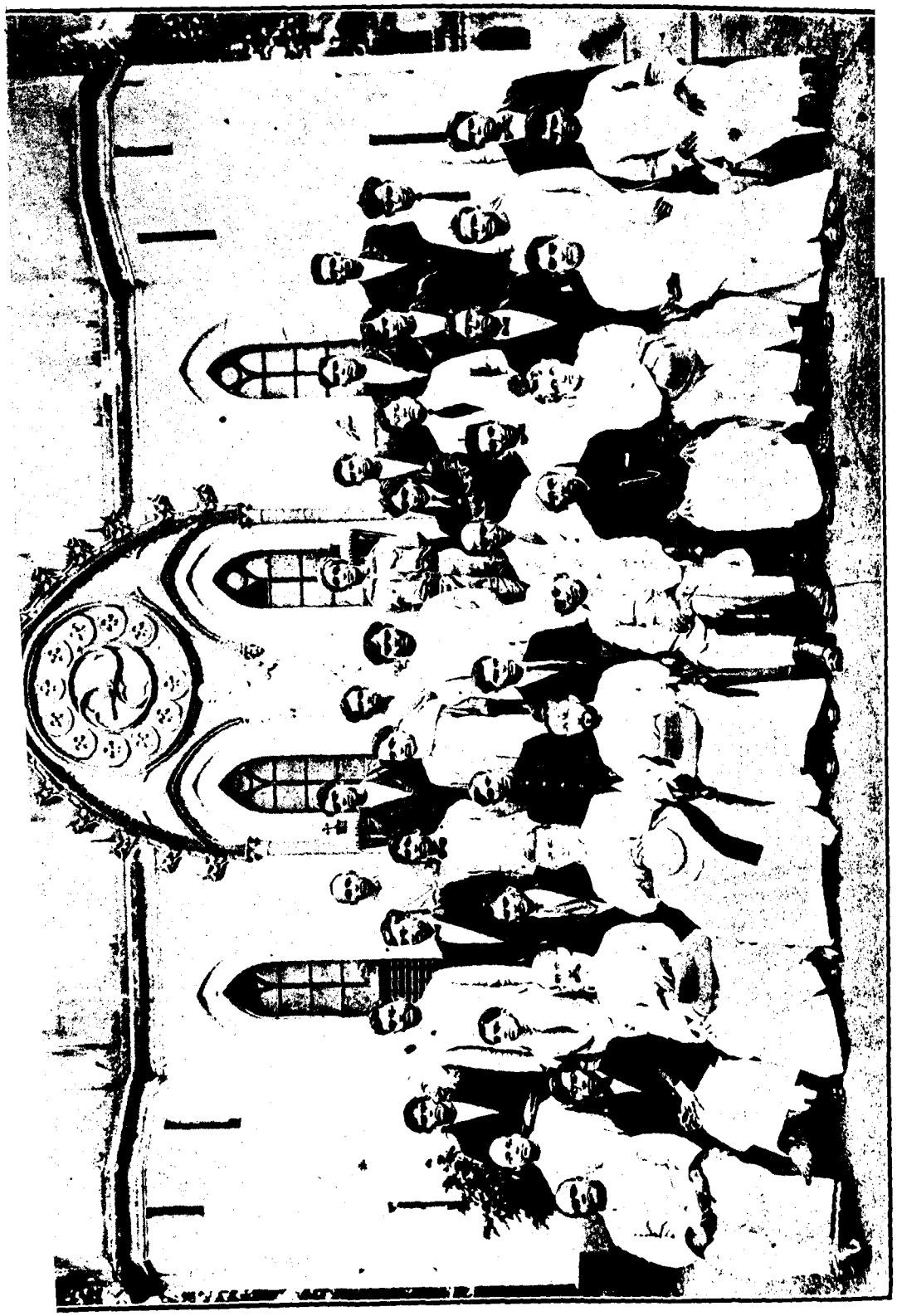

A THE LITERARY AND DEBATING SOCIETY.

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The Ratio on Teaching in Secondary Schools.

V.

Memory Exercises.

The efficient use of any language, be it a foreign language or the mother-tongue, supposes facility in the organs involved in hearing, speaking, and writing, to recognize, distinguish, retain, and reproduce sounds and symbols of sounds. This facility of retention and reproduction is what we mean here by memory, and it is developed by the memory exercise in class. The exercise is not an examination to see whether boys have done the work assigned, nor is it intended for the purpose of filling 'the store-house of the memory with beautiful thoughts beautifully worded.' It is an exercise in speaking, in pronunciation and intonation, and its purpose is fluent, correct expression of thought. If our boys cannot easily recognize and distinguish sounds, they will not understand when spoken to; if they cannot easily retain and reproduce sounds, they will not speak easily and fluently; if they cannot retain and reproduce symbols of sounds, letters and their combinations, they will not be able to spell and to punctuate.

A memory lesson should be set every day—and every boy should have to recite it every day from the first word to the last. This cannot be done without some such agency as we called 'the Bench-Monitors.' These monitors hear the lesson recited by the boys in their benches; and they themselves, even though they should know the lesson so well as to be able to check without book the number of mistakes made by the boys they hear reciting, must recite the lesson to a boy appointed to hear them, or to the teacher. No one should be deprived of this exercise in speaking. Nowadays it happens that a boy may get through a form with very little exercise in speaking; the teacher's

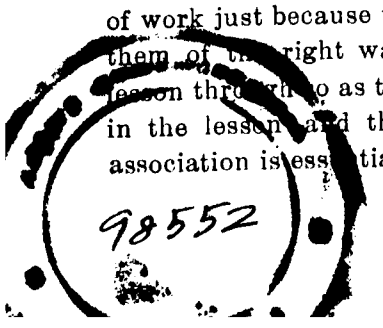
questioning, even supposing the questions fairly distributed among the boys, cannot give them anything like the amount of exercise they need for facility in the use of the organs of speech.

The length of the memory-lesson, which should be as often in prose as in poetry, requires careful consideration for each set of boys. The lesson should call for an effort of attention and application, and be of such length that it can be perfectly repeated by most of the boys in the class-room. The teacher may allow himself to be guided as to the amount of work he assigns, by the number of mistakes and hesitations made by the boys. Many mistakes would show that the lesson is too long or too short; it requires too much of a strain, or it does not call for that amount of attention and application which is necessary to fix it in the memory, or that amount of exercise which is necessary to give facility in repeating it.

About the amount of four iambic pentameter lines seems to be a good average of what boys in the III, IV, and V Forms can do well. Four lines are appointed for the first working day of the week, and are recited in class; for the second day, four lines more, and the eight are recited: on the third day, four lines more, and the twelve are recited; and four more on the fourth day and the sixteen are recited. The sixteen are repeated on the fifth working day. If there should happen to be no fifth working day in the week, the repetition is omitted that week.

The boys must be prepared for the exercise. It will not do for the teacher to say, 'Add four lines more for to-morrow.' He must himself speak the lines as he wants them recited, with due attention to pronunciation, pauses, and intonation. If the boys have been trained in phonetic script in the first stages, as they ought to have been trained, the best plan would be for the teacher to write the lines on the board in script, and then to recite them as he wishes the boys to recite them. The whole thing depends on the teacher of course; if he makes it perfectly clear that he means the work to be done and to be done well, the boys will do it and will do it well.

The teacher must also tell the boys why he insists on perfect work in the memory exercise, and why he insists on any particular method of recitation; it is always a great mistake to make boys do any kind of work just because they must. He should also frequently remind them of the right way to learn by heart. 1. They must read the lesson through so as to get very clearly before their minds the thoughts in the lesson and the order in which they occur; this exercise in association is essential in all memory work. 2. They must repeat



the lesson over and over again, if possible in a loud voice, to give the speech organs facility to reproduce sounds in various combinations. 3. They must also exercise their eyes so as to be able to recognize words at first sight, and from the length and shape of the word learn its spelling. In the high school, boys should learn spelling not as they did in the initial study of the language, with their ears, their lips and their tongue, but with their eyes.

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When a teacher finds a boy backward in spelling, grammar, punctuation, and idiom, though he may get on well in mathematics and sciences, or a boy who cannot be persuaded to read the simplest and most entertaining books, though he should answer questions on history and geography fairly well, he must be especially careful about that boy's memory exercises. A boy may be backward in the language class because of defective organs; he may have little flexibility in the articulating organs, or he may have a bad ear. The teacher may do a something for that boy, but the something will never be much. But generally speaking, our boys are gifted with wonderful facility for languages; there is no natural defect; yet a little attention to what goes on in the class-rooms will suffice to make it evident that there is an all-round need of very much more exercise in speaking than our boys get. Let our backward boys have the exercise they need. They might be required to recite the lesson two or three times, and they should be frequently questioned in class. It often happens that a boy we so readily call backward, does a lot of thinking of his own in numbers, and lines, and symbols, and concrete images, and he is often clever with his fingers in making kites and other toys; but when he has to talk and write, he seems dull, uninterested, and bored. There is no reason to despair of such a boy, if he can be brought to submit to the discipline of reciting and writing out his memory work regularly and more and more carefully every day. The recitation, which must never be omitted, should, in a class of boys backward in spelling and punctuation, be followed by an exercise in hand-writing, in which the spelling and punctuation of the book should be exactly reproduced. This exercise in writing the lesson from memory seems to be much more fruitful than dictation.

We used to meet with only one or two specimens of this type of backward boy, twenty years ago. The number is rapidly increasing, and the increase may perhaps be explained by exaggerations in other departments of secondary school work. The use of counters and mental arithmetic seems to be vastly overdone, and the natural knack that most boys have for this kind of work seems to be vastly over

developed. Then boys of this set are looked upon as the intelligent ones, and are condemned to specialize from the V Form onwards in mathematics. The need of more perfect balance in the development of our boys' faculties is no doubt producing a plentiful lack of all-round educated boys. Some of the bad spelling and bad hand-writing may be accounted for by the disuse or the misuse of headline copying by our little boys. It is ridiculous to oblige all those little fingers so different in strength, length, and shape, to write on one and the same model; each boy should have the headline he likes and which he can copy best of all, and he should be helped to notice the shape and length of the word written and correctly spelled in his own hand-writing. Of course this headline copying was an ordeal worse than tyrannical which children were made to undergo, and to take some of the painfulness out of it was a move in the right direction; but as an exercise in the form, length, shape, and spelling of the written word, it has not been replaced.

But there are boys of another type whom, like the poor, we shall have always with us, so long at least as memory work is misunderstood. I refer to those little prodigies we meet in the lowest classes and forms, whose talents grow dim in the IV Form, or suffer total eclipse in the VI Form or in the Intermediate. Omitting cases of arrested development due to external causes over which the teacher has no more control than the boy himself, it does seem possible to do good service to these unfortunately gifted boys. Their impressionability for sounds, and words, and short phrases, has been developed at the expense of every other faculty and especially of every other kind of memory. These boys repeated day after day the teacher's words and phrases, and reaped a harvest of unstinted, though very thoughtless, praise for their attention and application, when they were doing nothing at all but parroting. They were the master's pets, and were set up for imitation by the other boys, and when they had a pleasant voice, and an ear to catch easy tunes, and easy good-manners, and a sufficiency of self-conceit to put on airs and graces, out they were trotted in all school functions for the admiration of the public. These boys are very unfortunate in the hands of an inexperienced teacher. They must, of course, have memory work assigned to them as all the other boys in the class have, but it is facility for new thoughts and for associating thoughts that must be aimed at in their development; they should have much work to do during the reading lesson, or, as we call it, in books for non-detailed study.

As regards the kind of lesson the boys should be required to learn by heart, very little need be said here; it will be fully treated in connection with the kind of text-books to be used in secondary schools. Suffice it to say that the passage set must be worth learning by heart, and must usually have been explained in detail. Its parts and their order must be clearly discernible, so that boys may learn to associate part with part. Its sounds, combination of sounds, and rhythm, should usually be remarkable for strength, or sweetness, or imitative harmony. The subject-matter should be varied, and express the common universal thoughts and feelings of men, or large impressive views of such subjects as literature, art, science, general estimates of religion, of the fundamental and social virtues. It should include in great abundance accounts of noble deeds and of beautiful scenery. And the lesson should be in the most perfect standard English; in such English as we should like our boys to speak when occasion may require them to be at their very best.

Besides this daily exercise of memory, the Ratio requires an exercise every week in recitation, declamation, or acting. Elaborate attempts were made to distinguish the three exercises, so that a boy might know exactly what was required of him at this weekly exercise. The recitation, whether with or without book, is supposed to be an exercise in pronunciation, and chiefly in such modulation and intonation as may clearly and strongly impress the hearers with the worth of the thought or feeling expressed. The declamation adds to the recitation, practice in gesticulation, and facial expression. Acting has been more clearly defined and practised in the schools and colleges of the Society. Acting is taken to mean impersonation in the strictest sense of the word; it is possible only after a long course of training in recitation and declamation. The boy is supposed to be capable of such an act of imagination that he can feel himself to be in the situation of the character he intends to impersonate, and consequently his tones and action must be his own in that particular situation. This exercise supposes power to appreciate literary situations and language, and power to enter into the thoughts and feelings of others appreciatively and sympathetically; in a word, it supposes the humanizing effect of literary study.

The time given to these exercises is looked upon as time lost nowadays, for our aim in the schoolroom is to convey information into heads, not to train boys to think and feel and live as men with men. The old adage, 'Homo sum; humani nihil a me alienum puto' is out of date. Even when teachers are interested in bringing to the front the humanity that is in every boy, they make the mistake common in all schools of bringing out those boys for this exercise who need it least

of all ; smart, pert, lively little chaps, always ready and delighted to show off.

A something still remains to be said for the good old common sense of the Ratio Studiorum.

The Village Grandmother.

(*By* A. N. MAKARA BASHANAN, IV U.C.)

One July morning I alighted at the station S—— in order to see a friend of mine who happened to live in a little village close by.

