materially by contributions of articles. The balance sheet of the Magazine accounts for the past year is published elsewhere.

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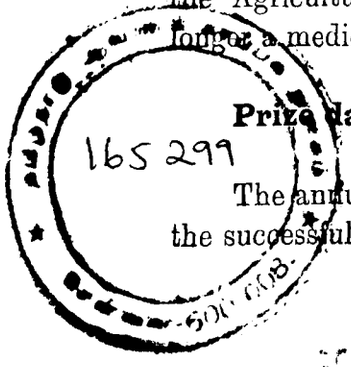
The College and the Museum, were visited by His Excellency Lord Pentland P. C. G. C. I. E. and a party of Zemindars, during the middle of July. Among other distinguished visitors during June and July were, the Hon. Mr. L. E. Buckley I. C. S., the president and members of the Board of visitors, the examiners for the year, Mr. F. A. Lodge C. I. E. (Inspector General of Forests, Hyderabad) etc. Among the new features that attracted the attention of visitors this year were the 'Engineering Park' which owes its inception to Mr. E. M. Crothers, instructor, Madras Forest College, and the 'Arboretum' which contains a choice collection of plants, correctly labelled, for the edification of the students.

We are glad to be able to announce that, to the relief of the residents of the Forest College estate, a 'fuel depot' and 'Provision Stores' have been opened by the principal of the College. These, together with an assured and regular supply of good dairy produce from the Agricultural College will add considerably to the convenience and comfort of the people here.

It is appropriate here to mention another change in the College, viz., the opening of the 'Lawley Road dispensary' which is to be common for both the Forest and the Agricultural Colleges. The Forest College has no longer a medical officer of its own while at head quarters.



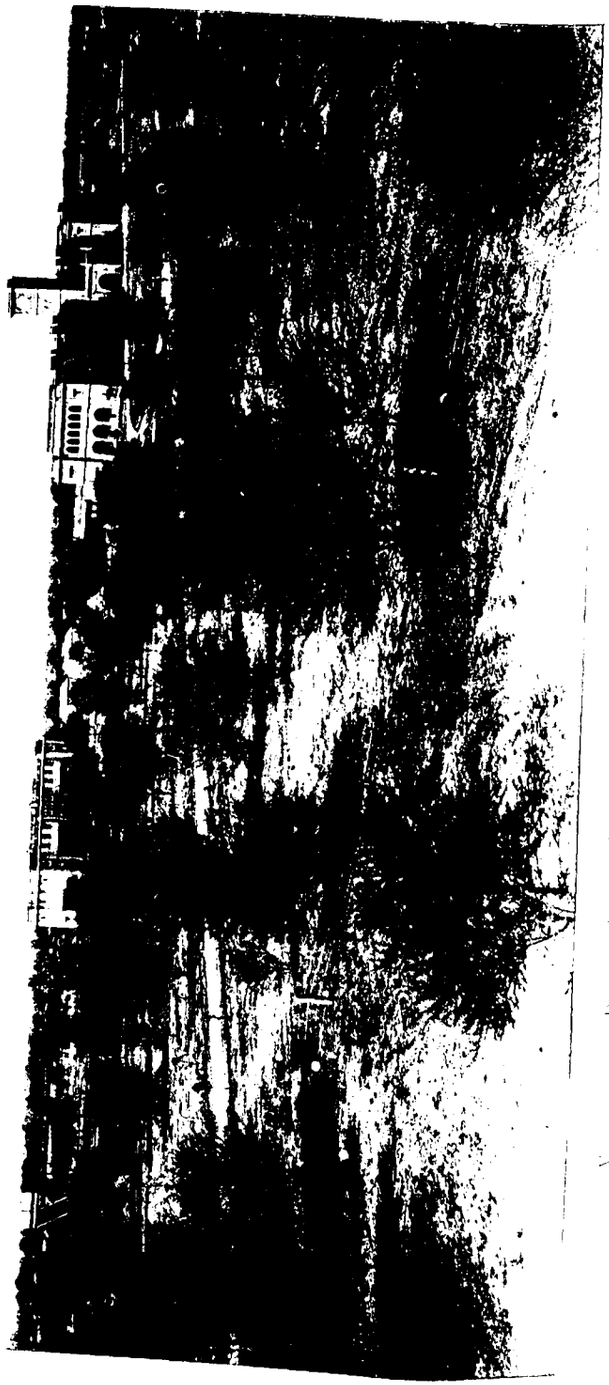
Prize day at the Madras Forest College.

The annual distribution of prizes and certificates to the successful students of the Madras Forest College was held on the 1st July 1918 at the College with Hon. Mr. M. E. Couchman I. C. S., President of the Board of visitors, in the chair. Mr. E. M. Crothers, the House Tutor, was in charge of the general arrangements which were quite satisfactory. Among those present were :—the members of the board of visitors, Dr. C. A. Barber C. I. E. and Mrs. Barber, Mrs. McCarthy, Mrs. Bryant, Mr. and Mrs. Fischer, the principal, Messrs. Marjoribanks, H. F. A. Wood, Sayyid Abdul Qadir Sahib Bahadur, Rai Bahadur K. Rangachariar avergal, Messrs. Panchapagesa Iyer, Raman Menon, Littlewood and others.

Mr. F. L. C. Cowley-Brown the principal read the following report on the working of the college during the year :—

Mr. President, Members of the Board of Visitors, Ladies and Gentlemen:

The past year has been one of steady if uneventful progress. We are gradually consolidating our position here both metaphorically and physically. Our aims and requirements and our lines of work, both at Headquarters and on tour, have by now been fairly crystallised, and the uncertainty of experiment has been replaced by routine based on recorded precedent. As a result, both Staff and students know in advance what is expected, and consequently every year the machine works with greater ease and efficiency. With the completion of the Demonstration Forest there will be far greater scope at Headquarters for practical Forest and Survey work in all its branches. The Museum has been re-organised on more definitely instructional lines. I had the advantage of studying the scientifically arranged collections in the admirable Dehra Museums, and anticipate that with the arrival of the Sylvicultural and Utilisation models that the Dehra Officers have promised me, the Gass Museum will be of



THE

Madras Forest College Magazine.

Published Quarterly.

Vol. III. **September 1918.** **No. 1.**

N. B:-Contributors are requested to send in their contributions typed or written legibly in ink on one side of the paper only.—Editor.

Ourselves.

The Madras Forest College has sent out the fifth batch of students with their mental and physical faculties considerably improved, and shaped for an efficient discharge of their duties as rangers. Of the 27 students, two got "Honours," twenty 'Madras ranger higher' and five 'Madras ranger lower' certificates. We congratulate Messrs. C. Srinivasa Rao and J. S. Rowland in particular, on their winning a number of medals, details of which will be found in the Principal's report published elsewhere. The prizes and certificates were distributed on the 1st July 1918, by Mrs. C. D. McCarthy when Hon. Mr. M. E. Couchman presided.

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The College Magazine is now in the third year of its existence. We are glad to announce that the number of subscribers for the past year (1917–18) has been over 230 as against 195 of the previous year, (1916—17) and take this opportunity to tender thanks to our subscribers for their support both by way of subscriptions, and much less

more direct and daily instructional benefit and use than has hitherto been possible. The Arboretum and Engineering Park that have been laid out this year, will I anticipate, prove of marked educational value, and I have no hesitation in saying that in future years the practical side of the training here will be as thorough as the local circumstances permit and very much better than was originally expected. During the present term the students have put in about 12 hours a week of practical work on the Estate, and both students and Estate have benefited proportionately.

The Senior Division this year has been through a fairly thorough course of Gymnastics, and thanks to the generosity of a former Principal Mr. Fischer, whom we are delighted to welcome here once more as an Examiner, a permanent challenge cup for Gymnastics has been established.

The Athletic Ground and the Tennis Courts presented by the Government have been practically completed, to the very material advantage and convenience of the players and the tax on time and energy necessitated by bi-weekly expeditions to the Coronation Park is now only a memory of the past.

Since we last met nearly 2 miles of roads and paths have been laid down, more than 1000 trees have been planted in the avenues, the approaches to and connections between the hostels have been demarcated and consolidated, borders of evergreen and creepers have been started, a carpenter's shop has been opened, the Nursery has been resuscitated, and Badminton Courts have been prepared. A temporary reading room has been arranged for at the hostels, and members of the House Committee are given as far as possible two rooms each. Milk and dairy produce of the best quality is now obtained from

the Agricultural College dairy, and the keeping of cows and goats on the Estate is therefore practically prohibited. The result has been to the marked advantage of both the avenues and the health and convenience of the students: but I should not like to say that the change has been altogether welcomed by those individuals who considered that they had a vested right to graze sickly cows free on the College plants and to supply a mixture of milk and dirty water at their own rates.

Within the next few weeks a fuel depot and a provision store will be opened on the Estate.

To summarise the general position: the student is now very much more comfortable than he was in September 1915 when we took over the College, and infinitely more so than in the old buildings in the town.

The Senior Division to-day passing out is of a good average in every way, both at work and games. It is a better year than the last Senior Division and is in some ways a remarkable Division. The Examiners as a whole have reported favourably on the progress and capacity displayed, and I have informed the Board of Visitors that I am well pleased with the Division.

I will now no longer try the patience of the students but will read out the names of the winners of the prizes and certificates which Mrs. McCarthy has kindly consented to distribute: Mrs. McCarthy has always proved a good friend to the Forest College: and if I may venture to say so whenever she distributes prizes at our various gatherings, she adds to the pleasure of the recipients by looking as if she thoroughly enjoyed the function of conferring honours and happiness on others—as I am sure she does.

(1) Gold medal presented by Government for the highest Senior student at the College, C. Srinivasa Rao.

Second, J. S. Rowland.

(2) Silver medal for Honours, presented by Government, C. Srinivasa Rao,

J. S. Rowland.

(3) Compbell-Walker gold medal for the Senior student likely to make the best all round Ranger, C. Srinivasa Rao.

(4) Brasier gold medal for the Senior student likely to make the best out-door Ranger, A. B. Fenn.

(5) Lodge gold medal for the best Senior student in Engineering, J. S. Rowland.

Second, C. Srinivasa Rao.

(6) Silver medal presented by Government for the best Senior student in Forestry, C. Srinivasa Rao.

Second, A. B. Fenn.

(7) Silver medal presented by Government for the best Senior student in Survey, J. S. Rowland.

Second, C. Srinivasa Rao.

(8) Silver medal presented by Government for the best Senior student in Range Administration, S. G. Venkataramanan.

Second, C. Srinivasa Rao.

(9) Silver medal for the best Senior student in Botany, C. Srinivasa Rao.

Second, J. A Stephen.

(10) Indian Forester gold medal: This year the competition took the form of an essay : for former students the subject was " The special difficulties of Range Administration and how they are best met."

The envolope containing the name of the winner bears the motto " Nil Desperandum."

I will now open it :

The essay contained much that was meritorious and gave me at least some new ideas.

For the present students at the college the subject of the essay was " the best Forest Conservancy consists of wise usage."

No essay was sufficiently meritorious to merit a prize.

(11) Gold medal presented by the Board of visitors for the first Junior student in order of merit by marks : T. D. Ponniah.

(12) The Pentland challenge Shield for all-round Athletic proficiency—presented by His Excellency Lord Pentland. This is one of the hardest of all prizes to gain : the winner has to show a greater proficiency than that of his fellows in the Athletic Sports, Marathon Race, Hockey and cricket.

The winner this year is : C. S. Chengappah.

Second, P. K. Parameswaram Pillai.

(13) The 'Fischer challenge cup' for Gymnastics presented by C. E. C. Fischer Esquire: A. B. Fenn.

Madras Ranger higher Certificates.

Names in order of merit.

1. A. B. Fenn.
2. S. G. Venkataramanan.
3. B. S. Sankara Ayyar.
4. J. A. Stephen.
5. B. B. Syid Yahia.
6. B. T. Sitaraman.
7. A. Bhaviah.
8. A. Muthukrishnan.
9. J. Venugopal Naidu.
10. C. Vasu.
11. U. Thimmayya.
12. G. M. Bartholomeuz.
13. T. Kondathu Goundan.
14. P. K. Parameswaram Pillai.
15. Abdul Azeez.
16. I. Sambasiva Rao Naidu
17. K. Parthasarathy Ayyangar.
18. S. Sankara Alwa.
19. T. S. Ratnavelu Mudaliar.
20. C. R. Rajagopalan.

Madras Ranger Lower Certificates.

1. A. Vyasalu.
2. V. Arasaratnam.
3. M. Narasinga Rao Naidu.
4. Abdul Guffur.
5. A. K. Anantarama Ayyar.

I am glad to have this opportunity of drawing your attention, ladies and gentlemen, to the case of the Senior Student and Honours man C. Srinivasa Rao. He *was* an Instructor here but as his prospects were blocked he voluntarily resigned his Instructor-ship and became a student. His position here during the last two years has therefore been peculiar and perhaps not altogether comfortable. But he has never by one word or action showed that he in any way was conscious of the fact that he had been an Instructor. On the contrary as a student of exemplary conduct he has always been of material service and support to me. Such self-abnegation is I think as praiseworthy as it is remarkable.

In the department of athletics we have had average teams and have won or lost much the same percentage of matches as usual. The Club has lost in Mr. Bennett an able and enthusiastic Vice-President and coach, but I nevertheless hope that thanks to the improved facilities for games the standard will in future show a considerable rise. The outstanding performance of the year is Narasinga Rao's cricket record of 2 centuries 101 and 126 in 2 consecutive matches at a week's interval. His merits were recognised by the presentation of a bat, with an inscription on a silver plate. The inter-division Hockey produced a fine struggle which finally resulted after the match had been replayed 3 times in the Junior division winning by 3 goals to nil.

The Marathon race this year was signalised by the generous gift of an inter-division challenge cup by

Rissaldar Major Bahadur Amir Mahomed Khan the distinguished father of one of the Junior students. The cup was won by the Junior Division. The actual winner of the race was Parameswaram Pillai of the Senior Division.

The thanks of the College are due to those District Forest Officers who have supplied us with seeds, with Engineering Manuals, bamboos etc., and especially to Mr. Fischer for an extensive herbarium collection and Mr. Butcher the Curator of the Government Gardens on the Nilgiris who presented us free of cost with many comparatively rare plants for the Arboretum.

We are very greatly indebted to those District Forest Officers who laid themselves out to make us comfortable on tour. We *are* a nuisance undoubtedly to District Forest Officers, but we are sincerely grateful to those officers who recognise that the trouble we inevitably cause will eventually be compensated by the improved training of the students thanks to the co-operation and help afforded us while in camp. Without the assistance and demonstrations of, for instance, Mr. Richmond, Mr. Vencataramanan and Mr. Bourne, the College tours this year would have been the poorer.

Col. Fearnside and his assistant have again this year kindly undertaken the examination in First Aid for the St. John Ambulance Certificates.

I am myself under great personal obligations to the Staff of the College for their devoted enthusiasm to the cause of training raw material into efficient Forest Rangers—and to Mr. Crothers in particular for the manner in which he has carried out the onerous and responsible task of House Tutor, and for his willing response to the many extra calls that I have made on his energy and leisure: to his initiative and skill is due the Engineering

Park. I am glad to see one or two old Students here this evening. I hope that it will be possible in future to make arrangements that will enable more to come.

And now students a word to you. You have probably noticed in the past that my remarks to you are usually not unlike the scorpion's tail—there is a sting at the end of it. Well, you shall have it now all right. You are not sufficiently responsive—and in that respect I am disappointed with you. The Government has done a great deal for you. You have this year been given an Athletic Ground, Tennis Courts, Dairy Produce, Badminton Courts, Additional prizes, paths, benches, carpenter's shop, newspapers, books for the students, library, extra privileges for the House Committee etc., etc. But I do not see a very material response when any invitation or demand is made for a little exceptional energy or devotion to the cause of *self*-development. Your united efforts to win the Indian Forester Prize were beneath contempt. I should like that comment to sink into your mind, in the hope that it will bear fruit next year in the shape of half a dozen really good essays from the present Junior Division. Thirteen of you have failed to take the opportunities for learning to swim that were provided for you : and believe me you are the poorer for it and the less efficient citizens. Then the Forest College Magazine : we do not get the amount of copy that we should from the body of the students—nearly all of you could write something of interest and probably of value also—but with the honourable exceptions of Srinivasa Rao, Venkataramanan, and some of the former students the majority of you either make no effort at all or but a fitful attempt under somewhat strong pressure. The Magazine has a useful future before it as a periodical edited and run mainly by a ranger class for the ranger class, stiffened from time to time by

contributions from gazetted and other officers. It should therefore become a channel of communication of the views and ideas of the ranger class—and we ought by this means to get many good and original ideas that will be of direct service to the department. But the magazine will not be run by the staff of the college as a poor imitation of the Indian Forester for the benefit of people too lethargic to write for it themselves. As we have no room for failures at the Madras Forest College the Magazine will be stopped unless the ranger class supports it by an adequate supply of copy. But its death will be to the discredit of past and present students of the college. Your comfort and convenience as well as your intellectual and physical welfare are studied as much as local conditions render possible here, but in return we expect a good deal from you, and it is up to you to see that we are not disappointed. Next year the Board of visitors, whose one aim is to benefit the college and to whose realisation of your intellectual difficulties several of you owe your Higher Standard Certificates to-day, the Board of Visitors I say hope that it will be possible to make the Prize Day in future more of a social link between past and present students. The possibility of students' vegetable and flower gardens is also being considered. But these, and similar advantages, will in great measure depend upon the spirit of responsiveness awakened. I have no doubt that the germ is there—and I hope to see it quickened into life in the near future. To those of you whose certificates are a source of congratulation I would say "Improve upon them by your post-college work" to those of you who are disappointed in the results I say "Remedy them by greater effort in future." You are only now commencing your profession. In future you rise or fall by your own efforts with very much less outside help that you have had here.

Mr. Richmond showed the senior division in the last tour

that it is one thing to pass a brilliant examination in Engineering or to design and estimate a Forest road, but quite another thing to carry out that estimate and project. Cultivate the Forest Eye; don't leave logs of valuable timber to lie deteriorating in the Forest; don't leave broken gates and fences unmended; to-day is the best of all days for doing anything—to-morrow is the worst. Don't be afraid of making suggestions to your District Forest Officer such as the construction of a bridge to appreciate coupes. Don't forget that you have been taught to illustrate your reports by freehand drawings. Above all don't fotget that you belong to the Madras Forest College and that its honour is in your hands.

I am proud to reflect that your conduct throughout the year has been uniformly good and to that fact I am indebted for one of the happiest of my 27 years professional career.

I wish you good bye and all the luck that you deserve."

The names of the winners were then read out, and Mrs. McCarthy distributed the medals, cups, and certificates amidst loud applause.

The Hon'ble Mr. Couchman.

The Chairman said:—"I always feel rather sorry for the Chairman on these occasions. What happens is that the Principal reads a very full account of the year's work and leaves very little for the Chairman to say. This is what has happened to-day. I have been trying to remember what the Chairman used to say at the prize givings when I was at school. The General impression that I have is that he distributes praise to the students

and staff for their good work, and tries to leave everyone well satisfied with themselves. The most distinct recollection, however, that I retain of these speeches is that the parts which we appreciated most were those which seemed to indicate that the speech would be a short one, and what we liked best of all was the last sentence. Bearing this in mind I will try not to keep you long.

The results of the year's work are that out of 27 students, two obtained honours, twenty got the Rangers' Higher Certificates, and five got the Lower Rangers' Certificates. None failed altogether. The examiners report that the average of the students was higher than usual. All of them got marks in the compulsory subjects entitling them to a Higher Certificate, some only failing in the minimum aggregate. Of the five who only got the Lower Certificate, some belong to other Administrations, and I understand that their failure to get the Higher Certificate will not injure their prospects. Those students from this Presidency who failed to get the Higher Certificate need not despair. If they show themselves fit for promotion to the Ranger's grade they may rise to it in the future. I have as usual to add that much of the success of the working of the College is due to Mr. Cowley-Brown. (Cheers). I see from the applause which his name evokes that he manages to combine efficiency with popularity, a rare accomplishment.

I do not propose to give the students any more good advice. They have received plenty of that from Mr. Cowley Brown, and if they want any more, most of them are married men and can get it from their wives. (Laughter). All I will say now is to remind them that the Forest Department, particularly at the present time, offers exceptional opportunities for good men, that is to

say, men who are both honest and hard working. We have at the present time several District Forest Officers who began life as Deputy Rangers, and I hope that among the batch of students now leaving the College there are several who will rise in the same way to the Gazetted ranks.

Now I wish to make a few general remarks about the position of the Department. It is rather an interesting moment, because the Conservator has already to a great extent taken the place of the Collector, and the Chief Conservator will soon take the place of the Forest Commissioner. Probably this is the last time that Forest Commissioner will preside at this meeting.

In the first place it would be a mistake to suppose that these changes will at once introduce to millennium. It is almost inevitable that the head of the Department should be to some extent unpopular. If I may say so, it is his *meteor*. He has to refuse leave to his subordinate, to refuse to sanction increase of establishments, to reject schemes and so on. Along with the powers of the Collector and Board, therefore, the Conservator and the Chief Conservator will have to take over some of their unpopularity. Of course the change is being made with all possible good-will on our part, and we hope that it will be successful.

Moreover, while hitherto, whenever your schemes were rejected by the Board, you have had the consolation of feeling certain that this is due to the ignorance of the Board of Forest matters, in the future you will be deprived of the comfort.

