṇaki and, after worship, prayed to be enlightened as to why she, instead of following her husband on his death or leading the resigned life of the widow, gave herself up to the cruel work of destroying Madura. Kaṇṇaki replied to the effect that it was all the result of past *karma*. She however acknowledged that, though she and her husband

* The caste title is interesting.

* Later inscriptions use the expression: Kōpperundēvi (கோப்பெருந்தேவி) which seems to be the exact translation of Kāsamādevi (Kāja-mahā-dēvi).

were now Dēvas, the effects of her anger might make themselves felt at the end; and that, after a chain of Siddhic lives, they would, thanks to the building of the Indravihāra by the latter at Kāveripūmpattanam, get the opportunity to listen to the doctrines of the Fourfold truths and the twelve *Nidhānas* from the sun-like Buddha at the foot of the Bōdhi tree, and obtain Nirvāṇa. [It is clear from this that, according to Śāttan, Kāṇṇaki was yet to obtain Nirvāṇa. His idea of the Buddha's birth long after is an amazing anachronism which, it seems to me, was due to his propagandic desire to improve upon the pro-Hindu character of the story of the *Śilappadikāram*.]

Maṇimēkalai then entered Vañji, the seat of the Chēra government and a city of savants and sages. With the desire of acquainting herself with the tenets of all the different sects and creeds she approached, in the guise of a male scholar, their leading expounders. She heard the doctrines of the Pramāṇavādin,* (அளவவாதி), of the Vaidika school, the Śaivite, the Brahmite, the Vaiṣṇavite, the Vēda-worshipper, the Ājivaka, the Nigaṇḍa-vādin, the Sāṅkhya-vādin, the Vaiśeṣika and the Bhūta-vādin. Not satisfied with these, she sought the residence and expoundations of Aṟavaṇa Aḍigal. Traversing the streets occupied by the different communities, she reached the Buddhistic monastery where Māsāttuvāṇ, Kōvalan's father, was an inmate. The latter was exceedingly glad to see his son's daughter and, on learning from her all the events of her life, addressed her thus: "Formerly when this city was ruled by Imayavaramban Neḍuñchēralāḍan, he once came to this grove in company with his queen. Just at that time, some Chēraṇas who

were returning from a pilgrimage to the Śamanoli hill (Śyamanta) in Laṅkā, got down here. The king welcomed and fed them and was in turn edified by their expoundations of the evils of birth and death. The king had then in his retinue a merchant named Kōvalan who was the ninth ancestor of your own father. On listening to these teachings, he bestowed all his riches on the poor and, embracing the life of a recluse, built a *chaitya* for the Buddha. I came to see this *chaitya*. After coming here I learnt that Kāveripūmpattanam would be swept away by the sea. So I did not return thither. I have heard that your father, who is now a god on account of his good Karma, will after further experiences of an opposite character, eventually hear the Buddha and obtain Nirvāṇa. Aṟavaṇa Aḍigal has gone to the city of Kāñchi on the ground that that is the best place wherein he could discourse to you on the truths. Further, the city of Kāñchi is suffering from all the evils of drought and famine. Many have died. Many monks have migrated hither from there. Go there, therefore, and save the starving and dying."

Maṇimēkalai, accordingly, left for Kāñchi. She felt a great pity for the grievously stricken city into which she descended after reverentially going round it. She visited the *Buddhālaya*, built in ancient days by Mañikāḍi, the colleague of Teḍakalar-killi, and then sojourned in a park to the south-west of it.* The news of her arrival—she, with her *Maṇḍa-sarabhi*, was already known throughout the Jambudvīpa—reached the king. He at once hastened to her. He had already been assured by a deity, in gracious response to his heart-felt prayer of despair, that Maṇimēkalai would come there and that her advent would be signalled by the end of Kāñchi's misfortunes;

* The reference to a Kili's building a Buddhist Chaitya at Conjeevaram is of singular interest. Its significance is pointed out later on.

that she would save the world with her feeding-vessel; that the clouds would then give showers. Indeed he had been advised to construct a grove and excavate a tank—in imitation of Maṇipallavam and Gōmukhi—for her. The gratified king now took Maṇimēkalai to the place specially prepared for her. The pious lady established there the *Buddha-piṭṭa* which gave her her wisdom, constructed (with the king's help) temples for Dīvatilakai and Maṇimēkalai, arranged for the festivals connected with them, and placing the life-giving bowl in the Buddha shrine invited all those who were suffering from hunger to avail themselves of it. There was no longer hunger, drought, or barrenness in that land.

Aṟavaṇa Aḍigal heard all this. He at once came to Maṇimēkalai. She paid him due obeisance and fed him with a food rich in the six tastes! After the narration of each other's movements (with which we are acquainted already), Maṇimēkalai prayed to be enlightened on the true doctrines. Aṟavaṇa Aḍigal thereupon expounded to her the true *pramāṇas* (அளவை) of *Pratyakṣa* and *Anumāna*. Maṇimēkalai formally pronounced herself as having surrendered to the Buddha, the dharma and the Saṅgha. She worshipped thrice 'the Three Gems' and placed herself at Aṟavaṇa Aḍigal's feet. He thereupon taught her the life-story of the Buddha—his leaving the *Tuḍita-lōka* for this one, his discovery of the Truth, his conquest of *Māra*, etc., and of the Buddhas preceding him. He dwelt upon the twelve *Nidhānas* and taught her the wisdom which knew no ignorance and which made her engage herself ever after, as a formally ordained nun, in that city, in a life which would save her from re-birth.

Such is the plot of the *Maṇimēkalai*. It contains thirty Gāthas or chapters (literary songs), besides a *padika* in which it is stated that Kūla-vāṇikan Śāttan narrated the whole thing to Mañikō-aḍigal.

the author of the *Śilappadikāram*. The poem is not inferior in beauty of style to the *Śilappadikāram*. In fact, in many places, the latter seems to have been re-touched by Śāttan's hand. But it is distinctly inferior to the *Śilappadikāram* in the story and in general character. While the former is cosmopolitan, the latter is distinctly sectarian. It is professedly, provokingly Buddhistic. From the beginning to the end it does nothing but reiterate the monotonous adventures of a Buddhistic recluse. It makes the reader tired and bored. The pathos of the *Śilappadikāram* on the contrary makes it a poem for the universe.

(To be continued.)

THE SCHOOL ARITHMETIC

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* The poem refers to the different views of Vēdavyādhā, Kṛtakōṭi and Jaimuni in regard to the number of *Pramāṇas*. The reference is very important for the discussion of the chronology of the poem. See next chapter.

OPPORTUNITIES FOR HIGHER EDUCATION IN THE UNITED STATES*

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PART I

BEFORE I proceed any further with my narrative, I think it will be appropriate to give the reader an exact idea of the educational system of the United States so that he can follow me intelligently in my description of the University of California whose annual residential enrolment in Berkeley alone exceeds ten thousands.

I.

ORGANISATION OF EDUCATION IN THE UNITED STATES.

Complexity.

Strictly speaking there are forty-nine systems of public education in the United States corresponding to the forty-eight States and the District of Columbia. Each one of these self-governing commonwealths is free to exercise full control over the initiation, direction and development of its own educational policies. Hence the absence of a national system.

In addition to these public educational systems a number of municipalities, individuals, private corporations and religious denominations support schools, academies, colleges and universities, thus adding to the complexity of the American educational

* Adopted, abridged and re-arranged from the bulletin issued by the Institute of International Education, New York; the Hindustani Association of America, New York; and other similar organizations and supplemented from the writer's own observations in his wide travels throughout this country extending over 20,000 miles.

system. Under the constitution of the country, these non-public institutions are allowed practically perfect freedom of activity. In some parts of the country, especially the eastern section, private institutions of higher education predominate and some of them have attained a world reputation.

UNIFORMITY OF STANDARD.

While no two State systems and no two private institutions are exactly the same, yet in essentials they are more or less alike. The States, for instance, provide by law for elementary education at public expense. The standards of admission to, and graduation from, the principal type of institutions are almost identical. The usual length of the elementary school course is eight years. The age of compulsory attendance is generally from seven or eight to fourteen or fifteen, and there is an upward tendency to sixteen. Public secondary schools, also called high schools, offer ordinarily a four-year course, which is a continuation of the elementary school. The college course with rare exceptions is four years in length. There is, however, a widespread movement to reorganize the twelve-years' course in elementary and high schools and to devote six years to elementary education, and six to secondary, with a further tendency to divide the six years of secondary work into a three-year junior high school course, and a three-year senior high school course. Thus, underneath the apparent dissimilarity in the foundation, management and control of the educational system in the United States, there is, nevertheless, a fundamental unity of purpose, and a unity of standards and methods.

THE AMERICAN COLLEGE.

The American college was the first institution for higher education to be founded

in the United States. Harvard was the first college established in America—the date of its founding being 1636, six years after the founding of the Massachusetts Bay Colony. Oxford and Cambridge furnished the prototype for Harvard College.

The colleges to-day vary considerably in size; the majority are independent institutions and do not offer graduate work at all, or only within the limits of their resources. The small college, while more restricted in its offerings and limited in its equipment, offers other advantages which for the foreign student may outweigh the disadvantages. The personal touch and relationship which are more likely to prevail in a smaller college offer an atmosphere in which the foreign student may more readily identify himself with the spirit of the institution.

Most of the small colleges were and still are denominational. Although they may attract mainly students from their own denominations, they are open to all. These denominational institutions are most numerous in the South and Middle West. While they lay special stress on religious education and outlook, the tendency to require attendance at religious exercises is not as marked as it was once. Opportunities for religious worship are found, however, in all institutions, as a rule, irrespective of their affiliations.

Many of the leading institutions for higher technical instruction, while not bearing the title of college or university, are equal in rank and general character. Such are the foremost engineering colleges, like the Massachusetts Institute of Technology, Worcester Polytechnic Institute, Rensselaer Polytechnic Institute, Stevens Institute of Technology, Carnegie Institute of Pittsburgh and the Case

School of Applied Science. Many of the States through federal grants have established and maintained separate institutions for agriculture and engineering. While many of the colleges are co-educational, a number of independent women's colleges exist.

The American college is a unique institution. It seems to have no exact counterpart in the educational system of any other country. It is the nucleus from which all higher institutions of learning have sprung. Traditionally, its curriculum covers a period of four years and leads to the Baccalaureate degree.

THE UNIVERSITY.

The American University is the outgrowth and the expansion of the American college. Before the last quarter of the nineteenth century there were no universities in the modern sense of the term. With the rise of professional schools of theology, law and medicine, the American college began to approach university organization. The university then came to be designated as an institution composed of a college and one or more professional schools, each under the control of a separate faculty. Nevertheless the terms "College" and "University" are still sometimes used interchangeably and are often confused. In some States it has been possible to secure a university charter on the strength of achievement possible in the future, rather than accomplished in the past. Thus to-day we find many colleges offering but a single course leading to the Bachelor's degree and yet chartered as a university. In the strictest sense of the term a university is an institution maintaining, in addition to the college proper, professional and graduate departments offering advanced degrees. The specialized departments of the university in-

clude besides the graduate schools of arts and sciences, schools or colleges of engineering, agriculture, medicine, pharmacy, law, commerce, education and theology. Columbia, California, Chicago and Illinois universities, each has a dozen or more of such schools or departments. In their early development American universities consciously followed the German type.

COMPARISON WITH EUROPEAN INSTITUTIONS.

The lack of standard which we have previously observed is the chief characteristic which distinguishes the American system of education from the European systems. Experiments in education are constantly being conducted in this country and the results accomplished by one institution are available to all others. The individualism of the American people is nowhere else better revealed than in their institutions of education.

Another feature of American education is its democratic character. Next to the political institutions the educational institutions best reflect the democratic tendencies of the American people. American education is so graded as to make the necessary secondary school the continuation of the elementary school, and the college the continuation of the secondary school. In France and Germany, and to a certain extent in England, the elementary and secondary systems are not well articulated. Transference from the one to the other is not easy except at one or two points. The elementary school in many cases is not a preparatory institution for the secondary school but an institution furnishing education for the children of the labouring and artisan classes, whereas the secondary school is intended to fit the more well-to-do

children for the professions and for civil life. Much of the work that is done by the French lycée and the German nine-year secondary schools is included here in the secondary school and in the first two years of college.

II.

THE UNDER-GRADUATE COLLEGE.

The Colleges of Liberal Arts and Sciences.

At the core of every American university stands the collegiate department variously called the under-graduate department, the school, department or college of arts and sciences, the college of letters, the college of liberal arts, etc. Graduates of recognized high schools and private schools, and students who give evidence of equivalent preparation, are admitted to the schools of arts and sciences.

The average age of students entering college is eighteen or nineteen years, making the average at graduation twenty-two to twenty-three years.

The college offers a four-year course leading to the Bachelor's degree, of which there are three chief groups, namely, A.B., B.S. and Ph.B.