The morning was far advanced when I stood before my friend's house. The door was double-locked, and I was disappointed to learn that my friend was absent in a distant town. There being no hotel in the village, I had recourse to an old woman for my temporary board and lodging.

It was a typical Tamil village. The sober wishes of the villagers never strayed beyond the bounds of their rustic isolation. Even the distant railway station was resented by them as an unhallowed inroad of alien civilization into their country seclusion. They challenged me to point out any town which commanded such conveniences both spiritual and temporal as their village possessed. My unorthodox appearance and heterodox habits provoked not a little comment from the villagers. And I was, in particular, the object of the repeated religious harangues of my friend the village preceptor. This religious man had somehow marked me from the beginning for a proselyte of his.

The woman whom I lodged with was one of those ripe old grandmothers whom the Tamils, among others, regard as possessing the golden key to the treasures of their folk-lore and fairy-tales. Any traveller in the Tamil villages may meet with one or two individuals of this type in each village, gathering around them all the girls and boys of the village in the gorgeous evenings or in the silver streaming moonlight nights, and enrapturing them with the magic of their endless stories.

After an early dinner, I found I had yet over two hours to wait for the train. Opening my Oxford 'Shelley', I found the lyric charmer unsuited to beguile the post-prandial respite. And I began to curse internally the dull small village which was absolutely without any

diversion to dispel the tedium of lingering hours. Finding me quite uneasy about my time, the old woman came and sat by my side. After stretching her arms over her head with her fingers interlaced by way of preface, she began to weave for me the following story :—

One April evening in a little house in a small by-street in the large city of Madras, an emaciated figure of about twenty years lay upon his bed of sickness and sorrow. Krishna Iyer and his wife, the parents of the sick lad, were running to and fro as if their son's life depended upon the celerity of their motions. Beside the sick person sat his friend and class-mate, Ramanathan, a plump-looking youth of about the same age. The young men were conversing earnestly in soft and subdued tones.

"Ramu," the young patient was saying, "pardon me, I have concealed even from you an affair of great importance, which has so long lain upon my heart with the oppressive heaviness of a thousand nightmares. Pardon me, I have not found an earlier occasion to acquaint you with certain matters of great secrecy and some delicacy. It is the fate of Savitri, my girl, that distresses me most. She is the only treasure of my mother's poor brother. You know we have been betrothed for a long time, for the last five years and more. This dreadful complaint of which I am now a defenceless victim, this asthma, as the doctor has told my parents in private, must kill me soon..... What will my poor girl do after my death ? Dead to all pleasures and enjoyments, she must live the wretched and hopeless life of a Hindu widow. My uncle and aunt can never bear the sight; they will go mad or else commit suicide. How are my own parents going to survive this double shock of the death of their son and the living death of their daughter ? How to avert, or at least to allay, these calamities, has been the burden of my thoughts....." Here the patient stopped and lay gasping for breath, interrupted by one of those paroxysms peculiar to the disease; but after several minutes' wheezing he was again in a position to continue.

Ramu had fought and won many a verbal victory on the side of modern social reform, and was worthy of the office of aide-de-camp to a Ranade or a Chandravarkar. Visibly impressed by his friend's words, he gently interrupted him: "Mani, there are no greater evils to our discredit than our practice of early marriage and the inhuman treatment we accord to our widows. It is sheer injustice to burden the girl, who is still a child, with the heavy responsibility of marriage, and the number of child and virgin widows in our country is shocking beyond belief. With her husband's death, the widow is deprived

of the treasure of her hair and her ornaments, is given her peculiar weeds, is confined to the dark corners of the four walls of her house, and shunned as an ill-omen by all the superstitious people of the locality."

Ramu stopped, and Mani began again with vehemence," Never shall my Savitri lead such an existence. I count on you to avert such a calamity befalling my girl. You cannot deny, she loves you next only to me. I entrust the welfare and happiness of my beloved girl to your care. She is sufficiently acquainted with our thoughts and opinions to entertain no great scruples against my proposal when she comes of age. But I am aware my uncle and aunt cannot be easily persuaded to embrace any such monstrous deviation from the habits of their ancestors. However, even of them I have hopes. They love their daughter too passionately not to be willing to undergo some trouble to further her happiness. You are parentless, and my parents love you so much that I can easily persuade them to accept you in my place. I am sure the love that all bear me, backed by the irresistible request of a dying man, will make them respect my last wishes."

Ramu listened with great attention and profound sympathy. After gazing at his friend's earnest and plaintive countenance for a time, he addressed him in the softest accents: "Mani, I don't know how you dare to make a proposal that will be sure to breed a violent storm of orthodox opposition and indignation. Pray do not alienate the last sympathy of your people by this shocking blasphemy, as they would call it."

Mani heard his friend with impatience. "Never mind the others. Promise by the death-bed of your friend that for your own part you will abide by my settlement, and will do your utmost to hasten its fulfilment." Ramu trembled with great anxiety and fear, and then said slowly: "I promise."

Days passed. Mani's disease became more and more aggravated. At one time he felt so bad that an urgent telegram was despatched at his request to his uncle who lived in a village some distance away.

Mani was restless in his bed. At each sound of approaching footsteps, he cast wistful glances towards the door. But disappointment awaited him on every occasion, till, at length, the door of his house was thrown open, and Rama Iyer, his wife and their little daughter Savitri, entered with breathless anxiety writ large on their countenances. Mani wept bitterly on seeing his girl-wife and her parents. Who could fathom the grief that possessed them all?

Mani motioned Savitri to his side, and encircling her with his weak and languid arms, burst into tears: "Savitri, I never thought matters would come to such a pass. I do not grieve so much for myself, for my parents, or yours. It is you, the inspirer of my dreams, it is your fate I bemoan most." Here he checked himself with an effort. Drawing the girl yet nearer to him, he almost whispered in her ears: "Sweetest, I have settled everything. Ramu has promised to be the mainstay of your future life. Never despair." So saying he placed in her hands an envelope addressed to his uncle, and another in the hands of his friend Ramu addressed to his father. Both the envelopes were sealed and bore above the superscription the injunction in Mani's hand: "Not to be opened till two years after my death." He then charged both his wife and friend to see to the proper delivery of the letters. Finally, he conjured his parents and his uncle and aunt not to leave anything undone which they were satisfied was his peculiar wish.

These were almost Mani's last words. Having delivered his commissions, he felt greatly relieved. Shortly after he became unconscious; and soon the spark of life was for ever extinguished.

Days rolled on. Ramu gradually won for himself a secure place in the affections of Mani's parents, and they began to treat him as their own lost son. During his holidays, Ramu was often a guest at Rama Iyer's in the distant village of V—— with little messages of peace and goodwill from his adoptive parents. And Savitri came to spend more and more of her time in the company of her friend Ramu.

Two years after the death of his friend, Ramanathan took his degree with distinction. He went to V—— with eager haste to communicate to his girl-friend and her parents the happy news of his present honours and future prospects. He urged Savitri to deliver Mani's last commission. Rama Iyer tore open his envelope with trembling hands and perused the close-written pages with wondering eyes. Mani had used every argument and point, which his education and intelligence revealed to him, to persuade his uncle and aunt of the desirability of settling Savitri upon Ramanathan.

Mani's letter upset them considerably. At length the time came for Ramu's departure for Madras. After taking leave of Savitri and her parents, he lingered awhile beside them. Savitri looked up to her father. Rama Iyer appeared resolute: "Mani's proposal can never be realised." But Mani's parents were more tractable. Krishna Iyer read his letter, sighed deeply, and said nothing.

Time passed. Rama Iyer came to hear with ever-growing alarm the gossip of the villagers with regard to his widowed daughter. His love for his daughter and his pride in her beauty were so intense that he could not bear to bring himself to the idea of marring her physical charms. The widows and the old folk of the village poured into his house every day, and after making a pretence of bemoaning Savitri's luckless fate, dwelt on the wisdom of our forefathers and the inviolability of our Shastras. They threatened Rama Iyer and his wife with the uncanny punishments which awaited them in hell. But Rama Iyer was firm as adamant and was not unnerved by these superstitious horrors. He loved not the Shastras less, but he loved his daughter more.

Meanwhile Ramanathan pursued his post-graduate studies with vigour, and passed his M. A. with distinction. A long vista of brilliant prospects opened before him and he was a happy man. His only grief was for the fate which compelled such a noble girl as Savitri to languish in sorrow and seclusion in a distant village. Letters came from Rama Iyer describing the village tyranny that made their life so very uneasy and painful. At length, Krishna Iyer wrote advising his brother-in-law to quit his village and settle in Madras, the place of refugees from social tyranny and orthodox oppression. Rama Iyer with his little family bade a last adieu to their home of years.

When Rama Iyer and his wife and daughter reached Madras, Ramu was not at home. They were closeted together for a long time with Krishna Iyer and his wife, and all of them came out with countenances beaming with silent joy, when Ramu entered the house and knelt at his uncle's feet. Rama Iyer gave him his heartiest blessings and said: "Dearest son-in-law, arise."

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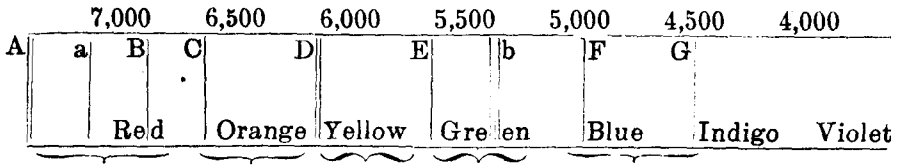
The grandmother finished, stretched her arms and legs, and yawned terribly. When she moved her lips to continue, the cart-driver came into the room and cried, "Samy, it is time for the train." I hastily gathered up my things, paid the grandam's bill, and bade her farewell. As soon as I was comfortably seated in my carriage, the dull-looking village, the mysterious grandmother, and the incidents of romance which the village had given birth to, flashed before my mind's eye in a lighted scroll of vivid pictures.

The Spectrum in Astronomy.

[The following notes are a summary of a lecture, with lantern slides, on "The Spectrum in Astronomy" which Mr. Evershed, the well-known Director of the Kodaikanal Observatory, delivered before the Jesuit Community at Shembaganur in April, 1923 on the eve of his departure for England. The Editor regrets that for want of time he was not able to submit the notes to Mr. Evershed, and he assumes the sole responsibility for any errors in the following pages.]

I. Interpretation of the solar spectrum.

When a pure spectrum of solar light is examined in a spectroscope, it is seen to be traversed by numerous dark lines parallel to the length of the slit. Sir Isaac Newton, who was the first to study the solar spectrum and who laid down rules for obtaining it pure, does not seem to have noticed the dark lines; if he did, he had no idea what their meaning might be. Their existence was first pointed out by Wollaston in 1802, and a detailed description of them was first given by Fraunhofer in 1815. Fraunhofer drew up a map showing the places of 354 dark lines. Some of the more conspicuous he distinguished by letters of the alphabet, thus: A, a, B, C, D, E, b, F, G, H. The line A is at the extreme end of the red, B in the middle of the red, C on the border of the red and of the orange, D is a double line in the orange-yellow, E and b are in the green, F is in the greenish-blue, G in the indigo, and H in the violet portion of the spectrum.



These lines, called, thenceforth, Fraunhofer's lines, form a convenient means of specifying any particular colour in the spectrum. Thus we commonly speak of the C, D, H, K light, when we mean light of the colour which corresponds to the dark lines C, D, H, K in the solar spectrum.

Many of the lines, which to Fraunhofer appeared single, were afterwards with more powerful spectroscopes resolved into several. Many new lines too were discovered and mapped, the total now exceeding 20,000.

It is no matter for surprise if these lines, so persistently reappearing in every pure solar spectrum and so invariably taking up the same

position in the same colour, were at once suspected to be more than mere chance coincidences. They must, it was assumed, be hieroglyphics expressing messages of the highest importance, if only we could arrive at a correct interpretation of their meaning. Well, their meaning has been made out, the language has been learnt, and a lexicon has been composed. The astronomer reads the document almost without hesitation. The solar spectrum, he says, is a wireless message from the sun, which reads as follows: "I am an incandescent liquid mass; this is the meaning of the seven colours of the rainbow spread out in successive bands before your eyes. My garment is made up of glowing vapours comprising all the metallic elements which you are acquainted with on earth. This is the meaning of the innumerable dark lines which cross the colours mentioned above: the linesare, as it were, the signs-manual of the various vapours which my light has to traverse before reaching you. Lines A and B are the signatures of potassium, C is that of hydrogen, D of sodium, E is a double line which reads calcium and iron; b is a group of four lines due to magnesium and iron; F is due to hydrogen, G to calcium, and iron, H to calcium and so is K..."

Wonderful! exclaim the uninitiated. How did you come to decipher this extraordinary document?

It was not done in the twinkling of an eye. It came about gradually, and in an apparently roundabout way. The examination of the solar spectrum first suggested the study of the spectra given by various terrestrial sources of light. It was then discovered that all incandescent *solids and fluids* (e.g., molten platinum) give a continuous spectrum, identical with that of the sun, *minus* its dark lines. They must be incandescent, that is, raised to a white heat. For, at a lower temperature, for instance at 600°, the metal merely glows with a dull red colour and its spectrum exhibits only the red portion. At about 1000° the yellow will appear as well as the red, while at about 1600° the spectrum will stretch from the red to the violet.

In the case of glowing *gases or vapours* the spectrum is of an entirely different character. Thus, when a salt of sodium is held in a colourless flame and the light is examined in a spectroscope, the spectrum will be found to consist of a bright double-yellow line. Vapours of other metals, similarly, produce spectra of a finite number of bright lines separated by dark intervals. The position and number of these lines may even vary with the same metal according to the temperature; but although new lines make their appearance as the temperature is raised, the position of the lines already present does not vary.

COLLEGE BAND.