Another thing is that you would make a mistake if you supposed that the forest policy of the Government will in the future be governed more than before by strictly

professional considerations. The Government will remain, as before, responsible for all the actions of their subordinates. They will have to bear the unpopularity of measures which are based on a policy which looks farther ahead than the ryot looks. They will have to adjust the demands of their forest experts to the agricultural needs, the habits and even the prejudices of the people. As the masses of the people become more educated and articulate, they will bring increasing pressure to bear on the Government. The effect of the forthcoming political changes has also to be taken into account. The moral for the Forest Department is that it must try to remove all possible causes of friction between itself and the people as soon as possible. A great deal has been done lately in this direction. We must persevere on these lines, and rely on tactful and good administration to reduce friction.

I trust that one result of these changes will not be to foster the growth of a departmental spirit. A good departmental spirit is a very good thing. What I fear is the frame of mind which sticks up for the department right or wrong, and glosses over the mistakes of its men, from a mistaken *esprit de corps*. This would ruin the influence of the Forest Department with Government and the public, and, therefore, I hope that we shall never see any such thing. At present I see little signs of it, and I hope that this state of things may continue in the future.

At the present juncture, when the ties which have bound the Revenue and Forest Departments together are being loosened, I am desirous that they should part on good terms, and, therefore, I think it would be a good thing if there were more recognition on the part of Forest Officers of the great debt that they owe to the Revenue

Department. I remember when I first came out to India that Forest Reservation was in full swing. At every camp the Collector was besieged by crowds of ryots protesting that if their cattle and goats were prevented from grazing and browsing in the forests as before, and if they themselves were prevented from cutting down the trees at their own will and pleasure, absolute ruin stared them in the face. It would have been very easy and very popular if the District Officers and the Board and Government had given way to this clamour, and abandoned a good part of the forests proposed for reservation. On the whole, they stood firm and now the clamour has died down, and you have between 18,000 and 19,000 square miles of reserved forests, practically unhampered by troublesome rights and easements, a position which, I believe, excites the keenest envy of Forest Officers in other countries. It would be well if the older men among you, who remember this, were to explain to the younger men in the department that the present satisfactory position in this respect is due to the firm stand made by the Collectors, the Board and the Government of former days.

One more point before I sit down; it always strikes me that Forest Officers worry too much over their temporary disappointments. The District Forest Officer sitting in his lonely hut gets an order from the Board refusing to grant his Head Clerk that increase of pay for which he has been worrying him so long; or refusing to create that new appointment for the Head clerk's son-in-law, and at once he jumps to the conclusion that all is lost, and sits down and writes a furious letter to the Collector or the Conservator. I advise him to take a longer view. All may yet be well. At all events it is worth while waiting till to-morrow to see if the clouds will not roll by. In any case, this will not be the ruin of

the department. Perhaps another reason for this predisposition to despondency on the part of Forest Officers is the obvious fact that trees grow slowly. Each individual Forest Officer only stops a few years in one district and perhaps does not notice much improvement in that time. I have been long enough in India and in one district to see the vast change which is coming over the country in consequence of the reservation of the forests. Bare hills are being covered with tree growth and scrub jungle is growing up into properties of enormous value. Forest Officers should take a longer view. Just as a man working on a great building toils away every day, covered with dust and dirt and perspiration and at the end of each day sees no visible result of his work, but all the time the building is rising into the air, and will be a fine sight in course of time, in the same way a Forest Officer would take his small daily disappointments more philosophically if he realised that every day's work contributed something to a vast structure, the Forests of the Presidency, which will be a worthy memorial of his life's work." (Cheers).

Mr. Dawson, at the close of the proceedings, called for three cheers for the King, the Board of Visitors and the President, which were enthusiastically responded to and the meeting dissolved.

Forest Notes from Switzerland.

(Translated from La revue des Eaux et Forets.)

During the last 6 months Swiss Sylviculturists have had a difficult task. The economical situation of our country so hardly tried by the war has been aggravated from week to week in spite of the meritorious efforts of the allies to revictual us.

As is well known besides of the food question that of fuel causes the most serious embarrassment to our Government. The fact that some good veins of coal have been found in the Canton of Valais and that the exploitation on a large scale has been undertaken of peat unworked in the greater part of our peat bogs during the last 20 years, the grave problem of transport of supplies to the factories and of fuel for cooking and for the heating of the houses has been by no means solved.

The supply of German coal in spite of the promises and undertakings of our neighbours from the north shows an ever descending curve which places Switzerland in a more and more disquieting situation.

Appeal has been made even more than in 1916 to the Swiss Forests and with reason ; for it is not with the object of restricting the liberty of proprietors, be they communes or private individuals, that the State has resolved after 40 years of restriction, legislation to undertake a material capitalization of the forest wealth of the country.

If on the one hand excessive cuttings have been restrained and important re-afforestation has been carried out in the mountainous regions, on the other hand it is possible without abuse to relax the reins a little and to actually realize certain reserved areas and thus to benefit by previous accumulation of material. Unfortunately these reserves are very unequally distributed and are to be found mainly in valleys not very accessible and lacking in means of transport.

At the beginning of 1917 the great effort that was required was for the purpose of helping the paper industry. But during the last six months the pulp interests have been relegated to a second place and now the production of fuel has to take preference. Certain cantons last June had

already adopted special measures to stimulate exploitation and particularly to distribute the firewood judiciously.

In the month of August the question was taken up by the Federal Power which now exercises control over the supply so that certain cantons export to other cantons that are deficient in wood fuel. Moreover in order to prevent profiteering and monopolies public auctions are forbidden.

It will be obvious that our most populous towns such as Geneva, Zurich, Berne, and Basle, crowned as they are with comparatively little forest, cannot actually satisfy the enormous demands of the consumers deprived of charcoal. There is no longer any store of dry wood in reserve in the forest and very little anywhere in the urban centres : consequently green or at the most partially dry wood has had to be burnt while the agriculturists live on their stocks formed during the past winter.

Maximum prices have been fixed ; they vary between Rs. 14 and 15 per unit of broad-leaves and Rs. 12 and Rs. 14 for conifers free on rail.

It will be evident that for the present winter the problem of firewood or peat for cooking and heating has not been solved : for there has been no time during the summer to cut enough stacks to dry for subsequent consumption only after proper preparation.

In the canton of Vaud for example the public forests (State and Communal) have been burdened with a heavy contribution for exportation on the assumption that Forest communes have enough and to spare for their less favoured neighbours.

The chief difficulty in the production of fuel is to be found in the question of wood-cutters' labour. Experience during the last 6 months in the exploitation of wood either

by idlers from towns or by the interned has given very unsatisfactory results, for the reason that the labourers so improvised show themselves in general to be unsuited for this rough work demanding as it does great physical energy, adroitness and power to withstand hardship.

The second difficulty is the question of transport which depends on the quality of the draft animals and on the facilities for obtaining wagons. Actually as is well known our railways in order to make sure of the victualling of Switzerland have to send beyond the frontier a large proportion of their rolling stock.

The scarcity and exorbitant price of corn renders animal transport outside the forest exceedingly costly. The consequence of this double restriction further aggravated by the lack of petrol, which prohibits the employment of motor lorries, is that wood fuel has not arrived sufficiently quickly or in the necessary quantities at the centres of consumption to enable it to be cut up and dried.

In spite of repeated efforts on the part of the Forest Administration the Army Department has not yet agreed to mobilise in the forest a sufficient number of soldier woodsmen. The result of this opposition is that next winter we shall have to continue to burn green wood and consequently to waste a large quantity of fuel.

The Swiss forests have also been laid under contribution for the production of silver fir and spruce in log. The Allies' demand for such material is always very considerable. It is well known that sawn timber is exchanged for food and other products indispensable to us.

The price of timber is always rising. The Government constantly talks of fixing a maximum. The Forest Administration is opposed to such a measure.

Our railways had adopted 20 years ago metal sleepers but before the war had to some extent given them up. Now they are unable to import wooden sleepers; further our own forests have to contribute to this end and the foresters are thus burdened with an addition to their work.

Actually the cantons have to make a certain supply of sleepers; these are taken not only from the Fellings of oak and beech but also from pine and larch. This permits us to place on the market a large quantity of assorted species. Our Railway Administration thus now admits four different species whereas previously only oak sleepers, and very rarely those of beech, were ever accepted.

What will be the aspect of the Swiss Forest after the war? Certainly it will be very different from that of the forests on the western front, since hitherto the stress of battle has spared out woods. It is nevertheless true that our forests will be hardly tried, and perhaps even over-exploited or exhausted, if the situation is prolonged for several years more.

Our authorities are fully occupied with this question and in spite of our conservative laws, which are perhaps the most drastic in Europe and which have assured to us the existence of magnificent supplies in reserve especially on the mountains, it is necessary now without further delay for us to take up the question of intensive treatment, of stimulating the increment, of extending considerably the net-work of roads and multiplying the ropeways in the Alps, and above all of increasing the number of officers which is obviously still very inadequate.

In Switzerland all forests, whether Public or Private, are rigidly controlled by the State. In Forests of Protection grazing is absolutely prohibited. Zurich Town Forest has

been under systematic management since the 13th century; its clear profit is about Rs. 30 per acre per annum.

Editor.

The special difficulties of Range administration and how they are best met.

(We publish below, the essay for the 'Indian Forester' Prize for past students, by Mr. L. J. Taylor, the winner:—)

"The source of most of the information that goes to make up the Annual Administration Report of the Forest Department, emenates from a Range; such being the case, range administration is a task both arduous and responsible, and the difficulties a range officer has to contend with during the course of his administration, are many and various. These difficulties arise both in the office and in the field, the former generally being the outcome of mismanagement in the latter.

I do not intend in these pages to discuss all these difficulties as that would not be compatible with the space at my disposal, I shall therefore confine myself to dealing, broadly, with a few of the special difficulties a Range Officer experiences in administrating his range.

The first difficulty is experienced on assuming charge. He comes as it were, into possession of a large estate, and does not know what it consists of. The relieved officer is able at the time to give him a vague idea of his possessions, and that is all. There is very little on record, and it takes the new Range Officer the best part of three months to find out all about his range.

Judging from the nature of the records left behind by them, few Rangers seem to realise the fact that the administration of a range is continuous—I had to find out for myself all about the range, why shouldn't my reliever do likewise? is apparently their maxim, and consequently Forest Note Book, Control Journal and measurement book, are all left neglected, and the relieving officer suffers. "I'm sorry I couldn't tell you Sir" is his reply to some query of the District Forest Officer, "I've just been transferred here."

The only way to remedy this, is to insist on the proper maintenance of the above named registers.

The forest note book should show one at a glance, the nature of the forests he comes into possession of, the produce they contain and the approximate quantity of the several produces available.

The Control Journal should show, from past working, the yield and demand of the several produces with their prices, markets etc. The pages under the heading "History of the working circles from year to year"—alone, ought to give any relieving Range Officer, all the information he desires, regarding what has been, and is taking place in the range. The measurement book is another most important record to be maintained. It is very often the case, that a Range Officer is posted to a range where several large works are in progress. He knows that the works are going on, but what has been done, and what paid for, he has not the faintest idea. A properly maintained measurement book will show him at once the total quantity of work turned out, and the amounts paid, under the several items of work, and he has simply to carry on.

I shall now turn to another difficulty which I believe is general in all ranges. This is the question of labour. The difficulty arises from various causes.

The Forest Subordinate i.e. the forest guard and watcher class is one of the most poorly paid in the Presidency and he has got to live. This he does by oppressing and

harassing the people, chiefly the Ryots. As a consequence there arises amongst the people a sort of resentment and antipathy against the Forest Department, whom they get to regard as their "Bete Noir."

Again. The sanctioned allotment for many works is much below what the work can be got done for, conscientiously. The forest guard knows this, and as he is made responsible for having the work done, he coerces the people into coming to work, by threats and other means and gets the work done some how. Meanwhile he pockets the money, and as a sort of compensation, allows the people to remove some of the produce from the Reserve. The irony of it though is that he generally manages to show some savings.

The remedy for this is obvious.—A thorough reorganisation of the subordinate staff. Do away with the watchers, and better the prospects of the Forest Guards. If the recruitment of them is made from men of respectable families with a certain standard of education, things will, I am sure, get on much better, only their prospects must be bettered, or else the men would have no incentive to work honestly.

Regarding the sanctioned allotment for works, this should be raised to a reasonable figure. A Range Officer from practical experience, knows what the works will cost, accept then, and pass the estimates he sends in. I will never believe that any self respecting Range Officer would try to swindle the Government.

An estimate prepared by a Range Officer who knows his work, is very often returned with the remark that the work has been done at such and such a cost in previous years. Yes, but do the authorities know how ?

With the increase in sanction, the Ranger, should make every endeavour to pay for all works himself. This is often

impracticable in a range where the work is heavy, but can be remedied by making enquiries, when subsequently camping in a place where work has been done and paid for by subordinates, as to whether the amount has actually been disbursed. The result of the enquiry will either be satisfactory or—a charge sheet.

In places like the Javadis, where the forest village system is in force, the labour problem, for ordinary works is not so difficult, and the practice of entering up all work done and paid for, in a measurement book supplied to the headman of each village, gives no scope for dis-honesty among the subordinates. What though, is a real difficulty on the Javadis, is the inability to secure skilled labour from the plains, for building construction and other important works. The occurrence of a few casualities among the men who had already gone up, and the already notorious reputation which the javadis have, for their fever giving propensities, has resulted in scaring the people of the plains to such an extent, that not even the most exorbitant rates, will induce them to go up.

Speaking of buildings and other important works, recalls to mind another rather serious difficulty which a Ranger has to contend with in range administration.

There are several ranges where in addition to heavy work in forestry, the Range Officer has to devote a fair amount of his time in attending to the construction of roads, buildings and other engineering works.

With an adequate staff of skilled subordinates, this would be all right, but under existing circumstances, with the department undermanned as it is, it is rather hard on the Range Officer and is frequently a source of worry and annoyance to him.

The remedy I would suggest for this, is to divide the forestry from the engineering section of forest work, appointing a special staff to attend to the latter. This is quite feasible, and is, if I am not mistaken, in force in several districts. Why not in all? It would relieve the Range Officer of a fair amount of worry, and allow him to devote more of his time to forestry, which after all, is the more important. Of course his training in engineering will enable him to attend to the small works, such as repairs, and also to generally supervise the work of the forest engineering staff.

I come now to a difficulty in range administration, which I am sure almost all Range Officers experience, and which I am afraid, few take the necessary measures to combat.

I refer to the control of his subordinates.

In his subordinates, the Range Officer has the means of efficiently administrating his range. They are as it were, the steering wheels of his administration, and it is for him to steer in the right course.

The majority of forest subordinates are as a rule not very energetic, they need a little bit of driving, and in driving, require careful handling. A certain amount of kindness and encouragement, do a lot to make a man work, and this coupled with the enforcement of discipline, should be the Range Officer's policy towards his subordinates.

Don't give a subordinate more work than he can reasonably be expected to do. There is such a thing as, Division of labour, and if a work can be got done by two or more subordinates conveniently divide it, and make each responsible for his share.

It is a mistake giving a man too many works to be attended to at the same time. At times it is unavoidable,

but it should be discouraged. Let him complete one and then give him another.

Forest guards should each be provided with maps of their beats. These should show the limits of the different working circles (Timber, Fuel etc.) comprised therein. The areas under working should be pointed out to them by the Ranger Officer, and it is for them to see that no irregularities occur.

They should also be provided with an Order Book, which they should always carry with them during inspections by their superiors. If during an inspection, any irregularities are observed, the forest guard can be given a written order on the spot, to have them rectified. On his next inspection the Range Officer can inspect the Order Book, see what orders have been passed, and find out whether they have been carried out. If not, the man can be dealt with on the evidence recorded in the book.

The occurrence of fires is another thing which is very often due to lack of control over the forest guard. This evil can, I am sure, be greatly mitigated, by proper precautionary measures at the outset.

Directly the fire season commences, each forest guard must be ordered to patrol his reserve line with his watchers. Each man must be aportioned off a certain distance, and it will be his duty to patrol that. At intervals of every two or three minutes, as they walk along, the forest guard should blow his whistle, and the watchers, if not provided with them, give a long call. This will certainly if kept up regularly, deter any one, bent on mischief, from entering the reserve. The subordinates are however apt to slacken in this work, but surprise inspections by the Range Officer, ought to keep them up to the mark.

Another thing which should be done, and which will certainly have a moral effect on the people, is to take the names and addresses of all people entering the reserve, such as graziers, wood cutters and removers of minor produce. By this means though we may not completely protect the forest from fire, we will probably find that there will be a less number of fires than if this were not done.

In setting down the above difficulties, I have taken those which I believe are most general, and as remedial measures, I have suggested those which appeal to me as being most practical. This however is a matter of opinion. Difficulties there are in range administration, and difficulties there will be, in spite of all measures taken to combat them, though they may be in a way alleviated. To those however, who are of a pessimistic turn, regarding how these difficulties are to be met, I would suggest the adoption of the policy of the men at the front. Pack up your troubles in your old kit bag and Smile, Smile, Smile.

"Nil Desperandum."

Extracts:—

The following extracts from the 'Pioneer' are of interest.

How hoarding rupees helps the Germans.

The Central Publicity Board has issued the following:–

How can I help to win the war? is the question which should be present in the mind of everyone in India to-day. Very many thousands of Indian soldiers have fought gallantly side by side with their British comrades in France, Mesopotamia, Egypt, Palestine and elsewhere, and great services has been performed by Indian lascars and by labour corps raised in various parts of India. Everyone cannot go out to fight, but there are few who cannot assist in one way or another to back up our soldiers in the field. Armies

consisting of men drawn from India, from England, from France and from the United States are protecting India from an enemy who if successful would rob and oppress the people of this country, and therefore it is the duty of every true Indian to help in every possible way the soldiers who are bravely fighting for them. It is astonishing but it is none the less true that there are people in India to-day who instead of assisting to win the war are hindering the efforts of the army and are even helping the enemy. They do not know the harm they are doing; they do not understand that their action is making it more difficult for victory to be won and for peace to be restored to the nations of the earth. In modern warfare it is not only the soldier who has to play his part. The armies actually fighting must be supplied with rifles, guns ammunition, food and many other things which have to be produced by people who stay at home, and have to be sent by ships long distances over the sea to the soldiers in the field. Those who make it more difficult for the supplies to be produced and for the ships to carry them to the fighting men are assisting the Germans and their Allies as surely as if they are actually working for the enemy.

It may be said that no one in India would willingly injure the soldiers of his own country who are fighting his battles or would add to the hardships which they have to face. This may be true, but it is also true that people who during the war hoard rupees by burying them, by locking them up in boxes, or by melting them down for use as ornaments are doing serious harm to their own country and to all the countries which are engaged in fighting for the liberty of mankind. Even those thoughtless people who buy silver ornaments are thereby encouraging the practice of melting as the silver used for making these ornaments cannot at the present time be obtained in any other way. Such persons probably do not know that if rupees are

hoarded in India the Government have to buy silver in far distant foreign lands, and to bring it enormous distances across the sea in order to make the new rupees which are necessary to carry on the business of the country. Here is a fact which will help to show what hoarding means. During the last two years the Government have been compelled to buy silver in order to coin no less than 50 crores of rupees to take the place of those, which have been thoughtlessly hoarded by people in India. Further they have now found it necessary to make arrangements to bring from our great friend and Ally, America, an additional amount of silver to enable them to coin 50 crores more of rupees. A large part of this silver is on its way to India and the remainder will shortly be sent here.

The supply and purchase of these huge quantities of silver are very wasteful in many ways. In the first place these purchase mean that India sends her resources abroad in return for mere metal. If the Government of India had lent the money required to buy this silver, India would have received interest thereon amounting to more than Rs. 5 crores a year. This additional income would have made it possible for the Government either to reduce taxation or else to spend larger amounts for the benefit of India either by providing for better education or sanitation, or in other ways.

Again, we can in this matter learn a lesson from our enemies. Germany has been able to carry on the war for so long largely because she adopts as one guiding principle that of "waste nothing." The hoarding of silver in India is a most flagrant waste of an essential of war. Exactly the same applies to the hoarding of gold. It is almost as bad as burying shells and other ammunition instead of letting them be used against the enemy. The Prime Minister of England has told us that silver bullets will win the war,

and yet in India, by hoarding our silver and glod, we are hiding away silver and gold bullets, so that they can be of no help in winning victory.

It is also important to mention that in all other countries except India a note issue has been developed and popularised in order to economise the metal used for coin. This is especially the case in Japan where very small notes indeed are now in circulation. India is the only country which uses metallic coin instead of notes to the enormous extent which she now does. The result is that people of other countries are benefiting greatly from this policy, so that they grow richer at India's expense.

Apart from the effect of the practice of hoarding on the wealth of India, it must also be remembered that the production of silver from the mines of America calls for the labour of men who would otherwise be engaged in war work, as the Americans are fighting on our side and the soldiers they have sent to the battlefield require enormous quantities of food and military supplies to enable them to conquer the enemy. The silver which America is sending to India has to be taken in trains to the seaports and this adds to the difficulties of working the American railways when they are engaged in carrying supplies for the war. Then when the silver has reached the ports it has to be taken many thousands of miles by ship to this country at a time when every vessel is wanted for the purposes of the war and for conveying articles which people in India would be very glad to have such as cotton cloth and salt which at the present time owing to the demands for ships for other purposes cannot be brought to this country in the same quantities as before the war. The consequence of the shortage of ships is that the stocks of cloth and salt as well as of other articles used by the people of India are much smaller than in ordinary times and that prices are much higher.

It has been shown that huge amounts of silver have been bought by the Government within the past two years. But even these will not be sufficient to provide rupees if hoarding continues, and it cannot be too strongly declared that this practice is most harmful to India and to her soldiers. In the first place, instead of spending money to buy the silver, India could have drawn interest upon it and money could then have been spent in providing rifles, clothes and food for soldiers, and in building more ships which might have brought to this country articles that every one wishes to have such as salt and cotton cloth just mentioned. Secondly, since hoarding makes it more difficult to obtain articles like salt and cotton cloth the prices of these articles as well as of foodstuffs and other necessaries are raised and the people who hoard are thus injuring themselves and their friends.