The early practice of prescribing courses of study for the Bachelor's degree has practically broken down. The required studies are confined to two or three subjects and the student is allowed freedom of choice with respect to the rest of the program. A still later development, known as the "group system" came to meet the needs of students, and was first put into practice at Johns Hopkins University. The theory is that work should be concentrated along certain lines to definite ends. Certain groups of studies are organized to correlate with a single

central subject and to permit the students to choose one of these groups. Princeton was a pioneer in what is called the "preceptorial system" by which each student is carefully supervised and assisted in his studies. The assistant professors are the preceptors, whose duty it is to meet the students in little groups to give advice and test the faithfulness and accuracy of their work. Each semester or term culminates in an examination designed to test the knowledge of the student in the branches he has studied. Many of the colleges have adopted the "honour system" in the written examinations according to which no proctors supervise the examination period. This system endeavours to cultivate honesty in examinations. The offender is usually suspended by the Student Council elected by the students themselves at the beginning of the academic year.

The instruction in the school of arts and sciences is carried on by means of lectures, recitations, discussions and various kinds of written exercises. In the Freshman and Sophomore years—the first two years of the college course—instructors usually assign a definite number of pages from a prescribed text-book and the student's knowledge is tested by recitation. In the last two years lectures become more the rule and periodic examinations take the place of formal recitations.

COLLEGE OR UNIVERSITY ENTRANCE REQUIREMENTS.

Admission to a standard American college or university is, in general, based on the completion of a four-year course in a secondary school. To secure entrance a student has to fulfil certain educational requirements

which are known as pre-requisites. A matriculate of any Indian university must produce along with the university certificates, his high school certificates. Physics, Chemistry, with laboratory work, Solid Geometry, Trigonometry are among the pre-requisites. Full particulars about subjects taken and years studied are therefore necessary for admittance. Credits in addition to matriculation for any college work taken in an Indian university are adjusted in so far as they are equivalent to courses given in an American university. A student may enter the university at the beginning of any semester or quarter, but it is to the interest of the student to start work with the first semester or quarter.

The physical condition of a student is more and more being taken into consideration by college authorities. Some colleges are beginning to require a certificate of health for admission.

Foreign students are advised to bring with them as detailed a statement as possible of the nature and amount of work pursued and completed by them. Such statements should be translated into English, wherever necessary. It is especially important to present diplomas or certificates obtained from institutions previously attended by them and preferably those that are usually recognized in the countries of their origin. The Institute of International Education, 522 Fifth Avenue, New York City, has prepared a blank printed in English upon which foreign students may make application for admission to a college or university in the United States, and when properly executed, may be used in lieu of diplomas or certificates obtained from institutions previously attended by them. They should also

bring copies of the calendars of the universities or institutions in which they have studied.

It is suggested that students bring no ordinary text-books since the libraries supply all the copies needed. What is wanted, however, is material dealing with education in your own country, such as reports, pamphlets, etc., of which there is usually a great dearth here.

THE CREDIT SYSTEM.

American university education is based on the "credit system" which generally confuses new students from foreign countries. Usually, one credit or unit or point (all meaning the same thing more or less) is equivalent to one lecture a week. If a course has "three credits" it means there will be three lectures a week with at least an equal amount of home work. A student "gets his points" (*i.e.*, passes his examination), if he has attended regularly, done the work, and passed the examination in this particular subject at the end of the semester.

The under-graduate work, extending over a period of four years and divided into Freshman (First year), Sophomore (Second year), Junior (Third year), and Senior (Fourth year), is further sub-divided into two terms (semesters) a year. During this period of eight semesters a student has to complete about 15 or 18 or more credits a semester. These credits are chosen from a specified group of subjects prescribed by the university. The subjects required fall under three general classes; Major, Minor, Elective. For a student of Civil Engineering that subject becomes the major, of which he must take courses amounting to 24 to 30 credits. Minor subjects are higher studies for subjects

allied with the major subjects. Of this a minimum of 20 credits is usually required. Elective subjects refer to subjects of general culture, such as history, psychology, etc. For the first two years of college or university the subjects taught in various departments are practically the same. This is especially true of the College of Engineering. From the third year specialization begins and courses are divided according to major, minor and electives.

Nine months of college work constitutes one academic year. The first semester of each year begins in September and lasts till January; the second semester extends from February to June. The University of California starts and closes a month earlier. The Universities of Chicago, Stanford, Ohio, Washington and a few others have their academic year divided into three terms or quarters of 12 weeks each instead of two terms of 18 weeks each. The time for graduation is the same as it requires 180 quarter credits (as against 120 semester credits) to complete a four-year course. The two terms or semesters system is followed by most universities, but the practice of dividing the academic year into three terms or quarters is gaining ground especially in the West.

The average student takes about fifteen points per semester. This will leave him to complete the hundred and twenty points that is normally required for the Bachelor's degree in four years (at the rate of thirty points a year). In some universities tuition fees are fixed same per semester; in others, like Columbia, Chicago, etc., they are proportional to the number of points taken. Some students, who do outside work to earn a living, carry proportionately less points, and

EXAMINATION SYSTEM.

Unlike Indian universities where the year's work is tested by an examination at the end of the year, the American universities hold examinations at the end of each semester. Success or failure of a student does not entirely depend upon final or semester examinations, but upon the progress of the student day by day. If the average grade or marks of a student in a subject is below the passing point, he has to repeat that one subject in another semester, but not all the other subjects which he took along with it and in which he has successfully passed. This compartmental system of examination along with the division of the academic year into semesters and quarters makes it very easy for a student to get through college without loss of unnecessary time or without the discouragement which an Indian student has to go through.

PART II.

III.

POST-GRADUATE EDUCATION OR THE GRADUATE SCHOOL.*

The cap-stone of the American university is the graduate school of arts and sciences, more often called the graduate faculty or the faculty of philosophy. It admits as students only those who hold a Bachelor's degree from a college of recognized standing and offers courses leading to the Master's degrees (A.M., M.S., M. Ped., etc.) and the Doctor's degrees (Ph. D., Sc. D., etc.) Students coming from other countries are given special consideration and I have known instances where a Pandit

* The word "school" is used in a very broad sense in the educational world of this country. Thus, in the phrases "graduate school," "school of commerce," "school of economics," etc., the word "school" is equivalent to college or university.

it will take them correspondingly longer to get the full number of points required for a degree. Other students with ability and energy enough to devote every possible moment to studying may considerably shorten their period of study by carrying more than the average number of points per semester and by attending summer sessions where from six to eight points per session may be earned. It is, however, advisable that during the first semester students do not take more than the normal number of points, since it usually takes some time to become adapted to the new conditions of work. When, therefore, a calendar says that it requires a minimum of from sixty to seventy-five points post-graduate work for the Ph.D., candidates must remember that whatever time is devoted to the Ph.D. thesis must be added to the two years or more; and this will vary with the difficulty of the problem and the amount of work already done upon it. If candidates prefer to work on their dissertations contemporaneously with their class work (as very many do) it will only mean that the required number of points will be spread out over a longer period of time than an individual puts in on his work. In the case of the higher degrees, the number of points are given simply as a general indication of the time and work that will be involved. It is not prescribed in any sense nor in every case strictly adhered to. In each individual case it depends on the general status of scholarship attained, and on the judgment of the faculty of a department in which a candidate is majoring as to whether he is fully qualified to proceed to the final examination, or not. In most cases the number of points indicated will be a bare minimum.

from India with no Bachelor's degree has been awarded higher degrees after going through special courses.

No definite practice has yet been established for the admission of foreign students to graduate standing. The subject is, however, being considered by special Committees representing the Institute of International Education, the American University Union in Europe, and the American Council on Education. Two of these have already made recommendations with the approval of the leading graduate schools in the country, on the admission of students from France and the British Empire. It is expected that other Committees representing the same organizations will make recommendations of a similar character for students from other countries. These proposals, however, will not absolve a foreign student from the necessity of bringing detailed official records, translated into English, of their previous education as well as diplomas and certificates obtained.

Almost all the American graduate schools have been developed within the last generation. Nevertheless, the progress achieved by many of them has been unparalleled by any other university department. Students from abroad will find opportunities for graduate study and investigation in the leading American universities that compare most favourably with any European university.

The Master's degree is usually awarded to students who have pursued post-graduate studies for at least one academic year devoted, as a rule, to not more than three studies, one of which, the major subject, receives the claims of the greater part of the student's time and interest. The requirements may in-

clude the writing of a thesis approved by the appropriate department.

The Doctor's degree is awarded to students who have pursued post-graduate courses for usually three years and who have satisfied their particular departments of their mastery of a special subject, and of general acquaintance with the broader field of knowledge of which their subject forms a part. This mastery is demonstrated, not only by oral and written examination, but by a thesis or dissertation in addition, embodying the results of original investigation and research on some topic previously approved by the professor in charge of the major subject. Some universities require the publication of the dissertation.

Many universities, especially those on the West, charge less tuition fees and give exemption from non-residential fees for graduate work to deserving students. Scholarships are awarded on the basis of merit. Indian students will be saving lot of money and energy if they come to this country after finishing all their under-graduate work.

IV.

PROFESSIONAL EDUCATION.

THE COLLEGE OF AGRICULTURE.

The typical school or college of agriculture offers to graduates of accredited high schools, or equivalent secondary schools, a four-year course in agriculture leading to the degree of Bachelor of Science or equivalent degree. Most of the colleges of agriculture also offer opportunities for post-graduate work leading to the degree of Master of Science or Master of Science in Agriculture, and a number offer work leading to the degree of Doctor of Philosophy.

The colleges of agriculture now embrace a wide range of specialized departments of in-

struction, such as animal husbandry, poultry husbandry, agricultural chemistry, dairy industry, agricultural economics, farm management, entomology, farm crops, vegetable crops floriculture, forestry, pomology or fruit growing, landscape gardening, meteorology, plant breeding, plant pathology, soil technology, rural education, rural sociology, rural engineering, and home economics. Many of them also include the basic sciences on which agriculture rests.

The typical course of instruction includes fundamental sciences, languages, economics, mathematics, together with technical instruction in agriculture and practical work in laboratories, shops, greenhouses, barns and farms.

THE SCHOOL OF COMMERCE.

The schools of commerce, of business, or of business administration in the United States may be classified in three groups:

First—Those corresponding to the collegiate course of four years which require a complete high school education. These schools give a degree in commerce at the completion of four years. The course combines cultural subjects and technical business training. In the group belongs the Wharton School of the University of Pennsylvania.

Second—Schools which require two or three years of collegiate preparation followed by two years of technical and professional study. This course leads also to the degree of B. S. in Business given by Columbia University, and Amos Tuck School of Dartmouth College.

Third—The graduate school of business administration which calls for a complete college course and is thus offered only to graduates and confers a graduate degree as at Harvard University.

The schools classified in the second group also offer, as at Columbia University, graduate courses leading to the degree of Master of Science and of Doctor of Philosophy. In this sense the schools of the second group also may be classified with those of the third group.

Somewhat different from these three types is the five-year co-operative business course offered by the University of Cincinnati, in which class study and office work are combined.

THE SCHOOL OF DENTISTRY.

The course in dentistry is four years in duration and is open in some dental colleges to graduates of accredited high schools; most dental schools now require one year pre-dental college work, and in 1926, two years will be required by all schools in New York State. The dental course leads to the degree of D. D. S. Two schools confer the degree D. M. D.

There are no less than forty-eight schools of dentistry in connection with universities and colleges. American schools of dentistry are mostly well-equipped and offer unexcelled facilities for clinical work and study. American practitioners of dentistry enjoy world-wide reputation.

THE SCHOOL OF EDUCATION.

The School of Education is comparatively new and is distinctly American, whereas the normal school is European in origin. The general aim of the School of Education is to prepare prospective high school teachers, school principals, and superintendents. In some universities it is a distinct school offering a four-years' course leading to a Bachelor's degree. Frequently there is merely offered a two-years' course, super-imposed on

the sophomore year, leading to the degree. Occasionally it is a department of the university, recommended as any other department, for the degree.

For high school graduates the normal school course covers two or three years. Most States maintain normal schools for the training of teachers for the elementary schools.

Good schools of education provide opportunities for observation and for the practice of teaching. In the professional part of their curricula they offer instruction in such subjects as history of education, principles of education, methods of teaching, educational psychology, educational sociology, educational administration, and the various aspects of secondary, elementary, and kindergarten education.

There is a growing tendency for the school of education to relegate to the collegiate department that part of its curriculum which is cultural, and thus to stand on a graduate basis. Graduate courses in education leading to the degrees of M.A. and Ph. D. are now offered by the graduate departments of many universities, especially by the State universities. Among the foremost specialized schools of education are Teachers' College, Columbia University, the Schools of Education of the University of Chicago, Harvard University, Yale University, the University of Pennsylvania, the University of Pittsburgh, Stanford University, State University of Iowa, State University of Ohio, University of California and the University of Minnesota.

THE SCHOOL OF ENGINEERING.

The school of applied science or engineering offers to graduates of secondary schools a four-year course leading to the degree of B. S. in civil mechanical, mining, metallurgical,

electrical, hydraulic, architectural, chemical, sanitary or communication engineering. Though most universities require only a high school certificate, some universities require graduation from a scientific school in good standing for admission. Columbia University has adopted a combined six-year course of college and professional work. In certain institutions, separate schools are maintained for mining, mechanical, electrical, and other forms of engineering, and sometimes a five or six-year course is offered. In these cases the degree conferred is usually E. E., M. E., C. E. or A. E.