In the case of gases, such as nitrogen and oxygen, the spectrum is obtained by passing the spark from a Ruhinkorff coil or an electrostatic machine through the gas which is contained, in a rarefied condition, in a vacuum tube. The spectrum, in this case, includes also that of the vapourised substance of the conductors, and we have thus a method for obtaining the spectra of metallic and other elements not easily volatilised in other ways. In addition to line spectra, under certain conditions of pressure and temperature, the spectra of some gases exhibit bands of light, which are sharply defined on one side, but shade off gradually on the other. The band spectra may, however, be changed into line spectra by raising the temperature.

Another phenomenon was discovered. Brewster found that, when ordinary solar light is transmitted through the thick vapour of nitrous gas, a number of dark lines are seen, parallel to the Fraunhofer lines, especially in the violet part of the spectrum.

In 1861 Kirchhoff proved that the two bright orange-yellow lines of sodium correspond exactly with the two D lines in the orange-yellow part of the solar spectrum. He made the important discovery that sodium vapour absorbs the same light tints which it has the power of emitting. It follows that sunlight, which shows two dark lines exactly where the sodium light shows two bright lines, must, before reaching us, have passed through the vapour of sodium: it must have been, partially at least, absorbed by these vapours. Either in our atmosphere, then, or in that of the sun, the metal sodium must exist in quantities sufficient to cause the absorption lines which have been observed.

Similarly, those countless other lines which cross the solar spectrum, must each indicate some process of absorption exerted by vapours in our atmosphere or in that of the sun.

To settle this question, Kirchhoff compared the spectrum of luminous vapours of iron—a spectrum which, as seen by him, contained no less than 60 bright lines--with the solar spectrum. (At present more than 450 iron lines are known.) He found that precisely as the two sodium lines agree with Fraunhofer's D lines, so every one of the iron lines had its counterpart in the solar spectrum. Every line of the iron spectrum appeared as a dark line in the sun's spectrum. No mere chance coincidence could account for this fact. The only possible explanation was that the rays of light, which form the solar spectrum, had passed through the vapour of iron and had thus undergone the absorption which the vapour of iron must exert.

Now, these iron vapours cannot belong to our atmosphere, which cannot contain such a quantity of iron vapour as would produce the very distinct absorption lines which we see in the solar spectrum. Their presence in the pure atmosphere of high mountains, at any rate, is highly improbable, whilst the dark lines in the solar spectrum are as definite there as they would be in less pure surroundings. Again, if the iron lines in the solar spectrum were due to vapours in our atmosphere, they would appreciably alter according as the sun is near the horizon or at the zenith. But they do not. We conclude then that, owing to the high temperature of the sun's atmosphere, iron is present in it in the form of vapour, even as the vapour of water is present in the atmosphere of the earth. Kirchhoff found that calcium, magnesium, chromium and nickel exist in the solar atmosphere. Later on, it was gradually established that all the known elements—except gold, platinum and mercury, for which evidence is wanting—are contained in the atmosphere of the sun. This is how the hieroglyphics of the solar spectrum came to be deciphered. They give us information about the constitution of the solar atmosphere, and therefore of the sun itself.

II. What the spectrum teaches us concerning the constitution of all heavenly bodies.

After the spectrum had given us this information about the sun's constitution, the idea naturally suggested itself of consulting the same document about the constitution of other heavenly bodies, of those myriads of brilliant objects with which the heavens are studded at night.

It was thus found that—excluding the planets which shine only by the reflected light of the sun, and consequently, exhibit only the solar spectrum—the heavenly bodies can be divided into two great categories—those whose light gives a continuous spectrum crossed by dark lines or bands, implying, therefore, a solid or liquid incandescent nucleus surrounded by absorbing vapours, and those whose spectrum consists merely of a few bright lines produced by glowing gases or vapours.

The former category comprises various types of stars: the so-called white or Sirian stars, the yellow or solar stars, the red stars, and the carbon stars.

The Sirian Stars, that is, the stars of which Sirius is the exemplar, shine with a brilliant white colour, sometimes inclining towards a steely blue. Among the more conspicuous examples may be mentioned Vega (α Lyrae), Canopus, Spica (α Virginis), Regulus and Castor.

The Sirian spectra are very little encroached upon by absorption lines. Yet a number of metals reveal their presence by faint and fine dark lines. The ubiquitous double line of sodium is unmistakable, as well as the magnesium group '*b*', and a line of iron in the green part of the spectrum known as 'E.' The characteristic feature of these spectra is the emphatic representation of hydrogen by the whole *Balmer's series of 14 lines, most of which are situated in the ultra-violet portion of the spectrum. The strong proportion of the ultra-violet radiations is a sign that vaporous intervention by the star's atmosphere must be insignificant. The presence of all the hydrogen lines testifies to an incredibly high temperature in these stars and in their atmosphere: for, in order to obtain them from hydrogen gas by the electric spark, powerful electric discharges are required, and a three-and-a-half exposition of the photographic plate has been found necessary for the highest radiations to get satisfactorily printed. Mr. Evershed estimated the temperature of Sirius at 10,000 C, that of the sun reaching only 6,000 C.

The Yellow or Solar Stars, examples of which are Capella and Ursae♃ Majoris, Aldebaran and Arcturus, give a spectrum delicately ruled from end to end through the absorptive effects of a great variety of metallic vapours. Non-metallic substances give no sign of being present, unless by a trace of carbon in the sun. Dark hydrogen lines are present, but with no preeminence, and the series is apparently not continued above H in the violet. The presence of the K line, especially, which is almost completely effaced from the spectra of the hottest stars, testifies to a lower temperature in these stars than in the Sirian type. The Solar and Sirian stars together form about eleven-twelfths of all the stars we see.

One star in 400 may be roughly estimated as belonging to the type of *red stars* exemplified by Bethelgeux, Antares, γ Crucis etc. Their spectra, instead of being crossed by sharply defined dark lines, are traversed by broad, dark bands terminating abruptly towards the violet, but very gradually towards the red. Banded or fluted spectra of this kind are derived from chemical compounds, such as oxides and chlorides, as well as from elementary substances, both metallic and non-metallic, at moderate degrees of heat. Hence it is that these stars are considered to have a lower temperature than the solar ones, and to have in their atmosphere not only vapours of metallic elements, but also of compounds.

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*[$\lambda = 3645 \times \frac{m^2}{m^2 - 4} \times 10^{-8}$ *cm* ; *m* = successively 3, 4, 5, ...up to 16]

There is yet another class of stars allied to the previous, telescopic objects for the most part, of which 120 are known. The spectra of these exhibit bands of absorption with the sharp side towards the red. These bands agree perfectly with the bands caused by burning alcohol and other hydro-carbons. The atmosphere of these stars must therefore contain carbon vapours: hence the name carbon stars. Their temperature must be relatively low. Their spectrum shows no trace of free hydrogen.

The division of the stars into the four types just described was made by Father Angelo Secchi, S.J., former Director of the Observatory in Rome, who, between the years 1863 and 1867, examined spectroscopically the light of four thousand stars. His classification does not imply that perfect uniformity exists within each group, nor that there is an abrupt transition from one group to another. "Natura non facit saltus". There are no gaps in nature. Other classifications are therefore possible.

The contemplation of the heavens at night reveals to us, not only the brilliant dots which we call stars or planets, but also—if we use the telescope—a large number of cloudy patches of light spoken of as *nebulae*. (We do not now refer to the Milky Way, which is milky only to the unaided eye, but is resolved into a stream of innumerable stars by the telescope.) Although more than 10,000 of these bodies have been observed and catalogued, only two of them—the nebulae in Andromeda and the Orion nebula—can ever be seen by the naked eye. Many bodies, once supposed to be nebulae, were found, by means of powerful telescopes, to consist of a close cluster of stars. The question naturally arose whether all nebulae may not be clusters of stars, their nebulous appearance being due to their enormous distance from us and to the powerlessness of our optical instruments. The spectroscope has settled this question. It has clearly shown that there are bodies that cannot be separated into distinct stars, and that the light of many of the nebulae proceed mainly from luminous gas. It is not maintained that all the bodies which are ranked among the nebulae are mere masses of gas. For, whilst a great number of them display only the bright line spectrum, many others exhibit a faint continuous spectrum crossed by 6 or 7 bright lines, and a few exhibit only a continuous spectrum without bright or dark lines.

The nebulae which give out the bright line spectrum, and these alone, are made up of gases at a low pressure. What are these gases? Hydrogen is certainly present: for one of the bright lines perfectly coincides with Fraunhofer's 'F', which is the sign manual of

hydrogen. As to the other gases which may be present, no evidence has been obtained so far. Huggins for a time maintained that two of the lines indicated nitrogen. Lockyer thought that he could identify them with the magnesium group. Maybe, we are here confronted with a substance as yet unknown on earth. Why not? A line in the solar spectrum (line D3) revealed to us the existence of helium, a gas which was found to exist in all radio-active bodies. The distant nebulae may perhaps give us similar information concerning our enlightened little globe.

The continuous spectrum nebulae, such as those in Andromeda and Canes Venatici, have been a puzzle to astronomers, and will be so for a long time to come.

The other kind, the one with bright lines on a faint background, partakes of the nature of stars and of true nebulae. It constitutes the nebulous stars or the stellar nebulae as they are called. Many of the elements known to exist in our earth have been distinguished in their spectra.

By spectroscopy, therefore, we have been enabled to learn something about the constitution of the sun, the other stars, and the nebulae, and to learn something also about the relative temperatures of these bodies. Spectroscopy has enabled us to make a general statement about the constitution of the Universe, the statement that the matter, which makes up the bodies of the Universe, is of the same kind as that which we meet with on this earth.

The excellence of the spectrum as a source of information becomes especially impressive, if we consider the enormous distance of the objects by which it is produced. It tells us the constitution of the sun, which is about 93,000,000 miles away from us. It tells us as clearly the composition of Sirius, whose light requires 8½ years to reach us, although it travels at the constant rate of 186,000 miles a second; of Vega, whose light reaches us only after a 20 years' journey at the same rate; of stars whose light started before we were born, a hundred, two hundred, perhaps thousands of years ago; of the stars of the Milky Way, that starry stream which seems to flow around our system as the centre of a great circle, the diameter of which may be 300,000 light-years. And about all these it tells us: "They are made of the same material more or less." But this is not all. The spectrum has still more information to give us.

III. What the spectrum tells us about the motions of heavenly bodies.

Physicists at one time thought it possible to prove experimentally the absolute motion of the earth in space. Their experiments failed, and Einstein tells us that they could not but fail: for it is impossible to prove this absolute motion; no phenomenon in nature can help us to do it. In fact, we know, experimentally, only of relative motion in the universe; and logically, we conclude that absolute motion must exist somewhere, because there can be no relative motion without there being absolute motion somewhere. Absolutely, then, our universe may be drifting along in space; we can, however, be aware only of the relative motion of a body or a system of bodies with regard to another body or system of bodies.

Here we are concerned only with relative motion, and we shall examine the question whether the so-called fixed stars do keep their relative positions unchanged, as they appear to do to the naked eye, or whether they undergo displacement sideways, or in the line of sight, or in both respects.

As regards angular displacement, the exact methods of modern astronomy, in which the telescope is brought in to measure spaces absolutely invisible to the eye, have shown that the stars are actually in motion, and that a change in the shape of the constellations is brought about gradually. But the rate of change is so slow that the eye would not, in most cases, notice it for thousands of years. The annual angular amount of this telescopic proper motion is 3·7″ for λ Centauri the nearest star, or 14 miles per sec; 2·2″ for Arcturus, or 54 miles a sec; 1·2″ for Sirius, or 9 miles per sec.

The sun, itself a star, is found to have a proper motion, moving with its retinue of planets at the rate of 20 Km. per sec. (Evershed) towards a point in the constellation Hercules.

The lateral displacement of a star on the celestial sphere can be determined by means of the telescope, but the telescope cannot decide whether a star is, or is not, changing its distance from our system, whether it is, or is not, moving directly towards us or directly away from us. To determine this kind of motion, which is technically called motion in the line of sight, we need the spectroscope.

According to the usual theory of light (the wave theory), the luminosity of a heated body is a result of the vibrations communicated by it to the ether medium which fills all space; and if the body be gaseous, it is supposed that a molecule of the gas vibrates at a certain definite rate, and thus communicates only certain definite vibrations

to the ether. The rate of vibration is determined by the position of the bright line in the spectrum of the gas. Now, according to * Doppler's principle, if the vibrating body be moving through the ether, the light waves which it throws behind it will be longer, and those which it throws in front of it will be shorter, than if the body were at rest. The result will be that, in the former case, the spectral lines will be nearer the red end of the spectrum, and, in the latter case, nearer the blue end. Hence, if a dark or bright line is found nearer the blue end of the spectrum than it should be, the conclusion is that the star from which it emanates is approaching us, while in the contrary case it is receding from us. The experiment is performed by comparing the stellar spectra with those of hydrogen or sodium, or iron, etc., as obtained by means of the electric spark or other devices, either by direct eye observations of the two spectra simultaneously, or by photographing both spectra on the same plate and measuring the displacement afterwards. In this way it was found that Sirius is receding from us at the rate of about 29 miles a sec., while Arcturus and Vega are approaching us at the rate of about 50 miles a second. Mr. Evershed showed us such a simultaneous photo taken by him, on the 12th February 1923, of the spectrum of Venus and the iron arc lines. The shift of the Venus lines towards the red told him that Venus at that moment was receding from the earth at the rate of 13 Km. per sec. He applied this method to determine the velocity of Venus in its orbit, and knowing its period of revolution, to determine its distance from the Sun. The same method, he said, would be applied to determine the distance between two stars forming what is termed a double star. It would be enough to determine first their periodic revolution, then their speed; and their distance could then be easily calculated.

Doppler's principle has been applied to prove the rotation of the sun about an axis and to find out the rate of rotation. The advancing eastern or left limb of the sun shifts the spectral lines a little towards the violet end of the spectrum, while the light of the retreating western limb slightly displaces them to the red end of the spectrum.