There is no reason whatever why people should hoard rupees in India. The Government is just and powerful and there are many opportunities for safely investing money which is not required for the time being so that it can earn interest and increase the wealth of its owner. In all foreign countries which have become rich and prosperous, the people instead of hoarding use the money which they have to spare to make more money, and they thus benefit not only themselves but the whole community. There are Post Office savings banks and Government loans in which they can invest and from which they can draw interest and their money when used in this way is not liable to be lost or stolen by thieves, as it would be if they followed the practice of hoarding which is so common in this country. In India, too, as has been stated, plenty of opportunities can be found for placing money where it is absolutely safe and where it can earn good interest. If a person has spare money which he is likely to want at short notice he can deposit it in the Post Office savings bank or buy Post Office

cash certificates with it. Or if he is not likely to require it immediately he can invest it in War Bonds which pay a very substantial rate of interest. It is a direct benefit to him to use it in either of these ways. It is also a direct benefit to the country since any money lent to Government will be spent in India in buying for the soldiers wheat, rice and other foodstuffs as well as jute, cotton, hides, boots and shoes. A large demand for all these means good profit for the ryots and other producers and adds to the wealth and prosperity of the whole country.

It will be clear then to any one who looks at the question of hoarding intelligently that the practice is a bad and a foolish one. Hoarding injures the soldiers who are fighting for India and thus helps the enemies of the Indian people. It also prevents money from being used to earn profits in the shape of interest, and it makes more difficult for Government to buy Indian produce for the use of the Armies in the field. Great harm is done in the world by want of thought. The hoarding of rupees in India affords an illustration of this truth. It is not too much, however, to believe that once the facts are realised every patriotic Indian will not only avoid hoarding himself but will do all in his power to dissuade others from following a practice which benefits and assists the bitterest foes of his country.

Why I should subscribe to the War Loan.

BECAUSE :—

Every rupee subscribed to the War Loan helps to beat the Germans.

Every rupee subscribed to the War Loan will be spent in India and strengthen her agriculture and her industries.

Every rupee subscribed to the War Loan will help to keep down prices by reducing the currency.

Every rupee subscribed to the War Loan increases the national wealth of India.

We have promised the King-Emperor 150 crores of rupees towards the cost of the war. If we raise all this money in India, we shall keep 539 lakhs of rupees in India every year instead of sending it out of India to pay interest and because thousands of men are dying on the battlefield every day to defend Freedom, Right and Humanity from German brutality, and to save India from the Hun; the least we can do is to save and lend.

What is the Loan?

The War Loan is issued in four classes to meet the case of different classes of investors :—

	Per cent.
(1) $5\frac{1}{2}$ per cent Income Tax Free War Bonds, 1921 (repayable on the 15th September, 1921, at Rs. 100 per cent)	$5\frac{1}{2}$
(2) $5\frac{1}{2}$ per cent Income Tax Free War Bonds, 1923 (repayable on the 15th September, 1923, at Rs. 100 per cent)	$5\frac{1}{2}$
(3) $5\frac{1}{2}$ per cent Income Tax Free War Bonds, 1925 (repayable on the 15th September, 1925, at Rs. 103 per cent)	$5\frac{7}{8}$
(4) $5\frac{1}{2}$ per cent Income Tax Free War Bonds, 1928 (repayable on the 15th September, 1928, at Rs. 105 per cent)	$5\frac{7}{8}$

The longer the term of the bond, the greater the yield to the investor. The wise investor will therefore invest in Ten Year Bonds, giving him a return of $5\frac{7}{8}$ per cent or a bonus of five rupees on every hundred rupees at the end of ten years.

How to invest.

The Man with Cash :—The man with cash can make his investment without difficulty. If he keeps a banking account, he has only to send a cheque to his bankers with instructions to buy, 3, 5, 7, or 10 year Bonds of the value of the cheque.

If his capital is in the form of Notes or rupees, he has only to present these Notes or rupees at controller of Currency's Office, Calcutta.

Bengal
Bombay
Madras } Presidency Banks.

Any Accountant-General's Office.

Any Government Treasury or Sub-Treasury.

The War Loan Office of his Province.

War Bonds for Rs. 25 and upwards can be purchased up to Rs. 10,000 at any Post Office.

The Man without Capital :—Many men are without capital or possess only a small capital, but they can save from their income every month and would like to invest these savings in the war loan. All the banks in India will assist them. Take the case of the man who wishes to invest Rs. 1,000. All he has to do is to send to any of the undermentioned banks Rs. 50 and undertake to pay Rs. 40 a month for 23 months and Rs. 30 on the 24th month. The bank will buy his bonds, keep them in safe custody, and deliver them to him free of charge when the instalments are complete. The following banks will assist in this manner :—

The Bank of Bengal.
The Bank of Bombay.
The Bank of Madras.
The Chartered Bank.
The Central Bank of India.
The Tata Industrial Bank.
Other banks will arrange special terms.

The Small Man :—Many who would like to subscribe cannot afford to invest in War Bonds. Almost everyone can afford to buy a Cash Certificate. These are sold at all Post Offices on the following terms :—

Original Price.	Purchase price by Government after five years.
Rs. A. P.	Rs.
7 12 0	10
15 8 0	20
38 12 0	50
77 8 0	100
387 8 0	500

These certificates can be cashed at any time during the five years with increasing interest.

FORMS OF BONDS.

War Bonds are issued in three forms—
Inscribed Stock Certificates.
Government Promissory Notes.

Both these will be exchanged free of cost for Bearer Bonds when Bonds are available.

The most convenient bond for those who keep their securities with a Bank is the Bearer Bond, it can be transferred as easily as a Currency Note. The disadvantage is that if lost it cannot always be traced. Inscribed Stock and Promissory Notes are quite secure.

For those who wish to keep their securities in their own possession Inscribed Stock is the mort satisfactory form. There is no risk since a fresh certificate is issued on satisfactory evidence of loss by theft, fire, etc. Further, holders of Inscribed Stock need not present them in person or by agent when interest becomes due; but interest warrants (which are practically cheques) are sent on the

due date to the holder at any address and payable at any Treasury which he previously designates

SPECIAL RIGHTS.

Interest on all War Bonds is paid Free of Income Tax.

War Bonds will be accepted as cash at their face value for subscriptions to New Loans. Advance interest at the rate of 5½ per cent will be paid from the date of purchase until the 14th September.

No fees are charged on the transfer of Government securities.

This loan is secured on the revenues of India. India has a very small unproductive debt; the security is the best in the world.

Full facilities are given for the exchange of securities from one form to another.

The Buried Sword.

This is the tale of the man who buried his sword to keep it safe. He said, "This sword enabled my father, and his father, to protect themselves against dacoits. It is an invaluable possession, and must be safeguarded." So he buried it. A celebrated dacoit got wind of this. "Now," said he, "is my chance." And he went, and fell upon the defenceless man, and took his women and all his goods, and enslaved him. And whether he found the buried sword, or whether it remained buried in the ground, does not matter; it was no longer any good to its owner. Now this is a parable.

The present war is a war of resources. In the old simple days, when each man had to protect himself against possible enemies, without his weapon he was helpless. In

these days, people fight, not only with swords, but with all they possess, for all they possess. Money, no less than men, is a people's weapon. What will happen to a people that buries that weapon? What happened to the man in the parable? His father had used his weapon to protect his life, his liberty and his belongings. And his weapon was no worse in the end; on the contrary, use had greatly improved it. He handed it on to his son better than ever.

Money is our weapon. Let us use it for the defeat of our foes, who if they could, would rob and enslave us, as they heve already robbed and enslaved small States like Belgium and Servia, outraged their women and destroyed their lands. It is our vital interest to lend our weapon, our money to the Government,—knowing that we shall receive back, when our liberties are assured, far more than we ever lent.

Killing trees with arsenic (continued).

Adverting to the note under the above heading on page 66 of Vol. II, No. 2, of the Magazine, the following further information is perhaps of interest.

It was remarked last year that the coppice shoots from the poisoned trees were less copious and healthy than those from the girdled, and that some poisoned trees had not completely died. By the month of May of the current year, that is, about eight months later, it was found that nearly all the coppice shoots had completely died, and six more (poisoned) trees that were not quite dead in September 1917 have since died.

G. V.
14-6-18.

Occasional Notes.

Supply stores for provisions and fuel at rates settled by the House committee have now been opened.

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Mr. Krishna Ayyar (1914—16 division) has been enrolled as a Surveyor for Mesopotamia on 112/8. We hope he will soon write on his experiences.

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The following back numbers of the Indian Forester have been received from Mr. R. D. Richmond, Deputy Conservator of Forests :—

Volume IX { No. 3 March 1883 / No. 4 April 1883 / No. 6 June 1883 / No. 7 July 1883 } Vol. XI No. 5 May 1885.
Vol. XIII No. I to II January to November 1887.

Supplement April.....1884

The following back numbers have been promised by Mr. P. M. Lushington, Conservator of Forests:—

July 1875 to April 1876	1882 July to December.
July 1878 to April 1879	1883 Complete.
July 1879 to April 1880	1884 Complete.
	1885 Complete.
	1886 Complete.

Volume XIII No. 12, December 1887.

The thanks of the College are due to these Officers. If any Officer possesses, and is disposed to part with, the vols. or numbers advertised as still wanting in this number of the Magazine, he will confer a benefit on the College.

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The following communication has been received from the D. P. W. with reference to the Tomb on the Southern boundary of Compartment C Demonstration Forest.

"With reference to your No. 1682M/505 B/11th the d instant, I have the honour to state that the tomb in question is that of Captain R. Temple killed on 13th December 1783. The following note is given by Mr. J. J. Cotton.

Large square tomb on the Mettupalayam road within a mile of the Coimbatore toll gate. The inscription is of rude type of different sizes and the officer commemorated was probably killed at the seige of Coimbatore."

List of Contributions to the Gass Forest Museum since June 1918.

No.	Contribution.	Contributor,
1.	A bundle of 'Odai' bamboos.	C. M- Hodgson, Esq., I. F. S,
2.	A suspected spiked sandal branch.	P. M. Lushington, Esq., I. F. S.
3.	A viper with its prey—a lizzard just swallowed—taken out of its stomach.	C. B. Dawson, Esq., I. F. S,
4.	A caterpillar defoliating Pongamia glabra.	Mr. J. S. Rowland, M. R. Hons.
5.	A Sholaga gun	L. S. Janes, Esq.
6.	Seventy one simple pencils made of different woods, at the pencil factory Madras.	C. A. Innes Esq., I. C. S.

Notice.

The manager receives numerous letters and post cards (the latter preponderating) regarding changes of address etc., but unfortunately he is compelled to assign the majority of these to the waste paper basket being unable to unravel the hieroglyphical signatures appended to such correspondence. The manager requests that persons desirous of having their wishes attended to will kindly write their names legibly.

Manager,
Madras Forest College Magazine.

THE
Madras Forest College Magazine.

Published Quarterly.

Vol. III. December, 1918. No. 2.

Ourselves.

The Annual Athletic Sports of the College were held on the 21st September 1918. The occasion is of historic interest as it marks the first time on which the sports were held on the College Athletic grounds. Of the completion of the latter in a short space of about a month, the management can justly be proud. We should be duly grateful to Government for their generous sanction for the grounds during the present financial stress caused by the War.

The sports were a success from many points of view, and the students concerned did credit to the College motto "*Mens sana in corpore sano.*" A novel feature of this year's programme was the 'log cutting' event suggested by Mr. C. B. Dawson. Another was the form of most of the first prizes, *viz*, Post Office Cash Certificates for Rs. 10/- each. A detailed account of the Sports is published elsewhere.

The Madras Forest College students are to be congratulated on having contributed Rs. 50/- or 100/- each, in all Rs. 5000 - in response to a special appeal, for the War loan.

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It is gratifying to note that Influenza is having much less claim on the Forest College estate than elsewhere, the supervision and condition of the sanitation here, being perhaps partly responsible for the fact.

* * * * *

The College Touring season started on Oct. 3rd — the Seniors to Komattiyeri [S. Vellore Division] and the Juniors to Wallia [C. Coimbatore Division]. On information received from the D. F. O just as the kit was starting, it was necessary to cancel the Juniors' Tour to Mount Stuart. The College returned to Headquarters for a week on November 2nd for the Periodical Examinations.

* * * * *

The 1918–20 Division consists of 33 students under the following categories :—

Madras Government ;	N. Circle	...	...	5
	C. Circle	...	...	8
	S. Circle	...	...	7
	W. Circle	...	...	7
Coorg Government ;	...	...	...	1
Ceylon Government ;	...	...	...	4
Hyderabad Government ;	...	...	...	1

* * * * *

We much regret to learn of the death of the little daughter of Mr. Marudachalam Pillai — the College storekeeper — to whom we tender our sincere sympathy.

Memorandum dated 1912 on the Administration and establishment of the French Forest Department as compared with Madras.

Madras.

Area of Reserved Forests and reserved lands : 19,570 sq. miles

France.

	sq. miles.
Area of Reserved Forests.	4609
„ Communal „	7603
„ Private „	2,0209
Director General	No. 1
Administrators	„ 3

(The Administrators now called Inspector Generals are in charge respectively of general administration, Working Plans and exploitation and Reboisement)

The above are all Forest Officers who have risen from the lowest gazetted rank.

There are also two Conservators and several Deputy and Assistant Conservators attached to the Headquarters Staff: also Directors and Staff of two Forest Colleges:

	No.
Conservators ...	3
District Forest Officers ...	32
* 21 Assistants in the Provincial service for leave vacancies etc. Rangers ...	156
Deputy Rangers ...	159
Foresters	233
Forest Gaurds ...	1238
* or fewer	

	sq. miles.
Conservator's charge ...	6523
District Forest Officer's charge	612
Range Officer's ...	129
Forest Guard's ...	16

	No.
Circle & District Staff	
Conservators ...	32
Deputy Conservators in charge of a Division ...	200
Assistant	442
	674
Rangers ...	1030
Forest Guards ...	2720

(for the Reserved Forests only) there is a separate establishment for the Communal Forests.

	sq. miles.
Conservator's charge ...	144
Deputy Conservator's ... (each Deputy Conservator has 2 Assistants)	23
(They have also to advise on the Administration of Communal Forests)	
Ranger's charge ...	4
Forest Guard's ...	1.7

Budget.

Madras.

RECEIPTS:–

£. 259,086: Rs. 38,86, 296; per square mile £. 13 : Rs. 199/-

EXPENDITURE.

£. 199,023: Rs. 29,85,358 per square mile £. 10/- : Rs. 150/-

NET REVENUE.

£. 60,062: Rs. 9,00,938 per square mile £. 3/- and odd Rs. 46/-

France 1907.

RECEIPTS :–

£. 1,211,656: Rs. 181,74,840 per square mile £. 263 nearly Rs. 3945.

EXPENDITURE :–

£. 558,064: Rs. 83,70,960/- per square mile £. 121/- Rs. 1815/-

NET REVENUE :–

£. 653,592: Rs. 98,03,880/- per square mile £. 142 : Rs. 2130/-

The expenditure includes the following items of interest :–

Pay of Gazetted officers :–
£. 100,000 : Rs. 15,00,000/-

Pay of non-gazetted officers :–
£- 114,160 : Rs. 17,12,400/-

Cost of two Forest Colleges :–
£. 7,440 : Rs. 1,11,600/-

Improvement and maintenance of the Forest and water courses :–
£. 49,580 : Rs. 7,43,700/-

Restoration and fixing of unstable mountain tracts :–
£. 135,040 : Rs. 20,25,600/-

Working Plans :–
£. 16,600 : Rs. 2,19,000/-

Destruction of wolves and noxious animals :–
£. 1,040 : Rs. 15,600/-

It must be remembered that there is practically no such thing as departmental working in France: everything is done by contract.

In Germany on the contrary departmental work is almost universal. Consequently, the receipts and expenditure are very much higher.

RECEIPTS :– 15–18 million sterling.

NET REVENUE :– £. 1,200,000/-

'Indian Forester' August 1908 gives German State Forests Annual Revenue :–

£. 22,000,000.

'Indian Forester' Sep. 1910 :–

German State Forests : 16,000 sq. miles. Therefore nett revenue per square mile £. 75.

Gross revenue per square mile £. 1,375 Schlich gives area of German State Forests as 17,711 square miles.

The French Colonial Forest Budgets are also worthy of note, as the conditions are not unlike those of Madras.

Algeria.

RECEIPTS :–

£. 180,900/- Rs. 27,00,000/-

ORDINARY EXPENDITURE :–

£. 140,417/- Rs. 21,06,255/-

EXTRAORDINARY EXPENDITURE (raised by loans) :–

£. 48,000 Rs. 7,20,000.

Territories south of Algeria.

RECEIPTS :– £. 100/- Rs. 1,500/-

EXPENDITURE ;–

£. 6634/- Rs. 99,510/-

the fire goes down to the rhizomes and burns them. Next year a few tender culms may appear and these can be removed along the weedings. The chief defect in it is that it is conducive to fires. This can be warded off by rigid protection and as the operations in these Plantations are concentrated this is not impossible.

M. Umapathi.

[Our readers are referred to pages 16—18 of Vol. I No. 1, where appears a similar article on the subject of underplanting; further discussion on this interesting subject is invited. Editor.]

The Collection of Minor Forest Produce

in East Kurnool District.

The Collection of Minor Forest Produce forms one of the chief items of works of the District. It is that which keeps the Chenchoos at work almost all the year round; it is that which feeds them and makes them active; it is that which prevents them from committing crimes and in fine it supplies the wants of the teeming millions of the country and fetches a good revenue.

All the works of this District except building and road works are extracted from the hill tribes known as Chenchus. There are about 16 gudems all under the control of the Forest Department. Either a Deputy Ranger or a Forester is appointed over each Gudem, and he will engage the chenchoos daily on some work or other and disburse their wages in grains. He has to maintain the Shop Accounts, Timber Accounts etc.

To come to the article proper: the thirtyfirst day of January passes, Firetracing operation ceases and Forest produce collection commences.

The products that are found in abundance in this District are honey & wax, dyes & tans, oil seeds and other forest produce and also skins and horns in small quantity as killing of animals is not encouraged.

The collection season commences with tans, because at this season no other produce is ripe for collection. Moreover it is easy to strip off the bark in this season and above all it is in great demand due to the present war.

The barks of Cassia auriculata, Cassia fistula and Anogeissus latifolia and also the leaves of the last species form the tanning stuffs of the District. The chenchoos collect the barks in different ways for various species. For collecting Cassia auriculata bark, they first cut the branches of girths above 1½-inches, collect them and bring them under a shady tree. They then with the help of small sticks of about 1½ft. long and 6 inches girth, extract the bark by placing the green branches over a stone and beating them. The bark is then dried in shade.

The collection of the barks of Cassia fistula and Anogeissus latifolia is easier than that of Cassia auriculata. In the former case they fell the trees and strip off the bark by strongly beating against stems and branches with their turned axes. They collect the bark and dry them under shade. It is found that they are able to collect from 2 to 3 maunds of dry bark every day whereas the collection of dry Tangedu bark (Cassia auriculata) is possible only from 1 to 1½ maunds a day.

Madras.

Rs. 73,751 or £. 4,916 $2\frac{1}{2}$ % spent on rest houses and sub-ordinates' quarters.

Tunis.

RECEIPTS :–

£. 35,968: Rs. 5,39,520.

EXPENDITURE :–

£. 25,986 : Rs. 3,88,790 (of which £. 1864 or Rs. 27,960 or 7 % of expenditure is spent on Forest rest houses).

Cochin China.

RECEIPTS :–

£. 48,480 : Rs. 7,27,200.

EXPENDITURE :–

£. 29,520 : Rs. 4,42,800 of which £. 19,360 or Rs. 2,90,400 is spent on the European Establishment and £. 2,240 or Rs. 33,600/- on the Native Establishment.

MADRAS FOREST COLLEGE DEMONSTRATION FOREST.

About 78 acres of the College estate are now being worked as a demonstration forest under the Uniform Method. The area has been divided into three compartments by natural boundaries (for purposes of nomenclature only) and by artificial lines into 30 strips for purposes of exploitation. Each three strips are combined into a Periodic block of which there are thus ten. The oldest periodic block is treated annually by the Senior division under Regeneration fellings. Final fellings (clear) in the oldest strip, secondary fellings (roughly $\frac{2}{3}$ of the stock) in the next oldest strip, and seedling fellings (roughly 1/3 of the stock) in the youngest strip of the Periodic block. Simultaneously the Junior division take in hand the two youngest Periodic blocks for cultural operations, weeding, sowing, clearing and if necessary, thinning.

The whole forest is consequently traversed once in ten years for major operations, and once in five years for minor operations.

To give the project a fair start broad-leaved species of all kinds are being sown in the oldest as well as the two youngest Periodic Blocks. It is hoped eventually to rely on natural regeneration only.

The students surveyed and demarcated the Forest and carry out nearly the whole of the operations with the exception of clearing the prickly pear from the itteri — the latter work is being undertaken on contract.

The result should be a demonstration forest stocked with the broad leaved species that have proved themselves to be the fittest to

the number of years given to the teak as a start or a simple fraction of it such as 1/2 or 1/3 so that the crop may be realized once, twice or thrice as the case may be before the final fellings of teak.

We shall now suggest some species and see whether they fulfil our considerations. The easiest and safest course is to introduce the species that is naturally growing in the locality. Xylia dolabriformis is one of the kind. This thrives well on laterite soils. It requires a good amount of shade till it establishes itself, but afterwards it requires light and flourishes better in it and has a tendency to form a pure crop of its own especially on the 2nd class soils. On the first class areas the teak grows well and xylia may be introduced after teak is given a start of at least 6 years.