The work in these schools, being mainly professional, tends to be more prescribed than elective. It is more practical or concrete than purely academic work; a great part being carried on in laboratories and machine-shops belonging to the universities, and with supplementary work in the factories or industrial organizations of the city. The so-called co-operative course in engineering by which a student attends classes for two weeks or more and works in a shop for an equivalent period of time alternately, was first instituted in the University of Cincinnati. Many other schools, such as the Georgia School of Technology, have since followed the lead. Such a course usually covers five years.

In recent years several universities have begun to offer graduate work in engineering science, leading to the degrees of M.S., Ph.D., and Sc.D. The conditions are practically the same as those prevailing in the graduate school of arts and sciences.

SCHOOLS OF FORESTRY.

American schools that offer courses in forestry leading to a degree may be divided into those that offer a four-year under-

graduate course leading to the degree of Bachelor of Science in Forestry, and those that offer the degree of Master of Forestry for two or three years of technical training based upon three or four years of under-graduate collegiate work leading to the degree of Bachelor of Science, Bachelor of Arts, or Bachelor of Philosophy.

Men from foreign countries that come to America to study forestry, if they desire to enter an under-graduate school, should come here after the completion of their high school course or its equivalent. In this case a considerable proportion of the work required is in pre-forestry subjects which include mathematics, language, science (botany, zoology, geology, chemistry, physics), mechanical drawing and economics as well as other general cultural subjects. As a rule, less than one-half the work is in technical forestry. On the other hand men who come here to study forestry after the completion for three or four years of collegiate work or its equivalent in their own country can immediately take up their technical training to the exclusion of other subjects provided they have completed in their under-graduate work the pre-forestry subjects mentioned above. They can become candidates for the degree of Master of Forestry given after two years of technical studies provided they have previously completed the essential pre-forestry subjects and have had a minimum of three years of under-graduate collegiate training. Men who come with a baccalaureate degree but without the essential pre-forestry training should expect to remain for two years in order to complete the prescribed work for the Master's degree.

A number of agricultural colleges, which do not give a full training in forestry, offer excellent courses in certain branches, es-

pecially adapted to the needs of agricultural students. Among these institutions may be mentioned the New Hampshire College of Agriculture and Mechanic Arts at Durham, New Hampshire; the Massachusetts Agricultural College at Amherst, Massachusetts; the Connecticut Agricultural College at Storrs, Connecticut; the University of Louisiana at Baton Rouge, Louisiana; the State College of Washington, Pullman, Washington and Purdue University, LaFayette, Indiana. Most other institutions teaching agriculture give a certain amount of instruction in forestry for farmers.

THE SCHOOL OF JOURNALISM.

Only a few universities include in their organization schools of journalism, most of which are also recent additions. The course ordinarily covers four years and is open to graduates of secondary schools. The degree conferred is B. Litt. or B. J. The first two years are mainly devoted to social sciences and English, planned to familiarize the student with present social and economic conditions and to help him in the use of self-expression; and the last two years to such courses as reporting, interviewing, editorial writing, feature writing, and international relations. Columbia maintains one of the best equipped, and the University of Missouri, one of the oldest schools of journalism in the country.

THE SCHOOL OF MEDICINE.

The best schools of medicine require for admission two or more years of college work after the completion for a four-year high or secondary school course and offer a four-year course leading to the degree of M. D. Not only the school authorities but the State must be satisfied that the pre-medical education of

the applicant is up to standard. Upon graduation a physician cannot ordinarily practice in a State without passing an examination before the licensing board.

The American medical college is usually well-equipped with laboratories and has hospital facilities for first-hand observation and practice. Along no other professional line of American education has more rapid and noteworthy progress been made in recent years than along medical lines.

Upon the recommendation of the American Medical Association a number of the more progressive medical schools have in late years added a fifth year to the medical course in which the student serves as an intern in a hospital. Advanced study and research in medicine is possible in only a few colleges in this country. Post-graduate work in medicine, leading to the degree of Doctor of Public Health, is offered by California, Detroit College of Medicine and Surgery, Harvard, Johns Hopkins, Michigan, Pennsylvania, Wisconsin, Yale, and the University of New York.

A number of universities offer a combination of cultural and medical courses covering six or seven years and leading to the two degrees of B. A. (or B. S.) and M. D.

THE SCHOOL OF PHARMACY.

The school of pharmacy usually requires graduation from a high school or an equivalent education for admission. At the end of a two-year or three-year course in pharmacy, the degree of Graduate in Pharmacy (Ph. G.) is conferred. At the end of an additional year, the degree of Pharmaceutical Chemist (Ph. C.) is conferred. Schools of pharmacy connected with universities generally confer the degree of Bachelor of Science in

Pharmacy at the end of a four-year course and a few of them the degree of Doctor of Pharmacy at the end of a six-year course.

V.

SUMMER SCHOOLS AND EXTENSION WORK.

THE SUMMER SCHOOL.

One of the interesting features of many prominent universities is their summer school work, covering six weeks in July and August or extending through the summer months. These schools are designed primarily to meet the needs of teachers who seek advanced instruction, with or without regard to academic degree, and students who wish to shorten the period of residence, make up deficiencies, or complete their preparation for entrance to some college or professional school.

The majority of the courses given in the summer will do well to register in a summer school of good standing, especially if they do not possess a sufficient credit to be admitted in the university they wish to enter and thus fulfil all the necessary requirements for admission. It will also help him to "Americanize" himself during the regular year much more easily than otherwise.

EXTENSION WORK.

Foreign students will find it practically useless to depend much upon this kind of work. Since students have come long ways to learn something about American education, it is to their advantage to try to secure first-hand knowledge through first-hand source instead of second-hand information. The following paragraph selected from the bulletin of the University of California describes in clear words the nature of the extension work offered by all large universities of this country:—

The primary aim of the Extension Division is to co-operate with the men and women of California who, while engaged in the pursuit of their vocations and thereby presumably prevented from being resident students in a university or college, nevertheless wish to carry on some form of university training. Hence correspondence courses and extramural classes are conducted. Extension lectures and visual materials circulated by the illustrate learning, and in general, to prepare the way for some form of systematic study.

Department of Correspondence Instruction.

Following are some statistics regarding the Department of Correspondence Instruction for 1923-24 in comparison with the corresponding statistics for 1922-23:—

	1922—1923	1923—1924
Inquiries received	6,075	5,346
Letters written	6,645	7,349
Lessons received	52,787	36,992
Enrolments	5,036	5,060

These figures show an increase in all except inquiries; and the exception is accounted for probably by the fact that our work has become better known throughout the State by means of information given both by our branch offices and by students.

The increases in lessons received and in enrolments are more significant than the figures indicate, since, this year, the greatest increases both in lessons received and in enrolments have been in advanced courses of university grade. English heads the list of enrolments with 1105; education is second with 1000; and then comes mathematics 552; economics with 516; and political science with 319.

For additional information regarding immigration restrictions, routes to this country, best method to travel, etc., watch this magazine from time to time.

SOME INTERESTING STATISTICAL DATA OF U.S.A.

(in round numbers only)

Total Population	...	114,000,000
Total School-going Population (Age 5—17)	...	30,000,000
Attendance in Public Schools.		25,000,000
Total Number of Teachers		
(Men)	132,000	
(Women)	648,000...	780,000
Total Public School Buildings	...	260,000
Total Expenditure on Teachers' Salaries	Rs.	3,50,00,00,000
Total Expenditure on Public Education	„	6,10,00,00,000
Value of Public Property used for School purposes	„	14,00,00,00,000
Number of Universities, Colleges and Professional Schools	...	1,000
Number of Instructors and Professors	...	60,000
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SANSKRIT STUDIES IN THE UNITED PROVINCES

By Pandit HARADATTA SARMA, M.A.,

Professor of Sanskrit & Religion. S. D. College.
Cawnpore.

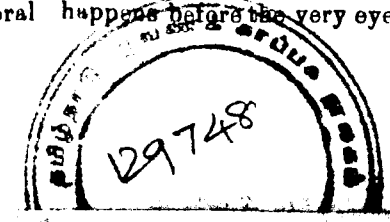
IN ancient days the region now embraced in the United Provinces was unique in position with regard to Sanskrit learning. Scholars from far and wide came to quench their thirst for knowledge at the fountains of learning in Kashi or modern Benares. No scholar or preacher in India could rise to any glory, much less be universally accepted, until he had established his reputation by vanquishing the learned Pandits of Benares. Whether they were great prophets like Buddha or Sankara in ancient times, or such recent propagandists as the founder and leader of the Arya Samaj, the late Dayananda Saraswati, all had to measure swords with the Pandits of Kashi. But as the saying goes, none returned a victor. Kashi has not bowed its head to anyone, although every new-comer spread the news of his victory.

But the times are changing. Although the United Provinces can now boast of five Universities, as no other province in India can, and although the Vice-Chancellor of one of the premier Universities—the Allahabad University—and the Pro-Vice-Chancellor of another University—the Benares Hindu University—are Sanskritists of considerable reputation, still the position of Sanskrit is anything but satisfactory. When the Punjab, the Calcutta and the Bombay Universities have classical languages as compulsory subjects up to the Intermediate standard or Matriculation standard, the Universities of the United Provinces, with the exception of Benares, take pride in following the liberal

policy of keeping the classical languages as optionals from the very beginning. Even in Benares, it is only a nominal test in Sanskrit that is compulsory and even that for the students in the Faculty of Arts. They have advanced a step further in abolishing Sanskrit altogether from the Sixth standard! The Board of High School and Intermediate Examinations is to be congratulated on this suicidal policy. The result is obvious. Whether in school or in college, the number of students offering Sanskrit is dwindling day by day. If we take into consideration the most up-to-date Universities of Europe, we find the classical languages in a much better position. Everybody has to offer either Greek or Latin as one of his compulsory subjects in his Matriculation examination.

The evil effect of this newly-introduced educational reform is felt by the teachers in the college much more. If even in the old system when a boy began his Sanskrit in the sixth class, he was generally found very weak in the Intermediate and the B.A. standard, how much more so will it be when he will now begin it actually only in the seventh standard? And the incongruous part of the whole matter is that the course, which he had to finish in five years up to his Matriculation examination, remains the same. Either the ever-difficult language has suddenly become so easy that it is useless to waste one more year over it, or the average student has at once grown so intelligent that he can finish the old course of five years in four years now!

It is nothing if not a reflection on the common-sense of the controllers of the educational destiny of the youth of this province. And one is struck with wonder when all this happens before the very eyes of the renowned



Sanskritists. "There is something rotten in the State of Denmark." Seated above and wearing a look of indifference, these makers of student-destiny seldom feel the difficulty of the student or of the teacher.

The time has come when this indifference has to be shaken off. Europeans, who are far removed from Greece or Rome and their literature, feel their culture and education incomplete without at least an elementary knowledge of the classical languages. Indian culture and tradition are entirely bound up with Sanskrit. How can Indian education be complete without its knowledge? The ideas of citizenship, of culture, of nationality and even of Swaraj are all mere words if our youth are not allowed to imbibe inspiration from the masters of yore.

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EDUCATIONAL PROBLEMS OF THE PRESENT DAY.*

EVERY nation must solve, *first and foremost, its economic problems* and if its education can be made to solve these problems, it is necessary to shape its education with that end in view. We cannot however rush into starting unneeded vocational schools. Vocational schools of the higher grades have to be started in response to specific needs and have to go hand and hand with the national development in industries and technical professions. They come naturally into existence also on the basis of a sound system of general education. Schools of general education are thus the arteries of the educational system. They start with the individual and seek to develop his capacities. Vocation is one of the aims of a general education but is not the main aim and is not often the immediate aim. It is not right to condemn schools and colleges of general education as useless, because they do not directly serve economic ends. When the Hon'ble Sir Annamalai Chettiar proposed to start the new University, there were people who offered the advice that there was no use in starting more Universities of the existing type but that he should start a purely technological University. These critics forget that humanistic and scientific studies have not had their due chance and under the present circumstances of this country it is the wisest thing to give these studies a proper chance in a well-conducted unitary type of University. The new University will be in a position to make necessary changes in courses and methods of study

* An Address delivered by Mr. K. S. Appaswami Ayyar, B.A., L.T., District Educational Officer, South Arcot, on the School Day of the Ramaswami Chettiar's Town High School, Chidambaram.

and to make experiments, without having to consult, as the over-burdened Madras University has had to, numerous and widely differing interests. It can exert quick and immediate influence on the High Schools from which it will get its supply of students so as to induce them to do the kind of work that the University needs as preparation for its courses. If unification and organisation of all the stages of education is made by the new University, it will have achieved a good thing and the charge that our Universities are not able to do superior kind of work will no longer have to be made. The new Annamalai University in relation to the Madras University is like a major son who leaves the family and goes out to add to the glory of the family by his new and independent achievements. Where there was doubt and hesitation, Sir Annamalai made a quick and bold decision and endowed. Such has been the way of all great patrons of learning since the time of Janaka.