IV. The Einstein Effect.

One of the conclusions of Einstein's general relativity is that two similar atoms, vibrating in different parts of a gravitation field, will have different periods of vibration. Thus, if a sodium atom vibrates on the sun's photosphere, its period being represented by t', and a

* Doppler's Equation: $\lambda_1 = \frac{V-v}{V}\lambda_0$; $\lambda_2 = \frac{V+v}{V}\lambda_0$.

sodium atom is made to vibrate in a sodium flame, produced in a terrestrial laboratory, the latter's period will be represented by t and the ratio t/t' will be equal to 1·00000212, showing that t is greater than t', or that the solar atoms vibrate more slowly than terrestrial atoms. Hence the spectral lines of a solar element must present a slight shift on earth. Einstein concluded that the shift must be of the order of ·0080 Angstroms or 0·634 km. per sec.

Mr. Evershed gave us the startling information, that, for the last ten years, they had noted in the Kodaikanal Observatory such a shift of solar lines towards the red. Einstein's theory was still in the making, and Einstein's name was still unknown, when this curious behaviour of the solar spectrum was first noticed. Let it be borne in mind that there is here no question of the displacement due to either the earth's rotational motion (observations were carried on at noon when the place of observation was facing the sun) or the sun's rotational motion (the displacement is observed in light from all the parts of the sun), or any other recognised motion. After allowance had been made for all these causes of disturbance, a shift remained which could not be accounted for. It was at that time suggested to Mr. Evershed that the shift might be due to the pressure of the gases on the sun's photosphere : about 3 or 4 atmospheres would account for the displacement. To this suggestion Mr. Evershed replied that, although the sun's gravitational pressure is 27 times that of the earth, its atmospheric pressure is zero ; and this fact should produce a shifting towards the blue rather than towards the red.

A remarkable thing about this shift is that it increases from the centre of the solar disc to the limb. This, it was suggested, might be explained by a sort of electric repulsion exerted by the earth, a sort of blowing away of the gases by the earth. The experiment was performed, of examining the light of that portion, and the same shift towards the red, which appeared in the spectrum from the front light, was also observed here. No sort of motion then accounts for the shift, and Mr. Evershed is convinced that we have here the Einstein effect. He has examined the effect with the iron lines particularly, and his results are ·0057 Angstrom on the northern limb, ·0080 for the southern (Einstein's number), and ·0037 for the centre of the disc.

V. The spectrum applied to the study of sun-spots and Solar Prominences.

This is the specific work of the Kodaikanal Observatory. The spectra of the sun-spots show a curious swelling-out of the lines,

sometimes a decomposition of one line into two or three lines. One cannot help referring this to the so-called Zeeman effect, the effect of a magnetic field on light. The fact may throw light on the nature of sun-spots. The latter may be in the centre of a whirlpool of irons, which in their motion produce a magnetic field. The connection of magnetic storms on the earth with large sun-spots is well known. Another conclusion from the study of sun-spots, is that the gases in the 'umbra,' instead of having a circular whirlpool motion, move radially outwards.

One of the most fascinating sights for the astronomer is undoubtedly that of the solar prominences. These are protuberances passing from the chromosphere. They consist chiefly of hydrogen, calcium, and helium. They assume all kinds of shapes. One of the photographs shown by Mr. Evershed exhibited a prominence having the shape of a perfect ring. The size of the ring was such that, with just a little sqeezing, the whole terrestrial globe might have passed through it. We were shown another photograph of an immense eruptive prominence, which Mr. Evershed observed at Srinagar in Kashmir (1916), whilst Dr. Royd took photos of the same prominence at Kodaikanal. The height of this prominence exceeded considerably the radius of the sun.

Photographs of sun-spots and prominences are taken with an instrument called the spectro-heliograph. This was first brought into use by Mr. Hale at the Kenwood Observatory in January 1892, and later, in a modified and improved form, by Mr. Evershed in England. It consists essentially of a direct vision spectroscope in which the eye-piece is replaced by a (second) slit. An image of the sun is formed on the first slit by means of a telescope and a spectrum is formed which can be observed at the second slit. This slit can now be so arranged that it just faces a given line in the spectrum, and allows only the kind of light corresponding to that line to pass through. Behind, and almost in contact with the second slit, is a photographic plate. If now, the telescope and the photographic plate being fixed, the spectroscope is moved at right angles to its optical axis, an image of the sun in monochromatic light will be formed upon the plate. Generally, hydrogen or calcium light is chosen for photographs of this kind. The process lasts about a minute. It is immaterial whether the telescope and photographic plate are fixed while the spectroscope is moveable, or the spectroscope is fixed while the telescope and plate are moving. The latter system was used by Mr. Evershed in Kashmir, the former is the one used in Kodaikanal.

N. S.

Some General Impressions of Oxford.

By RAJU.-J. STEPHENS B. A. (*Oxon.*)

It is a peculiarity of Oxford that it discloses its complete greatness and charm to none but its own few. An outsider may praise Oxford, but it is the Oxford man who goes raving mad over it. The reason is obvious. The outsider is unconsciously led to concentrate his full appreciation on just one or another of the general aspects of the University. He may talk in high terms of the standard of education upheld there; he may admire the residential system, which owes its origin and reputation to the University; or he may grow enthusiastic over the rich store of tradition, which imparts an ever fresh glamour to its life. But the Oxford man has more to admire than these general aspects of the place. During his stay of four years or thereabouts, he has become keenly alive to the consciousness that there are, besides, a thousand other aspects, perhaps minor and more subtle, but exerting a greater and more lasting influence on his mind. To put it shortly, the reputation of Oxford does not rest on its institutions alone, it rests, to a greater extent, on its atmosphere. To appreciate the greatness of the University, therefore, one must do more than merely study it, one has to feel it. It is for this reason that, compared with the almost inspired enthusiasm of the Oxford man, the argued and calculated appreciation of the outsider is a mere shadow.

A great asset of Oxford is that it possesses a strange external beauty. Beautiful nature is always attractive, but where it mingles, as in Oxford, with the subtle impressiveness of antiquity, the effect is something bordering on the sublime. Walls and ramparts, with the hoary look of centuries, almost rejuvenated by the garb of profuse creepers that turn green in the freshness of spring and soft-red in autumn, are sights that are peculiar to the older Universities. And again, it is a constant delight to see the lawn of the College Quadrangle, smooth and velvety in its appearance, surrounded by quaint buildings, with the College Chapel and the Dining Hall forming an impressive cluster in one corner. An American visitor was once very much taken up with the extraordinarily well-kept appearance of the Balliol lawn, and curious to know how it was achieved, he took the gardener aside and offered him a fabulous sum to get him to divulge the secret. The latter quietly pocketed the money and whispered: "This is the secret, sir: cut and roll the lawn continuously for 800 years." That,

indeed, is the secret of the whole attraction of Oxford. Antiquity reigns in every corner, and in every stone. The Dining Hall of Christ Church, the Chapel of All Souls, the cloisters of New College, and the walks of Magdalen—they are all legacies of a distant past, possessing a strange splendour and charm that cannot be rivalled by modern creation. The High Street in Oxford is particularly notable in this respect. On a moonlit night, especially, if one passes down the street, and approaches the vicinity of the Radcliffe Camera, one sees, silhouetted against the grey sky, the sombre outlines of many towers and turrets, that, softened in the paleness of the moonlight, appear like strange structures in a magical vision. And if, perchance, at that moment, there come breaking the stillness of the air, the slow and measured toll from Tom Tower, or the mellow and rhythmic chimes of Magdalen, the effect is exquisite, filling one's heart with an almost poetic ecstasy.

But the natural beauty of Oxford is a thing which takes time to grow upon one. What strikes one at the very outset is the distinctive nature of its institutions. First and foremost is the fact that Oxford is a residential University. It has no external students, like the University of London, and it is not a huge comprehensive affair like the University of Madras. Everyone who wishes to undergo a course of studies in Oxford has to come and take up residence there. There are three terms of eight weeks each in a year, and a student, to have kept a term, must have resided in Oxford at least six weeks in that term. The student keeps as many terms as are required for the particular examination for which he is appearing. Residence is controlled not by the University directly, but by the colleges that form the University. There are twenty-two colleges, and a Delegacy for non-collegiate students. Every student is required to join one of these colleges or the Delegacy; without doing so he cannot participate in any of the functions of the University or qualify for any of its degrees. Colleges in this respect are mere hostels that cater for the accommodation of the undergraduates. But this is not an easy affair. Every undergraduate is entitled to two, and in some colleges, three rooms, and even the biggest college, say Christ Church, can hardly accommodate more than two hundred students at a time. The usual practice, therefore, is to make the students reside in the colleges during their first and second years, and then send them out into lodgings in the city for the rest of the period. The college authorities, however, do not cease to control these students, as one might imagine. All lodgings occupied by undergraduates have to be licensed by the University, and must be situated within a prescribed area. Non-collegiate students

always live in such lodgings, and this is practically the only difference between them and collegiate students. The undergraduates are given free scope in their movements, except that they are required to be back in their lodgings or their college rooms by midnight, and cannot leave them before six in the morning. The landladies of licensed houses—they form in Oxford an amusing species by themselves—send every week what is known as the 'gate-bill,' from which it can be ascertained at what time precisely the undergraduate returned home every night. This, in brief, is the whole machinery of the residential system. It is intended to bring the students into closer contact with one another, and to generate amongst them a healthy outlook and solidarity.

But the residential system by itself would be a tame affair, if there was not side by side a whole structure of social life. This is a great feature of the Oxford system—this predominance of the idea that true education does not consist in the mere amassing of knowledge, but that it consists, to a very great extent, in the profitable formation of character, which it is impossible to achieve except through the medium of a highly cultivated and organised system of social life. A life of seclusion finds no place in Oxford. Everything conspires to throw the undergraduates in continual contact with one another, not only in matters purely academical, but very much more so in other attractive spheres of life, such as sports, associations and social functions. The colleges of Oxford are nothing if they are not social centres. Living in the college premises involves a series of traditional and strictly defined duties, which definitely tend to create a most valuable *esprit de corps*. Each college possesses a net-work of clubs and societies, and to keep aloof from them is derogatory to one's honour and sense of duty. There is another inducement provided in the idea that distinctions in sports and other social activities are as appreciated as they are in studies. A Cricket Blue, for instance, will have achieved as much prominence as a first in Greats. The Presidency of the Union Society is a miniature premiership in Oxford. And the President of the Oxford University Boating Club is a great personage locally, and in England. What then is our conclusion? Perhaps things are a little overdone. If students of the London Bar eat their terms, there are undergraduates in Oxford who play their terms. They would certainly be the gainers, if they could curb a little their inordinate passion for sports, and had less facilities to give full play to it. But these are the exceptions. The influence of the system on the character of the students is on the whole salutary. Experience has proved it to be so, and experience is the safest guide.

OUR BADMINTON CHAMPIONS.

The education of the undergraduates at Oxford is mainly controlled by the tutorial system. Lectures are arranged by the University, and are open to all undergraduates, irrespective of the colleges they come from. This may seem curious to students of Indian Universities, where to attend the lecture of another college is nothing short of a risky adventure. But in Oxford lectures are not so exclusive, nor are they so very important. They are, as somebody remarked, like Devonshire Cheese, meant to be cut. There is no compulsion on the students to attend any lectures, and it is perhaps a startling fact that a student can stay in Oxford for four years, and yet not have attended a single lecture. But the studies of the undergraduates are looked after in another way. There are tutors attached to the colleges, on whom falls the responsibility of supervising the work of the students. Every undergraduate is placed under a tutor, whom he is obliged to visit every week for an hour. The tutor scrutinizes the undergraduate's work, advises him as to the lectures he may profitably attend, and the books he ought to read, and generally, gives him such help as he may require. In addition, he gives the student an essay to write, merely prescribing the books wherein he is likely to find the necessary material, and when the next week the student brings the essay ready, he offers criticisms on it, and discusses the question generally with him. The whole policy of the tutor, then, is to guide his student, and not to teach him. The student does the learning all by himself. Much might be said in favour of and against this system, but it is an undeniable fact that, where the student is prepared to do honest work, this policy of giving the widest scope to self-reliance and individual learning is the most successful means of true education. It will be wrong, however, to imagine that lectures in Oxford are utterly insignificant and useless. The fact that there is no compulsion to attend lectures does not necessarily mean that the lecture halls are deserted. There are students who cannot do without them, and there are subjects where they are absolutely essential. But under circumstances such as exist in Oxford, the popularity of lectures depends largely on the ability of the lecturers. A Don of All Souls used to punctuate his lectures with extremely witty remarks and sparkling epigrams. The crowd that flocked to these lectures almost required police control. And again, much depends on the subject. One can hardly expect, for instance, to be crushed going to a lecture on 'Early English Constitutional History.' But it certainly is the reverse when the subject is 'Frederick the Great' or 'The French Revolution.'

Elementary Notions of Psychology.

(*Continued*)

14. The instrument and the operator.

The notions given so far on nerves, their number, and their sensitiveness, refer to the instrument of the soul, not to the soul itself; they belong to Physiology rather than to Psychology. Important and interesting as they are, they form only an introduction to the main subject. A man who knows the whole nervous system in all its details, knows much indeed, and may be accounted a good Neurologist; yet, unless he goes beyond the material knowledge of the scalpel and the microscope, he may remain a poor Psychologist; he may even be tempted to express all the vital phenomena as sole functions of nerve affection, and thus act like a rank materialist. The farmer who year after year compares the produce of his fields with the manure spent on them, may similarly be tempted to express his bushels of rice in terms of cart-loads of phosphates only, as if rice and manure could be put on the same line. The Psychologist ascends higher: he sees the operator behind the instrument, the substance behind the accidents, the nature behind the faculties. It is the privilege of intelligence to see through the veil of external appearances and to go to the heart of things.