Next comes Hopea parviflora. This is found growing naturally in the Plantation of 1851. The soil is 2nd class. This species requires a soil retentive of much moisture. It is thought that it flourishes better in light and experiments are now being carried out at Mundandorai forests. This is a fast growing species although not so fast as teak. After the 1st thinnings of teak, Hopea seeds may be sown in regular lines between the teak rows and they should never be sown broad-cast for it cannot be successfully tended afterwards. They must be weeded during their earlier stages. Where it is found naturally growing, the saplings must be freed by removing other species growing under teak. Financially Hopea will not prove useless. The Revolution of teak is probably to be 70 years. If Hopea is sown at the 10th year of teak two crops of Hopea may be raised within the remaining 60 years for it attains its marketable age in 30 years. Experiments are still to be made to find out the exact nature of its growth. Its introduction however, is confronted with many difficulties. The seeds are difficult to preserve and perish easily in transport. The seedlings cannot be raised

in nurseries for their long and tender tap roots do not stand transplanting or pricking out. The seeds must be sown as soon as they fall from the tree which is not always possible.

Artocarpus intigrifolia may be introduced as an underwood. But its seeds are difficult to obtain in large quantities. If they are a little under or over ripe, they do not germinate. In transport they generally become over-ripe and are rendered useless.

* Cassia fistula is good being a fast growing Leguminous plant. It protects and enriches the soil but as it does not grow to a very large size it cannot be expected to remove epicormic branches on the upper part of the stems of the teak. Its bark may be used for tanning purposes. Lagerstroemia Flos Reginea is very useful in swampy and water-logged places. In such regions it grows equally well as the teak and suppresses the epicormic branches.

Lastly and the most important is the introduction of bamboo. It is effective and very advantageous. It grows well on the 1st & 2nd class soils, but it should not be introduced in the 2nd class for it may out-grow the teak itself. It can be very safely introduced in the 1st class soil after the teak is given a good start. The bamboo seeds may be sown broad-cast. It grows up quickly in dense mass and to a great height so that the epicormic branches near the top of the trees will be removed. There is large demand for the bamboos for rafting and other purposes and it fetches a good price of Rs. 5 to 7 per 100. As it has a superficial root system, it does not exhaust the soil; but on the other hand yields a good humus. Its eradication is not difficult at the final fellings. It can be cut down easily and when the clump is set fire to

* [These (Cassia fistula and Lagerstroemia Flos Reginae) are not well suited for the purpose of underplanting, as they are deciduous. Editor.]

The collection of Chiruman (Anogeissus latifolia) leaves does not take place in these months, because the leaves are at the shedding stage. This collection commences early in the month of May. The tender rosy leaves known as "Rosy Sumac" are collected, dried under shade, powdered and packed in gunny bags. Again, when the tender leaves of the tree turn green in the months of June and July when they are known as "Green Sumac", they are gathered, dried under shade and finely powdered; then it is filled in gunny bags. The collecting charges of Rosy Sumac is twelve annas and that of Green Sumac is six annas per bag.

Large quantities of Pongamia glabra seeds, soap nuts and tamarind are collected during the months of February to June. To deal with the collection of these products in detail is only to try the reader's patience; suffice it to say that they are either plucked from the tree or picked up. It is worth noting that the rates for collecting Pongamia glabra seeds and soap nuts are very low when compared with that of tamarind. A man is able to earn 8 annas a day, on an average, and even more if he is a little bit hardworking, whereas he may be able and that with much difficulty, to earn only four annas a day by the collection of soap nuts etc. This is a very low rate for those poor chenchus, who are growing more & more civilised under the proper care of the Forest Department and the special chenchoo officer. The rates fixed for soap nuts are only six pies per measure as against eight pies per measure for seeds of Pongamia glabra. Recently on the recommendation of the special chenchoo officer the collection rate of Strychnos nux-vomica seeds is raised by three pies. In similar manner if the rate of collection of soap nut is raised, I hope the hardworking chenchoos will work with increased zeal and perseverance.

The month of May with its green canopy set with bright flowers of various hues, enchants the eye of man, the eye of beast and especially that of honey sucker. May brings harmony to the humming bee. The bee with happiness alights on the flower, sucks up honey and takes it to store in its house made of wax. It thinks not that the hand of man will be upon its home, it thinks not that its future hopes—whatever they may be—will be undone by man and it thinks not that man, one day, will turn out to be its enemy and plunder its home and drive it away.

Some bees construct their hives upon the branches of high trees and some in a gigantic size build in deep ravines and on the impending rocks of enormous height.

The collection of honey is a difficult task; it costs the life of a man if due precautions are not taken. The man has to bear the pain caused by the severe sting of the bees if any. When the collection is done in *selas* it is quite horrible to look at the man hanging in the air with a half burnt torch in one hand producing smoke in profusion and a long bamboo stick with a net attached to it in the other. He is held down by a number of persons on the hill by means of a strong rope passing around his waist. The people above carefully hold him so that they may not slip him. He aerates the torch by swinging it to and fro, smoke rises in puffs and in abundance and the bees with a murmurring sorrowful sound leave their lively cavities bounded by nice walls of wax and stored with sweet "honey". Then the man pierces the hives and breaks them into pieces with the stick in such a way that the pieces thus obtained fall into the net attached to the stick. When the net is full of these pieces he sends it up and repeats the operation one after another till all of them are finished. There should be much of smoke when the operation is going on, otherwise the bees may come back and they are sure to attack any man and take his life out of him. When

the work is over the man hanging in the ravine will be lifted up and all of them get down with their booty. All assemble in a place still under the cover of smoke and extract honey and fill it in pots and tins by pressing strongly the cakes between their hands. The refuse that is left behind honey is known as crude wax. This is refined by melting the pieces in boiling water and then filtering.

As already observed all the products that are available in this District are collected by the hill tribes chenchus. They bring them to the Depôts and the officer in charge of the gudem takes them weighed or measured according to the nature of the produce and pays them back in grains according to the collection charges fixed in the schedule of rates. By this arrangement of supplying the Chenchoos with grains and other articles they require, in their gudems, the chance of their going to the villages is stopped and their temptation to stealing and committing offences of criminal nature is prevented. By the strict supervision and proper control of the officer in charge of the gudems, almost all the gudems are brought under control and number of crimes also have decreased and the villagers express their heartfelt thanks to the Forest Department for the great relief given to them.

The produce collected is disposed of every year by giving contract to some merchants or other in an auction. To do this the District Forest Officer holds an auction, every year, for all the Minor Forest Products of the District after publishing the date and hour of such auction in the District Gazette. Every bidder is to deposit some fixed amount in the Treasury. The highest bidder will be proclaimed the contractor of the District and he alone, has the right to purchase the Minor Forest Produces collected by the Department. Every month the Range Officer sends a notice to the contractar stating what all produces are in his Range ready for disposal. On receipt of this, the contractor remits amount according to the sale prices of the produces. Then he produces the Treasury chalan to the Range Officer, who issues orders to the Deputy Ranger or Forester to hand over the produces to him. Another contractor is also appointed for tanning Stuffs. He purchases all the barks collected by the Department. Now, the bark and leaves of *Anogeiossus latifolia* are not sold to these contractors, but are directly sent by the Department to the Superintindent of Tanning Stuffs, Madras. This way all the produces collected in this District are disposed of every year and a large income is realised. A few years back the Government itself was selling produces in their own Depôts. Only those products that were in demand were easily disposed of, and the rest were left unsold or they had to be auctioned at low prices; the produces were lying in the Depots more than a year and as a consequence there was dificit in the produces. After the introduction of this system of giving contract, all the produces that are collected are disposed of every year and a good revenue is realized by the Government.

The chief dis-advantages in this operation of collection are the chances of occurrence of fire and of the diminution of the regeneration of the species which yield the produce. The breaking out of fire in the forests is caused by the carelessness on the part of the chenchoos while extracting honey, but it is very well guarded. Regarding the less regeneration of the yielding crops a remedy should be sought for at once or else it may be felt very keenly as time passes on. By the constant removal of seeds of soap nuts, kanuga seeds and Mustee seeds no chance is left for new seedlings to come up, the existing crop diminishes, and these species may in the long run be exterminated altogether. This is why there is but a limited number of these species scattered here and there in these areas. Hence to improve the regeneration of these species artificial sowings should be carried out as early as possible.

In conclusion, I may be permitted to say that as this article is only a maiden attempt of mine, I request that it may be given a patient reading.

A. Rama Rao,
Junior Division.

It is just such maiden attempts to present facts and observations from the Ranger's point of view that we welcome. Editor.

A Study of Xylia dolabriformis.

Occurrence.

In the Bhagavathiculam and Yezhattumugom Felling Series of the Malayattur Reserve of North Travancore, we have a fine legacy of Xylia dolabriformis, occurring in large patches, and looking, as it were, a natural Plantation. It occurs as a pure crop in some places, while in others it is interspersed with Lagerstroemia lanceolata, Terminalia paniculata, Strychnos nuxvomica and some others. It may now be pertinent to enquire how it has attained this preponderance in the composition of the growing stock. This takes us on to a study of the œcological condition of the locality.

Soil & light.

Xylia affords us a practical illustration of the correlationship between light and soil requirements for its natural regeneration. Adopting Mr. Coventry's classification of soil we find this species to be characteristic of non-humus soil *i. e.* soil exposed to the full glare of the sun. In this type of soil, the ground is bouldery and porous, and heat

also appears to provide a stimulus due to exposure of root-system caused by cracks in the soil. These factors coupled with shallowness of soil are responsible for making Xylia a surface rooted species, reproducing itself profusely by root suckers. When Xylia is felled, more root shoots are found than coppice shoots. This has stood the test of my observation. Lastly it seeds in some places late in the fire season, and seeds escape burning; dispersal of seeds is sometimes brought about by sudden bursting of the pods, and hence seeds are hurled some distance, and have more chances of germination under favourable circumstances. Thus in deciduous forests where we have a non-humus soil, we have a plant life, an illustration of a survival of the fittest.

Relation of fire protection to Xylia.

There is one school of thought which holds that fire stimulates production by root suckers owing to injury caused to roots. Actual observation, shows that this holds good of Xylia, as it is also corroborated by Mr. A. W. Lushington who has observed in Cochin, a prolific reproduction of xylia by root suckers. It is held by some that reproduction by root suckers is a case of 'sickening malady.' This requires careful experimental operations to prove it beyond doubt. Among others, Mr. Gamble holds that fire does not retard but encourages germination of certain seeds by destroying the thick outer covering of *pods. These are some of the causes for its large proportion in the growing stock. In South Travancore, it is not abundantly met with, and this may be due to poor rainfall as compared with North Travancore.

[* This is perhaps more true with *indehiscent* fruits with a thick covering, than with such fruits as Xylia, which though woody, usually dehisces after maturity allowing easy access of the seeds to the soil; further, the testa(seed coat) of Xylia seeds is by no means so thick and horny as to need the agency of fire for its disintegration. Editor.]

Mr. Coventry arrives at the conclusion that species adapted to regenerate on non-humus soil are also adapted to regenerate with full exposure to sun, and says that non-shade demanders belong to Leguminosae. How true it is of Xylia, which is also, a Leguminous species, though shade bearing.

Thus gregariousness of growth is characteristic of non-humus soil and in such cases, there always exists a correlation between their light and soil requirements for natural regeneration.

In Travancore, Xylia is rising in value and largely in demand for, house construction and bridge work as it lasts long. Demand from a foreign market is also growing keen.

Malayattur.
1—10—1918.

L. A. Krishnayer,
[M. R. H. 1915-17]
Ranger.

A brief note on the progress of the Athletic Club during 1917-18.

The *Annual Sports* were held on 29—9—1917 on the Police Recruits school grounds. Two new items — Sack-Scrimmage a very mirth exciting item, and servants' Race — were introduced this year. Competition was keen in all items. Junior Student C. B. Chengappa won the Richmond Championship cup with 21 marks. Athletic colours were awarded to Senior Student P. K. Parameswaran Pillai - 15 marks. Hockey was played from August to November & Foot-ball from December to June.

At *Hockey* 6 matches were played, one interdivisional and five against outsiders. Of the latter, 1 was won, 2 lost and 2 ended in a draw. The interdivisional match for the Cowley-Brown Cup, was won by the Junior Division who defeated the Senior Division by 3 goals to nil, after two draws. N. K. Timmaya was Captain of Hockey. Colours were awarded to Abdul Hameed Khan & C. B. Chengappah.

At *Foot-ball*, three matches were played - win 1, loss 1, & draw 1. At the Sadivayal Camp a six - a side tournament for prizes given by the Vice-President was held. Almost all took part. A. B. Fenn was Captain of Foot-Ball. Colours were awarded to students Seshagiri Rao, C. L. Narayana Rao, P. K. Paramaswaran Pillai and A. Baviah.

At *Cricket* 4 matches were played - all won, a very successful season. M. Narasinga Rao was captain of Cricket. In two of the matches, M. Narasinga Rao scored centuries, for the first of which he was awarded a Cricket bat. Colours were awarded to A. Muthukrishnan, De Sylva, and Seshagiri Rao.

Tennis was started towards the close of the year. Two matches were played: (1) Messrs. Lushington and Fischer *versus*, Messrs. Abdul Qadir and W. C. Hart, in which the former won by 2 sets to nil., and (2) Messrs. Latham and Fischer, *versus* Students Sankara Alwa and Seshagiri Rao inwhich, the former won by 2 sets to nil.

Badminton. The courts being within Hostel premises, special facilities for this game are now afforded. Students played badminton both at Head-Quarters and in Camps. One match was played & lost.

The Pentland shield for the best all round Athlete of the year was won by Junior Student C. B. Chengappa; P. K. Paramaswaran Pillai was the runner up. The preparation of an Athletic ground, 3

tennis courts and two badminton courts was undertaken and completed during the year, on the College estate. Thus a great want has been met. This has contributed considerably to the general improvement in the Athletics of the College and also enhanced the interest among students in games.

The Marathon race took place on the 16th February at 7 A. M. over the usual course at the Sadivayal combined camp. Senior students Paramaswaran Pillai won the first prize. The other prize winners were C. B. Chengappah, M. Narasinga Rao, C. L. Narayana Rao and B. S. Chengappah in order. The interdivision competition in the marathon race was started for the first time this year — a 'marathon challenge cup' having been generously presented by Rissaldhar Major Bahadur Amir Mahomed Khan (late xx Deccan Horse). It was won by the Junior Division.

The year has been one of improvement in many directions in Athletics.

T. D. PONNIAH,
Secretary,
M. F. C. Athletic Club.
9—9—1918.

Madras Forest College Athletic Sports 1918.

The 21st of September1918 will be a memorable day in the annals of the Madras Forest College, as it marked the 1st time on which the Annual Athletic Sports of the College were held in our own

grounds recently made on the College Estate. The grounds and surroundings were, as far as possible, made to put on a festive appearance.

This year the 'Relay Race' and the 'Obstacle Race' were omitted and a new, and interesting event, viz, "Log cutting" — at the suggestion of Mr. C. B. Dawson Imperial Instructor — was added. The proceedings commenced at 3-40 P. M. The display was as good as ever and indeed in some events, such as 100 yards Flat Race, and Hurdle Race, it was 'magnificient' — to use the expression of the spectators. In these events, the College record for the past years was broken. In the 100 yards Flat Race, Junior Student Mulyal and Senior Student C. B. Chengappa finished dead level at first. They had to run again with the result that Junior Student Mulyal came first; this time by about two feet. The show in High Jump was excellent — Junior Student Mulyal taking it very easily and clearing a maximum height of 4' 10". The hurdles was won by Muliyal in 18-1/5".

The College and students were at home to the ladies and gentlemen, and to students of selected institutions of Coimbatore; the Principal and staff entertained the European ladies and gentlemen.

A noteworthy affair of the year was that the first prizes in most of the events consisted of "Post Office Cash Certificates" of the value of Rs. 10-0-0 each fulfiling thus two objects at once viz helping the country in the execution of war and also awarding prizes to the winners. The prizes were given away by Mrs. C. D. A. MacCarthy wife of the Conservator of forests Western Circle. The Principal in a suitable speech thanked Mrs. MacCarthy and the audience and drew their attention to the fact how well fitted she was, to perform the function of giving away the prizes not only because she was the wife of one of the most senior Forest Officers in India but also because she was the mother

Hurdle race. (120 yards).

1. Muliyal; winner's time 18 4/5 seconds (1917—20 3/5 sds.)
2. Abdur Rahim Khan.
3. Narayanasami Iyer.

Sack scrimmage.

Winning team
1. Pedalakshimiah.
2. Abdul Hameed Khan.
3. Abdur Rahim Khan.
4. Narayanasamy Iyer
5. Ramasami Iyer.

A very mirth exciting event. The circle this year was larger than last year's—11′ radius, the effect being that the competition lasted longer and was more interesting.

Log Cutting.

1. Venkateswarelu.
2. B. S. Chengappa.
3. C. B. Chengappa.

The logs used were air-dry-babul ones of about 9″ diameter and had been obtained from the College Demonstration Forest.

Tug of war.

Senior Division Versus Junior Division.

For want of time we had to be satisfied with one instead of the usual three pulls.

Seniors won — The winners had been coached by Mr. Crothers our First Provincial Instructor.

Servants' Race 200 yards.

1. Anthony – Peon of the M. F. C. Imperial Instructor.
2. Karunakaram.
3. Ponnappah.

It is to be noted that competition in this event was in a way unequal—lads having had to run with young men. This may be remedied next year by dividing the competitors into two batches, or by giving handicap to younger competitors.

Children's Race.

1. Thandy Goundan.
2. Krishnan.
3. Guruvan.
4. Sethammal.
5. Rajammal.
6. Marudachalam.
7. Thulasi.
8. Lakshimi.

Senior Student C. B. Chengappa won the Richmond Championship cup with 20 marks and Junior Student Mulyal gained 'colours' with 17 marks.

It is to be regretted that no 'Past Students Race' was run this year for want of enough competitors — only two past students Messrs. A. P. Sreenivasa Iyengar M. R. H. & T. T. Ansep M. R. H. having honoured us with their company, although the date of the Sports, unlike that in the past years, was moved back to the 3rd week of the month specially to suit the convenience of past students who, it was thought were hither to unable to attend, being busy with their monthly accounts and returns, when the sports day was at the end of the month.

T. D. Ponniah,
Secretary & Treasurer,
Athletic Club.

The Stanes Hockey Trophy Tournament.

—o—

On Saturday the 28th September at 4-30 p. m. we met in the first ties the Coimbatore United Eleven on the Recruit school ground, the umpires being Mr. Hamilton and Mr. Berry. The players at first seemed to take matters somewhat easily. But when we put a goal, the contest on both sides was marked and the play became very lively. Another goal was scored by us during the first half which was soon followed by one against us. About the end of the first half hour one of our best players, C. B. Chengappa was very unfortunately struck by the ball on his nose which resulted in profuse bleeding and he was at once taken to the Municipal Hospital. Our players were not discouraged by having to play with ten men against their opponents eleven, and a third goal was soon scored (C. L. Narayana Rao). The first goal was put in by B. S. Chengappa and the second goal by M. P. Subbiah, the ball being passed on to him by C. B. Chengappa right wing out.

The play thus ended in our victory by 3 goals to one. The centre Forward M. P. Subbiah acquitted himself very creditably and carried the ball against many opponents very gracefully. The Captain Abdul Hamid Khan is much to be congratulated upon our victory against such odds.

Coimbatore Tournament, Hockey Match.

Madras Forest College *Versus* Madras Agricultural College.

On 30—9—1918.

It is a pleasure and privelege to pen the events of this day. The opposing teams met punctually at 4-30 p. m. on the Police Recruits

grounds. The match from beginning to end was a splendid one. The teams being strong and well balanced, the excitement was kept up throughout. In the early part of the first half for-tune seemed to favour our opponents and they put in a goal though after much contest. This nerved our players with more vigour and soon a goal was scored by B. S. Chengappa. Then ensued a stronger contest. In the second half another goal was scored by M. B. Subbiah. The latter has proved himself a consistent scorer throughout the season.

The absence of one of our best men C. B. Chengappa was much felt. Thayuman full-back, M. P. Subbiah Centre forward and goal keeper Y. P. Lakshmayya merit special mention. Thus ended a fine hard Match resulting in a win for us by 2 goals to one.

FINALS.

Played on Recruits School Ground October 2nd between the Reserve Police and the College before a large and enthusiastic assembly. Result: the College was defeated by 1 goal to nil. On the day's play the best team won. The Police played much above and the College much below previous form in the Tournament. Early in the game the Police Scored by a long shot, and M. B. Subbayya (forward) was seriously injured: the latter continued in the game but had to join the full back line where he could be but little more than a passenger. This seriously disorganised the forwards combination and resulted in inaccurate passing for the rest of the game. But for this misfortune and a few lesser injuries to other members of the team the College should have just pulled off the match. The game was a hard severe one played with keen-ness and fair-ness on both sides The refereeing was characterised by quick observation and prompt decision.

In asking Mrs. Stanes to present the medals and cup to the winner Mr. C. Wood, Principal of the Agricultural College drew attention to the happy appropriateness of the cup being presented by a conection of the Donor Mr. R. Stanes. The Trophy was given by Mr. Stanes 4 years ago to the Coimbatore Athletic Association and has been won twice by the Stanes High School (very properly as Mr. Wood observed) and once by the Agricultural College.

A Tribute was paid by Mr. Wood to the labours of those gentlemen who had organised this year's tournament and who had performed the functions of referees etc., and the *proceedings* terminated with cheers for those officials of the tournament and for the Donor of the cup.

We have probably a better Hockey Team than we have ever had before, but in the crucial test we failed to do ourselves justice partly from lack of condition (such an essential against a heavier team) and partly from nerves.