Having emphasised the importance of a sound general education, the lecturer referred to other criticisms of the prevailing system of education that it is a denationalised and irreligious system. Here he wanted to distinguish between a thing being wrong in essence and being defective by accident. The present system of education had its defects but these were not innate in the system and could be remedied by improvements. There was nothing that was taught in the schools that had the effect of undermining national feeling or religious consciousness. The school no doubt failed to do certain things and these we must discover with a view to improve. There is first the life and social habits of the pupil which have to be better directed and moulded. In this respect schools and colleges can do much only if they are supported by the

parents. It is the parents that should decide what the life and social habits of the students should be. The educational system cannot be blamed for the formation of habits over which it has not been given specific control. He then referred to certain glaring defects in the courses of studies and standards of instruction. In the matter of the vernaculars, the standards are absurdly low. Vernacular teaching must cut out new paths and take inspiration from the teaching of English in schools in England. The establishment of a Training College for Pandits by Sir Annamalai is a step in the right direction. The standards and the ideals must rise and the public must believe in and ask for higher standards. After all it is the public that determine what education should be and teachers will be able to do much only with the authority and the support of the public. Vernacularisation of studies, i.e., the adoption of vernacular as the medium of instruction in the higher forms of Secondary Schools will be widely adopted only when the vernacularists demonstrate they are able to cover wider ground and do higher work by the use of vernaculars. The lecturer suggested that Sanskrit must be universally or at least more widely studied. The direction 'Drink deep or taste not the Pierian spring' does not apply to this knowledge. All pupils should be taught the Sanskrit script and given practice in reading and writing and given some knowledge however little of the language. Those who wish to spread a knowledge of Hindi in Tamil country may first look to this. Religious instruction has not had due attention paid to it. We must make up our mind on the courses and arrange so that pupils get the most inspiring religious knowledge and the most useful religious

discipline. Another defect is inadequate attention paid to *Science*. Science teaching has no doubt improved during the last two decades but not sufficiently, in the opinion of the lecturer. The lecturer was not satisfied with the science work as it actually obtains in the lower forms. There should be more halls provided in schools specifically for science teaching and the apparatus and appliances should be more freely available and more freely used. It is because our science teaching is still so half-hearted that our science courses are not sufficiently advanced.

Regarding time-tables and hours of work, he said that the shell of the time-table should be broken, wherever it is found to confine and not merely to safeguard. The so-called Dalton Plan has done this. With the existing

hours of work and time-tables, if more time is needed for any courses in, say Indian languages or religious instruction, it may be found by providing optional extra classes out of school hours. The school time-tables dealt only with a portion of the pupils' time of work. It is known that some pupils have not the required facilities or help in their homes for study out of school hours. It will be a wise plan to provide what may be called *common study halls* to which local pupils may resort for undisturbed work under the guidance of supervising teachers.

It is by closer study and better understanding of educational problems and by the wise and willing co-operation of the parent, the teacher and the public, that a better era can dawn in our education.

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ON PRINTER'S DEVIL IN PUBLIC EXAMINATION PAPERS.

By

Mr. A. A. KRISHNASWAMI AYYANGAR, M.A., L.T.

Lecturer in Mathematics.

Intermediate College, Mysore.

IT is well known that examinations are necessary evils. In view of errors of print that are getting common in public examination papers, one may pertinently inquire whether the printer's devil is also an equally indispensable item in the examination programme. While small errors in question-papers can be easily corrected and rectified by the exercise of a little common sense by the examinees themselves in subjects other than mathematics, such errors especially in a mathematics paper are very serious. They are vexing both to the examiners and the examinees. The examinees are misled by the wrong question and waste a lot of time in attempting the impossible, leaving a trail of absurd manipulations for the edification of the examiner whose duty it is to assess them in all fairness to himself and the pupils concerned.

The printer's devil is a fairly comprehensive term. It is a collective name for all kinds of errors that occur in print; for example, a grammatically wrong sentence is also sometimes explained away as a printer's devil. The printer's shoulders are supposed to be broad enough to bear even the blame that justly belongs to the careless author himself. Anyhow, the proximate source of error being the printer, the remoter source the author is merged in the proximate. But whatever be the source of the evil, it is very unfortunate

that a question-paper, especially a public examination-paper, which decides the fate of numerous souls, should betray the carelessness of either the author or the printer or both. To use a legal phrase, such carelessness belongs to the genus of 'contributory negligence' and the examiner loses his case. Whatever compensations the examiner may think of in the 'post-mortem', whatever concessions he may show in marking after the evil has worked itself out in the answer papers, they cannot be deemed adequate to the wrong done to the poor examinees.

An irresponsible question leads to an irresponsible answer. At least in the examiner's self-interest to spare himself the dilemma of assessing ambiguous answers, a question should be worded as carefully and precisely as possible and the examiner ought to know exactly what answer he expects. I do not know whether any examining body—say, a University—insists on the examiners actually producing the full text of the answers to the questions set and not mere hints indifferently thrown out to the plodding assistants for valuation. Just like the question-papers (after the examination, of course), even the authorised answers thereof should be public property and boldly face public criticism. These conditions may appear a little hard on the examiner but it is the only way to make examinations a responsible business and not merely a remunerative one.

One other suggestion. When a board of examiners meets to discuss questions set, it will often be convenient if each examiner or paper-setter presents not merely his question-paper but also a brief resume of the answers expected, so that the board may be in a position to judge each question as much on

its own merits as on the answers they are intended to call forth. This is the best way of avoiding 'wolves in sheep's clothing,' i.e., apparently simple questions but really involving a great deal more than what the appearances warrant.

The suggestions outlined above may seem to imply a certain want of confidence in the

examining bodies. It is not so. While conceding that the examiners are the best of men with the best of intentions, one has to realise that they are yet human beings subject to common human foibles and weaknesses, which it is our duty to safeguard against as far as possible. The Homers of to-day not as much as, if not more than, their Greek prototype is supposed to.

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DURING the last century, it was in Germany, much more than in France or even in England, that the study of Indology—of Indian languages, literatures and culture—enjoyed conspicuous popularity. In the land of Weber and Max Muller, the study of this subject was pursued with an enthusiasm and an intensiveness that are characteristically the German's own. The *elan* was all due to the reaction of that new-born sense of wonder, of that newly-awakened spirit of enquiry initiated by romanticism, on the introspective mind of the Teuton, which thereupon fled to the enchanting realms of Oriental, and particularly of Indian philosophy and culture. While thus in Germany a brilliant galaxy of Sanskritists were distinguishing themselves by their studies of ancient Hindu culture, there were at this time comparatively few in France working in this field. It is true that Burnouf in the earlier half of the century, and Sylvain Levi and Emile Senart in the later half attained conspicuous eminence in their respective spheres of Indology; but these are

perhaps the only French scholars of the last century, who could claim a place by the side of that illustrious band of nineteenth century German Sanskritists to whose labours should be ascribed in a large degree the high prominence attached to Indological research in the West to-day.

But within the last twenty years, and especially within the last decade, the interest of French scholars in things Indian has been awakened as never before. The phenomenal popularity of Tagore in Europe following upon the award of the Nobel Prize to him, the ecstatic homage paid by a French sage to the personality and work of Gandhiji, and the noble and selfless cultural propaganda organised by a group of Indian scholars (like Dr. Kalidas Nag),—all these helped forward the growing interest of the scholar-world of France in the arts, literatures and languages of India. Sylvain Levi himself and a devoted band of his students and colleagues are to-day, by their distinguished researches, making Paris one of the most important centres of Indianist scholarship and learning. The *Société Asiatique*, the *Association des amis de l'Orient* and even the *Ecole Française d'Extrême-Orient* (which primarily concerns itself with the ancient civilisations of Indo-China) are devoting great attention to the study of India and her culture. The fields of Indian Linguistics, Comparative Ethnology, etc., have also not been left out. Prof. Jules Bloch of the *Ecole des Langues Orientales* has, by his brilliant researches, proved himself to be one of the greatest authorities on Indo-Aryan; M. Jean Przylusky of the same school has won his way to the front rank of European Indologists by his comprehensive studies of Buddhism, by his analytical and comparative enquiries into the constitution of ancient

* (1) *A Quatre Voix*: par Rabindranath Tagore —Traduction de Madeleine Rolland précédée d'une étude sur Tagore par Romain Rolland —collection de la Revue Européenne—Published by S. KRA, Paris.

(2) *Kalidasa: Le Raghuvarsha*—Traduit du Sanskrit par Louis Renou—Published by Paul Geuthner, Librairie Orientaliste, Paris.

(3) *L'Ethnologie du Bengale*: par Biren Bonnerjea—Published by Paul Geuthner, Librairie Orientaliste, Paris.

Indian culture and, above all, by his epoch-making discoveries of the influence of the non-Aryan Indian (Austrian) element on Indo-Aryan languages and culture. The atmosphere thus created has made Paris a veritable *foyer* of Indianist research, which in the years to come is bound to attract such large numbers of students from India that the need for a residential institute exclusively for Indian students has already been envisaged and partially given effect to.

In an atmosphere so favourable to the study of things Indian, it is only to be expected that publications dealing not merely with the research-aspects of Indian culture but also with the popular and more widely appealing side of modern India and her literatures, should appear more often than before. When in 1913 the poet Rabindranath Tagore cast a spell over the European peoples, it was more the personality of the sage and the charm of his literary style than his philosophy, that appealed to the large masses of the reading public of Europe; but in a brilliant French translation by P. P. Jouve of Tagore's Bengali work *Balika*, French readers were enabled to taste something of the genuine Tagorean dish. This French translation owed its success to the collaboration of a French poet (P. P. Jouve) with the Bengali scholar, Dr. Kalidas Nag. Such happy collaborations are but rarely possible, and the task of interpreting, through translations or otherwise, the genius of Tagore is indeed a difficult one for the Westerner. But, happily for India and happily for the West, Europeans equipped with the necessary knowledge and endowed with the necessary sympathy for appreciating Tagore, have not been wanting; and no one in France is more fitted by temperament, outlook and sympathy

for this task than the family of the Rollands. And therefore when under the immediate supervision of M. Romain Rolland, his sister Madeleine has produced the translation of one of Tagore's later stories (*Chaturāṅgā*), one could feel sure that the reputation of Rabindranath is safe and that his genuine personality itself is interpreted to the French public. This novel appeared for the first time in the original Bengali in 1915 in *Sabuj Patra*. We may observe here that though it was rendered into English by the late W. W. Pearson for the columns of the *Modern Review*, the English version has not so far appeared in book form. In the course of a penetrating introduction, M. Romain Rolland observes: "Europe has paid less attention to Tagore's works of observation than to his works of poetic and prophetic illumination; for while the poems and the large essays have a universal character, the sphere of observation of his romances and novels is naturally Indian. But it is precisely for this reason that these novels and romances should to-day attract the attention of all those who, already fascinated by the refulgent light which they see rising yonder, radiated by the Indian sun, seek to know the people who have produced living geniuses like Tagore, Aurobindo Ghose, J. C. Bose and the saint Gandhi."

It is as a picture of modern Bengali society that Rolland commends this work to the attention of his countrymen. And the picture is indeed a fascinating one, pervaded by the Tagorean blending of subtle satire and colourful romance. The main *motif* of the tale is the God-Quest of Satish. Not in the vigorous daring atheism of his uncle Jagmohan, not in the *kirtans* and *prayers* of Lilanandaswami, nor indeed in

the captivating charms of Damini, does Satish recognise his God,—but he finds it at last, after bitter struggling and striving, in his own soul. "There was a time" says he, referring to the days of his discipleship under Jagmohan, "when I relied on reason, only to find that logic could not support all the burden of life. Another day came when I relied on emotion, only to discover that it was a limitless abyss... Man can rely only on his own self and soul..." Again, in reply to the advice of his bewildered friend Srivilas that he should seek the help of a *Guru*, Satish bursts forth: "Will you never understand that I do not run after a geographical truth? He-Who-Is-Above-All can come to me only along the path that is mine own. The path of the *Guru* leads only to the *Guru's* door." The creation of this character is at once a triumph of artistic achievement and a master-stroke of moralistic penetration.

The sorrowful lot of the widow Damini, though a subsidiary motive, equally evokes the best powers of the Bengali bard. Tagore's women are, like Meredith's women, elemental, allied to the great Mother Nature. Damini in this story is a more pathetic figure than Vinodini in *Chokher Bali*; her agony in gradually becoming aware of the distance that separated her from Satish, her utter disregard for Lilanandaswami and his crew who were more anxious to gather disciples than to foster or inspire conviction, and her final submission to the will of Satish who dictated to her that *she* should not stand in *his* path, are elements that would powerfully move the reader. The problem of the widow which is a part of the larger problem of the Indian *ewig weibliche* is nowhere more acutely analysed than in the stories of Tagore. By virtue of the combination of unique teaching, infinite

pathos, mild satire, profound analysis and, above all, the air of romance in which the story is bathed, this work takes a very high place among similar productions of the world.

The value of the French volume is also considerably enhanced by the inclusion in it of M. Romain Rolland's study of Rabindranath's literary genius. While M. Rolland has elsewhere brilliantly discussed various aspects of Tagore's work and genius, this is perhaps the only place where the Western sage has given us a critical interpretation of the purely literary traits of the Eastern bard. And, in this critique, we find that the kinship of temperament and outlook has enabled M. Rolland to see into the essentials of Tagore's genius with deeper penetration and greater understanding than many another European. Short as the *Etude* is, it is a solid contribution to the literature of Tagore-criticism.