15. Substance and accidents.

The substance of a thing is not a mere bundle of visible and invisible properties or accidents, such as weight, colour, savour, smell, and the like; it is the substratum without which these qualities would not come into existence, that out of which they rise as a natural outgrowth.

Accidents are realities of an order totally different from that of substance, and yet they are realities, not mere aspects of the substance. Colour is a reality, which though inseparable from matter, has nothing to do with the mass; it is a reality of another order.

Accidents are such realities as may go and come without the substance ceasing to be. They are many; Aristotle counted nine, of which quantity is the most important; the others form the following four pairs: action and passion, time and place, situation and habit, quality and relation.

Porphyry viewed them from another angle. He studied the individual in relation to the great classification under which he grouped him. His tree of classification contained the following scheme: *Genus*, *Difference*, *Species*, *Property*, *Accident*. Thus Peter belongs to the *genus* animal, with the *difference* of rationality which gives rise to the *species* man, who has among other natural *properties* the power of expression. He has as *accidents* such accessory qualities as tallness, fairness, etc.

Whatever be the way of looking at a thing, we must be careful not to take the mere surface appearance, which is made up of accidents, for the substantial reality. We must know that the senses give us only the accidents, the imagination reaches a little further to the individual, but the intelligence alone reaches to the heart of things, that is to their nature.

Our nerves are not the essence of our being, but the instruments of our activity, and behind our activity we find our soul.

16. Nature.

We can never have an adequate notion of the soul unless we have some clear notion of *nature* in general.

The word *nature* has several acceptations.

One acceptation is that of the vague, undefined and impersonal, though ever personified, cause, which we understand to be at work behind all visible phenomena. Thus, with a capital N, we say: "Nature's works are more perfect than those of Art," or "Give Nature a favourable opportunity, and it will develop knowledge in the mind of the child, just as it develops the proper crop in the field." Thus understood, *Nature* may be defined as the prime physical cause which, under God, develops through ages according to a definite law.

The word *nature* is also taken to mean the product of that prime physical cause, and as such, it comprises the whole aggregate of visible things, which we distinguish from the invisible and spiritual, the latter being called the ultra-mundane, or the "beyond," of which occult science pretends to know much more than it actually does, as we shall see by and by.

But *nature* means chiefly the special intrinsic constitution or heart of a substance or any reality, which gives it the inner power of working in a characteristic way. This characteristic way being the means of manifesting the inner self, is reciprocally the means for the scientific man to reach the nature; every external action, such as

speaking and writing, may be considered an emanation of our inner self, which reveals us without diminishing us.

This notion becomes clearer, when we reflect on the distinction which we make between nature and person.

17. Nature and Person.

Human nature, as every body knows, is two-fold—material and spiritual. Man is a compound of body and soul; not a chemical compound, nor a mere physical juxtaposition or compenetration, but something better than either, the result being a perfect unity under a distinct personality.

In our daily forms of speech we make a great difference between the person and the nature of a man.

It is the person that possesses the nature, and not the other way about. The person is essentially particular and individual, the nature being universal and common. The person is the principle which determines the action, the nature is the principle which executes it. The person is the ultimate principle of merit or demerit; the nature is the ultimate principle of success in execution.

Peter and John are two distinct persons, both are said to possess the same nature, because if both determine to do the same action, they do it by the same methods according to one common law; but one may choose to abstain or go half-way, and thereby assert his personality. Again, both may be forced by external pressure to do the same action; yet, one acquiescing, the other protesting, and thereby asserting their respective personalities. With the same measure of success or failure they may still have different degrees of credit or discredit.

The person, says Bœthius, is the individual substance of a reasonable nature. This philosopher puts a substratum to our reasonable nature, which we do not find in irrational animals. The schoolmen imitating his phraseology, called the person "prime substance," and the nature "second substance". Modern scholars have not had the patience to carry on the distinction; they have used the single word "subject," which applies both to men and animals. Confusion has followed, and Psychologists have been obliged to find a new word for person, they call it the "ego".

The eagerness of men to distinguish between the person and the nature is as old as Philosophy. Socrates, one of the founders of Philosophy, is credited with the following remark: "When I die and you bury my body, do not say that you bury Socrates, do not confound my personality with my carcase."

18. Nature and Faculties.

Whether we consider nature to be the general prime physical cause which, under God, is at the root of all the phenomena and changes of this world, or the special prime cause which is at the root of every operation in an individual, there is a further distinction to be made. In the one and the other we distinguish the immediate causes of operation from the remote; these immediate causes are called, in the case of physical nature in general, forces,—in the case of a living being like man, faculties.

The forces of nature are not nature itself; they differ from it as much as colour differs from mass. They may vary with the state of the substance; thus water has different powers of action and reaction in its three states; and so with sulphur, diamond, &c.

Similarly, the faculties of man are not the man, nor are those of the soul, the soul. We have the faculty of walking forward and not backwards; we have the faculty of understanding or of remembering; some have a special faculty for music, which others have not.

A watch may have, with one main spring, several capacities, v. g., to mark the seconds, to ring the hours, to be our alarm call &c. So is it with men: each has a special set of faculties.

The forces of nature are innumerable, yet they may be grouped under three principal headings: mechanical, physical, chemical; similarly, the faculties which are also very numerous, may be grouped under three headings: physiological, psychological, mental.

The forces of nature operate in definite ways called laws; similarly, the human faculties operate according to laws. The laws of inert nature, which are simple enough in themselves, give rise to a tangle of complications when many forces work together; the laws of psychology give rise to a greater tangle still, chiefly when the element of personality interferes to check or enhance any faculty. We shall revert to this point when we speak of laws.

19. Faculties and Habits.

Faculties and habits differ as much from one another as forces and their smooth working in a piece of machinery. The machinery is our system, partly psychological, but largely physiological. Our faculties work upon it from the earliest hours of our life, and by degrees obtain ready and accurate response, chiefly if their application is studiously pressed for a long time and during the period of natural development. Responsiveness in fact is the conjoined product

of two factors—exercise and constitution. Exercise ensures the repetition of the action, constitution growing under these repeated actions tunes itself to them, and the habit is induced.

The best time to induce habits is obviously the period of growth. The time to go through education, and to complete it, is therefore before this period of growth is closed. A youth who is not formed to settled habits of work and virtue by the age of eighteen or twenty, is not likely to form himself to them at a later age. To postpone the learning and the practice of virtue till old age, means in practice to give it up for ever.

It is sometimes said that faculties improve with cultivation. This statement must be rightly understood. Faculties do not grow any more than the forces of nature do. but the facility of application grows, and the fruits of that application multiply. Thus the cultivation of memory does not increase our retentive power, but increases the stock of remembrances, and this very stock may facilitate the acquisition of new units of knowledge. Similarly the faculty of intelligence does not increase, but the exercise may produce a valuable discerning habit which was not possessed in the early stage of life.

Thus we may in some sense justify the phrase of Thackeray "Sow an act, reap a habit: sow a habit, reap a character."

20. Activity.

Activity is the power to act; it is the immediate manifestation of a faculty; indirectly it is the manifestation of nature.

We distinguish three types of action according to the degree of the manifestation of nature; in the first type of action, the effect is a replica of nature, and is then called univocal; in the phenomena of reproduction, nature is said to act as a univocal cause.

In the second type of action, the effect is characteristic of nature, but not a replica of it; thus the pine tree produces resin, which is certainly characteristic of the pine, yet it may be produced on a minor scale by other trees; the cause is then said to be equivocal.

The third type of action is that in which the effect bears a mere analogy to the cause: when the pine moans in the wind, we say that it acts as a mere analogous cause.

This triple activity is to be found in all causes—from God to the least animal. For instance, God, in creating the world, acts as a mere analogous cause; all creatures come from Him, as the voice

comes from the soul; the voice which darts through the air is an emission from the soul, yet it bears only a distant analogy to it.

Our actions, chiefly those of a psychological order, bespeak our faculties in different degrees: some show our memory, some our intelligence, some our will-power, some our muscular power, etc.

Left to themselves without any interference of our free-will, these actions are perceived to proceed according to a definite order, which we call law, the knowledge of which enables us to proceed deeper into the heart of things.

21. Laws of nature.

A law of nature has been defined as "the relation of covariation of cause and effect." It is not the mere relation of concomitant phenomena; this might be due to the likeness of two causes acting simultaneously: if we wind two clocks in different rooms, they strike hours concomitantly, or perhaps one a little ahead of the other, yet there is no connection of cause and effect between them.

A law is not to be confounded with the principle from which it emanates. The latter has been defined as "a relation of invariance of cause to a class of effects." In man, the soul is the invariant principle which acts through its faculties and produces either immanent or transient effects; the immanent effects remain with the operator, the transient effects pass on to outer beings. The laws of nature may be classified according to the connection between the cause and the effect.

The connection between cause and effect may be 1° material—the law belongs to the physical or cosmological order; 2° living—the law belongs to the biological or physiological order; 3° sensorial—the law belongs to the imaginative or lower psychological order; 4° mental—the law belongs to the logical or rational order; 5° moral—the law belongs to the ethical or even to the theological order.

A word might be said on each of these types. The first type of law can be treated mathematically, because the causes at work being material can be measured as accurately as their effects. But as soon as we pass on to the field of biology, we have to do with causes which transcend the order of ponderable things; we can neither weigh nor measure the principle of life, nor can we find a constant ratio of covariance between it and the effects which it produces. We can never tell beforehand how many grains of rice a definite one is going to produce; all we can say is, that to favour production we have to provide good soil and good irrigation.

When the phenomena of sensibility come into play, we can still less judge by the material constitution of the agent; the flying-fox and the flitter-mouse bats with the same external constitution prove to be so different in their pursuits—the first feeding on fruit, the second on flying insects. The eagle and the vulture differ very little in anatomy, and yet the first feeds on living prey, the other on carrion. Wasps of apparently the same general build feed their grubs, some on vegetable stuff, others on animal stuff.

The laws of logic depend still less on our material constitution. We may find an exceedingly refined reasoning power in a person of weak health, and dulness in one who appears perfectly healthy. Who could trace the path followed by a Newton, a Pasteur, a Lavoisier, a Fresnel?

As for the laws of morality, they are still less connected with matter, since by definition free-will receives no external stimulus but from the personality.

Elusive as they appear, most of these laws still form the object of deep scrutiny for the Psychologist, who studies them under the groups of instinct, knowledge, and morality.

22. Instinct.

All the laws of nature may certainly be considered as instilled by God the Creator and Ruler, and as such, they might all be included in the group of instinct. Yet the word has been restricted to a class of special impulses to action, which we find in living beings.

Instinct may be defined as an innate disposition which urges living beings to carry out, accurately and unhesitatingly, a series of actions which converge to a definite purpose, the purpose being unknown—initially at least—to the agent, although it may be known to others and is certainly known to the designer. Instinct, in fact, is one of the most wonderful manifestations of God's own hand behind the veil of nature.

Instinct is characterised by three notes: uniformity, spontaneity, urgency. It is a spontaneous impulse which urges irresistibly to action, and which can be checked only by a superior force; when it is free to act, it acts with the uniformity of a physical law.

In virtue of this triple character we may extend the usual sphere of instinct beyond mere animal life, to the vegetable world on the one hand, and to the intellectual world on the other.

23. Vegetative Instinct.

Vegetative instinct may be considered to be the uniform, spontaneous impulse which directs vegetative functions to their natural terminus. Plants have a kind of instinct for the selection of food, the upward development of leaves, the downward growth of roots. Some have a way of climbing upward, others of trailing on the ground; some of twining round supports to the right, or to the left. The ground-nut plant has a special habit of burying its pod in the ground to make the seed ripen. But the Vallisneria Spiralis is probably the most striking case of plant-instinct: this plant grows at the bottom of shallow ponds, and there produces leaves and flowers; the flowers are of two kinds, pistillate and staminate: one with ovaries for seeds, the other with pollen sacks. The fertilisation takes place out of water in the following way. The pollen flower snaps off from its short pedicel and reaches the surface first; immediately after, the female flower, which is attached to the end of a long spiral pedicel, unwinds its coils and reaches the top, there opens to the wind and receives a few of the pollen grains which are wafted from the male flower. Fertilisation takes place, and the coils form themselves again, bringing down the flower to mature its fruit under the water.

When we speak of vegetative instinct, let it be understood that we do not imply any knowledge or even sensitiveness in plants; let us remember what we said about vegetative movements; they belong to the class of reflex action, and this by itself lacks sensation.

24. Animal Instinct.

Animal or sensitive instinct is the proper type of instinct. Animals do not perform one action, but a whole series of actions tending to a definite terminus; they build nests, they migrate to distant and unknown lands, they show evident signs of fear in the presence of a natural enemy, they recognise their prey as if they were intelligent, and yet they give evident signs of absence of intelligence. The books of Henry Fabre on insect life are exceedingly entertaining. There we find, among other details, that the mason-wasp, which knows so well how to build its nest with clay, how to stock it with the proper caterpillars after having duly anæsthetised them, which knows so well how to bite its way out of the clay-nest, never think of biting its way out of a further thin paper cage which covers the same nest.

In a castle in Holland there were up to a recent date two swans, which year after year, at the spring season, built their nest and guarded it most jealously against intruders; they did not know that they worked uselessly; they were both males.

25. Intellectual instinct.

It seems at first sight a contradiction to couple instinct with intelligence; however, if we examine the matter more closely, we find some justification for it. Instinct is an irresistible impulse to a terminus; it is the function of, and directed by the terminus without previous knowledge of it. Our intelligence at its very dawn is attracted by the nature of things, as our appetite is attracted by food; the child breaks his toys in order to know what there is inside. Thirst for knowledge is as irresistible as thirst for food; the mind will take in bad knowledge just as the stomach will take in bad food rather than starve: we are therefore somewhat justified in speaking of intellectual instinct.