Results of Matches Played by the Madras Forest College during August & September '18

(I) HOCKEY.

Date.	Particulars.	Result.
8th Aug. 18	Madras Forest College *versus* Madras Agricultural College—on M. F. College grounds.	Lost by nil to four.
15th Aug. 18	Madras Forest College *versus* Stanes High School—on Stanes High School grounds.	Lost by one to three

Date.	Particulars	Result.
20th Aug. 18	Madras Forest College *versus* District Police Club—on Forest College grounds.	Draw nil to nil.
22nd Aug. 18	Madras Forest College *versus* Young Men's United—on M.F.C. grounds.	Won by four to nil.
3rd Sep. 18	Madras Forest College *versus* the Central Police Recruits' school on Recruits' school grounds.	Won by twelve goals to nil.
10th Sep. 18	Madras Forest College *versus* District Police Club—on Coronation Park grounds.	Won by five to four
26th Sep. 18	Madras Forest College *versus* Madras Agricultural College—on M. A. C. grounds.	Won by four to two

Coimbatore Hockey Tournament.

28th Sep. 18	Madras Forest College *versus* the Young Men's United — on Recruits' school grounds.	Won by four to one.
30th Sep. 18	Madras Forest College *versus* Agricuitural College—on Recruits' school grounds.	Won by two to one.
31st Sep. 18	Madras Forest College *versus* District Police.	Lost by nil to one.

Date.	Particulars.	Result.
	(II) TENNIS.	
6th Sep. 18	Madras Forest College *versus* Madras Agricultural College, Three teams, —on Agricultural College grounds.	Team 1 lost by one to two „2 do nil to three „3 do nil to three
	CRICKET.	
1—9—18	Madras Forest College *versus* Madras Agricultural College.	Won by M. F. C. by 63 to 41 runs.
8—9—18	Do.	Won by M. F. C. by 122 to 79 runs.

T. D. PONNIAH.

Rambling thoughts.

The following vagrant ideas were suggested by a perusal of the issues of the Magazine for March and June 1918. In both there are interesting articles on fire lines generally and one on fires in the Nallamalais in particular. The latter is a really valuable contribution from a Ranger, the man who has to carry out the work, and just the kind of article that one of the other contributors — R. D. R. — has called for.

The writer "touches the spot" when he recommends that the chief causes of fires should be ascertained. It is obviously of little use

taking measures against one source of fire if the majority *in that locality* are started in a totally different manner, requiring a quite different method of defence-

This brings me to another quite excellent contribution — the one entitled, "Hill tribes and how to deal with them".

The author gives many wise hints regarding behaviour to be adopted towards hill men so as to gain their willing co-operation. Now this applies not only to hill tribes but to all with whom a Ranger comes in contact. A careful consideration of the causes of fires in the forest will soon convince an impartial enquirer that practically every fire (in South India at least) is directly caused by man, either intentionally, carelessly or accidentally.

It is quite certain, therefore, that unless Forest Officers secure the co-operation of the people all other measures for fire protection will be inoperative in the long run. How easy it is for a malicious villager to sneak into your nicely fire traced block, set fire in two or three places and be miles away before there is any sign of fire. Several methods are adopted by such people. One is by means of a ball of dry cotton or similar material that will smoulder. Live charcoal is placed inside and the ball is deposited in a nest of inflammable grass. Another way is by the use of a fuse lit at one end, the other being disposed so as to set the grass on fire when the fuse is burnt through; whichever method is practiced a considerable time lapses before the actual forest fire is started, allowing the perpetrator ample time to cover a long distance and prepare the inevitable alibian the remote chance of his being suspected.

Therefore, fire lines may be amply wide; they may be perfectly designed and equally perfectly executed, but they will only avail

to keep the fire *within* the protected area if the people really *want* to burn the forest. People may perhaps be coerced, but prevention is better than cure. All precautions are of little avail if the co-operation of the people is not secured. Therefore, conciliate the people, at the same time make them responsible *i.e.* let a village be responsible for a definit area. Much, however, depends upon the Ranger and his ability to "move well with the people" by fair dealing.

* * * * *

One factor that very often stultifies the best efforts of the Indian Forest Department in the protection and improvement of the forest property of the state, is the very great ignorance of the people at large on most subjects connected with the forests. They have deep-rooted prejudices and beliefs of hoary antiquity and it is exceedingly difficult to persuade them out of these firmly held misconceptions.

The writer well remembers trying to convince some jungle men that the constant firing of the hills around their settlements was bound to be prejudicial to their cultivation and affect their water supplies. They laughed & retorted that it was since reservation that their water had fallen short.

The general conception is that the forests have always been there and have always been in the same condition, and the ignorant naturally tend to resent what they consider as unnecessary and vexatious interference with immemorial rights. It should be, therefore, one of the Range Officer's chief duties to endeavour to dispel this ignorance as far as his opportunities will allow. It will probably be found impossible to move the old and even the elderly, but let the Ranger tackle the young. I should like to hear of frequent visits by Rangers to village schools, giving short addresses of a few minutes, duration to the scholars. No

doubt both teacher and students would look upon it as a pleasant interlude. Let him try and speak in an interesting and yet simple manner on the value of the forests to the country, their effects in regard to climate, water storage and improvement of soil and the like. Such a practice is bound to have useful result if persisted in.

It would also be of value if some capable officers were to draw out brief summaries of the utility, aims and objects of the forestry in the several vernaculars of the Presidency for wide distribution, especially in schools. This would have to be deferred, however, till the end of the war.

It must not be thought that ignorance on forest subjects is confined to the uneducated classes. A great lack of knowledge is exhibited even by those who may append B. A. & B. L. after their names and a little propoganda even among members of the legislature would not be a waste of time. I would like to mention here that I heard recently of a well educated Indian Gentleman, who had occupied official posts of great responsibility, who declared his belief that goats, far from being detrimental to forests on the contrary, are beneficial. As this gentleman is the owner of a garden and an orchard, a Ranger who heard him asked why he did not introduce a herd of goats into his property, received the indignant reply, " my trees and plants are valuable ".

* * * * *

Another article of merit is that on page 115 (March issue) on forest offences. There is no doubt a more careful preparation of cases is needed in most ranges. Important points that should be noted are the precise locality and time of detection. Detecting officers should be encouraged to *write down* all emergent facts of the case as soon as

possible after detection if possible with the collabaration of the other witnesses. There is no intention whatever in this to suggest collusion to secure false evidence, but this procedure is likely to impress correct details on the memory and avoid conflicting evidence, which may be seized upon as an excuse for acquittal by a magistrate not fully alive to the interests of Government in such matters. It is a common experience that witnesses differ in their remembrance of the details of an occurrence after several weeks have elapsed.

For similar reasons it is advisable that there should be no unnecessary delay in any of the steps in dealing with forest offences. There is seldom any good reason why ordinary forest cases should not be finally and absolutely disposed of within two months of the date of detection, even when there has been an offer to compound which bas been refused.

Another point worth attention is the estimation not only of the value of the produce seized but of the damage caused to the forest. An offender may be found removing a bundle of fuel or half a dozen sugarcane props worth a few annas, while he has caused damage to the value of as many rupees in obtaining them. If the case goes to court, as the Magistrate is unaware of any compounding fee fixed by the D F. O. and has only the value of the property actualy seized as a guide, it is likely that the punishment inflicted will be inadequate. For the same reason the occurance report should state invariably in grazing cases whether the area grazed in is open or closed to grazing by the particular description of animal in question. An estimate of damage done by grazing is usually a difficult problem, but if it is possible, as in a growing Coppice coupe, or a nursery or a young plantation, it should be made and noted.

* * *

On page 154 (March issue) quinine is recommended as a remedy for wasp and scorpion stings, but, as the part affected is first to be incised with a sharp implement and the quinine then rubbed in, it seems probable that the remedy is as little desirable as the original injury. Salvolatile (or any form of ammonia) and also vinegar are good remedies and need only be rubbed on to the wound without any painful operation.

* * *

The note on page 214 (June issue) regarding the weight of the fuel loads carried by women in Vizagapatam recalls a curious tragedy that overtook one such woman a few years ago.

These loads are made up in long bundles 8 feet or so long. On one occasion a string of women so laden was moving rapidly homewards; one of its members turned her head so as to bring her bundle at an angle to the line of march; The next behind rammed the displaced bundle with her own. The impact, acting on the great weight, with the leverage gained by striking the end of the bundle, was sufficient to dislocate the bearer's neck and cause her death.

* * *

On page 216 (June issue) it is stated "The African elephant has probably never been tamed". This is not correct. It is true that the African species is far less tractable and less easily tamed and trained than his Indian cousin, but several individuals have actually been trained. I believe that the famous *Jumbo* was an African elephant. I well remember an illustration in a book on natural history (though I cannot just now recall its title) showing side by side an African and an Indian Elephant each with a mahout on his neck. The reproduction was from a photograph and there could be no doubt of its authenticity.

In this connection, the following extract from a book entitled. "From the niger to the Nile" is interesting. The book was written by Lt. Boyd Alexander, the sole survivor of the 3 original participants (one

his own brother) of the Alexander Gosling expedition in 1905—6 that went, mainly by water, up the Niger, across lake Chad and down the Nile.

The passage runs: "For some years past the Belgians have been training young elephants, which are caught in the bush by native hunters, for transport work in the Congo; but as an Elephant connot carry his full load till he is 7 years old the business is a slow one.....at the time of our arrival at Bambiii in April 1906 the number amounted to 28.

The method of capturing them is to shoot the old male (in a herd) and then as the cow goes off with her young, a native jumps on the back of a baby elephant, separating it from the cow and driving it off into the bush."

It seems very probable that the age (7) at which it is stated that an African elephant carries a full load is a slip for seventeen. An Indian Elephant could certainly not carry a full load at a lover age than 18 without serious danger of permanent injury; it does not seem possible that a still larger beast should devolope so much quicker.

* * *

On the same page as the last note is another entitled: "Evidence of intelligence in plants." This is a very misleading title and there seems no evidence given in the note of intelligence but only of a remarkably doveloped response to chemical attaction (*chemotropism*). There would be as good grounds for claiming "intelligence" for the young shoots of climbing plants that seem to seek for a support. The young shoots describe a complete circle, the radius of which is determined by the length of the shoot (*movements of nutation*). But we know that this movement is entirely mechanical and antomatic, and taking place whether there is a possible support within reach or not, and not in any particular direction or towards any particular object.

Such terms as intelligence should be used with caution; misused they are apt to mislead.

The following extract, taken from a report made by Dr. H. Cleghorn, Conservator of forests of the Presidency, under date of 1st May 1858, is interesting from two points of view. Firstly, as showing how early the expansion of the sandal bearing area received attention; and, secondly, as regards methods of suppressing forest crime. It is not in all, or even many, localities that conditions lend themselves to the use of mounted patrols for the purpose.

It is conceivable, however, that platoons of the I. D. F. might be worse employed than in the suppression of forest offences.

"**Sandalwood.** This tree has received much attention in Canara, Coimbatore, Salem and a little in North Arcot. It would appear that its spontaneous growth has increased to a considerable extent; and it seems certain that, with the vigilant supervision of local officers and slight assistance to nature in clearing the heads of young plants, which are often matted down by strong creepers, an addition might accrue to the revenue of these provinces.

From information received from the late assistant Surgeon Drew, I was enabled to communicate to the commissioner of Mysore the existence of large band smugglers in an unfrequented path near the Carkur Pass, who were captured by the Mysore Horse to the number of 78, with the sandalwood tied on their backs."

I cannot close these wandering remarks without heartily congratulating the management of the Magazine on the excellent reproduction of a view of the College and Museum that forms the frontispiece to the September issue.

C. E. C. F.
25—9—1918.

[We welcome these notes and criticisms. Some of them will form suitable matters for discussion at the durbars and Ryot's meetings that are held during the College *tours* eg. Komattyeri & Walliar.

EDITOR.]

Extract from 'NATURE'

"Toxin production in the soil by growing plants."

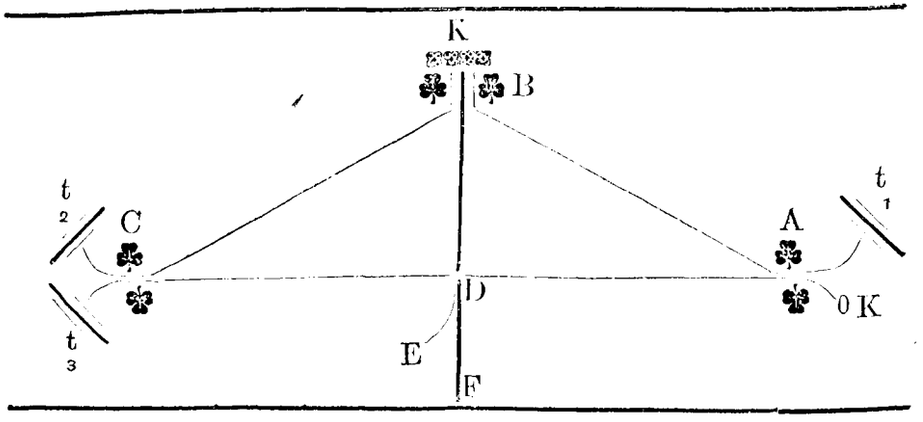
In the 'Annals of Botany' (Vol. XXXI No. C XXII.) Dr. Spencer Pickering gives a summary of his investigations of the effect of one plant on another growing near it. These experiments originated in 1895 in his wellknown observations on the effect of grass on fruit trees. Proceeding from this complex Case to the simplest conditions, conclusive evidence of toxin production in the soil by the growing plant has now been obtained. The deleterious effect of one growing plant on another appears to be a general phenomenon. By means chiefly of pot experiments the following plants have been found susceptible to such influence: Apples, pears, plums, cherries, six kinds of forest trees, tobacco, tomatoes, and two varieties of grasses; while apple seedlings tobacco, tomatoes and 16 varieties of grasses have been found capable of

exercising toxic effects. In no case have negative results been obtained. The magnitude of the effect varies greatly, but the average effect in pot experiments is placed at a reduction of roughly one-half to two-thirds of the normal growth of the plants. The evidence that these detrimental effects are due to toxin production is regarded as conclusive. A plant affects its own kind just as much as any other kind and hence it follows that the toxin formed by any individual plant will affect that individual itself. The practical bearing of these observations in various directions is discussed in the light of experimental results.

The triangle method of laying a curve.

—o—

This method is based mainly on the formula $\frac{C^2}{2R} = P$ in which C = chord, R = radius and P = perpendicular from one end of the chord to the tangent at the other end. By using this formula an isosceles triangle can be constructed (in which each of the equal sides is equal to the chord and the prependicular from the vertex to the base is equal to $\frac{C^2}{2R}$) by means of an instrument which has been devised by me, consisting of 3 deal wood pegs having narrow holes near the top through which some pieces of strong twine have been passed as shown in the figure below exaggerated for the purpose of illustration.



A, B, C pegs. AB=BC=chord. t_1 & t_2 chord reals. t_3 base real. BD=P or $\frac{C^2}{2R}$. E=a piece of fine thread tied to the twine BF at D, so that BD=P. K=knots to prevent slipping through the holes in the pegs A and B.

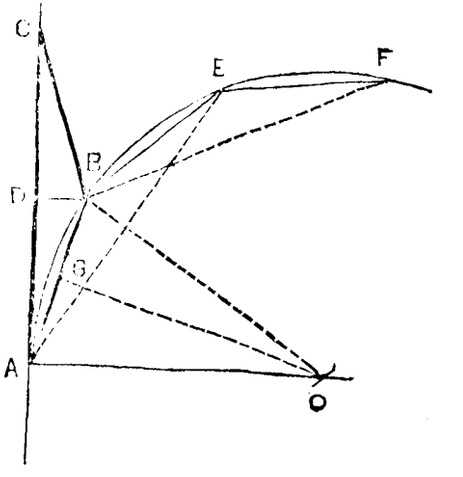
Now let it be required to lay a curve of 25′ radius. First set the instrument in the following manner. Choose any convenient length of chord, say 5 feet. Then, $P=\frac{C^2}{2R}=\frac{25}{50}=\frac{1}{2}'$ or 6″.0. Find the value of P always in inches correct to the first decimal place. Fix the peg A or a level piece of ground and mark AB=5′= BC by winding or unwinding t_1 and t_2. Fix the peg B on the ground and make AD=6″.0. Adjust the base string AC by moving C and by winding or unwinding the real t_3 so that D touches but not cuts the base string. Now fix the peg C. If the setting is accurately done AD must be equal to DC.

Secondly place the the peg A at the starting point of the curve and the peg C along the tangential direction. Stretch the triangle and the peg B will be on the curve. Take out the peg C only and stretch

the triangle so that the peg C is now on the opposite side of AB. The new position of the peg C will be on the curve.

Thirdly take out the peg A and drive in a strong peg in its place. Take out the peg B & put A in its place. Take out C and place B in its place. Stretch the triangle and the peg C will be on the curve. Continue this operation till the required point where the curve should end is reached.

[The theory upon which this method depends is very simple.



(i) Let A B E F be the curve, O its centre, AB the chord, AC tangent at A and B D ⊥ to AC. It is required to prove that BD= $\frac{AB^2}{2AO}$. Draw O G ⊥ to AB and join O A.

In the $\triangle^s$ OAG and ABD

$\because \angle AOG = \angle BAD$ and $\angle OGA = ADB$

$\therefore$ the $\triangle^s$ OAG & ABD are similar, so that $\frac{OA}{AG}=\frac{AB}{BD}$

That is $\frac{OA}{\frac{1}{2}AB} = \frac{AB}{BD}$

$\therefore BD = \frac{AB^2}{2OA}$

(ii) Now, make BC=AB= & BE=AB. Join A E. It is required to prove that the $\triangle^s$ ABC & ABE are congruent.

In the $\triangle^s$ ABC & ABE
$\because$ <BAC = <BAE
<BCA = BEA
& the side AB is common
$\therefore$ the $\triangle^s$ABC & ABE are congruent.

(iii) Make EF = BE & join BF. It is required to prove that the $\triangle^s$ ABE & BEF are congruent.

In the $\triangle^s$ ABE &BEF
$\because$ B E is common
& <BAE = <EBF
& <AEB – <BFE
$\therefore$ The $\triangle^s$ ABE & BEF are congruent.

Thus we find that by constructing the triangle ABC and moving it as explained above, we can get several points on the curve.

The middle string BF may be dispensed with by finding out the length of the string AC in terms of the chord and the radius in the following manner.

We have already proved that $BD = \frac{AB^2}{2AO}$.

$AC = AD = 2\sqrt{AB^2 - BD^2}$

$$2\sqrt{AB^2 - \left(\frac{AB^2}{2AO}\right)^2}$$

$$2\sqrt{\frac{4AO^2 \cdot AB^2 - AB^4}{4AO^2}}$$

$$= \frac{2}{2AO}\sqrt{AB^2 \cdot (4AO^2 - AB^2)}$$

$$= \frac{AB}{AO}\sqrt{(2AO+AB)\cdot(2AO-AB)}$$

$$= \frac{\text{chord}}{\text{radius}}\sqrt{(2\text{ radius} + \text{chord})\cdot(2\text{ radius}-\text{chord})}$$

$$= \frac{C}{R}\sqrt{(2R+C)\cdot(2R-C)}$$

A. Seshagiri Rao.

Occasional Notes.

We congratulate C. B. Chengappa on winning the open 100 yards, quarter, and one mile races (the only events in which the College was eligible to compete) at the Grigg Memorial Sports on August 31st; also K. G. Monnappa 3rd in 100 yards and 2nd in quarter mile, and C. L. Narayana Rao–3rd in 1 mile race.

We also congratulate Junior student K. G. Monnappa on taking 7 wickets for 12 runs against the Agricultural College on September 1st.

* * *

C. H. Ashe (1914—16 division, M. R. H. Hockey and foot-ball colours in 1914) who was given a commission in the I. A. R. O. as second Lieutenant is now a Lieutenant in the Labour corps at Quetta. We wish him every success.

The following students have been awarded Colours :—

1. **Hockey.**
   - Abdul Hamed Khan.
   - C. B. Chengappa.
   - B. S. Chengappa.
   - K. Appayya.
   - T. V. Thayuman
   - Y. Peddalaksmia Naidu.
   - M. P. Subbiah.
   - C. L. Narayana Rao.

2. **Cricket.**
   - A. Seshagiri Rao.
   - E. De Sylva.
   - P. V. Krishna Rao Naidu.

3. **Tennis.**
   - A. Seshagiri Rao.

4. **Athletics.**
   - C. B. Chengappa (for the second time), and
   - J. A. Mulyal.

* * *

Arrangement are now being made to obtain green Blazers with (for 'colours' men) the regulation pockets and binding.

* * *

The Board of Visitors has accepted the generous offer of Mr. Fischer I. F. S. late principal of the College to present a challenge cup for gymnastics, open to the whole college. The Cup was won last June by A. B. Fenn.

* * *

The Tennis courts have been completed. The Courts although they are still very rough have already proved very popular.

* * *

Mr. R. D. Richmond won the Hunt Cup at the Ootacamund Hunt Races in September. Mr. S. Cox I. F. S won this Cup in 1914.

The following forest officers have recently visited the College :—

Messrs. R. M. Williams on (conservator)
R. D. Richmond (Dy. conservator)
C. C. Wilson (Dy. conservator, on leave from Mesopotamia)
R. W. Inder (Dy. conservator.)

* * *

We congratulate S. Cox Esq. I. F. S. on being made a Member of the Order of the British Empire.

* * *

A very attractive model of a Sledge way and turn-table with a loaded sledge has been made at Dehra Dun for the Gass Museum.