The Orientalist Publisher, Paul Geuthner of Paris, has brought out recently in the *Joyaux de l'orient* series an excellent literal prose translation of Kalidasa's *Raghuvamśa*. The difficulties of adequately transferring the charm of the original Sanskrit verses of Kalidasa into a European language are obvious; nevertheless, Prof. Renou (who appears to be a distinguished Sanskritist) has successfully carried out the task he has set before himself "to reproduce for French ears the rhythm of each stanza; the four clearly demarcated lines; the movement sometimes swift and sustained, as in the short epic metres and at other times slow-placed and sinuous as in the long lyric metres; and the concerted march towards the *finale* in which often is deliberately fixed the crucial word

which lights up the sum-total and makes it rebound towards fresh possibilities."

In the *Avant-propos*, Prof. Renou gives a sketch of the distinguishing characteristics of Kalidasa's theme and treatment, especially as seen through the eyes of the Westerner: Kalidasa's choice of a limited number of episodes which would lend themselves to the expression of various *rasas*; the disconcerting (to the Westerner!) concision which this inevitably involves; the subordination of even the unity of the episode to the unity of the stanza; the metaphors which, instead of being more or less precisely adapted to the idea illustrated, are often carried to the most minute shades of fidelity in a continuous parallelism; the use of alliteration, assonance, play upon words, and of the device whereby two different meanings may be conveyed by the same stanza according to the stand-point from which it is viewed; and finally the veritable grandeur to which the verses attain, in spite of all such devices.

"Kalidasa," says Prof. Renou, "furnishes us with aspects which are less direct and more subtle than those to which we are accustomed in Western art, and his treatment might be compared in this respect to some of the efforts of the contemporary spirit of Europe."

The analytical modern languages of Europe cannot easily convey the swing and the dance of elaborately constructed Sanskrit strophes; yet through the preservation (as far as inevitable limitations would permit) of the order of words and of ideas, M. Renou has done all that could be done in transferring the spirit of the original to his rendering:

नृत्यं मयूराः कुसुमानि वृक्षा दर्मानुपात्ताम्बिजहृदिः ।
तस्याः प्रपन्ने समदुःखभावमत्यन्तमाशीद्रुदितं वनेऽपि ॥

"Alors les paons délaissèrent leurs danses, les arbres leurs fleurs, les gazelles leur herbe déjà saisie; il y eut à travers la forêt, compagnie de son malheur, une immense lamentation."

Or, take the lines depicting the sorrow of Rama after exiling Sita:

बभूव रामः सहसा सवाष्पस्तुषारवर्षाव सहस्यचन्द्रः ।
कौलीनभीतेन गृहान्निरस्ता न तेन वैदेह्युता मनस्तः ॥

"Rama, aussitôt, éclata en sanglots, comme la lune de Pausa qui répand le frimas. Car s'il avait, par crainte de la calomnie, chassé de sa maison la fille du Vaideha, il n'avait pu la chasser de son cœur."

The translator, as will be evident from these instances, has succeeded, through the adoption of a singularly cunning metaphrastic method, in conveying fully the emphasis of the main ideas, and something at least of the march and the ring of the Sanskrit original.

We heartily welcome this volume as one of the best of Kalidasa-translations and would recommend the study and adoption of Prof. Renou's dexterous method to those who might try their hand at rendering Kalidasa's verses into other languages.

Another recent publication of the Paris Publisher, Paul Geuthner, is a volume in French on the Ethnology of Bengal from the pen of a Bengali scholar, Dr. Biren Bonnerjea. Besides a *resumé* of the important researches of Kiskey and others, the author claims to have given the results of his independent investigations also. Chapters I to IV of this richly documented book deal with Ethnology proper, and the remaining portion with Folk-lore. To us in the south of India, the most interesting of all topics is that dealing with the Dravidian and the

Kolarian elements in the population of Bengal. Unfortunately the author in Ch. II clubs together the Kolarians and the Dravidians, and makes no attempt at marking off their respective characteristics or social traits and traditions. Though it may be true that there has been much mixing-up of blood between the Kolarians and the Dravidians of Bengal, we fear that the author is rather too absolute in classifying the Oraons (who speak the Dravidian language Kurukh) as Kolarians, and conversely the Santals (who speak a Kolarian language) as Dravidians. In this connection we might draw the attention of our readers to a most interesting paper from the pen of Prof. Jean Przylusky, recently published in the columns of the *Revue de l'Histoire des Religions*, on *Vegetalism and Totemism* in India. M. Przylusky convincingly demonstrates in this paper that the fundamental difference between Dravidian and Kolarian lies in the fact that, while the ancient Dravidians were *vegetalists* the Kolarians were *totemists*. The institution of *pūjā* now so prominent in modern Hinduism was the contribution of the former, while the barbaric human sacrifices that

certain classes of Hindus practised till a half-century or more ago, were copied from the Kolarians. After an elaborate survey of the characteristics of these two (Dravidian and Kolarian) cultures of India, M. Przylusky sums up by observing that in modern India three different religious divisions could be distinguished, corresponding probably to three superposed ethnic strata: (1) the most ancient of these (Dravidian) which offered worship to the gods by decorating them with flowers, unguents and pigments but did not offer them sacrificial victims; (2) another (Kolarian), which offered sacrifices, the essential elements of which were raw flesh and warm blood; and (3) the latest-come of the three—the Aryan—which favoured sacrifices, not of raw flesh and warm blood, but of cooked flesh and of libations of the inebriating liquor *soma*. A very fruitful line of enquiry has thus been opened up by M. Przylusky for ethnologists and we hope that scholars like Dr. Biren Bonnerjea would pursue it with researches of their own among the Kolarian and Dravidian populations of Bengal and elsewhere.

TATTVA-TRAYA

OR

APHORISMS ON THE THREE VERITIES, SOUL, MATTER and GOD,

By SRI PILLAI LOKACHARYA

TRANSLATED BY

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ON A DESIRABLE ORIENTATION IN MATHEMATICAL TEACHING AND EXAMINATIONS.

BY

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Working Mathematics:—The popular notion regarding mathematics is that it is a thing to be 'worked' and not studied or appreciated or enjoyed like a novel or a poem. This plebeian association of 'work' and 'mathematics' engenders an instinctive dislike for the subject, for it is but natural that man's dislike for 'work' should be carried over to 'mathematics.' Further, work suggests a certain mechanical element and one is apt to think of mathematics just in the same way as drawing or drill which consists in carrying out certain isolated and empirical sets of movements under the guidance of an instructor. It is unfortunate that mathematics is commonly taught and examined in schools and colleges, just like drawing or drill, the pupils mechanically repeating certain sets of processes to get familiar with them and applying them always to the same stereotyped situations; this tradition has justified the popular phrase 'working mathematics.' There is, however, nothing wrong in the denotation of the phrase, but custom has associated with it certain wrong connotations. The right connotation of 'work' is creative work, work with an aim, illustrated by the usage 'poetical works,' 'work of art,' and so on. The little problems in mathematics that engage the attention of boys at school are tiny bits of creative work, provided they are done with an insight and understanding and not mechanically in blind imitation of a model.

A Desirable Orientation:—It is the object of this paper to suggest a desirable orientation in mathematical teaching and examinations with a view to elevate the subject from its present mechanical level to the same status as (if possible, to a higher status than) literature or any other subject that is considered stimulating, pleasant and lovable for our boys.

Mathematics and Drudgery:—The trivial pages of an elementary text-book do not sufficiently set forth the real nature of mathematical ideas and their applications. They are content to give a dry mass of technical details unilluminated by a general conception. The teacher and the pupils plod through these technical details, year in and year out, in a philosophical disinterested manner, the teacher for the sake of his living and the pupil for the sake of his examination. The whole work is one monotonous drudgery relieved probably by the holidays on which the public and the authorities always cast an evil eye. This kind of teaching may be compared to 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.

Technical facility is no doubt 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. Wherever there is an opportunity, the general ideas behind mathematics must be brought out in bold relief to the

pupils so that they may understand and appreciate them.

General Ideas:—A true mathematician is always on the look-out for general ideas. The concrete particulars are of interest to him only in so far as they are manifestations or illustrations of the general principles lurking behind them. To quote an anecdote from Galileo's life: when Galileo was interviewed by some members of a guild who wanted their pumps to be altered so as to raise water to a height greater than thirty feet, he remarked that it might be desirable first to find out why the water rose at all. When a bystander suggested the explanation that Nature abhorred a vacuum, Galileo commented that apparently it is only a vacuum less than thirty feet.

It is the duty of the mathematics teacher to create in the pupils the taste for general ideas, to take them behind the veil of the apparently meaningless mathematical symbolism and lead them on to the enchanted island of generalisation; for the spirit and essence of mathematics is 'generality.' Several side excursions are necessary for this deeper plunge into the subject, so that mathematical instruction may not degenerate into superficial floating on symbols. The why and the wherefore of even such tame things as the brackets, the decimal notation, the rule of signs, could be definitely and systematically gone into in a popular and convincing manner, so that the boys feel that they are *necessary incidents and steps* in the development of mathematics and not arbitrary affairs invented just to tease them. The unity and harmony among apparently divergent fields of mathematics (say, Arithmetic, Algebra, Geometry), how one branch lends its helping hand to the development of another, and

thereby helps also its own growth, can be abundantly illustrated even in the small range of elementary mathematics. For instance, the theorem of Pythagoras has its obvious applications in so many fields of mathematics.

Another fact that can be pointed out in the course of the class-room mathematical instruction is the beautiful way in which every bit of previous knowledge is utilised in mathematical work—witness the succession of theorems in Geometry, how every link in the chain is important—and also the wonderful economy in the organisation of mathematical ideas. There is absolutely nothing lost or wasted.

Appreciation Lessons in Mathematics:—Let it not be presumed that there is scope for appreciation lessons only in poetry. It is possible to give appreciation lessons in mathematics and I dare say with greater success than a similar lesson in a piece of poetry written in a foreign language. We have only to introduce to the boys Dr. Abbott's *Flatland* where geometrical figures are characters enacting funny scenes and behaving just like human beings with all their strong and weak points, or *The Life and Letters of Lewis Carroll*. A teacher with a little imagination can devise semi-popular lessons on such subjects as the beauties of the cube, the romance of an algebraic formula, or the adventures of the unknown in an equation. Boys can also be trained to write semi-popular essays on mathematical topics such as: the services rendered by the symbol '0,' the distinction between constants and variables, and the genealogy of number. One may also indulge occasionally in such speculations as the possible alternatives for the decimal system of notation.

Numerous ways similar to those outlined above will suggest themselves to any thoughtful and enthusiastic teacher to enliven mathematical instruction, and to make the pupils feel the beauty, importance and significance of mathematical studies.

Examination Grinding:—I believe certain teachers and many parents may consider that deviations from the rut are waste of time and that time would have been well spent on the solution of isolated types of problems of examination interest. But I should point out that such an examination grinding (which is analogous to the learning of nonsense syllables) is a sheer waste and prostitution of one's intellectual powers for the sake of the immediate gain in the examination, which is also very doubtful; for the examiners may be sometimes freakish and the expected types may not occur and even if they occur, your memory may play you false, especially since it has not been trained on rational lines. The tradition of working isolated types kills originality and individual talent and fosters a wrong notion of the nature of mathematics, just as a pupil fed purely on the small sentences in a grammar book that are constructed to illustrate grammatical rules may perhaps know some rules of grammar but be utterly incompetent to write any original composition or to appreciate literature.

The working of isolated types must not be the sole basis of our mathematical studies, but should be supported by proper grounding in general ideas, of which these isolated types are mere applications or illustrations. If the general ideas are thoroughly grasped, a little training in a few of the applications is all that is necessary and the pupil will be in a position to work out for himself novel applications of the general idea or devise methods of attack-

ing original problems, problems not of the type specifically drilled in the class-room. In the present system (if we may call it a system) of teaching, our pupils are utterly helpless in meeting even slightly altered situations, in penetrating through even thin disguises and recognising the identity underneath. This indicates how superficial is the whole mathematical course from top to toe, from the College to the High School, our Colleges being nothing but glorified High Schools. This superficiality is reflected naturally in the examinations. Questions are set on the standard types drilled in the class-room and the boys who have developed 'psittacism' to the highest degree come out with brilliant colours, while one who has a true taste for his subject rarely shines in examinations. The famous S. Ramanujan, F. R. S., whose works are the glory of Indian mathematical genius could not pass the old F.A. Examination of the Madras University!

Mathematics and Common Sense:—To the lay mind, mathematics is a kind of game played with meaningless (nonsense) symbols on paper. It is supposed to be hard, crabbed and repulsive to common sense. People will take you for a crank if you say it is 'sublimated common sense.'