We can speak of intellectual instinct in another way. When our mind has conceived a concrete notion, it is irresistibly impelled to act according to it; the notion acts on the motor nerves somewhat as the electric current on the magnetic needle; action is bound to follow. A man who has a single idea in his mind, does not differ much from the brute which has also one single idea; both obey that single idea fatally; but the man is then said to be an idiot and irresponsible: he is not free.

The Micrococcus Scholarum.

Do you know the Tse-Tse fly? The Trypanosoma? The sleeping sickness? Juniors perhaps do not. Let me say for their information that the sleeping sickness is a fatal disease prevalent in Central Africa, that it is due to a microbe called Trypanosoma, and that the carrier of the microbe is the Tse-Tse fly. There you have it in a nutshell. For further information, refer to any Cyclopedia.

Is there any sleeping sickness in Southern India? Go round the classes, especially at certain seasons, particularly in the afternoon, and you will come away with a definite conclusion—that there is some sort of sleeping sickness abroad. There are sleeping people in class, and many, no doubt about it. That it is a sickness, is borne in upon any one who takes the trouble of noting and comparing observations.

The symptoms are unmistakable, they are widespread, they are *identical* in all cases; the stages of their development are regular and *easily* observable. The conclusion is irresistible: we are in the *presence* of an infectious disease, i.e., of a disease of microbian origin.

But fear not, my good friends, it is not so bad as the African sleeping sickness. The usual form of fatality about it is what is known as the "Slaughter of the Innocents." This is bad enough, yet many of its victims are thankful to escape with dear life, and, for the rest, they seek comfort in the saying: "Better a live ass than a dead lion."

Now what is the cause of the dreadful scourge? A wee little *invisible microbe, the Micrococcus Scholarum, not the Trypanosoma, thank Heaven, but a cousin* of his, or one of the same caste at all events. *Out upon him, boys!*

But he is a sneak! Beware! He catches his catcher. A regular Tartar he is.

The Micrococcus Scholarum is carried in the air; some say he is brought in by the monsoon in June. Like many microbes he is scattered all over the land, but he thrives only in favourable ground, that is, in predisposed subjects. His chosen field is colleges and schools, whence he spreads on to other subjects, as I shall presently explain.

The time of infection is June or July. Incubation lasts between one and two months. Accordingly, the first symptoms appear towards the end of August or in September, and the worst of it is that these symptoms cause no alarm to the victims!

The chosen subjects are generally students of the Junior classes, I and III U. C. They come to college full of good resolutions. They are going to attend to their books, never to miss a lecture, to take plenty of notes, to devour the whole library—without mentioning newspapers, reviews and other periodicals,—to see their professors very often, to ask for their remarks, advice, guidance, correction, to compete for and carry away all the prizes, to pass the University Examinations in the first class, to become Collectors and Judges, if not Governors...

But Micrococcus Scholarum sneaks in. How he works I cannot explain—I am not a doctor, you know,—but his presence is manifested by a general relaxation of attention, or tension, among the students. Relaxation is followed by a sort of coma, during which the boys show very low vitality—in the lecture room—and do little else than nod

assent to all that the professor says. But the lecture over, a remarkable reaction sets in: all is fever and excitement. The students go to matches, to theatres, to cinemas, to meetings, to an sort of கூட்டங்கள், as they call it. They get giddy.

Meanwhile days and weeks roll by. The lecturers lecture.....to the walls! the notes are left unwritten; the books gather dust.

Now comes a most interesting phenomenon, a mode of infection unknown in the case of other microbes. The infected boys, either through letters or through visits or by suggestion or by telepathy, convey the germs of the disease to the folks at home, and—would you believe it?—of all the folks at home the grandmothers catch the infection first.

Now, remember what I said about the period of incubation; it is about two months. Calculate. The infecting agent, that is the student, becomes an active source of transmission in September or thereabouts. The grandmothers become infected in September or October; the disease attains its paroxysm at the end of November, or in the beginning of December. Unfortunately, grandmothers, unlike their grandchildren, have not youth on their side to help them to resist the malady, and in their case the disease often terminates fatally.

Hence the deplorable number of fatalities among grandmothers early in December, that is, at examination time.

It appears that in some cases grandfathers, and even fathers, if somewhat aged, share the fate of the grandmothers.

Meanwhile, Ramaswami at college is enjoying life. True, there is the lecturer, the ex-officio joy-killer, who frowns at times; he requires exercises, note-books, and such other trifles, all meaningless to Ramaswami. There is also the Principal, who occasionally pries into things he ought to leave alone; he even pretends to read the inside of boys from the outside. These people are apt occasionally to make themselves disagreeable, and they are to be, if not propitiated, at least negotiated. In this matter, negotiating means finding reasons to cover deeds or misdeeds committed under the influence of Micrococcus Scholarum,—reasons or no reasons—allegations would be the word, what they call in common parlance சாக்கு, or pretexts. Here, again, Micrococcus is a source of inspiration.

You have heard of the phenomenon called mirage. The traveller in the desert, dying of thirst, fancies he sees in the distance clumps of trees revealing the presence of water. It is what scientists call an

optical illusion, due to various causes, objective and subjective. (*Cf.* Cyclopedia.)

Ramaswami, dying of intellectual thirst in the desert of ignorance, that is, unprepared for an essay, for an examination, etc., looks for a சாக்கு that will rid him of the dreaded ordeal, and his heated brain discovers reasons, real or not,—he does not know or care to know. He exteriorizes or objectivates his imaginings. The task is all the easier as, in such a state, memory grows rusty and fails him in proper time. What are the reasons accepted as valid for leave? Illness, ceremonies, business, (to be properly represented as "urgent business at home")... Well, there shall be illness or ceremonies or business at home.... Mirage!

Thus, it once curiously happened that 30 or 40 grandmothers, or fathers, or close relations, died on identically the same day!!! I am not sure if it was their first death...

Unfortunately, mirage does not always help; rather, Ramaswami does not always succeed in negotiating the Principal or Lecturer; or then, after all, he has got to write at least one examination in the year, —no examinations, no promotion—if he wants to be promoted, and he does want it, in spite of Micrococcus Scholarum.

So then Ramaswami stirs himself, finally, after a fit of lethargy lasting several months. He first spends one or two weeks saying: "I must get through this exam!" But his intellectual larder is empty. He will fill it. How? He has not got notes of his own. He borrows notes from some bookworm, from some good boy free from Micrococcus Scholarum. He goes about for notes, for references, for "tips." He sets to work feverishly, sits up at night, cramming notes and books. He eats in one week the meals of a whole year. He comes to the hall half, if not wholly, crazy for want of sleep, and with severe mental indigestion.....Yet he writes his exam "satisfactorily" to his thinking. Result: The "Slaughter of the Innocents." Beware of the Micrococcus Scholarum!

ANTI-MICROBE.

College Notes.

Old Boys.

We have the honour, we are told, of having produced the first graduate of the Nattukottai Chetty community. The first titular of the degree in that interesting caste is M. Murugappan, son of Mr. V. A. A. R. Mayandi Chettiar of Devakottah. Our congratulations to Murugappan and his family! May he have many imitators! Our best wishes to him!

* * * *

One of our young and esteemed lecturers has left us. We miss the familiar and cheering figure of Mr. G. V. Krishnaswami Aiyangar, M. A., our popular Mathematics Lecturer. He has gone to fill the new Mathematics Chair of the Sri Minakshi College, recently founded by the Hon'ble Sir S. Rm. M. A. Annamalai Chettiar, Kt., M. C. S., at Chidambaram. We are sure his old students will miss his impressive presence, his paternal look, his kind and sympathetic attention. We too shall regret him, for we lose in him an able and devoted lecturer.

"Then, why let him go?" you will say. Yes, why? Resist Sir Annamalai Chettiar, if you can. Besides, from our friend G. V. K.'s point of view, this is well-earned promotion, which unfortunately the cadres of this college do not permit us to give him, and it would be bad grace on our part to grudge it him. Our gratitude to him for all he has done, and our best wishes to him for the future.

* * *

Another familiar face which has vanished from our sight is that of Dr. V. Vedamuttu. It is superfluous to say anything about so well-known, so universally esteemed, and so successful a practitioner. That praise is best which is on the lips of all.

Dr. Vedamuttu had little or nothing of the conventional type of the medico. You know that type: gaunt, dry, gruff, stern, austere-looking, solemn, awe-inspiring, like a man who holds life and death in his hands: a type aptly labelled, in satire and cartoon, as "Dr. Sawbones" or "Dr. Killem."

Dr. Vedamuttu was all smiles, was geniality itself. He was ever ready to answer a call at any time. His appearance, like a ray of

P. V. BALAKRISHNA AIYAR,
I. C. S. Probationer.

sunshine, dispelled the dark shadows flitting about the patient. We are not far from believing that the virtue of his medicines was due in large measure to the microbe of cheerfulness and hopefulness, which he inoculated in all those with whom he came in contact. He has gone back to his native Tinnevelly, and thither follow him our gratitude and our best wishes.

* * * *

Dr. Vedamuttu's place is taken by an "Old Boy", Mr. J. Ponnusawmy Pillai, the R. M. O. of the Municipal Hospital. His genial appearance augurs well of his work here. We wish him welcome and every success.

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We are glad to welcome in our midst, as the new Trichinopoly District Educational Officer, an "Old Boy," Mr. K. V. Subbaya, M.A., L.T. Education in this district is in good hands.

* * * * *

The recent Birthday Honours list contains the name of one of our distinguished "Old Boys," Mr. K. S. Chandrasekhara Aiyar, Chief Judge, Bangalore, brother to our well-known fellow-townsman and "Old Boy," Mr. K. S. Sambasiva Aiyar, B.A., B.L. Mr. Chandrasekhara Aiyar receives a knighthood. Our heartiest congratulations to the new knight. May he live to enjoy the honour conferred on him for many long years to come!

* * * *

Another Rip Van Winkle, who rubbed his eyes for all he was worth when, the other day, he revisited his Alma Mater for the first time since 1897, is Mr. K. Srinivasa Aiyangar B.A., B.E.,—our Divisional Officer, known in his college days as "Little K." He spent nearly two hours going round. But that won't do, Mr. K.; you will have to come again—the oftener, the better.

* * * * *

Mr. S. Ramachandra Row, B.A. (Hons.), has been appointed Chief Physics lecturer in the new college at Chidambaram—the right man in the right place.

* * * * *

It was not a surprise to anybody, though a source of intense satisfaction, to learn that our friend, Mr. P. V. Balakrishnan, headed the pass list at the recent I.C.S. Entrance Examination. That "P. V." would pass was considered 'a dead cert,' seeing that he had headed the lists in the Honours and the F. L. Examinations; that he would come

out first was also quite on the cards; but there are the proverbial slips 'twixt the cup and the lip. However, what every one anticipated and wished for, has come to pass—"P. V." is first. Three cheers to him! He proceeds to England in October, and with him go our best wishes for a successful and brilliant career.

* * * * *

We have now quite a colony of "Old Boys" out West. We say "out West" advisedly, for we are represented not only in the United Kingdom, but elsewhere as well.

B. Dasannacharya (Hons. II-A., 1917) is "somewhere" in Germany, but we have no news of him.

We are more fortunate with another "Old Boy"—Look at the photo of Herr N. Vembu. He is not a German, but a genuine Smartha Brahmin, born somewhere in South India—in Pudukottah, we believe—a student of this college from 1914 to 1919, and a Physics Honours man of the Madras University. You might wonder how he ever got to Berlin. But that is just the way with Vembu. There is no saying what he won't do. He is a daring, adventurous young man, who does not believe in cooling his heels at home waiting for Dame Fortune to come round and smile on him. He goes out to meet her. He takes her—I mean, he takes time by the forelock. That is the way to force a decision on this fickle lady.

Herr Vembu styles himself: "Projektierumgs—ingenieur" in the "Allgemeine Elecktricitats—Gesellschaft," which, being interpreted, is some sort of Engineer in the General Electricity Company.

He says he longs for his Indian dishes and Indian sweets! He has no stomach for the German *cuisine*, it would appear;—German tastes in things culinary are certainly at variance with Indian tastes.

Well, he *can* have his Indian dishes. Why not follow the example of P. N. Ramaswami at Cambridge and N. Anantanarayanan (Launcelot Gobbo of 1915) at Oxford? These two young gentlemen have their orthodox Indian vegetarian diet, (as one of us at least can testify to from personal knowledge), and it is most easy to get it. You teach your house-keeper to prepare your meals in the approved Indian fashion. The housekeeper—generally an elderly lady—is most anxious to please her master, and in less time than it takes to tell it, becomes proficient in the Indian culinary art.

Anantanarayanan boasts that he saves between 10 sh. and £ 1 a week, with his Indian diet. Prospective travellers to England, please note.

HERR VEMBU.

At all events, Herr Vembu is making a living in Berlin. He gets a big bag full of paper money for salary. He has been making projects and working out complete power schemes for various countries including South America, Bulgaria, Russia, &c. He finds work quite lively in his large bureau, and he says he is everyday reminded of the "rather frugally designed English lecture-hall in the college, without mentioning the 6 inch wide benches, ably defended by the luminous pen of Father Quinn in his articles on *Keeping Fit.*" May we observe that, if distance lends enchantment to the view, it may also blur the vision. Herr Vembu, we are sorry to contradict you, but the benches are 10 inches wide, not 6!

Anyhow, in spite of this malicious but friendly joke, we wish old Vembu every success, and we shall eagerly await his visit when he comes back to India.

Museum.

The Curator gratefully acknowledges the following gifts :—

The lower jawbone of an elephant. The elephant—a rogue—was shot by the donor, Lt. Colonel T. S. Cox at Benari near Sattiamangalam.

Height of the elephant 10 ft. 4 in, (exactly twice the circumference of the fore-foot.)

Length of Tusks	5 ft. 11 in.
Weight of Tusks	74 lbs.—the two.