* * *

The 'Engineering Park' of the Madras Forest College is being considerably extended and will include a model sledge road in two sections with turn-table, sleeper sledge Derrick, and shears : eventually a wire rope shoot will run from the College roof to a tramway traversing the park. A water shoot will also be constructed near the cistern.

* * *

The following students of the Junior division have been appointed members of the House Committee :—

1. Mulyal
2. Appayya
3. K. P. Chathu Nair
4. T. M. Doraisamy Pillai.

* * *

During 1917—18 about 12,800 persons (excluding M. F. C.

students) visited the museum as against 10,600 in 1916—17 and 5,000 in 1915—16.

* * *

The following additions have been made to the General Library:-

1. 'Report on the Extension of Cinchona cultivation, in India, by Lt. Col. A. T. Graze I. M. S.'

2. 'Catalogue of the Wood specimens exhibited in the Economic section of the Madras Museum'.

3. 'Forest grazing, and the Nellore kancha system'—a paper read by C. E. C. Fischer Esq. I. F. S. at the Indian Science Congress held at Lahore, last January.

4. 'The Madras Engineering College calendar' for 1918—19.—Received from the Principal of that College.

5. 'The life of the Plants' by F & L Duncan.—purchased.
6. A note on some European Sylvicultural systems by R. S.Troup I. F. S.

The following additions have been made to the Students' Library :-

1. "Madras Occasional Verse" } obtained by purchase.
2. "Journal of the Marquis of Hastings" }
3. "Drift wood spars by P. C. Wren." }
4. "Plato's Republic" } presented by
5. "The Mighty Mahseer" } F.Cowley-Brown
6. "Indian Snakes' by Nicholson. }
7. Several copies of a note on some European Sylvicultural systems

by R. S. Troup I. F. S.—this book will be found of great assistance to Senior Students struggling with the uniform Method.

* * *

Forest fires have been observed on the hills North west of the College at the end of september ; we wonder whether any of our readers have knowledge of the occurrence of forest fires at later date than this in any previous year.

* * *

Students' gardens have been started at the hostels.

* * *

The provision and fuel stores opened near the West Havildar's lodge has proved very successful ; the turn-over is already about Rs. 1500/ per month. The prices are controlled by the principal in consultation with the House Tutor and the House Committee. Standard weights and measures are being furnished to the Provision contractor: no other may be used.

* * *

Cattle are now prohibited on the Forest College estate to the marked welfare of the plants and at the same time to the advantage of the Students' health and comfort as milk etc. is no longer supplied by the College servants, but comes from the Agricultural College dairy direct.

* * *

A temporary reading room has been arranged for in the hostels.

* * *

It has been decided by the Board of visitors that in future a garden party or similar social function shall be held in connection with

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the Prize day. Arrangements will be made to enable past students, to be present.

* * *

It is proposed to convert at an early date the 25 acres immediately surrounding the main College building and Museum into an ornamental park.

* * *

During Head quarter terms each division now puts in from 5 to 6 hours work per week field work in the Demonstration Forest or Engineering park.

* * *

The joint dispensary was opened in July, the College Sub Assistant surgeon being transferred to its charge and placed under the D. M. S. O.

* * *

In response to a special appeal every student of the Madras Forest College with the exception of one junior who holds a bond in the 1917 loan has invested Rs. 50/- or 100/- in one War loan. The College is to be congratulated on its realisation of the duties of citizenship.

* * *

Students are recommended to study books on Athletics to be found in the students' library—eg:

Muscle building
How to Sprint
Running & Cross country running

Hockey
Foot-ball etc. etc.

* * * * *

BIRTH

ASHE—On the 18th November, 1918, at Baraca, Kilpauk, to Lieut, & Mrs. C. H. Ashe, a daughter.

* * * * *

We regret to have to record the death of V. J. Ramalingam M. R. H. [1915—1917] on the 21st October 1918. He obtained the M. R. H. certificate and bore an excellent name at the College.

———o———

Miscellanea.

The attention of students is invited to "Varieties of Viceregal life" by Sir W. Denison, which has been presented to the Students' Library.

The author remarks with regard to the Eucalyptus in Tasmania: "The trees that *I saw* measured were from 200 to 300 years old, judging from the annual rings, and the timber of the Blue gum is as good as can be found in the world, I believe, when properly seasoned".

It is probable that the poor reputation of Eucalyptus timber in India is due to its being grown in dense stocking, resulting in an abnormal height increment for 70 years, with the result that the cell tissue is unduly elongated and consequently thin-walled. Hence the Indian-grown Eucalyptus timber fails in durability and strength.

The experiments that the Nilgiri District Forest Officer is now undertaking will be of great interest eventually. The object is to

ascertain whether timber cut from the Eucalyptus Globulus in Brooklands, where the stocking is very open and the trees have consequently a great girth but a low height, will after careful seasoning respond to severe tests for transverse and shearing strength.

* * *

The total import of matches into India for the year ending 31—3—1917 was valued at Rs. 115,69,771 or Rs. 31,700 per dium.

* * *

A most informative article on Soil aeration appears in the 'Indian Forester' for May 1918.

The folly of watering without soil aeration in nurseries is clearly demonstrated—also the probability of aeration being the real antidote to toxicity.

* * *

The percentage of moisture in 'air-dry' timber varies as the climate. In Europe and North America 'air-dry' timber contains 15—30 % moisture; in dry parts of India in the hot weather, 8–15 %; in Burma, and the West coast of India 18—25 %; in Dehra under 15%.

* * *

WATCH AS A COMPASS.

Do you know that your watch is a compass, or at any rate, as good as one, if you only knew how to use it? If you do not, learn now. You want to find the North.

Well, point the hour hand to the Sun, and the South is exactly half-way between the hour hand and the figure XII on the dial.

For instance, suppose it is four O'clock. Point the hand indicating that hour to the Sun, and half way between it and the figure XII is figure II. That will be opposite the South.

Just the same if it is eight O'clock, the figure X is the South. Look to the North and your right hand is the east, your left hand the West. Very simple, is it not? But like the simple things, how many know it?

"*Madras Times*"

* * *

Calcium Carbonate heated, becomes Calcium Oxide—quick lime. Calcium Oxide subjected to water becomes Calcium hydroxide—slaked lime, in the form of a fine powder.

Slaked lime if exposed on soil gradually returns to the form of Calcium Carbonate.

Slaked lime is a more suitable form of Manure than Calcium Carbonate.

* * *

1. Cubic foot of Water weights 100 oz.
   = 6¼ gallons
   = 62½ lbs.
   1 ton = 224 gallons
   1 gallon = 10 lbs.
   = 4 Cubic foot.
   25
   1 " rain per acre ... ... = 22,400 gallons
   = 100 tons.

Serial No.	Contribution.	Contibutor.
2	A wild dog skin with head mounted—on loan.	C. C. Wilson Esq, I. F. S.
3	An instance of protective Mimicry.	Mr. R. B. Salisbury.
4	A Model of a timber slide with sledge and turn-table.	R. S. Pearson Esq, I. F. S. Imperial Forest Economist. Dehra.
5	A Model of a brake for timber slide.	do.
6	A photograph of the 'Madras Forest Research Establishment 1917.'	Mr. R. Jaganadham.
7	Six photographs of plantations.	C. F. C. Fischer Esq, I. F. S.
8	Loranthus on Eucalyptus.	C. N. Narasimha Achari Student 1917—19 division.
9	One Elephant foot (on loan).	C. E. C. Fischer Esq, I. F. S.
10	A Specimen showing abnormal germination of two Sandal seedlings from one seed.	Rao Sahib K. R. Venkataramanier Avl.
11	3 Photographs of Models and 8 diagrams of Sylvicultural methods.	E. Marsden Esq I.F.S. Imperial Sylviculturist Dehra.
12	4 Photographs taken at the recent opening Ceremony of "The Gillman road"	M. R. Ry. K. A. Chengappah Avl.
13	6 Sample barks.	Mr. S. Chidambaram R. O. Chingleput.

Serial No.	Contribution.	Contibutor.
14	6 long panels.	Mr. K. Venkatramanan R. O. Satyamangalam.
15	A section of a bore at komattiyeri.	F. L. C Cowley Brown Esq, I. F. S.
16	A stick insect.	C. N. Narasimhachari Student M. F. C. (1917—19.)

The Inter-divisional Hockey Match for the 'Cowley-Brown cup.'

On 8th November 1918, this match was played on the College Ground with Mr. Crothers as the umpire. The Match was very exciting from beginning to end for both teams played with a keenness and determination to win it and thus to show how much they appreciated the cup. The Principal, Mr. Tireman (Dy cons. of Forests Coorg) and all our Instructors were present. The captain Abdul Hamidkhan was absent on court business and the seniors had to play without him. During the 1st half hour the juniors scored 2 goals. But during the latter part of the 2nd half, the seniors put in 2 goals after a hot struggle. Thus the Match ended in a draw of 2 goals all just as was the case in the previous years, 1916 and 1917.

The match was replayed on the 10th. This game was even more interesting than the last one. It was very exciting and perhaps better play was never seen in any previous contest for the cup. The juniors had a narrow victory by 4 goals to one. The Principal, the

∴ 1 ″ rain on the College athletic ground ... ... = 22400 × 5 or 112,000 gallons.

∴ $\frac{1}{4}$ ″ = 28000 gals.
= 125 tons.

The College listern holds 7200 gals.
= 325 tons.

1. Kerosine oil tin holds 4 gals.

1 tin Kerosine oil should raise 10′ water from well to Cistern where it *would* form 5′ depth (total height of cistern = 4′)

* * *

All places on the same Parallel of latitude have the same length of day & night at the same time of the year, *i. e.*, same altitude of the Sun.

∴ If we take altitude of Sun at 12 hrs. we can fix latitude for the almanack.

All places on the same meridian of longitude have noon (or Sun attains its zenith) at the same moment.

∴ If we note actual time of Sun's zenith we can by comparing this hour with Greenwich time, fix longitude East or West of Greenwich.

It takes 4′ for each degree of longitude to roll from East to West.

* * *

It is said that in 1917 the Ford Company was turning out 750,000 cars per annum; i. e., $1\frac{1}{2}$ cars per minute night and day, throughout the year.

On page 152 of Vol. II No. 3 of the Magazine the quantity of fuel required for the production of sandal oil is inaccurately stated. The correct figures (since pointed out by Rao Sahib K. R. Venkatramanier Avl. E. D. C.) are :—

7 tons of wood fuel distil 100 lbs oil (value Rs. 3700) from one ton Sandal wood (value Rs. 1700.)

* * *

We understand that a project to form a forest park at Komattiyeri on the Javadi hills is under consideration with the objective of providing both a recreation ground for the Malayalis and an experimental area for technical purposes. We would suggest that the opportunity be taken to combine this excellent proposal with that of acquiring a site for the College camp and that the whole area be known as the 'Lushington Park'. No officer has done more than Mr. P. M. Lushington to open up the Javadis, to ameliorate the condition of the Malayalis and to encourage the development of Sandal research on those hills. Now that Mr. Lushington has retired from the Service it would be but fitting to take this opportunity of commemorating his valuable work in the locality.

——o——

List of contributions to the Gass Forest Museum.

Serial No.	Contribution.	Contributor.
1	Leaves and fruits of : (a) Pœciloneuron indicum. (b) Calophyllum elatum.	M. R. Ry. J. Sadasiva Ayyar Avl.

institutor of the cup, then made a short and very instructive speech pointing out to us the object with which it was instituted. It is not only to develop the spirit to play hockey in us and also to create in the students a feeling of brotherhood among those of the same year. The students must not only be proud of the College in which they are trained but also of the year during which they study. He observed that the game was a well fought out and as keen a one as he ever saw. He felt sorry that the seniors had not their goal keeper Y. P. Lakshmayya who was absent owing to illness. He commended the juniors upon their victory though a narrow one. He advised us all to keep up the tradition of the college and to set a good example to the students to come from other parts of India and to prove that Madras is not backward to other places. He then called upon Mr. Dawson to give away the cup to the juniors. Amidst loud cheers, Appayya, the vice captain received it from the hands of Mr. Dawson.

It is interesting to note that the juniors won the cup as has also been the case in every previous year.

The happy function came to a close amidst deafening cheers.

Athletic Records.

The following are the *Records* for the various events in the College sports. They are of interest as facilitating comparison of the present standard of the Athletics in the College with the past and with

[illegible] in other institutions. Record events of this year are marked with a cross.

	Event.	Record.	Year.	Name.
1	100 yards Race.	11 1/5 seconds	1918 +	J.A. Mulyal
2	100 yards race for past students ...	12 2/5 „	1917	C.S. Nanjappa
3	¼ Mile flat race ...	58 seconds	1916	U.K. Thimmayya
4	½ Mile flat race ...	2 mins. 23 sec.	1914	Y.S. Chinnigarayan
5	1 Mile flat race ...	5 min. 37 3/5„	1916	C.S. Nanjappa
6	High Jump ...	4 feet 10 ins.	1918 +	J.A. Mulyal
7	Long Jump ...	17 feet 4½ ins	1917	P.K. Paramaswran Pillai.
8	120 yds. Hurdles Race.	18 4/5 seconds	1918 +	J.A. Mulyal
9	½mile invitation race ...	2 m. & 15 2/5 „	1916	W. Armstead; Stane's High School
10	Throwing the Cricket ball ...	94yds; 2 feet	1917	C.B. Chengappa.

The table below shows the marks obtained by the [illegible] *Championship* c[illegible] in the different years and thus their relative merits.

Richmond Championship Cup.

Year.	No. of marks won.	Name of Student.
1913	14 marks.	R. E. Lemos
1914	17 marks.	J. A. P. D. Cruz
1915	19 marks.	C. S. Nanjappa
1916	26 marks.	C. S. Nanjappa
1917	21 marks.	C. B. Chengappah
1918	20 marks.	C. B. Chengappah

Coimbatore,
10—11—18

T. D. PONNIAH,
Secretary & Treasurer
M. F. C. A. Club.

Gazette Notifications.

JULY 30TH 1918.

Consequent on the death of P. Lakshmana Chetti, Ranger, fourth grade, Northern Circle, the following promotions are made in the class of Rangers with effect from 4th June 1918.

(1) M. R. Ry. A Swami Kutti, from fourth grade, *sub-pro-tem*, to fourth grade permanent.

(2) Mr. T. T. Ansep, from fifth grade, permanent to fourth grade, *sub-pro-tem.*

(3) Mr. H. Mac Bride, from fifth grade, *sub-pro-tem*, to fifth grade, permanent.

(4) M. R. Ry. K. C. Joseph, from sixth grade, permanent, to fifth grade, *sub-Pro-tem.*

(1) M. R. Ry. A. Ranganayakulu Nayudu, Ranger, fourth grade, now doing duty as the Senior Instructor, at the Vernacular Training School of 1916 in West Caddapah district is, on the close of the School, posted to the charge of Balapalli range, South Caddapah district.

(2) M. R. Ry. S. Chinnadorai Pillai, Ranger, third grade, in charge of Balapalle range, South Caddapah district, is, on relief by No. (1), granted three months privelege leave.

Mr. J. D. David, Ranger, second grade, *sub-Pro-tem*, from Sirvel range, Kurnool South, to kukuluba range, Ganjam.

M. R. Ry. H. Rama Rao, Ranger, second grade *sub-Pro-tem*, from Marrigudem range, Upper Godavari, to Sirvel range, Kurnool South.

M. R. Ry. N. Vijiarangam, Ranger, second grade, from Sivapuram range, Kurnool West, to Marrigudem range, Upper Godavari, To proceed first.

M. R. Ry. B. Punnayya, Ranger, fifth grade, from kukuluba range, Ganjam, to Gundlakumma range, Kurnool South.

M. R. Ry. R Virasami Nayudu, Ranger, fifth grade, on expiry of the leave granted to him, i. e., on 4th August 1918, to Sivapuram range, Kurnool West.

M. R. Ry. S. M. Krishnaswami Ayyar, Ranger, fourth grade, Tinnevelly range, is granted extension of leave one month on medical certificate in continuation of the leave granted to him in this office S. O. No. dated 26th May 1918.

(1) Mr. B. N. Salisbury, Ranger, third grade, is, at the close of the session of the Vernacular Training School, posted to the charge of Dharmapuri range, North Salem division.

(2) M. R. Ry. C. Rajagopal Nayudu, Ranger, second grade on relief by No. (1), is, posted to the charge of Harur range, South Salem division.

(5) Saiyyid Munavar Sahib, Ranger, sixth grade, on relief by No. (2) is, posted to Salem East range, South Salem to work under the orders of the Range Officer.

(4) A. P. Meekoy, acting Ranger, sixth grade, will, at the close of the Vernacular Training School, revert to Deputy Ranger, first grade, and is posted to West Vellore division to work under the orders of the District Forest officer.

M. R. Ry. S. Ramanjum Seshu, Deputy Ranger, first grade and acting Ranger sixth grade, is confirmed as Ranger, sixth grade, with effect from 1st July 1918.

W. A. Mekkeri Sahib, Ranger, fourth grade, is, on return from leave, posted to South Salem division for special duty under the D. F. O.

AUGUST 6TH 1918.

M. R. Ry. T. K. Ramaswami Ayyar, Ranger, second grade *Sub-protem* North Cuddapa District, is reverted to his permanent post of Ranger in the third grade with effect from 24th July 1918.

M. R. Ry T. K. Ramaswami Iyer, Ranger, second grade, *Sub-protem* in charge of Sidhout range, North Cuddappa District is granted combined leave for four months (4 weeks previlege leave and 3 months and 2 day's leave on medical certificate on half pay) with effect from 24th May 1918.

M. R. Ry. T. M. Duraiswamy Pillai, acting Probationary Ranger, sixth grade will be considered to have been on special duty in the Nellore District after his relief form range charge from 15th to 17th July 1918 both days inclusive.

(1) M. R. Ry. C. M. Kunhi Raman Nair, Ranger, Fourth grade in charge of Rajampet range, South Cuddappah District is granted previlege leave for 6 weeks with effect from date of relief.

(2) Mahammad Abdul Hafiz Sahib Bahadur, probationary Extra Assistant Conservator, attached to South Cuddappah District is posted to the charge of Rajampet Range of the same District as a temporary measure, vice No. (1) on leave.

M. R. Ry. V. P. Narayana Menon Ranger, Fourth grade in charge of Badvel Range North Cuddappah District will be considered to have been in additional charge of Porumamilla Range of the same District during the period from 20th May 1918 afternoon to 14th July 1918 afternoon both days inclusive.

M. R. Ry. A. Sidda Pillai Ranger Fifth grade on relief of Porumamlla Range charge North Cuddappah District by No. (1) is posted to Sidhout Range charge of the same district *vice* Ranger M. R. Ry. T. K. Ramaswami Ayyar granted four months combined leave from 23rd May 1918 afternoon.

P. A. Krishnaswami Mudaliyar Ranger Sixth grade is on return from leave posted to the charge of cumbum Range, Madura District.

M. R. Ry. S. Venkitaswami Naidu, Temporary Ranger, Sixth grade on working plans duty, is granted extension of previlege leave for fifteen days in continuation of one month's previlege leave granted to him from 3rd July 1918—(vide this office No. 1245 dated 15th July 1918.)

The following appointments of Rangers are ordered with effect from 1st July 1918.

(1) J. S. Rowland, Deputy Ranger, South Malabar, to act as Ranger, Sixth grade *sub-pro-tem.*

(2) A. B. Fenn Deputy Ranger, Second grade, North Coimbatore to act as Ranger, Sixth grade, *sub-pro-tem.*

(3) C. Vasu Deputy Ranger, Second grade, North Malabar. to act as Ranger Sixth grade *sub-pro-tem.*

(4) T. Kondathu Goundan, Deputy Ranger, Second grade, the Nilgiris to act as Rangers Sixth grade *sub-pro-tem.*

On handing over charge of the amans of the Vernacular Training School at Coimbatore, M. R. Ry. C. Naayanan Ranger, third grade will return to his charge of Kollagal Range.

August 20th 1918.

Mr. W. C. Hart. Extra Assistant Conservator of F[illegible] granted privilege leave for one month with effect from the 18th July '13.

Mr. W. C. Hart, E. A. C. of Forests, is transferred from the Western Circle to the Central circle.

The following candidate is declared to have passed the Forest departmental examination provided for in section 68 of the Madras Forest Code held on 31st July 1918 and the rest have failed :—

CODE AND ACCOUNT.

P. Subrahmanyam, fourth clerk, District Forest Office, West-

CUDDAPAH — SECOND CLASS.

In modification of this office S. O. No. 58, dated 1st May 1918, the following postings are ordered.

(1) M. R. Ry. G. Devanayagam Nayudu, Ranger, sixth grade, is posted for special duty in West Vellore Division for delimitation work in the Javadis.

(2) Saiyid Vagi-ud-din Sibgat-ul-lah Sahib, acting Ranger, sixth grade, to continue in charge of Alangayam Range.

Under art. 260, C. S. R. M. R. Ry. B. Sambamurti Ayyar, Ranger, sixth grade, Mudumalai range, Nilgiri district, is granted one month's privilege leave from 1st. September 1918.

(2) T. Kondathu Goundan, Ranger sixth grade, *sub-pro-tem* Mudumalai, will relieve No. (1) and be in charge of the range for the period of the leave.

The following candidates have passed the Departmental test under section 58 of the Forest code held in July 1918.

FOREST CODE & ACCOUNTS.

R. Vasudeva Rao, Acting head clerk, District Forest Office, Mangalore North, first class.

V. Margabundu Ayyar, Range clerk, Tirupathur, West Vellore division — second class.

BOARD'S STANDING ORDERS.

(1) G. R. Venkateswara Ayyar, acting second clerk District Forest office, South Coimbatore, first class.

(2) P. Seshadri Ayyangar, second clerk, District Forest office, The Nilgiris, second class.