This view has gained general currency from the way in which mathematics is handled in schools and colleges as a bundle of rules and processes to be memorised, drilled in, and applied to time-honoured types of problems. In the general race for exhausting the possible types, the general ideas and the common sense behind the mathematical work are not properly emphasized, nay, entirely ignored. Confining oneself to High School topics, one may pertinently inquire whether our S.S.L.C.

boys have appreciated the advantages suggested by common sense in the use of brackets and the Σ notation, whether they are in the habit of putting themselves common sense questions in deciding whether brokerage is to be added or subtracted in the purchase and sale of stocks and shares, and whether they have cultivated the power of giving a common sense analysis of an arithmetical situation. Are our boys aware that in Geometry, Euclid has systematised a method by which if you once stray from common sense, you are made to stray further and further from it, until the absurdity is laid bare before you?

It is interesting as well as useful to note in this connection that W. K. Clifford (1845—1879), one of the most promising British mathematicians of his day and a brilliant expounder of mathematical principles, has written a whole book on *The Common Sense of the Exact Sciences*, which is well worth careful perusal by every student of science and mathematics.

The absence of the exercise of common sense in mathematical work leads to many grievous errors in examinations and many of these I have pointed out in my report* on the performance of the candidates at the S.S.L.C. Examination of 1927. To give an instance, failure to note the significance or the propriety of an answer obtained is very common, for no student who professes to possess a grain of common sense will give 2 as the number of sides of a polygon. Reasoning by false analogy can be also traced to the same source;

* Vide pp. 6, 7, 9 and 10 (Report from the examiners on the performance of the candidates at the S.S.L.C. Examination of 1927—issued by the Department of Public Instruction, Bangalore.)

e. g., on the analogy of equating to zero each of the factors of an expression equated to zero a candidate applies the principle to non-zero cases also. This is nothing but a gross dereliction of common sense.

Wrong generalisations may easily be avoided by a little exercise of common sense.

Hence in the new orientation of mathematical studies, it is desirable that common sense plays a prominent part and the relation of common sense to mathematics is explicitly brought out. Be it noted also that of all the school subjects, mathematics bears the closest affinity to common sense and sometimes when you are off the track of common sense in any mathematical work, the final result reminds you of your error and thus helps to set you right.

Joy and Inspiration in Mathematics:—Another popular misconception regarding mathematics is that it is a painful subject. The mathematical course is often considered to be a necessary evil and is justified sometimes by its intrinsic difficulty as if the pupils accustomed early in life to painful situations can endure with better fortitude possible future hardships in life.

Mathematics is no doubt a difficult subject, but our presentation of it makes it still more difficult. Our system of mathematical education carefully excludes all the interesting portions in mathematics and presents simply the dry bones as meat food for the growing mind. It is time that proper steps are taken to reorganise mathematical studies on pleasant lines, though it may seem strange that I should suggest an intrinsic joy in mathematics.

For attesting that mathematics can be a source of pleasure, there cannot be better

evidence than that of the famous Hindu mathematician, Bhaskara, who says:

‘अतो बीजं प्रवक्ष्यामि गणकानन्दकारकम्’

implying thereby that Algebra is a joy to mathematicians. Need I add that several leading men of science have openly declared their passionate love for mathematics? Archimedes' refusal to follow the soldier from the enemy's camp until he had worked out his problem to a demonstration (which unfortunately ended in the brute's slaying Archimedes with a sword) is an instance (though tragic) of the intense devotion and love that mathematics can claim as its due. The discovery of new mathematical ideas has often given a thrill of joy to the discoverer—a thrill which is infectious and transmitted to others also; for instance, the discovery of logarithms by Napier has been a source of pleasure and delight not merely to the inventor, but to mathematicians like Kepler and Briggs. Cannot our boys at school and college share the thrills of our mathematical discoverers provided they are introduced to them at the proper psychological moment?

The lives and thoughts of the great mathematicians that have lived in the past and the inspirational utterances of the leading ones of our own times can be made available to our boys to impart the sense of true joy in mathematics. Would only our boys listen to extracts from D. E. Smith's essay on *Mathematics and Citizenship* or read G. H. Hardy's remarkable sketch of the life of S. Ramanujan! Is it not an irony of fate that our mathematical graduates, while they study so much about the great names of English literature, should be strangers to their illustrious mathematical forefathers Aryabhata, Brahmagupta and Bhaskara? The study of mathematical

literature is an essential requisite of at least the collegiate course in mathematics and it is a defect in our education to shut out the mathematical student from the ennobling and elevating influence of first-hand acquaintance with the works of the great leaders in mathematics like Euclid, Diophantus, Pascal, Fermat, Descartes, Newton, Leibnitz, Cauchy, Lagrange, Euler, and Gauss.

Mathematical Clubs:—The organisation of mathematical clubs with the express object of showing the fascination of mathematics and exploring the side-tracks is another effective method in leading boys to the enjoyment of mathematics. The members of the club may be induced to propose problems for pleasure, such as recreation problems, prepare and compile mathematical anecdotes, and read papers on such interesting topics as 'Women Mathematicians,' 'Mathematical Fallacies,' 'Paper folding Feats,' 'Dissection,' 'Magic Squares,' 'Exploded Theories in Mathematics' and 'Prize Problems'; the more imaginative members may write mathematical stories and organise mathematical scenes on the lines of Dr. Abbot's *Flatland*; those who have the collective instinct strong in them can compile famous and striking mathematical sayings, for example, 'Give me a fulcrum and I will move the Earth' (Archimedes); 'The laws of nature are but the mathematical thoughts of God' (Kepler); again, others with definite aesthetic tastes may vie with one another in the construction of the most artistic geometrical designs and patterns such as foliage designs for stone-work and tiles. Numerous activities of the kind outlined above will suggest themselves to enthusiastic teachers and students when once the club is started and organised under favourable circumstances. The extra text-book studies to which

the students will thus be naturally led in connection with their club activities have the further advantage of giving the students glimpses of the true nature and extent of mathematics and they will be in a position to appreciate the remark of the famous Cambridge mathematician, Arthur Cayley; that mathematics is like a vast expanse of 'beautiful country seen at first in the distance, which will bear to be rambled through and studied in every detail of hill-side and valley, stream, rock, wood, and flower.' I may add that in America, under-graduate mathematical clubs have been organised in several colleges with success; notices of the work of these clubs are published in the American Mathematical monthly, the official journal of the Mathematical Association of America.

Mathematical Library and Laboratory:—A word about the mathematical library and laboratory. Our mathematical libraries are generally stocked with lots of indifferent mathematical text-books which are very often paraphrases of one another, while the mathematical laboratory is not in existence at all. Books dealing with the popular side of mathematics, biographies of mathematicians, history of mathematics, books containing mathematical essays and recreations, books on mathematical philosophy and foundations of mathematics, books containing mathematical gossip such as White's *Scrap Book of Mathematics*, books of general mathematical information like Smith's *Rara Arithmetica* and Miller's *Historical Introduction to Mathematical Literature*, stories of mathematical developments in different countries and at different times, interesting and useful magazines, such as the *Mathematical Gazette*, the *American Mathematical Monthly*, of a fairly elementary character devoted to popularising mathe-

matics, mathematical charts, tables, models, and instruments, simple calculating machines, paintings, portraits and photos of famous mathematicians of the past and the present—all these in addition to the usual standard text-books, form the most urgent and necessary equipment of the mathematical library and laboratory.

Mathematical Examinations:—With the new orientation in mathematical teaching must follow as a necessary sequel changes in the nature of the examination. A student who has taken active part in the mathematical club and has tasted and enjoyed the general ideas and the common sense behind mathematical developments and lived the full mathematical life contemplated in the new orientation, needs no examination to test his mathematical powers. He must necessarily have received a broad mathematical education capable of exercising the happiest influence over the formation of his mind. If a test be indeed necessary, it may take some such form as follows:—

(a) Written tests:

1. To judge speed and accuracy in purely mechanical manipulations such as solving an equation, simplification, solution of triangles, computation of tables and drawing graphs.
2. To gauge the understanding of mathematical notation, and mastery of mathematical principles and reasoning. Let there be a clear understanding that a mere dumb show of steps in a mathematical demonstration without explanations will not be accepted.
3. To measure the power of application of mathematical principles to new situations—concrete as well as abstract.

(b) Written dissertations or essays on general mathematical topics, e.g., the role of logs in mathematical computations.

(c) *Viva-voce* tests to find out the extent of the candidate's general mathematical outlook and, to probe the real depth of his understanding as revealed in his written work.

Conclusion:—The need for a new orientation on the lines outlined above, I have often deeply felt in the class-room while with my students, I am forced by circumstances to drag the Juggernaut of a medieval mathe-

matical tradition. It is a pity, of course, that there are still numerous devotees who, in their misdirected zeal voluntarily throw themselves under the wheels of this Juggernaut in the hope of an ultimate salvation. But it is our duty as mathematics teachers to co-operate and so organise mathematical education as to enable our pupils to live and move in a happy and real mathematical atmosphere—an atmosphere with a glorious tradition in the past, a triumphant existence in the present and a brilliant prospect in the future—*The Mysore University Magazine*: March 1929.

GENERAL MATHEMATICS (TAMIL RENDERING)

By

V. RAGHUNATHA AIYAR, B.A., L.T.

Deputy Inspector of Schools, Madura Range.

The Tamil rendering of the above book is specially issued so that pupils in the Tamil districts who are weak in General Mathematics may secure with ease a decent degree of efficiency in it. A course through the book may reveal that offering to answer the S. S. L. C. General Mathematics Paper in Tamil is a point of vantage indeed to the pupils.

Advance copies of the first 208 pages of the book have been issued to enable such of the schools as wish to adopt the vernacular medium to do so from the beginning of this school year.

D. Cr. 16 mo. 208 pages. 10 as.

CONTENTS.

அத்தியாயம் I. (i) எண்கு விதிகள்; (ii) வகுப்பெண்ணும் பெருக்கெண்ணும்; (iii) சித்கூப்பெண்கள்; (iv) பதின் பாகவெண்கள். II. (i) எழுத்துக்குறிகள்; (ii) உடன்பாட்டு, எதிர்மறை எண்கள்; (iii) செவ்வியவகை விதிகள். III. இணைவு; செவ்விய வடிவங்கள்: வட்டங்கள்; கோணம்; தங்குவகைகள்; முக்கோணம். V. தகவும் படிசம். VI. சராசரி. VII. தூற்றக்கு வீதம் அளவு. VIII. பாய்வு அளவு IX. வட்டம். X. பருமன். XI. ஏறத்தாழச் சுருக்கி விடை அளவு. XII. வட்டக்கு வட்டம். XIII. இணைவு (தொடர்ச்சி).

The remaining portion will be ready in September next.

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

SCHOOL EQUIPMENT FOR NATURE TEACHING.

By

Mr. T. E. V. SARMA, M.R.A.S. (London),
Editor, "The Student," Chingleput.

The School Museum. The museum forms an important part as the equipment for nature teaching in schools. In every school a room should be set apart for the exhibition of specimens for study in connection with plant and animal life. Most of the things for the school museum should be secured through the children by utilising their collecting instinct and exercise of their love of doing. When pupils are studying a particular topic, leaves and their forms for example, they could be directed to collect during their excursions as many representative specimens as possible to illustrate the various types of leaves. These, dried between sheets of blotting paper and mounted on card-boards may be exhibited in the museum with a short description of each specimen. Similarly when the children are studying rocks they could gather specimens of different kinds of them and place them in the museum. It is important that the exhibits should be arranged in some intelligent order easily understood by the pupils. The following are among those things suitable for a school museum.

1. Dead specimens of butterflies and moths of the districts preserved in special cases.

2. Sands from different places and the rocks from which they had been formed.

3. Pebbles, minerals, ores, rock specimens, and fossils.

4. Shells to illustrate different structures and shapes.

5. Slices of different kinds of trees to show rays and rings.

6. Seeds and fruits to show (a) methods of seed dispersal, (b) types of simple, aggregate and multiple fruits.

7. Specimens of leaves preserved, mounted to show differences in shape, venation, margin and method of attachment.

8. Stuffed birds and reptiles, deserted nests of birds.

9. Scorpion in solution of formalin or in alcohol.

10. Teeth of various species of mammals, different kinds of feathers of birds, scales, slough of snake, some pictures or photographs of natural phenomena, such as waterfall, mountains, springs, rainbow, etc.

Teacher and pupil should co-operate with one another in securing things for the school museum, and thus gathered, the things are of greater value than those in public museums, since they are not only readily available for class instruction but are a constant source of pride to the children and of emulation to their mates. In this connection the teacher is warned that he would incur a serious responsibility if he asks his pupils to bring poisonous creatures such as scorpions, snakes, etc. It is better that the teacher makes his own arrangement to procure such creatures when required. We thus see that the school museum is not a repository of curiosities exhibited to please the sight-seer but a collection of natural objects, every one of which is to be used in class instruction.

But after all the museum is not an end in itself. It is simply an adjunct in nature-teaching and when living specimens are available, they should always be preferred to

the dead objects in the museum. Far more important than the school museum are the school garden and the *quarium*.

For the purposes of studying the life-history of the frog, the life habits of the fish, or other water animals, an aquarium is necessary. This may consist of a glass trough containing water, with provision for frequent aeration of the water. In order to make the surroundings of the aquatic animals as natural as possible, sand, pebbles and water-weeds should be placed in the water. Care should be taken not to place animals which are inimical to each other, in the same trough, and also to keep fresh water and marine animals in a separate aquarium.