A collection of silver and copper coins from Jodphur and the neighbouring states, from Mr. S. R. Srinivasathathachariar of Srirangam.

Two crocodile skins from Mr. T. T. Thomas (Physics Demonstrator.)

Two fox skins, and one Spotted Bill (duck), from W. H. Mitchell Esq. (Former Pupil), Deputy Collector, Coimbatore.

Wild boar tusks, one Shoveller (duck), one Pintail (duck), two Bronze-winged Jacanas, from Mr. B. Sodalaimuthu Pillai, Mirasdar, Coimbatore.

Samples of sand from Cape Comorin, from Mr. Gubil Sundaresan, Trichy.

Bark of tree, used by hill tribes and "Ascetics," from Mr. G. Subbiah Chetti, Dindigul.

Two large saws of saw-fish, from Mr. B. Miranda (F. P.), Tuticorin.

Two squirrel and two langur skins, from Mr. K. K. Mathew (F. P.)

Three squirrel skins, from Mr. K. M. Dominic (F. P.)

Four little Grebes from Mr. A. Saverimuthu Pillai, Teacher, II Form.

OUR FIRST INDIAN BISHOP

As we go to press news comes of the appointment of Rev. T. ROCHE, S. J., Parish Priest of the Holy Redeemer's Church, Trichinopoly, as first Bishop of the new see of Tuticorin. "***Ad multos annos***" is the hearty wish of his Alma Mater to the new Prelate, with equally hearty congratulations.

General.

It is now a matter of common knowledge that the Principal, the Rev. F. Bertram, S. J. has been appointed a member of the advisory committee and of the provisional syndicate of the newly constituted University of Madras, and that the Rev. D. Honoré, S. J., has been appointed to the Travancore University Commission.

Review of Books.

English History (1485—1920)—By the Rev. James H. Gense, S. J.

This book has been favourably reviewed in two or three papers, and we fully endorse the encomiums bestowed upon it.

A work of the kind must be judged from the purpose it intends to fulfil. It is a text-book for a High School, and such a work is not and should not be compared to works of erudite research and deep scholarship. As a text, the merits of this short History are evident at a mere glance, and it meets the needs of the students for whom it has been written: it judiciously combines method, clearness, readableness, sobriety, and emphasis on salient facts or movements. While leaving something for the teacher to explain, it supplies the schoolboy with an excellent summary for reference and study.

Though the author speaks out plainly on certain matters obscured by centuries of prejudice, the tone of his work is not controversial, and when he dissents from received traditions, his dissent is based on reliable authority.

Should a second edition soon follow the first, a few corrections would make this excellent production still more valuable. When opening the book at random for the first time, we found, on page 247, not once, but twice, the name of Louis XV where evidently Louis XVI is meant. On the same page we read 'Jacobites' for 'Jacobins.' and a reader thoroughly acquainted with the History of the French Revolution rubbed his eyes when, again on the same page, he noticed the statement that "more than a million people were butchered during the first two years of the French Revolution," i.e. before the reign of Terror was in full swing. Regarding the question of the Scheldt, which is supposed to be the cause of the Revolutionary wars, we can only refer the author to the Cambridge Modern History.

But we hasten to add that these slips are trivial blemishes. Taking the book as a whole, it deserves to be recommended for use in schools. Those who will give it a trial, will not be disappointed.

The Madras Year Book—1923.

Rao Sahib D. Arulanandam Pillai B. A., B. L., an "Old Boy," is to be heartily congratulated on this immensly useful and interesting compilation, which he has produced as Publicity Officer. A whole wealth of information concerning the Presidency is placed at one's disposal with extraordinay neatness and compactness. A particular feature of the work is the series of maps, which in their fulness and clearness leave nothing to be desired. We earnestly wish that the work will become an annual feature—its usefulness alone more than justifies the hope.

Obituary.

We desire to express our sympathy with Bishop Heber's College in the loss it has sustained by the unexpected and sad demise of Mr. W. S. Charlton on 25th June. We have heard much of the qualities of head and heart and hand of the deceased, and we have no doubt that his genial presence will be sorely missed in the sister institution.

Examination Results March-April 1923.

L. T. Degree Examination.

Second Class.

	Distinction.		*Distinction.*
Joseph, M. V.	(English)	Ramayya, S.	
Krishnan, S.	do.	Sundaram, R.	
Narayanan, K. V.	do.	Tyagarajan, V.	(History and Geography)

Third Class.

Desikan, A.		Sundaram, V. S.	(English)
Nagarajan, R.		Venkateswaran, S.	do.
Parameswara Ayyar, K. R.		Anantanarayanan, T. S.	
Parthasarathi, K.		Chandrasekharan, V.	
Rajam, K.	(English)	Innasirayar, S.	
Ramaswami, S. K.		Narasimhalu, S.	
Subbaratnam, K.		Panchapagesan, S.	(English special)
Subrahmanyan, B. V.		Radhakrishnan, T. V.	
Yegnaraman, B. S.	(English)	Ramaswami Ayyar, R. S.	
Ramachandran, S. N.		Subrahmanyan, N.	
Ramachandra Punth, A. S.	(Engl. and Engl. Special).	Tiruvenkatam, P.	
		Venkatakrishnan, G.	
Ramanujam, S.		Venugopalan, T. S.	
Srinivasan, S.			

B. A. (Honours) Degree.

BRANCH I.

MATHEMATICS.

First Class.

1. Gopalaswami, R.
4. Balakrishna Sastri, K. S.

Second Class.

2. Mahalingam, A.
3. Gopala Panikkar, K.
5. Visvanathan, K. S.
6. Rangachari, R.

Third Class.

5. Srinivasan, V.

BRANCH II-A.

PHYSICAL SCIENCE.

First Class.

1. Viramani Ayyar, K.

Second Class.

1. Ramachandran, P. V.
2. Ramadurai, S.
4. Rangachari, T. S.

Third Class.

4. Rangaratnam, K. N.

M. A. Degree under the Transitory Regulations. Second Class: Rangadhama Rao, K.

BRANCH V.

HISTORY & ECONOMICS.

Second Class.

3. Kalyanaraman, A.
7. Adinathan, R.
9. Venkatasubrahmanyan, P. R.
10. Natarajan, S.
12. Akhileswaran, A. V.
Srinivasan, K.

Third Class.

6. Subrahmanyan, E. N.
7 Venkataraman, N.
10. Venkataraman, B.
15. Machado, P.
16. Pinto, A. M P. A.
17. Sundaram, E. S.
20. Morais, J. T.
22. Sankaranarayana Ayyar, L. A.

B. A. (Honours) Preliminary.

Balakrishna Menon, P.
Ganapati Ayyar, T. S.
Hirudayaswami, A.
Jayasankaran, S.
Krishnamachari, M. R.
Krishnan, C. N.
Krishnan, S.
Kuppuswami, K.
Narayanamurti Ayyar, M. V.
Narayanaswami, N. V.
Radhakrishnan, K. V.
Rajagopalan, S. S.
Ramanatha Ayyar, P. S.
Ramanatha Ayyar, T. S.
Rama Varma Tirupad, V. K.
Rangachari, R.
Sambamurti, V.
Sankaran, C. S.
Sitaraman, S.
Srinivasan, T.
Subrahmanya, Ayyar, A. V.
Subrahmanyan, V.
Sundaram, N. K.
Sundarajan, G. T.
Thomas, N. C.
Vaidyanathan, V. K.
Vemban, S.
Venkatachari, K.
Venkataraman, K.

B. A. Degree.

ENGLISH.

First Class.

Subrahmanyan, T. V.

Second Class.

Subrahmanyan, P. N.
Venkatakrishnan, V.
Kalyanasundaram, P. N.
Rajagopalan, N. S.
Sankara Wariyar, K.

Third Class.

Alagiriswami, S.
Anantachari, T. S.
Anantanarayanan, M. A.
Anantarama Ayyar, P. M.
Anantasubrahmanyan, K.
Appanna Sastri, T. S.
Ardhanari Ayyar, B. N.
Arpudaswami, T.
Aruldas, S
Arunachalam, U.

Ayyamperumal, A.
Ayyamperumal, K. V.
Ayyappan Pillai, T. K.
Balakrishna Marar, K. W.
Balakrishna Menon, V. K.
Balakrishnan, M.
Balasubrahmanyan, M. S.
Balasubrahmanyan, S.
Bangaruswami, R.
Bharata Ayyar, P. R.
Chandrasekharan, C. R.
Daivachilai, T.
Daniel, J.
Dhanaswami, S.
Dharmalingam, T. M.
Dominic, K. M.
Duraiswami, M.
Ferdinand, M. X.
Ganapati, L. C.
Ganapatisubrahmanyan, N.
Gnanaprakasam, C.
Gopalachari, D.
Gopalan, G. V.
Gopalan, T. R.
Gopala Rau, V. R.
Govindan, A.
Govinda Nayar, K.
Govinda Panikkar, P. K.
Joseph, P.
Joseph, P. C.
Kalyanasundaram, N.
Kalyanasundaram, P.
Kandaswami, V.
Kasturirangan, S.
Kesavan, S. S.
Krishna Ayyar, P.
Krishnamachari, R.
Krishnamurti, L.
Krishnamurti, N. S.
Krishnamurti, S. P.
Krishnamurti, S. R.
Krishnamurti, V.
Krishnan, K.
Krishnan, R. G.
Krishnaswami, A. E.
Krishnaswami, K.
Krishnaswami, S.
Krishnaswami, S. P.
Krishnaswami, S. R.
Kulandaiswami, A.
Kuppuswami, M. S.
Kuppuswami, P. G.
Mahalingam, K.
Mariasundaram, D.
Mathew, V. J.
Miranda, Bennet.
Miranda, J. L.
Murugappan, M.
Nagarajan, V. K.
Nambisrinivasan, N.
Nanu, K.
Narasimhan, V.
Narasimha Rau, R.
Narasinga Rau, S.
Narayana Ayyar, A. S.
Narayana Ayyar, P. A.
Narayana Ayyar, P. N.
Narayana Ayyar, S.
Narayanan, K.
Narayanan, P. S.
Narayana Panikkar, K.
Narayana Pillai, K.
Narayana Potti, U. K.
Narayanaswami Ayyar, P. T.
Natarajan, S. S.
Nilakantan Elayathu, M.
Padmanabhan, C. K.
Padmanabhan, K.
Panchapakesan, S.
Paramasivan, S.
Parthasarathi, P. S.
Paulose, C. K.
Pichumani, A. S.
Piramanayakam, A.
Rajam, B.
Rajagopalan, K. R.
Rajagopalan, N.
Rajagopalan, R. 2006
Rajagopalan, R. 2007
Rama Ayyar, K. N.
Rama Ayyar, V. S.
Ramachandran, M. N.
Ramachandran, R.
Ramachandran, S.
Ramakrishna Ayyar, R. V.
Ramakrishnan, K. V.
Raman, C.
Raman, D.
Ramanathan, A.
Ramankutti, N.
Ramanujam, V.
Ramasubbu, P.
Ramaswami, K. S.
Ramaswami, N.
Ramaswami, S.
Ramaswami, T. P.
Ranganayakalu, K.
Rangaswami, C. R.
Sama Rau, N.
Sankaranarayana Ayyar, K. C.
Sankaranarayanan, S.
Saptarishi, N.
Saranathan, G.
Sarvesan, D.
Saundararajan, R.
Sellappan, V.
Selvarayan, S.
Seshadri, M. S.
Seshadri, S.
Seshan, P. A.
Seshan, S. A.
Sinnakannu, N.
Sivaramakrishnan, K. M.
Sivaramakrishnan, S.
Sivarama Menon, A.
Sivaraman, C. A.
Sivasubrahmanyan, K. V.
Srinivasan, M. S.
Srinivasan, P. N.
Srinivasan, R.
Srinivasan, S. R.
Subbaraman, S.
Subbuseshan, N.
Subbuswami, S.
Subrahmanya Ayyar, N.
Subrahmanya Ayyar, P. H.

Subrahmanya Ayyar, P. R.
Subrahmanya Ayyar, V.
Subrahmanyan, A.
Subrahmanyan, A. R.
Subrahmanyan, G. K.
Subrahmanyan, K. G.
Subrahmanyan, K. M.
Subrahmanyan, N.
Subrahmanyan, S. S.
Subrahmanyan, T. A.
Subrahmanya Sastri, S.
Sundaram, M. S.
Sundaramurthi, K. R.
Sundaresan, R. V.
Theodore, R. P.
Thomas, A. E.
Thomas, T. T.
Tirumalai, G.
Todman, E. N.
Ulakanathan, D.
Unnithan, M. N.
Vaidiswaran, K.
Vaidyanathan, A.
Vaidyanathaswami, P.
Vamanam, T. K.
Vanchi Ayyar, K. A.
Vareed, V. L.
Vasudevan Unni, K.
Vedamurti, T. V.
Velayudham Pillai, P.
Venkataraman, K. 1187
Venkataraman, K. 2056
Venkataraman, R.
Venkataraman, S.
Venkataraman, V. S.
Venkatasubba Narasimhan, R.
Venkatasubrahmanyan, K.
Venkatesa Ayyar, K. P.
Venkatesan, P. S.
Vetrivelu, T.
Visvanathan, B.
Visvanathan, N. S.
Vijayaraghavan, A. N.
Vyakulaswami, E.
Yegnanarayanan, A.

Group i.

Second Class.

Krishna Aiyar, R.
Sellappan, V.
Mariasundaram, D.
Saundararajan, R.

Third Class.

Anantachari, T. S.
Gopalaswami, L. N.
Joseph, P. C.
Krishna Ayyar, P.
Krishna Ayyar, M.
Murugappan, M.
Panchapakesan, S.
Rajagopalan, T. V.
Ramachandran, S.
Rangaswami, S.
Sankara Pillai, N.
Seshadri, S.
Subbaraman, S.
Venkatasubrahmanyan, K.
Venkatesa Ayyar, K. P.
Visvanathan, B.