August 27th 1918.

Mr. W. C. Hart, Extra Assistant Conservator of Forests transferred to Central circle, is posted to Chittor district to work under the orders of the District Forest officer in connection with the preparation of working plans.

Mr. W. S. Fernandez, Ranger, fourth grade, Ganjam, is granted leave on medical certificate for One month and eighteen days with effect from the afternoon of 25th April 1918 under art. 336 of the C. S. R.

SEPTEMBER 3RD 1918.

Mr D. E. Lewin, Ranger, sixth grade, in charge of Vempalle Range, West Cuddapah district, is transferred to Muddanoor Range charge of the same district — (to proceed forthwith.)

M. R. Ry. R. Krishnaswamy Ayyar, Probationary Ranger, sixth grade, in charge of Muddanoor range, West Cuddappah district, is on the relief of the range charge by No. 1, posted to the charge of Vempalle range of the same district.

M. R. Ry. K. L. Muniswamy Ayyar, Ranger, second grade, on return from leave, is posted to the charge of Ambur range.

M. R. Ry. R. Jayaraman, Ranger, sixth grade, supernumerary, is posted to the charge of Arcot range till M. R. Ry. V. D. Ramalingam, ranger fifth grade, *sub-pro-tem*, returns from leave.

M. R. Ry. V. D. Ramalingam Pillai, Ranger, fifth grade, [illegible], is granted combined leave for three mohtns, i. e., privilege leave for two months and twenty six days and leave on medical certificate for four days from 5th August 1918.

P. A. Krishnasawmi Mudaliar, Ranger, sixth grade, Tinnevelly district is granted two week's extension of privilege leave in continuation of one months privilege leave granted to him from 28th July 1918 in Tinnevelly D. F. O's. S. O. No. 213 dated 15th July 1918.

The leave on medical certificate, under art. 336 C. S. R. for 3 months granted to M. R. Ry. Krishnan Nayar, Ranger, fourth grade, The Nilgiris in this office S. O. Nos. 48 and 104 of 1918 dated 15th March and 3rd July 1918 respectively is further extended by three months and twenty days.

September 10th 18.

M. R. Ry. P. Dhananjaya Rao, Ranger, sixth grade in charge of Kalyandrug range, Anantapur district is posted to the charge of Bukkapatnam range of the same district.

M. R. Ry. B. V. Vaidiswara Ayyar, Ranger, sixth grade, in charge of Bukkapatnam range, Anantapur district, is, on relief of the range charge by No. (1) transferred to the charge of kalyandrug range of the same district.

In this office S. O. No. 141 of 1918 dated 26th August 1918, regarding grant of medical leave to Ranger Krishnan Nayar, Nilgiri division *for* "extended by three months and twenty days" *read* "extended by five months and thirteen days up to 22nd October inclusive."

September 17th 1918.

Under articles 233, 260 and 316 of the C. S. R., Mr. J. S Scot, D. F. O., North Salem, is granted combined privilege leave and special leave on urgent private affairs for two months with effect from the date of relief.

M. R. Ry. Rai Sahib E. C. M. Mascarenhas, D. F. O. South Salem, to hold charge of North Salem, in addition to his own duties.

Mr. G. C. Robinson, working plans officer, Southern Circle, to be D. F. O., South Malabar from or after 1st December 1918.

M. R. Ry. E. V. Padmanabha Pillai, D. F. O., Cuddapah west, on return from leave, to be D. F. O. Chittoor.

(The posting of M. R. Ry. E. V. Padmanabha Pillai to Kollegal ordered in notification No. 276, dated 1st June 1918, is cancelled.)

M. R. Ry. T. K. Ramasawmi Ayyar, Ranger, third grade, on return from leave, is posted to the charge of Kadiri range, Anantapur district.

M. R. Ry. R. Alagiriswami Nayudu, Ranger, fifth grade, in charge of Kadiri range, Anantapur district, on relief by No. (1), is posted to the charge of Vontimitta range west Cuddapah district.

S. M. Razvi Sahib, Ranger, fifth grade, in charge of Vontimitta range, west Cuddapah district, on relief by No. (2), is posted to Chingleput district for the charge of the new Sriperumbudur range, which is to be formed shortly.

In modification of this office, S. O. No. 107, dated 27th July 1918, M. R. Ry. T. K. Ramaswami Ayyar, Ranger, second grade *sub-pro-tem*, in charge of Sidhout range, North Cuddapah district, is granted combined leave for four months with effect from 24th May 1918.

(1) M. R. Ry. S. Sundaravaradhachari, Ranger, fifth grade, is, on return from leave, posted to Srivilliputhur range.

(2) M. R. Ry. P. A. Krishnaswami Mudaliyar, is on return from leave posted to do duty under the D. F. O. west Vellore.

(3) A. K. Anantharama Ayyar, Deputy Ranger, second grade, on relief by No. (1) is posted to do duty under the D. F. O. Tinnevelly.

September 24th 1918.

Mr. R. F. Coleco, first grade Ranger in coorg, is appointed as E. A. C. of Forests in the Madras Presidency and his services are placed at the disposal of the Honourable the Chief Commissioner of Coorg with effect from the date of his entering upon his new duties.

Mr. R. F. Madan, D. F. O., west Kurnool division, is granted privilege leave for one month with effect from 17th August 1918.

Mr. G. W. Thompson, D. F. O., South Kurnool division will hold charge of the west kurnool division, in addition to his own duties during the absence on leave of Mr. Madan or until further orders.

Under art. 260 of the C. S. R., B. Guiam Dustagir, Acting

ranger, sixth grade, Kurnool South, is granted privilege leave for two months with effect from date of relief.

M. R. Ry. N. K. Sarma, Ranger, fourth grade, from Ganjam to Golgonda range, Vizagapatam.

M. R. Ry. T. Srinivasachari, Ranger, fifth grade, from Vizagapatam to Rachakonda range, Kurnool East.

The following probationary and supernumerary Rengers, sixth grade, are confirmed as Rangers, sixth grade, with effect from 1st July 1918.

(1) M. R. Ry. G. N. Subba Rao, Probationary Ranger.

(2) M. R. Ry. M. R. Duraisawmi Ayyar, Supernumerary Ranger.

(3) M. R. Ry. S. M. Srinivasagam Pillai, Supernumerary Ranger.

October 1st 1918.

M. R. Ry. P. Venkataramanan Avergal D. F. O. Upper Godaveri, is granted privilege leave for one month with effect from 3rd September 1918.

Mr. F. A. Seager, D. F. O. Lower Godaveri will hold charge of the Upper Godaveri division in addition to his own duties during the absence on privilege leave of M. R. Ry. P. Venkataramanan or until further orders.

M. R. Ry. J. Ramalingam, Supernumerary ranger, Sixth grade, South Salem, is granted privilege leave on medical certificate for three months from 1st August 1918.

October 8th 1918.

Under article 260 of the C. S. R. Mr. H. F. A. Wood D. F. O. S. Coimbatore is granted privilege leave for 6 weeks with effect from date of relief.

Mr. H. F. A. Wood, D. F. O. (on leave) to act as Conservator of Forests, Southern circle, vice Mr. P. M. Lushington retired. He should join his appointment forthwith.

Muhammad Habib-ul-lah Sahib Bahadur, E. A. C. to be D.F.O. S. Coimbatore vice Mr. H. F. A. Wood granted leave.

Mr. F.A. Marshall, Temporary Forest Engineer, is granted privilege leave for three weeks with effect from date of relief.

October 15th 1918.

Under article 260 of C. S. R. Mr. F. X. Mascarenhas Special Veterinary inspector of the Forest department is granted privilege leave for two months and 13 days with effect from the 10th August 1918.

Mr. F. R. Madan D. F. O. W. Kurnool to be in charge of the E. Kurnool division in addition to his own duties.

M. R. Ry. S. D. Devadoss Pillal Special Veterinary assistant inspector of the Forest department, to act as Special Veterinary inspector with effect from 10th August 1918 during the absence of Mr. F. X. Mascarenhas on privilege leave.

Mr. D. A. Starcey E. A. C., on leave, is recalled to duty and posted to assist Mr. F. R. Madan D. F. O. W. Kurnool division.

M. R. Ry. K. Gajaraja Mudaliar avl. is on relief as D. F. O. E. Kurnool division posted to work under the D. F. O. Ganjam.

The six weeks' privilege leave granted from 23rd August 1918 to M. R. Ry. C. M. Kunhiraman Nair, Ranger, IV grade in charge of Rajampet range in extended by 19 days. The existing arrangement to continue.

October 22nd 1918.

M. R. Ry. A. R. Narasimha Ayyangar Avl., Muhammad Abdul, Hafiz Sahib Bahadur, and Mr. Roland Mitchell are confirmed as Extra Assistant Conservators of Forests with effect from 26th October 1916, 25th July 1918, and 26th July 1918 respectively.

The unexpired portion of the privilege leave for one month granted to Mr. F. R. Madan D. F. O. W. Kurnool, viz, 9th to 16th September, is cancelled.

Mr. G. C. Robinson, Assistant Conservator of Forests, W. Circle, is granted privilege leave for one month from or after 21st October 1918.

M. R. Ry. M. R. Sundram Ayyar avl. E. A. C. is posted to W. Cuddapah, to work on special duty in conjunction with the D. F. O. in connection with the preparation of Working Plans for the Red Sanders Timber Improvement Working circles.

S. M. Razwi Sahib, Ranger V grade on relief of Vontimitta range charge, W. Cuddapah dt. is posted to the charge of Sathiavedu range, chingleput dt.

M. R. Ry. N. C. Mahadevan pillai Ranger IV grade, in charge of Sathiavedu range, on relief by No. (1) is posted to the charge of the new Sriperumbudur range of the same district.

(1) M. R. Ry. K. R. Viswanatha Ayyar Ranger, IV grade in charge of Satenapalle range, Guntur district, is granted privilege leave for 2 months and ten days with effect from 9th October 1918, the date of handing over charge to M. R. Ry. B. K. Krishna Rao, Ranger IV grade in charge of Vinukonda range of the same district as a temporary measure.

(2) Mr. T. John acting ranger VI grade on probation working under the orders of the D. F. O. Chingleput dt. is posted to the charge of Satenapalle range Guntur dt. vice No. (1) on leave.

S. Venkatasami Naidu, Dy. Ranger I grade and acting ranger VI grade is confirmed as ranger VI grade with effect from 1st July '18.

—o—

Advertisements.

* The following timbers are still unrepresented by long or short panels in the Glass Forest Museum. The Principal would be grateful for any contributions towards rectifying the deficiencies: the dimensions of long panels should be, *roughly*, 3″ thick about 6′ long and as broad as available: and of short panels 1″ × 2′ × 1′

No.	Botanical Name.		No. required Long panel.	No. required Short panel.
1	* Dillenia indica	...	1	0
2	Dillenia pentagyna	...	1	0
3	Hydnocarpus Wightiana	...	1	1
4	Poeciloneuron pauciflorun	...	1	1
5	Vateria indica	...	1	0
6	Eriodendrun anfractuosum	...	1	1

No.	Botanical Name.	No. required. Long panel.	No. required. Short panel.
7	Sterculia foetida ...	1	1
8	Sterculia villosa ...	1	0
9	Sterculia guttata ...	1	0
10	Heritiera papilio ...	0	1
11	Helecteres Isora ...	1	1
12	Grewia tiliaefolia ...	1	0
13	Grewia asiatica ...	0	1
14	Erythroxylon monogynum ...	1	0
15	Canarium strictun ...	1	1
16	Ximenia Americana ...	1	1
17	Mangifera indica ...	1	0
18	Dalbergia paniculata ...	1	1
19	Pterocarpus Santalinus ...	1	0
20	Hardwickia pinnata ...	1	1
21	Tamarindus indica ...	1	0
22	Acrocarpus fraxinifolius ...	1	0
23	Acacia catechu ...	1	0
24	Acacia sundra ...	1	0
25	Acacia dealbata ...	1	1
26	Albizzia procera ...	1	1
27	Albizzia stipulata ...	1	0
28	Carallia integerrima ...	0	1
29	Terminalia belerica ...	1	1
30	Terminalia chebula ...	1	0
31	Lagerstrœmia lanceolata ...	0	1
32	Tetrameles nudiflora ...	0	1

No.	Botanical Name.	No. required. Long panel.	No. required. Short panel.
33	Morinda citrifolia ...	1	0
34	Bassia latifolia ...	0	1
35	Bassia longifolia ...	0	1
36	Mimusops hexandra ...	1	1
37	Diospyros montana ...	1	0
38	Diospyros embryopteris ...	1	0
39	Diospyros tomentosa ...	1	1
40	Diospyros melanoxylon ...	1	0
41	Diospyros paniculata ...	1	1
42	Holarrhena antidysenterica ...	1	1
43	Wrightia tinctoria ...	1	0
44	Alstonia scholaris ...	1	1
45	Cordia Rothii ...	1	0
46	Stereospermum chelonoides ...	1	0
47	Premna tomentosa ...	1	0
48	Gmelina arborea ...	1	0
49	Gmelina asiatica ...	1	1
50	Vitex altissima ...	1	0
51	Myristica malabarica ...	1	1
52	Cinnamomum iners ...	1	0
53	Cinnamomum zeylanicum ...	1	0
54	Alseodaphne grandis ...	1	0
55	Litsaea zeylanica ...	1	0
56	Machilus macrantha ...	0	1
57	Glochidion nilghirensis ...	0	1
58	Bischofia javanica ...	1	0

	Botanical Name.	No. required. Long panel.	No. required. Short panel.
59	Givotia rottleriformis ...	1	0
60	Mallotus philippinensis ...	1	1
61	Cleistanthus collinus ...	0	1
62	Aleurites moluccana ...	1	0
63	Ficus bengalensis ...	1	0
64	Ficus tomentosa ...	1	1
65	Aglaia Roxburghiana ...	1	1
66	Aquilaria Agallocha ...	1	1
67	Berrya Ammonilla (Trincomali wood)	1	1
[illegible]	Cedrus Deodara (Deodari) ...	1	1
[illegible]	Cynometra Ramiflora ...	1	1
[illegible]	Dalbergia lanceolaria ...	1	1
[illegible]	Dalbergia sissoo ...	1	1
[illegible]	Elaeodendron glaucum ...	1	1
[illegible]	Guazuma tomentosa ...	1	1
[illegible]	Pithecolobium bigeminum ...	1	1
[illegible]	Schrebera swietenoides ...	1	1

13—8—18.

[N. B. As numbers 11, 12, 17, 18, 21, 34, 36, 37, have since received, they will not be required.]

3—12—18.

Advertisement for Indian Forester.

The following volumes and numbers of the Indian Forester are wanting to the Library of the Madras Forest College. The undersigned will by glad to receive any of the above as a gift or on purchase.

Apply to: PRINCIPAL,
Madras Forest College,
Lawley Road Post Office,
Coimbatore: South India.

INDIAN FORESTER.

Volume	II	1876—77
,,	III	1877—78
,,	XXX	1904 No. 11—issue for November.

The following numbers of the Indian Forester are required for the STUDENTS' Library.

The Principal will be glad to receive any that officers can spare.

1. Volume 1, 2 and 3 for the years 1875—76, 1876–77 and 1877–78.
2. Volume 6 for the year 1880—81.
3. Volume 13 for the year 1887—March and April numbers.
4. Volume 14 to 18 for the years 1888, 1889, 1890, 1891 and 1892.
5. Volume 19 for the year 1893—February, June and November numbers.
6. Volume 20 for the year 1894—January, February, March and April to December.
7. Volumes 21, 22, 23 and 24 for the years 1895, 1896, 1897 & 1898.
8. Volume 25 for the year 1899.
9. Volume 26 for the year 1900—August number.
10. Volume 27 for the year 1901—March number.
11. Volume 29 for the year 1903—February number

12. Volume 34 for the year 1908—July number.
13. Volume 36 for the year 1910—August number.
14. Volume 38 for the year 1912—January, March, October and December Nos.
15. Volume 39 for the year 1913—January, April, September and October Nos.
16. Volume 40 for the year 1914—June number.
17. Volume 41 for the year 1915—April and September numbers.
18. Volume 42 for the year 1916—May, June, November and December numbers.
19. Volume 43 for the year 1917—January, February, April, November and December numbers.

* * *

WANTED for the Library a copy (mounted if possible) of the June 1916 College Group. Rs. 2—4—0 will be paid for it.

Madras Forest College, Coimbatore. Dated 31st October 1918.

F. COWLEY-BROWN,

Principal.

The Madras Forest College Magazine.

Vol. III. MARCH, 1919. No. 3.

CONTENTS.

Committee of Management.

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THE

Madras Forest College Magazine.

Published Quarterly.

Vol. III. March 1919. No. 3.

Ourselves.

The Madras Forest College, has lately had the honour of being visited by the Inspector-General of Forests for India. The detailed account of his visit published elsewhere will show the keen interest he evinced in the welfare of the College. Among other distinguished officers that have recently visited the College are Mr. C. DuPre Thornton & Dr. Gibson. (Director of the 'King Institute' Guindy.)

* * *

After the Nilambur and Nedungayam Camps where the students constructed a single lock bridge, and a Cantilever bridge respectively,—the latter, the first of its kind ever built by the College students—the senior batch proceeded to Waiayar, and the junior to Mundanthorai, a pleasant interlude being afforded by the Christmas holidays.

* * *

The Editor regrets that he allowed the result of the Cricket match on 8-9-18 against the Agricultural College to be chronicled as a

win for the Forest College. The match was not concluded, and was therefore not a win, although there was at the time of ceasing play every probability that the Forest College would have won.

* * *

We have to record with deep regret the demise, mainly from influenza, of a comparatively large number of Range officers during a short space of time. Among them, special mention must be made of Mr. C. M. Kunhiraman Nair, Ranger [illegible], who was the only Honours student of the 1914—16 [illegible] College, and carried off all the prizes. His conservator informs us that the death of this promising officer is a real loss to the circle.

We tender our heartfelt sympathy to the bereaved relatives of the several rangers.

* * *

It is gratifying to note that Our appeal to the Ranger class for contributions to the Magazine has not proved a cry in the wilderness, as there has been of late, a distinct and gratifying response, which we hope will be regularly maintained.

Visit of Mr. G. S. Hart C. I. E. Inspector General of Forests.

On December 1st the Inspector General of Forests to the Government of India accompanied by Mrs. Hart halted for the day at Coimbatore for the purpose of visiting the College. Although the students were on tour and the grounds by reason of the very heavy

recent rains were far from looking their best a fair idea of the scope and aim of the College, was obtained by the careful scrutiny of such features of the College, the Museum, and the Estate as came under notice. The Inspector General expressed himself as impressed by the spaciousness of the buildings, and the general potentialities of the situation. Amongst features that attracted his special attention were the completeness of the Hostels, the bungalows, the fittings of the College, and in the Museum some of the Timber Samples and the Sandal Tree.

On December 12th the Inspector General and Mrs. Hart accompanied by Mr. Mc Arthy (Conservator of Forests, Western Circle), Mr. Bourne District Forest Officer of South Malabar, and Mrs. Bourne as well as Mr. Robinson the future D. F. O. met the Senior Division at Nedungayam. The Cantilever Bridge, that the Division was at the time working on, was minutely examined by the Inspector General, who in the afternoon also visited the Senior Division Camp.

Both Divisions on December 14th were paraded on the Junior Division camping ground at Nilambur to meet the same party of distinguished Visitors in the presence of the Principal, the Staff, and the Sub Assistant Surgeons. The ground had been carefully prepared through the kind offices of Range Officer Mr. A. Swami Kutti (M. R. H. 1914–16), to whose willing cooperation is due much of the comforts of the 1918 Nilambur Camp. Amongst the audience were Mr. J. S. Rowland (M. R. Honours 1916–18), Range Officer of Nedungayam and the leading residents of Nilambur. After the students as a body and then the various categories represented at the College, such as Madras Circles, Coorg, Mysore and Hyderabad, Ceylon, House Committee, Colours Etc., had been put through their facings by the Senior Havildar, the parade was dismissed and a Hockey Match between the two years was played.

Owing to the limited scope of the ground, the teams were nominally 8 a side: but owing to a misunderstanding the Seniors during the first half played 9 men The Match was exceedingly fast and exciting and was much appreciated by the Visitors. The Seniors scored a goal in the first half and two more in the 2nd half to the Juniors Nil. After the Match the parade was reformed and the Inspector General addressed the Students.

He observed how greatly he had been interested in what he had seen at our Head-Quarters and at the College Camps, and complemented the students on their appearance, their out-door work, and on their hockey.

He expressed his satisfaction at the opportunities given to them to learn to control as well as to learn to obey. Their attention was drawn to the greatly improved prospects about to be opened to Madras Rangers including possible admission to the Provincial Service—prospects which were at least as good as those of Rangers in other Provinces of India. He congratulated them on their general turn out, on the interest taken in them by the Staff, and wished them all prosperity.

A very enjoyable afternoon terminated by three stirring cheers for the Inspector General.

In January 1913 the then Inspector General of Forests, Mr. Hayden Bryant C. S. I., visited the College at the time in its infancy, consisting as it did of but one division and housed in the comparatively suitable quarters of the old temporary habitation in Coimbatore Town. His function naturally under the circumstances could hardly compare with the inspection of the College on this occasion 6 years later, which will always rank as an important and gratifying episode in the History of the College.

"As others see us."

We append a translation from 'Revue Des Eaux Et Forêts'.

"FORESTS DEPARTMENT OF INDIA."