For the purpose of weather study, the school should have a good barometer with thermometer attached, a wet and dry bulb hygrometer, a rain gauge and a maximum and minimum thermometer. The barometer and the thermometers should be placed in a shady place at a convenient height and the rain-gauge should be kept in an open space at a higher level than the ground.

EDUCATION AND MORALITY.

By MR. RAMESH CHANDRA BANERJEE, M.A.,
Narail Victoria College, Jessore.

Has education, truly speaking, been successful in elevating the moral character of men? This is the question that suggests itself when we observe the conduct of the civilized men of the world.

To quote some eminent English thinkers on the subject—Ruskin says:—

"I do not care that children as a rule should learn either reading or writing because there are very few people in this world who get any good by either. Broadly and practically, whatever foolish people read does them harm; and whatever they write does other people harm."

A still greater authority, perhaps, namely, Herbert Spencer, once said:—

"So far, indeed, from proving that morality is increased by education, the facts prove, if anything, the reverse. It has been shown from Government returns that the number of juvenile offenders in the Metropolis area has been steadily increasing every year since the institution of the Ragged School Union, and that the number of criminals who cannot read and write has decreased and the number of those who can read and write imperfectly has increased. And speaking of the women employed in the iron works and collieries throughout South Wales, a writer says—'their ignorance is absolutely awful; yet the returns show in them a singular immunity from crime.' The fact is that scarcely any connexion exists between morality and the discipline of ordinary teaching. Mere culture of the intellect (and education usually conducted amounts to little more) is hardly at all opera-

tive upon conduct. Intellect is not a power but an instrument—not a thing which itself moves and works but a thing which is moved and worked by forces behind it. To say that men are ruled by reason is as irrational as to say that men are ruled by their eyes. Reason is an eye—the eye through which desires see their way to gratification. And educating it only makes it a better eye—gives it a vision more accurate and more comprehensive—does not at all alter the desires subserved by it. Did much knowledge and piercing intelligence suffice to make men good, then Bacon should have been honest and Napoleon should have been just."

Men devoid of virtue become more dangerous to society if their intellect is sharpened by education than if they were left alone. To quote an Indian author on the point: "As was anticipated by Herbert Spencer there has been an appalling enhancement of crimes of a Machiavellian character, crimes that elude clutches of law but which on the whole are much more dangerous to society than crimes that come within its grasp."

Froude says:—"From the great houses in the city of London to the village grocer, the commercial life of England has been saturated with fraud. So deep it has gone that a strictly honest tradesman can hardly hold his ground against competition. You can no longer trust that any article you buy is the thing which it pretends to be. We have false weights, false measures, cheating and shoddy everywhere."

Lecky, another eminent thinker, says:—"It is much to be questioned whether the greatest criminals are to be found within the walls of prisons. Dishonesty on a small scale nearly always finds its punishment. Dishonesty on

a gigantic scale continually escapes. In the management of companies, in the great fields of industrial enterprise and speculation, gigantic fortunes are acquired by the ruin of multitudes; and by methods which though they avoid legal penalties are essentially fraudulent. In the majority of cases these crimes are perpetrated by educated men who are in possession of all the necessities of most comforts, and of many luxuries of life, and some of the worst of them are powerfully favoured by the conditions of modern civilization."

Frederic Harrison is reported to have said:—"The boom in education has not brought any nobler literature, any greater art, any purer drama, any finer manners. Serious literature is being choked out by the increased cost of printing, the abolition of a leisured class able to study in peace and to produce from its learning, and by the mad whirl of modern existence. The result of this chaos in spiritual and moral training is a manifest loosening of the canons of moral life, the defiance of discipline by the young and ambitious, the mockery of age and all the lessons of age, worst of all, the sacrifice of family as a moral institution."

If we turn to our own country, things do not seem to be more hopeful. Lawyers, medical doctors and politicians are no doubt educated men. How many of them, may we ask, seem to have a scrupulous regard for truth and honesty and how many are capable of rendering disinterested service to the country? How many lawyers, for instance, are there who will hesitate to undertake the defence of a thief or a murderer knowing him to be such? How many doctors are there who will frankly and openly confess their error in

diagnosing a disease? Do we not see before our eyes eminent politicians changing their creed and principle, not on account of the discovery of the wrongness of their views, but simply to seek or maintain popularity, or to wreak vengeance on a political enemy? Instances are not wanting of some of the most distinguished public men of India who unfairly forced their individual will on a cringing committee or senate and ruthlessly persecuted any one who dared to raise a voice of protest. In Bengal, at least, it is known to many how one or two of her greatest sons did not consider any means too low to protect their satellites or to put them on the way to prosperity.

In educational field, unfairness, injustice, partiality make their appearance very prominently on many occasions. Apart from the alleged manipulation of marks in the highest examinations of the University which were discussed in the press, I have reports from authentic sources of the most scandalous misconduct of "guards" at two district centres of matriculation examination. These supervisors are all educated men—some practising lawyers, others teachers. Yet they are reported to have helped the examinees by supplying text-books, working out sums, pointing out spelling mistakes, showing geometrical figures—in fact in all possible ways—at the examination hall. Any effort to set things right here is rendered fruitless by the perfect unanimity that exists between the helpers and the helped as to the necessity of concealing the truth. The result is that these things have continued for years together—all knowing the rotten condition but none daring to protest. Only the other year, a friend of mine—who was sent to act as a

supervisor at a matriculation centre—was assaulted by some students because he had the courage to protest against the conduct of another supervisor who was dictating answers to an examinee!

My point in drawing attention to the dark side of our public life is to emphasise the need of reform. Our educated men have a bright record as well of which we can justly be proud. But persistent efforts should be made to reduce the number of instances of vice and corruption.

To turn to the main subject, from a careful consideration of the matter, we are forced to the conclusion that the kind of education that prevails in our country—that is, a mere intellectual training, is not sufficient for moulding human character. Unless men are taught from childhood to be virtuous and God-fearing, greater intellectual equipment will bring greater capacity for committing vice. It will be an easy task for trained and educated swindlers and murderers to keep out of the reach of law.—*Education, Cawnpore, March 1929.*

MY BOOK FRIENDS—II.

By

MISS CORRIE GORDON, ED. B. (Edin.)

Teachers' College, Saidapet.

THE POEMS AND PLAYS OF OLIVER
GOLDSMITH.*

Like many another who has made his mark in art or literature, Goldsmith was originally intended for quite a different career. His family expected him to be a clergyman, and he spent some time as a medical student; but he never crossed the threshold of either of these professions. Before he finally settled down to literature, he had been quite a number of things, including an apothecary, a strolling musician, and a school-master. It is a remarkable fact, that in his early days he does not seem to have been seriously attracted to literature, and he eventually made writing his profession chiefly in order to escape from another profession which he detested.

It is worthy of note, too, that Goldsmith was not a very prolific writer, and that his reputation rests almost entirely upon one poem and two comedies. There is probably no better known poem in the language than his "Deserted Village," and his plays, after nearly two centuries, have an assured place among the permanent treasures of English literature.

Nevertheless, though nobody could honestly call them great, his writings are essentially pleasant and readable. The ballad of "Edwin and Angelina" would most likely come second to the "Deserted Village" in popular esteem, but most of the other short poems, notably "The Hunch of Venison" are illuminated by a sparkling wit and humour.

In re-reading the comedies, one is often struck by their curiously "modern" tone. In spite of the passage of more than a century and a half, they do not seem out of date in spirit.

* Published by Messrs. Dent in "Everyman's Library." 2s.

Here, for instance, is an excerpt from a dialogue in "The Good Natured Man," which might have been written yesterday.

"Croaker:—May be not. Indeed, what signifies whom they pervert in a country that has scarce any religion to lose? I'm only afraid for our wives and daughters.

Honeywood:—I have no apprehensions for the ladies, I assure you.

Croaker.—May be not. Indeed what signifies whether they be perverted or no? The women in my time were good for something. I have seen a lady dressed from top to toe in her own manufactures formerly. But now-a-days, the devil a thing of their own manufacture about them, except their faces."

Recognition of his merits was not won easily, and his financial rewards were trifling compared with what those of a successful poet and dramatist of to-day may be. Unfortunately for him, he was born after the era when literary men could rely upon wealthy patrons, and before the time when the general public bought books or went to plays in any great numbers.

There was a great deal of exasperating delay before his first play was produced and neither Garrick nor Colman to whom he offered it, gave him much encouragement. Even "She Stoops to Conquer," the better of the two plays, was looked at askance at first, and it was only Johnson's interposition that led Colman to bring it out on a specific date. However the enthusiasm of the first audience must have amply compensated the author.

Reviews and Notices.

THE GREAT CHEMISTS, BY E. J. HOLMYARD. (METHUEN & CO., LONDON, 1929). 137 Pages. Price 3s. 6d.

This is one of a series of little volumes on 'The Great Scientists' covering in a brief and readable manner the history of chemistry by recounting the lives and achievements of its great exponents from the earliest times to our own day. In selecting chemists for their brief biographical sketch, the author has been guided by a sense of historical continuity and limitation of space. Hence several prominent names which rightly share the title of 'great chemist' do not find a place in the book.

The book opens with a chapter on 'ancient times' and traces the state of chemistry during Arabic, Medical, Sceptical, Philogistic and Modern periods through the works of Jabir, Paracelsus, Boyle, Stahl, Priestley, Lavoisier, Dalton, Avogadro, Davy, Liebig, Kekulé, Pasteur, Arrhenius, Mendelieff and Sir William Ramsay. Photos of these chemists in their proper places would have considerably enhanced the attraction of the book.

A CLASS BOOK OF PHYSICAL CHEMISTRY, BY LOWRY AND SUGDEN. (MACMILLAN & CO., 1929). 433 pages. Price 6s. 6d.

This book was originally intended to be an additional part of the well-known Donington's Class-book of Chemistry but has been published separately to form an independent introduction to the study of physical chemistry. It follows the same line of arrangement as Donington's class book while the presentation is simple and elementary without any attempt 'to exploit unduly the more novel or personal points of view.'

The book consists of 16 chapters devoted to a study of the Gaseous, Liquid and Solid states, the Phase Rule of one and two components, solutions and osmotic laws, thermo- and electro-chemistry, the Law of Mass action, Colloids and Adsorption. Each chapter commences with the experimental verification of the laws followed by a theoretical consideration of the facts and ends with typical questions on the contents of the chapter.

The get-up is good. The book will be found very useful to those preparing for the B.A. (ii-A) Degree of the Madras and Andhra Universities, while it can be read with advantage as an introduction by ii-B students.

EVERY DAY SCIENCE, BY L. M. PARSONS. (MACMILLAN & CO., 1929). 695 pages. Price 8s. 6d.

"No school course in science can be regarded as complete or satisfactory if it neglects the interests

of the pupils in the natural world of living creatures around them and their own relations to the life of the community. Even to read newspaper reports of natural events and phenomena intelligently requires a general knowledge of things in the heavens above and the earth beneath, of common plants and animals, of life as a whole, including man and his mastery of nature." These words of the author express in clear language the purpose with which the present work has been brought out. It is an oft-repeated complaint that elementary science is not paid that much attention which is its due and one reason for this neglect is obviously the absence of a suitable text-book that could guide the teacher and the pupil. The teaching world cannot but be grateful to L. M. Parsons for this timely publication.

The book is published in three parts of which each is also available separately. Part I deals with Astronomy, Geology and Biology. Part II with Elementary Physics, and Part III with Elementary Chemistry. While the parts can be studied in any order, the author desires that the pupil should carry out experimental work in any one of them. There are no less than 380 illustrations selected from various quarters and the book itself is written in very easy elegant style which no pupil of average intelligence can fail to follow.

We are sure that the book will be recommended by the S.S.L.C. Board for the Secondary Schools of the Madras Presidency.

THE SECRET OF DOMESTIC LIFE (IN TAMIL). BY M. N. GANESA Aiyar. (C. DHARMALINGAM CHETTI & CO., CHOLAY, MADRAS). Pp. 572. Price Rs. 3.

This is a laudable attempt to provide in Tamil such information about personal life and sexual life as is calculated to be useful in preventing human ills, and which is so abundantly available in English. This book is modestly written almost from a very conservative point of view, and women and men who have no access to English books may derive a good deal of useful information for their personal guidance. Matters of sex deserve to be known and discussed much more frankly and thoroughly than at present, and this book is a good means for such fulfilment. Chapters are devoted to the generative organs, to pregnancy and childhood, to rules for the youth and the newly-married couples, to exercises of different kinds for physical improvement, and to love and married happiness. The case for birth-control is also suggested in the penultimate chapter. We will advise the author to be briefer in treatment, and to be bolder in mentioning the latest ideas in sex life.

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SENATE HOUSE,
MADRAS,
31st May '29.

S. R. RANGANATHAN,
Librarian.

The Educational Review.

We desire to give publicity to an appeal made on behalf of this institution by a number of influential men and women of Allahabad, headed by the Collector of Allahabad and counting in it, Mrs. Dalal, the Secretary of the Committee, and Mrs. Uma Nehru, the Assistant Secretary. The institution teaches up to the B. A. standard and the results at the examinations for the past four or five years are seen to be excellent. It owns endowment funds of over nine lakhs of rupees besides properties of the value of two lakhs. The Government gives an annual grant of Rs. 26,424.