Group ii-A.

Second Class.

Kandaswami, V.
Rajagopalan, N.
Subbuseshan, N.
Thomas, T. T.

Third Class.

Anantarama Ayyar, M. S.
Arpudaswami, T.
Dominic, K. M.
Kodandapani, K. S.
Krishnan, K.
Krishnan, T. S.
Krishnaswami, S.
Madhavan Pillai, C.
Maharajan, S.
Nambisrinivasan, N.
Narayana Pillai, K.
Narayana Rau, B. S.
Padmanabhan, C. K.
Paramasivam, S.
Rama Ayyar, V. S.
Ramanathan, A.
Ramasubbu, P.
Ranganayakalu, K.
Srinivasan, S. R.
Subrahmanyan, K. G.
Subrahmanyan, T. V.
Tirumalai, G.
Vaidyanathaswami, P.
Vanchi Ayyar, K. A.
Velayudham Pillai, P.
Venkatasubbanarasimhan, R.

Group ii-B.

First Class.

Krishnamachari, R.

Second Class.

Anantarama Ayyar, P. M.
Bharata Ayyar, P. R.
Jayaramachandran, R.
Kalyanasundaram, P. N.
Narayana Ayyar, S.
Saptarishi, N.
Vaidiswaran, K.
Vasudevan Unni, K.

Third Class.

Balakrishna Marar, K. W.
Balakrishna Menon, V. K.
Chandrasekharan, G. R.
Gnanaprakasam, C.
Krishnamurti, V.
Kuriyan, K. T.
Mahalingam, K.
Narayanan, P. S.
Rama Ayyar, K. N.
Ramachandran, S.
Raphael, R. J.
Sebastian, A. P.
Sivaramakrishnan, S.
Sivarama Menon, A.
Subrahmanya Ayyar, N.
Vedamurti, T. V.

Group V.

Third Class.

Achyutan, M.
Anantasubrahmanyan, K.
Alagiriswami, S.
Appanna Sastri, T. S.
Ardhanari Ayyar, B. N.
Aruldas, S.
Arulnathan, S. J.
Arunachalam, U.
Bangaruswami, R.
Chinnakrishnan, K.
Daivachilai, T.
Dhanaswami, S.
Dharmalingam, T. M.
Ganapati, L. C.
Gopala Pillai, C.
Gopala Rau, V. R.
Govindan, A.
Govindan, V.
Govinda Nayar, K.
Govinda Panikkar, P. K.
Ittoop, J.
Joseph, P.
Kalyanasundaram, N.
Kalyanasundaram, P.
Kasturirangan, S.
Kesavan, S. S.
Krishnamurti, S. P.
Krishnan, R. G.
Krishnaswami, A. E.
Krishnaswami, K. 1981
Krishnaswami, K. 1982
Krishnaswami Ayyangar, P.
Kulandaiswami, A.
Kumaran, C. K.
Kuppuswami, M. S.
Mahadevan, L. A.
Mathew, V. J.
Miranda, Bennet.
Miranda, J. L.
Nagarajan, V. K.
Nanu, K.
Narasimhan, V.
Narayana Panikkar, K.
Narayana Potti, U. K.
Natarajan, S. S.
Nilakantan Elayathu, M.
Paulose, C. K.
Pichumani, A. S.
Ponnuswami, A. V.
Ponnuswami, S.
Rajagopalan, K. R.
Rajagopalan, N. S.
Rajagopalan, R. 2006
Rajagopalan, R. 2007
Rama Ayyar, N.
Ramachandran, M. N.
Ramachandran, R.
Ramakrishna Ayyar, R. V.
Ramakrishnan, K. V.
Raman, C.
Raman, D.
Ramankutti, N.
Ramanujam, V.
Ramaswami, N.
Ramaswami, S.
Ramaswami, T. P.
Ranganatha Rau, C. S.
Rangaswami, D.
Sankaranarayana Ayyar, K. C.
Sankara Wariyar, K.
Sarvesan, D.
Selvarayan, S.
Seshadri, M. S.
Seshadri, N. S.
Seshan, S. A.
Sinnakannu, N.
Srinivasan, M. S.
Srinivasan, P. N.
Subbuswami, S.
Subrahmanya Ayyar, P. H.
Subrahmanya Ayyar, P. R.
Subrahmanya Ayyar, V. 1540
Subrahmanya Ayyar, V. 2303
Subrahmanyan, A.
Subrahmanyan, A. R.
Subrahmanyan, K. M.
Subrahmanyan, N.
Subrahmanyan, S.
Subrahmanyan, S. S.
Subrahmanyan, T. A.

Subrahmanya Sastri, S.
Sundaram, M. S.
Sundaramurti, K. R.
Sundararajan, P. R.
Sundaresan, R. V.
Thomas, A. E.
Ulakanathan, D.
Vamanam, T. K.
Venkataraman, D.
Venkataraman, K. 1187
Venkataraman, K. 2056
Venkataraman, R.
Venkataraman, S.
Venkataraman, V. S.
Vetrivelu, T.
Visvanathan, N. S.
Yegnanarayanan, A.

INTERMEDIATE EXAMINATION IN ARTS AND SCIENCE,

First Class.

Groups I & III.

Natarajan, A. S.
Vaidyanatha Aiyar, K. A.
Ramanujam, V. S.
Romeo Thomas, I. C. Revd.
Seshadri, T. N.
Varadarajan, K. R.
Ramamurti, V.
Ganesan, V. P.
Natarajan, E. V.
Ganesan, A. K.
Mariasundaram, M.
Muttuswami Arya, K. S.
Sarangarajan, R.
Kalyanasundaram, P.

Second Class.

Group I.

Muttuswami, K.
Ramanathan, T. R.
Venkatasubrahmanyan, N.
Amalorpavanathan, D.
Balasubrahmanyan, V.
Govindarajan, K. R.
Kandaswami, M. V.
Muttuswami, K.
Narasimhan, S.
Narayanaswami, B.
Narayanaswami, S.
Parthasarathi, N. S.
Periyaswami Pillai, S.
Rajagopalan, P. V.
Satyamurti, P. S.
Subrahmanyan, M. D.
Subrahmanyan, N.
Subrahmanyan, N.
Sundararajalu, V.
Sundaresan, T. N.
Tyagarajan, L.
Sankaran, K.
Velayudha Marar, M. G.
Kerala Varma, L. A.
Seshachala Bharadvaj, S.
Raja Ayyangar, C. S.
Satyamurti, B.

Group III.

Thayappan, S.
Ramamirtam, R.
Kunchitapatham, N.
Visvanathan, P.
Ratnam, V.
Rangaswami, S.
Alagappan, V.
Sudalaimani, S.
Aiyaswami, H.
Durairaju, A.
Ganapathi, A. K.
Maria Antony, A.
Natarajan, N.
Radhakrishnan, B. V.
Raghunathan, V.
Shanmukhasundaram, N.
Srinivasan, N.
Narayanaswami, R.
Ignatius, P.
Antoniswami, M.
Kalyanasundaram, S.
Mahadevan, V.
Ramachandran, V.
Balasubrahmanyan, E. S.
Jagannathan, K.
Sebastian, A.
Subrahmanyan, S.
Vijayarangan, S. M.
Vijayavenkatachala Durai.
Abraham, O. L.

Part I only.

Group I.

Narayanamurti, B.
Le Merle, J. H.
Muttayya, M.
Narayanaswami, G. R.
Annamalai, E. M.
Krishnaswami, N. S.
Rangachari, R.
Rangaswami, A. C.
Sadasivan, K. R.
Subrahmanyan, R.
Venkatasubban, N. S.
Pubalarayan, G.

Group III.

Ramaswami, V. K.
Chidambaram, R.
Sivasubrahmanya Pillai, S.
Anavaratam, T. N.
Natarajan, K. S.
Ignacimuttu, I.
Ignacimuttu, S. V.
Joseph, J. M.
Vanniyasingam, V.
Rajasubrahmanyan, P.

Part II only.

Group I.

Dharmarajan, C. R.
Paul, C. M.
Bhuvarahan, S.
Gopalan, L. S.
Rangaswami, N. V.
Subrahmanyan, R.
Subrahmanyan, R.
Varadarajan, R.
Hariharan, K. G
Krishnamurti, S. N.
Lakshmanan, K. G.
Joseph, P. M.
Madurendram, V. M.
Mathew, P. P.
Narasimhan, R.
Thomas, P. P.

Thangaswami Nadar, N.

Group III.

Venkataraman, K.
Lakshmanan, R.
Chandrasekharan, G.
Susaimari, M.
Sebastian, P. C.
Thomas, P. O.
Shoury, S.
Arunachalam, K.

Joseph Roch, M.

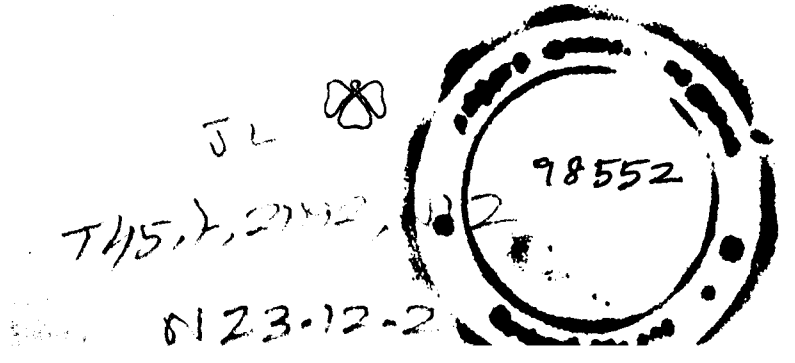
S. S L. C. Examination.

Abdul Rahim, C. Aiyaswami, P. Anantaraman, L. Antonimuthu, S. Arogyaswami, C. Arogyaswami, D. Arpudaswami, G. Arulmaria Adaikalam, C. Arulrajan, J. Athiappan, P. Balaraman, M. D. Balasubrahmanyan, K. Bhavanisankaran, N. Chinniah, D. A. Chinnatambi, A. Danaswami, D. Dandayudapani, D. A. Deva Anugraham. Devasakhayam, J. M. Deviah, K. Doraiswami, M. Ganapathi, K. Ganesan, G. S. Gopala Aiyar, K. Hariharan, T. N. Iravathan, N. N. Jaganathan, R. Jesudas, K. Jeyasankaran, S. Joseph, A. R. Krishnamurthi, M. Krishnamurthi, P. Krishnaswami, S. Krishnaswami, S. Lakshmanan, T. B. Lourduswami, A. Lourduswami, A. Lourduswami, Y. Manuel, S. Maria Louis Durairaj, M. Mariasusai Rayappan, S. Michael, N. A. Minakshisundaram, K. Motha, J. L. Muthuraman, B. K. Muttuswami, S. Namasivayam, T. M. Narasimhan, T. R. Narayanaswami, A. Narayanaswami, R. Narayanaswami, V. Natarajan, S. Natesan, M. S. Padmanabayya, T. J. Pakkiaswami, J. Pakkiaswami, S. A. Palaniswami, V. O. V. Panchapagesan, R. Peter, K. A. Ponnudurai, A. Pranatharthiharan, K. Pubbalarayan, G. Rajagopalan, M. S. Rajagopalan, T. S. Rajam, K. Raju, D. Ramachandra Aiyer, S. M. Ramachandran, I. A. Ramachandran, S. Ramaiya, P. S. Ramamurti, N. Ramaratnam, N. Ramaratnam, T. S. Ramaswami, K. Ramaswami, V. Rangarajan, V. A, Rangaswami, G. Sandanaswami, A. Savarinathan, G. Savarinathan, M. D. Savarinathan, P. Savari Rayan, V. M. Sesha Aiyangar, N. Seshadri, K. Serrao, R. W. Shahul Hamid, S. P. S. Sinnappan, S. Sitaraman, S. Somanathan, S. Sreedharan, V. Srinivasan, G. Srinivasan, N. Srinivasan, R. Subbanarayanan, A. K. Subrahmanyan, K. V. Subrahmanyan, N. C. Sundararaj, A. Sundararajan, S. Susaimarinathan, S. Thiruthuvam, C. Vaidyanathan, M. Varghese, P. P. Vasudevan, T. R. Venkata Krishnan, K. Venkataraman, R. Venkataraman R. Venkataraman, T. S. Venkataswami, P. K. Villavarayan, P.

UNIVERSITY EXAMINATION RESULTS.

March-April 1923.

EXAMINATION.	Number sent up.	I.	II.	III.	Total.	Percentage.	Pass Degree.
L. T.	40	...	6	23	29	72·5	
B. A. Honours.							
Branch I	8	2	4	1	7	87·5	
Branch II-A.	7	1	4	1	6	85·7	
Branch V	15	...	6	8	14	93·3	1
Preliminary	35	...	...	...	29	82·8	
B. A. Degree.							
English	286	1	5	191	197	68·8	
Group I	29	—	4	15	19	65·5	
Group II A.	50	—	4	26	30	60·0	
Group II B.	30	1	8	16	25	83·0	
Group V.	178	—	—	107	107	60·1	
Intermediate.							
Group I	103	13	27	...	40	38·7	
Group III	73	1	30	...	31	42·4	
					71	40·3	
Part I only.							
Group I	...	...	...	...	12	...	
Group III	...	...	...	...	10	...	
					93	52·8	
Part II only.							
Group I	...	..	...	...	17	...	
Group III	...	...	...	...	9	...	
					97	55·1	
S. S. L. C.	157	Declared eligible for College course.			109	69·4	



தமிழ்நாடு ஆவணக்காப்பக நூலகம்,
எழும்பூர், சென்னை-600 008.

தவணைத்தாள்.

இசை எண் : ப. எண் :

வழங்கிய நாள். (1)	திரும்பிய நாள். (2)	வழங்கிய நாள். (1)	திரும்பிய நாள். (2)

S.F. 259A-6—1,00,000—30-1-84.