The Crosthwaite
Girls' College,
Allahabad

The institution is now faced with a double crisis. The Government has cut down the grant-in-aid to Rs. 18,000 on the sole ground that the public is not doing its bit towards the institution. Secondly, the growing needs of the college want an additional annual income of Rs. 10,000, for which a capital investment of Rs. 3,00,000 is necessary. For immediate expenditure another sum of Rs. 50,000 is also required. The present needs are two new blocks of residence for teachers and pupils, a dispensary, a library, two motor-buses to substitute the bullock-carts now carrying the children to the school, and most important of all, the raising of the scale of pay for the staff. The college claims to "impart Western education without any real departure from the basic principles and sentiments of Eastern life." We know of

institutions where the attempt to have an unmixed Eastern ideal instead of the wholesome combination of East and West, has proved futile. The high popularity and the excellent management in the past should commend the Crosthwaite Girls' College to all donors among the princes and people of India.

While the institution to which we have referred above serves as a concrete illustration of the progress of girls' education in India, it is of special interest to follow the expression of general observations on the subject, by a veteran in the field. Miss L. Gmeiner, Principal of the Inderprastha Girls' School and College at Delhi, for the last twenty-four years and now going back to her home in Australia on long leave, has unburdened herself to a press representative of remarks on the outlook of Indian girls. There was no need to be alarmed over the rapid strides with which girls are now leaving behind their old-world seclusion. She quoted a saying of Babu Bhagwan Das of Benares : "As the *Purdah* thins, the *Kapra* must thicken." Miss Gmeiner was not extravagant in her opinion of the talents of Indian girls. They have "beauties and characteristics of their own." About Miss Mayo, there was no uncertainty. She "had gone out of her way searching for disgusting things."

Miss Gmeiner served to give the lie to the general mistaken notion that girls and boys needed different kinds of education. She agreed with the Rt. Hon'ble

Mr. V. S. S. Sastri in disapproving of the presumption underlying the Women's University at Hingue Badrak, that girls had their own exclusive scheme of education. She however conceded that boys should learn some handicraft in school, while the girls, domestic science.

Considerable trepidation should naturally be caused to readers in India by an article contributed by Dr. G. A. Persson, M.D., M.S., to the "Scientific American," in which he refutes the theory formulated by Sir J. C. Bose, that plants have a circulatory system and a heart, like ourselves. Dr. Persson succeeded in producing a perfectly good heart-beat of fine rhythmical quality in a mere cotton lamp-wick steeped in cabbage juice, and he therefore argues that the supposed heart-beats in plants were due to external causes, including faulty technique. Sir J. C. Bose's discovery merely illustrated the saying, the wish is father of the thought.

We would warn our readers against regarding any disproof of the Indian knight's theories by the American doctor as a serious calamity. Scientific theories have necessarily to stand the test of time, and the test of different unprejudiced scientists. It is of course foolish to predict too soon immortality for any scientific theory. Even if Sir J. C. Bose's fondest theories are disproved, he will still have the credit of having interested the scientific world for many years with his theories about plant-life and his minute apparatus to study it.

We are however not entirely surprised by the American doctor's apparently effective refutation of Sir J. C. Bose's theories. We have long heard doubts expressed about them. These theories have always tended to pass from the rigidity of science to the alluring spheres of mysticism and metaphysical speculation. To state that plants had a life and a sensitiveness very similar to man's, looked like a logical understanding of the immanence of God. Dr. G. A. Persson now carries this idea only a step further, by stating that lifeless matter can behave just like plants.

Incidentally, we may remark on the influence that these scientific researches with which Sir J. C. Bose has been connected, are likely to have on the choice of the proper human dietary. The Buddhist doctrine of *Ahimsa* ordained the avoidance of animal food, on the ground of avoiding hurt to life which must be held sacred. Sir J. C. Bose's discoveries were apt to make humanity uncomfortable by the consciousness that every vegetable that was eaten underwent the same tragic fate of a human life destroyed by a cannibal. Now Dr. Persson's discoveries would seem to make it foolish to discriminate between foods!

The idea of an inherent conflict between theory and practice is of long standing tradition. Kings would be men of action, and philosophers, men of thought merely. The world is said to have had only one philosopher-king, Marcus Aurelius, in its history, and that

**Institutes of
Political Science.**

instance is not held to have been very successful by the standards of a king. Shelley said that poets were the real law-givers of the world. John Morley was obliged to plead against literary men being regarded as impractical in politics. Within recent years we have had at least two great names in Haldane and Smuts who have been both statesmen and philosophers.

With the increase in the number of Universities in this country and their growth in importance in the national life, it is imperative that attempts should be made to link together the best thought of the academic world with the actions of the best leaders in practical politics. We want some new agencies to bridge the present gulf between the academic world and the political one. The *Leader* of Allahabad has recently suggested the starting of an "Institute of Political Science" and the suggestion has also been eagerly taken up by the Professor of Economics and Political Science at the Benares Hindu University. The suggestion should apply to all the provinces of India besides the U. P. The politics of this country are bound to receive a new orientation by the influence of such institutes of political science.

There can hardly be any doubt that people all over India realise that the Hindu social system needs considerable overhauling. The old-world conditions on which that was originally based have long disappeared, and a proper adjustment to the modern environ-

**Hindu Social
Reform.**

ment is the only remedy to secure vitality and strength to it. But this needs constant repetition in statement, and it is interesting to note that two speakers gave expression to almost the same sentiments, one at Poona and another at Madras, speaking within a few hours of each other. Mr. Justice Madgavkar, presiding at the Conference of the All-India Hindu Law Research and Reform Association held at Poona, on May 22nd, had for his motto, "Unless we reform, we shall degenerate and perish." The learned Judge quoted from Sir T. Madhava Rao who had said that there was no society which suffered so much from self-inflicted evils as Hindu society. "The causes are patent: extreme conservatism, lack of perspective, reluctance to face realities, attempts to work round difficulties by metaphysical casuistry and legal subtleties, inability to adapt ourselves to altered environment, stubborn pride in the past with insufficient thought of present and future—all these, most of us are agreed, are the root causes." Among other things, the rigidity of the caste system and the joint family should go. Dr. B. S. Moonjee addressed a public meeting of students at Lenin Ghat (Madras) on the 20th May and said that the Youth League should observe no difference of caste or creed, but at the same time they should not seek to uproot their very religion, its culture and civilisation. He firmly believed that it was the duty of social reformers and others now to sit and decide upon such a scheme of sociology as would meet the needs of

the present day. Writing about social reform, and conscious as we are of the enormous work that has to be performed in its behalf, we wish to suggest that educational institutions can be helpful in the matter by being the centres of wholesome preaching. We would suggest that, apart from their intellectual equipment, it should be required of teachers to possess progressive views of society, before they are appointed to their tasks.

This has become well nigh a sickening theme in the educational politics of the Madras Presidency. But the Madras Government's Minister for Education seems to cultivate a genius to offer fresh cause for irritation continually. Having experience of other provinces in India, we cannot but condemn in the first place the niggardly scale on which the collegiate branch of the subordinate service is maintained. It still stands at Rs. 125—5—175—71½—250. It is disgraceful that the increments have not been rounded off even to the modest amount of Rs. 10. The Madras Government announced in blustering tones about a re-organisation of the service, to cheat unwary readers, while the real fact was that only three or four posts were added in a selection grade starting on Rs. 250. The assistant masters in the United Provinces in Intermediate Colleges are graded on Rs. 200—25—450, and they have to do no more than teaching the Intermediate classes, while the "Assistant Lecturers and Assistant Professors" in the Madras Province teach also the

B. A. classes and even the Honours classes. Poor as it is, even the niggardly scale of the service was bearable. But the members of the service have now been treated to gross injustice. When two vacancies occurred recently in the M. E. S., one in Physics and one in Chemistry, the Government has unblushingly promoted the juniormost men to the places, on the score of their being non-Brahmins. Nor has the Government shown better sense in filling up the seven appointments newly created for the headmasterships of the Secondary Training Schools. All the men (except one) who have actually performed the work,—and many of them have performed efficiently,—have been thrust aside to make room for all kinds of persons appointed on a purely communal basis.

We confess to having entertained some bright hopes personally about Dr. Subbarayan with his comparative youth and a high British education, but we are now obliged to express our unmixed disapproval of the short-sightedness of his educational policy. We were told that teachers, in revenge, were to contest his seat in the Council and unite to defeat him, by backing a candidate of their own. All we can remark is that Dr. Subbarayan should thank himself for such a resolve on the part of the poor teachers.

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Two appendices render the book extremely useful to students. The first contains a chronological list of events in Hindu history from 8000-2000 B.C. down to 1850 A.D. The other gives a catalogue of books used in the writing of this one. These books can be usefully consulted by those students who wish to do something more than cramming the pages of a text-book—a very low ideal indeed for University students. It would be preferable to make

a clear distinction between *sources* and *literature*, in order to accustom the students to this distinction, which is the first thing to be realised on entering the sphere of historical research.

The Madras Christian College Magazine, April 1928:—"The volume under review presents a narrative of the history of India down to the beginning of the Muhammadan era. It is designed to meet the requirements of senior High School and Intermediate students, and ought to meet a real need for students of these grades. With so many kings and kingdoms, many of them short-lived and soon displaced by stronger arms, it is impossible to avoid a good deal of detail. We have wondered whether there is too much detail for students of High School age, and yet we would find it difficult to suggest how it could be obviated. No one can understand historical currents without a knowledge of the social background in which political movements take place, and our authors have done well to describe wherever possible the cultural, economic and religious movements that are so closely related to the political life.

We are particularly indebted to them for giving a more equitable proportion of space to South India than some historians have done. Much work is being done and requires to be done on the part played by Dravidian culture in the life of India. The present volume gives a fair recognition of the contributions that have been made to our knowledge of that important phase of influence. In this as in the earlier parts of the work there is a recognition also of the fact that opinions differ on many interesting points, due to the scarcity of accurate records. It is a valuable feature of the present work that the authors inform their readers on most of the noteworthy points where scholars hold different views.

The "Hindu" Literary Supplement, 11th April 1928:—"This book is intended to be a simple and continuous narrative of the political and social history of India from the age of the Rig Veda down to the times when Mahomedan military adventurers overthrew the indigenous kingdoms in different parts of India. As is customary now-a-days in text-books of History, the account is prefaced by a chapter on the chief physical features of India. This is followed by a chapter on the thesis, "India—a museum of races"—a phrase impossible to understand, in view of the fact that modern methods of ethnological investigation point to the conclusion that the bulk of the people of India belong to one race, i.e., the "Mediterranean" race. Chapter III starts with the pseudo-history of "the Aryans on their march;" they reached Oappalocia in 1400 B.C. (p. 24) and, it may be inferred, entered India several centuries later, though, as the authors inform us, "the Rig Veda does not tell us anything about the mode in which the Aryans performed this feat encumbered with wives and children" and Indian scholars take the Vedic period to 3000 B.C. or even 4000 B.C. (p. 29). This chapter, then, gives a lucid account of the condition of the people of North India during the Vedic age, illustrated by a map. Chapter IV deals in an equally lucid way with the social, economic and political conditions of North India, based on the Buddhist Pitakas and Jatakas, followed by the history of Magadha from 600 B.C. to 321 B.C. The great Mauryan Empire is next described and, here again, the authors give due prominence to the social, religious and economic conditions of the age. The succeeding chapters continue the story of North India, interspersed with notes on the progress of society, literature and the fine arts, age by age, till the greater part of North India came under the sway of Mahomedans.

The authors of the book are experienced Professors of Indian History of fairly long standing; they have acted research on their own account on sundry questions connected with ancient and modern Indian history and are quite up-to-date in their knowledge of the work of other scholars as almost every page of this book testifies. But sometimes the authors adopt hasty conclusions of European scholars * * *. The maps and chronological tables are likely to be of great help to the student and the bibliography fairly complete.

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The value of Child Study is first twofold, from the point of view of theoretical psychology, and second of education. Education along with psychology has much to learn from the science of biology which suggests to both of these sciences the unit for study, viz., a reaction which is a response to a stimulus. The mental life ought to be viewed as is the physical from this point of view. Further, biological science is showing the usefulness both as to method and content of the observation of development. The study of child-nature is in accord with the genetic method which characterises all the biological sciences. Educationally we have more to do with children than with adults in our schools and so from the practical point of view also the more that we can learn about the nature of educands the better for our work. Miss Gordon's book is thus a real contribution to our literature, for it considers these questions with special reference to conditions in South India.

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.

The book surveys the more important problems connected with the study of child-nature. It deals with the stage of child development, with the processes of sense-perception, with play, hand-work, and fatigue, with exceptional children, both sub-normal and supra-normal, with measurements of intelligence, and with the application of the Kindergarten system to the Indian system. It is one of the books which the Academic Council on the recommendation of the Board of Studies in Teaching has declared as suitable for candidates for the L. T. degree. We hope that it may have a wide circulation as its influence is sure to be for good.

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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