This is one of the most important services in India. Its energies are not confined merely to the superintendence of the exploitation of the Forests of India which cover 3,00,000 square miles; it also carried out in various regions very important reafforestations. The first Conservators were French and German Forest Engineers and English-men trained at Nancy School. In 1878, in Bengal was founded the Dehra Dun Forest School, of which the original function was to form a subordinate cadre of Native Foresters. Actually this Institution has become a centre of Forest Studies that are perhaps, the most important in the world. It receives English and Hindu Students. The school circle, that is to say the collection of forests serving as an instructional area for students of Dehra Dun comprise some 6,00,000 acres of Forest Land and yields an annual revenue of Rs. 3,00,000. The Forests of India administered by a staff of more than 400 European Deputy Conservators and by several thousand Indian Assistants meet the timber demand of the population of the country, and also supplies for exportation an appreciable quantity of Sandal and Teak.

Besides the Imperial Forest Service of which we have just spoken, the greater part of the Native States possess also Provincial Services fully recruited.

The Indian Forest Service has issued numerous official publications and in particular, a Periodical Magazine.

(BULLETIN ECONOMIQUE DE l'INDOCHINE.)

" The right holders shall besides be punished by the suspension of their rights for a period of three months and a maximum of 5 years".

* * *

" These fines shall be imposed by the Governor General at the Government council, after reviews of the minutes, reports, and recommendations of the local administrative authority and of the Watchers and Forests Service, the chiefs of tribes having been previously notified.

The proceeds of the fines shall be deposited at the Treasury. They can be entirely or partly employed towards repairing the damage caused by the fires. In this case the Governor General shall draw up the assessment statement and shall forward it to the injured parties; these may protest to the Council of State against the decisions made by the Governor General with regard to them, within a period of two months after having received the notification.

When the fires by their nature, or by the fact of their occuring simultaneously, indicate preconcerted action on the part of the natives, they may be treated as acts of rebellion and in consequence can lead to an application for sequestration in accordance with the provisions actually in force under the Royal decree of October 13, 1845.

Art. 131. The right holders are forbidden to use their grazing privileges for a period of at least six years, throughout the whole area of woods and forests which have been burnt, under pain of the penalties imposed in Art. 177, paragraph 2, of the present law.

In private woods this prohibition can be removed by the Governor General at the request of the owner, after consultation with the Watchers and Forests Service.

Art. 132. Railway or steam tramway companies having grants or leases, and built within or bordering woods and forests shall not allow any grass or herbaceous growth to grow on the railway right-of-way from June 1 to November 1 under penalty of a fine of 16 to 300 francs.

Moreover, fire lines may be (required to be) constructed along the track, cleared of all bush and, if it is considered necessary, of all conifers and constantly maintained in good condition. These fire lines shall be 20 metres (22 yards) in breadth, commencing at the railway right-of-way and shall be constructed within 6 months from the date of the official order for their construction.

The work of constructing and maintaining these lines shall be performed by the companies at their own expense. In default they shall be punished by the penalties established by paragraph 1, and Art. 42 of the present law shall apply.

The Sal Taungyo System in Bengal.

My last tour as a student in the Provincial Class at Dehra Dun, was mainly devoted to the study of the Sal Taungyo System in Bengal. It might perhaps interest the readers of the Madras Forest College Magazine to know something about this system.

Sal (Shorea robusta) is the most important forest tree in Bengal, as it is one of the most important forest trees in India. It yields a very strong and durable building timber. That is not, however, the chief reason for its importance. The reason is, that it is one of the principal sleeper trees of India. Barring teak, sal sleepers are second to none.

Extract from "French Forests and Forestry" by Theodore Woolsey.

CORSICA.

"Since the range of Pasturage outside the forests is not sufficient, it means a good deal of crossing by stock from winter to summer grazings and vice versa. There is urgent need either for the development of more grazing area or else a reduction in the number of stock. As late as 1852 there was actual armed conflict over grazing rights. This illustrates that the problem is not a simple one and must be handled with great tact.

QUARTERS:

The ranger stations usually include: one or more houses, a shed or small barn, outhouse, water system, and fenced garden. Separate rooms are provided for inspecting officers, for the ranger, and for each guard. The quarters are commodious; at the Aitone forest house there were no less than 8 rooms on the second floor, kept vacant for the use of officers on inspection—a dining room, kitchen, small study (in the hall,) and 5 bedrooms. The ranger was assigned a kitchen, combined living and dining room and bedroom, and each of the three guards also averaged three rooms. Plenty of storage space is provided.

Besides these quarters there are detached houses with only one or two rooms, located at strategic points as refuges or dinner camps for calipering or marking crews, improvement laborers, and the like.

At the Aitone forest house the equipment provided for the inspecting officers' quarters, of which the ranger is custodian, was inventoried at 2201 francs (Rs. 1320) and included complete kitchen and table service, beds and bedding, and generous furnishings. These quarters

are, on written permission from the Conservator, put at the disposal of visitors for a few days; yet, as the Conservator's order states, the houses are not to be regarded as hotels.

The name "forest house" seems more precise than the term "ranger house" or "ranger station" used in the United states.

* * *

THE ALGERIAN FOREST CODE.

Art. 127. In the Forest regions, the native rural population, and in general all right holders, shall be compelled, during the period July 1 to November 1, under pain of the penalties set forth in Art. 136, to act as watchman, which duties shall be regulated by decree from the Governor General of Algeria.

This watch shall be obligatory for the right holders and, if they are insufficient, for all able bodied men residing in the communes or section of communes bordering the Forests. They shall not necessarily be paid.

Art. 128. "During the period of watch duty the Governor General can have detachments, commanded by officers and sub-alterns, sent into the forests to co-operate with the Watchers and Forest Officers, in carrying out such measures as are legally undertaken against fires."

*

Art. 129. "Any European or native requested to help in putting out a fire, who has refused his services without legitimate reasons, shall be liable to the penalties carried by Art. 136".

Deodar is as good, and Xylia nearly so. Here, however, the list stops. Doubtless, there are a few other species which would yield good sleepers. But, unfortunately, they grow scattered, or could not be had in large quantities. I said that Teak gives the best sleepers. But of late their cost has become prohibitive for their extensive use; and Railway Companies now go in for them only at points, station yards, and on bridges, where they want to check jolting to a minimum. The sleeper trade in India, is thus mostly confined to these three species — Sal, Deodar and Xylia. And it will remain so, until artificial treatment of softer woods, emerges in this country, from the experimental stage to real working concerns. *

It is, therefore, of the utmost importance that the State raises and maintains Sal Crops on an extensive scale, wherever it would be naturally profitable to grow the species. In the rich alluvial plains of Bengal, subject to a heavy rainfall, and innocent of frost or drought, Sal obtains its optimum conditions of soil and climate. Yet, forest officers in Bengal, lately made the alarming discovery, that throughout their forests the regeneration of Sal was failing; and that, if remedial measures were not taken at once, the total extinction of the species was only a question of time. And a short time would that be; for, the standing crop was mostly middle aged and over.

Why were the younger age classes absent? Why did regeneration fail? Nothing could be done before this was satisfactorily answered. Fire-protection! Blind fire-protection! was the rather surprising answer.

When forest conservation started in Bengal, there were, in the plains and submontane tracts of that country, extensive blocks of

* [Experimentally their success has been established by Mr. R. S. Pearson, Forest Economist — Editor.]

magnificent Sal forests. With conservation fire-protection also started as a matter of course; and it continued year after year most successfully, thanks to the general low level of the country, its heavy rain-fall, and the numerous rivers and streams and minor water courses that cut it up and frequently inundate it. This remarkably successful fire protection, however, produced the most unexpected and deplorable results. Aided by a hot and moist climate evergreens of all sorts, trees and shrubs, weeds and climbers, ferns and trailers, soon took complete possession of the fertile soil. And to-day we find beneath the Sal, a hopeless tangle of evergreen undergrowth, shutting out light and air from the soil and rendering it water-logged and acid. Soil such as this, is far from the ideal seed bed for Sal. Many seeds get caught in the under-growth and do not reach the ground at all; of those that reach, many die without germinating; and the few that germinate either die soon, once and for ever, or die back year after year, until they could prolong their existence no longer even by this expedient. They are choked out by the weeds for one thing. But more important, the soil has been rendered too moist, too acid, too poorly aerated, for a Sal seed to germinate; or if it somehow germinates, for the seedling to establish itself.

Various experiments were tried to obviate these soil conditions and induce regeneration. They attempted burning the under growth; but no fire would get through it. It has established itself so thoroughly and densely. Then the weeds were cut low in the regeneration areas; but in no time coppice shooots in numerous numbers crowded in and established a thicker under growth than before. To pull out the weeds by the roots would be too expensive; and, for that reason, they did not try it on a large scale. Individual seedlings or groups of seedlings here and there, however, were relieved in this way. Failure again; for, the

whenever required, at the rate of 4 as. per head per day. They are permitted to have nothing to do with money lenders; and are generally to live and conduct themselves accoding to the rules from time to time made by the Forest Department.

Having traced the history of the system and described it as briefly as possible, it remains now to indicate some of its advantages. First and foremost, it solves the labour question—the most difficult of all questions that in many places, faces a forest officer. It assures controlled and systematic labour, and in time, trained lobour also. By allowing cultivation in regeneration areas, the soil could be got thoroughly worked, and, without any expense, a fairly established regeneration is secured. The villager's interests, being inseparably bound up with the Department, he gradually begins to identify them with the interests of the Department; and then, the protection of the forest becomes an easy matter. Lastly, the economic advantage of this system to the country generally, should not be forgotten. In Bengal, now, every year, 3 × 64 × 30 acres, or 9 sq. miles, of land, which would otherwise have borne only forests, would be bearing field crops as well. Nine square miles more of cultivation for the country is not a negligibe contribution to the prosperity of the land.

Before closing the article, I may be allowed to draw a few conclusions from what I observed in Bengal. On moist fertile lands if we wish to grow a pure crop, it wold be ruinous policy to fire protect the forest year in and year out, without break. The soil is likely to get, in course of time, water logged and acid, and unfit to grow the species we have chosen. This is especially true of species like Sal or Teak which are rather fastidious about the soils they affect. Any way, hosts of other species wold certainly crowd in to an undesirable extent, gradually changing the forest into the mixed evergreen type.

The best thing to do in these most pure forests strikes me to be this: concentrated regeneration, and then systematic departmental firing, after the crop has sufficiently matured to with-stand light and controlled fires.

P. Govinda Menon,
Probationary Extra Asst. Conservator of Forests.

Denkenikotta.

Denkenikotta is a picturesque little village in Hosur Taluk of Salem district on the borders of Mysore territory. The place is only 8 miles distant from Kelamangalam Railway Station lying on the Morappur-Hosur metergauge line of the South Indian Railway and is a small commercial centre. It has a fairly large population and an exceedingly pleasant climate. The forest Range extends over a very large area up to Anchetty, and to Hosur in the opposite direction. The latter is an important commercial centre situated within 3 hours journey from Bangalore City. Unlike most of our forest tracts in the Presidency with few exceptions Denkenikotta reserves have fairly big villages adjoining them on every side affording considerable fecilities to a Forest or other executive Officer who may happen to tour in those places. Almost all important forest stations are connected by roads and lately after the considerable improvement of working of Sandalwood has been taken up in the Range a network of roads throughout the Range to all the different sandalwood depots have been proposed for construction. There are forest Rest Houses in two important centres Anjur and Jowlagiri. Thalli, a neat attractive village situated on the road from Jowlagiri to Hosur 5 miles from the former station adjoins an important area of Reserved forest containing a very valuable growth of Sandal. The

soil was still too acid. Clearfelling rather broad strips, with a view to exposing the ground, and sowing the seeds broadcast on the cleared area gave no better results. The cleared strips lay bare only for a very short time before they were covered again by masses of shrubs and weeds.

The gist of the problem was that the soil wanted thorough working and exposure. Some exposed areas were selected and Sal seeds put in on ridges, after the soil was thoroughly worked. A sort of potato cultivation. The experiment gave successful results. But then, its methods were too expensive for practical forestry. It proved, however, one thing: that the only salvation for the Sal forests of Bengal lay in artificial regeneration on bare worked soil.

To get such regeneration at minimum cost was the next problem to be solved. Ridges were abandoned; and mounds, and afterwards, clods, tried instead. But they had a serious fault in common with ridges: that the attracted the pigs to an undesirable extent. Sowing on level ground, on worked soil, was next tried. Even, then, the cost of working the soil and of repeated weedings rose to dis-quieting figures. At last, to cut down the cost of formation still further a sort of artificial regeneration combined with field crops, forced itself on the consideration of the authorities, and was finally adopted.

This system of forestry combined with agriculture is called the "Sal Taungyo System".* All the existing Sal forests, as well as all the lands now out of Sal but which are nevertheless, capable of growing Sal, are put under one working circle. These areas, by the way, lie in two

* [A term borrowed from Burma, now understood generally throughout India and Burma to indicate a method of shifting cultivation combined with the raising of forest crops.] — Editor.

forest Divisions. The working Circle is divided into 30 felling series each about 8 sq. miles. There are 4 periodic blocks in each felling series approximating to 2 sq. miles or 1280 acres; and there are 20 coupes in a periodic block, the rotation being at present fixed at 80 years.

A forest village consisting of 64 houses (ie. as many houses as there are acres in a coupe) is established in each felling series. In the first year, the villagers should clear fell the 1st coupe and then raise on it any dry crop they like. The second year the area is cultivated again, and Sal seeds sown in lines in between the cultivation. Besides, the second year's coupe is clear felled and cultivated as before. In the third year, once again, and now for the last time, a crop is raised in the first coupe, in between the sal seedlings now. Also, the 2nd coupe is cultivated and sal seeds put in, and the 3rd coupe clear felled and cultivated. Thus after the third year, each house in the village will have in hand, year after year, 3 acres of forest land. This dry cultivation alone, however, is not sufficient inducement for the villagers to come and settle in the forests. They are, therefore, given, somewhere in a convenient locality some wet lands also for permanent cultivation. House sites would be allotted to them near the fields, and also small grazing grounds provided for their cattle. They would be given bamboos, posts etc. free, for building their huts; and would be advanced money to purchase the first year's seeds etc., and generally to set themselves up in the village.

The villagers who are directly under the Forest Department come down from the hills under a head-man, who is generally responsible for their good behaviour. They could keep only a definite number of cattle per house, both milch and plough. They are to give the Department 30 days' free labour in the year; And beyond this, labour

destruction from fire etc, there is magnificient regeneration of this valuable crop throughout the areas. The proposed reservation of these forests has now been taken up to the extreme annoyance of the neighbouring villagers who enjoyed for a very long period the full right to shape the forests to their own will by constant and indiscriminate hacking of every growth and it may be hoped that under proper protection and improvement workings the forests may form one of the best sandal producing areas in the district.

In speaking of the extremely bad treatment of forest growth by villagers by constant hacking, firing etc. it may not be out of place to mention here one other very important way in which they are injuring our sandal growth. This is by peeling the sandal bark. All along wide footpaths and narrow cattle tracks in the forests there may be observed countless number of sandal trees mostly in the sapling stage with barks cut and removed. The effect of this destructive work may also be noticed in matured trees where the cut would have been healed in course of time but results in some hollow or contorted surface. This may invariably be observed in all parts of the forests adjoining villages or in those parts remote from human habitation but yet frequented by graziers. A casual observer who happens to meet with this special feature on sandal trees would only very rarely suspect any interference of man in causing this damage to a valuable crop because the bark of sandalwood has not yet been known to be useful to man in any way other then fuel. But these rustics living from times immemorial in these forsaken places, shut out of communication from outside world, fully satisfied with their own rude mode of life, living peacefully devoted to agricultural pursuit with their own servants, and inheriting the same innocent calling, these men of the wild jungle even in days long past found out some use of sandal bark then unknown of the intrinsic value of its scented wood. They found it a good substitute for areca nuts in

chewing betel leaves which for good or bad our people indulge in. Probably areca palm was a rare growth then inaccessible to the poor people of the jungle who where thus obliged to find another thing which would serve their purpose and even to this day the poor villagers of our forest tracts are using this bark very largely not knowing that they are thereby causing injury to a very valuable crop. Not only here but in the extensive Sandal areas of the Javadis and other places many Sandal trees get somewhat distorted by such mal treatment. It would make considerable difference if the people were convinced of how they cause destruction to an inestimably valuable forest tree by this means but yet it may require very careful protection which may in course of some years put a stop to this baneful practice.

Besides the timely introduction of the improved systems of sandal work described above there has been a thorough check worked out on the smuggling of sandal wood carried on here from days past. Owing to its proximity to the Mysore forests, the villages on the border outside British territory afford ample scope for smugglers to carry on their operations. A very large number of Sandal trees were felled and removed from these areas through the paths leading to the Mysore Frontier. These must have been done mostly with the connivance of forest subordinates of the place. During my inspections of the Thally Reserved forest I had come across a very large number of stumps of Sandal trees varying in growth from 3′ to 5′ — the remnants of illicit fellings of some years back — and these were extracted and brought to depot. Really almost all the fully grown Sandal trees in this Reserved forest were thus cut and removed and enriched the private Sandal contractors of Mysore. The protection of the forests was so wanting that the fellings were detected only after some time and the enquiry resulted in the dismissal of the Forest Guard who was in Charge of the beat.

climate of this place is so agreeable that it has been named the "Little England" by some well known European Officer who happened to visit the place.* This has been a frequent resort for European visitors from Hosur and Bangalore who use to halt there for Shikkar. The jungle here is not so thick and extensive as to afford permanent shelter to tigers but these do appear often from the neighbouring Mysore reserves. Many different species of other game also abound in large numbers.

Denkenikotta Range would be an appropriate instance of the marvellous improvements worked out in late years in the Forest department. Only a few years back this Range was formed out of the old Hosur Range which was split up into two ranges Denkenikotta and Anchetty. The latter is an out of the way village 14-miles distant from Denkenikotta and is the Range head quarters. The staff of the Range only consisted of the Range Officer, two Foresters, and a few Forest-Guards and the important works carried out in the Range were the working of a few fuel and bamboo coupes, the former worked by the department and the latter by contract. The valuable areas of sandal growth now forming the most important factor of annual departmental operations were then comperatively neglected and the Sandalwood operations conducted annually were more or less insignificant. Dead and green sandal trees the latter often immature were extracted at random from throughout the Range only under the Supervision of Forest-Guards. A certain number of trees ascertained from previous years' working had to be supplied by each Forest Guard and he in turn allotted certain number of trees to different villages in his beat also based upon previous years' workings. The enumeration list furnished in Form Ia was liable to the fudged or prepared after extraction and a copy was submitted to the D. F. O. The Range Officer only took care to see that a

* [Probably Hosur, not Thalli. Editor.]

fair quantity of scented wood was supplied from his Range every year without much decrease in the quantity despatched in previous years. Thus this system was carried on for years together doing considerable havoc to the valuable sandalwood areas by untimely extraction of immature trees until the necessity of improvement workings was happily realised with the progress in other sandal areas.

The first attempt towards this improvement was taken up early in 1915 by appointing an additional special staff for sandalwood work alone. The sandal areas of the Range were divided roughly into extensive coupes to be worked each year. Only dead sandal trees were extracted to eliminate from the valuable crop the refuse of former years' workings. The very first year showed a considerable improvement both in the system of work and the quantity of dead wood obtained. This method of work continued for about two years more when a working plan for the Range was prepared. The Special staff on sandal duty was considerably enhanced and a Deputy Ranger was put in charge of each felling Series, seven of which were formed containing most valuable areas of sandal both in reserves and unreserves. Another Deputy Ranger was posted to be in charge of the Intermediate Sandal Depot at Denkenikotta where final-cleaning of all the rough sandalwood received from all the forest-depots is conducted. The cleaned wood is transported, packed in gunnies, to Tiruppattur Sandal depot in batches where annual auction sales are held.

There are long belts of unreserved forests in different parts of the Range containing thick sandal growth and much dead wood has been extracted from these areas in the few years of improved working. Thousands of sandal trees young and old can be seen in these extensive unreserves hacked by graziers for feeding goats and cattle. In spite of the utter want of protection from the constant interference of man,

Another factor which promoted so much smuggling of this valuable produce was the existence of a good number of local dealers in Sandal wood who supplemented their purchase from patta lands by such illicit removals from neighbouring forests. The very thick growth of Sandal in almost all patta lands of the place and largely in uncultivated areas throughout the Hosur taluk has been a never-ending source of their stock of wood to the competing local men. This trade is being carried on to the best advantage now when the price of scented wood has risen so exorbitantly high and the number of Sandal Contractors in the place has by far increased, but the old system of adding to their stock from Government forests has been completely put a stop to, not only by the improved restrictions introduced in the work, in the extraction transport and sale of wood but also by the considerable improvement, lately effected in protection by increasing the special sandal staff in the Range.

With the advance of systematic treatment of sandal, the work of eradicating lantana growth which is supposed to do considerable harm to other crop especially sandal by its suppressing seedlings and checking their growth, has also been taken up in the Range by an extra Special staff. This plant, though quite foreign to the land has spread with considerable rapidity in a short time throughout our forests and has become a regular pest to important crops. Its impenetrable bushy growth does not permit any other species to germinate under it and chiefly sandal has been observed to suffer most from its suppression. The plants are extracted by the roots so that the species may be altogether wholly removed from the areas containing thick sandal growth. It is yet to be known how far the Species can be exterminated by this* method.

[* Agricultural Entomologists in India, are investigating a pest, which would eradicate Lantana by attacking it—*Ed.*]

Hopes of a bright future for the sandal areas of Denkenikotta have been frustrated by the appearance of "spike" disease. The disease was first observed in Jowlagiri R. F. and within the space of a few years it has spread so widely that the whole Range has now been infected with Spike. In almost all sandal areas the infection was noticed to spread and from its effects Sandal trees died every year in very large numbers. The first experiment to prevent the spread of the disease conducted in the Range was the extraction and removal of diseased trees from the infected area. All the sapwood trees were burnt, trunk, branches and all, and those containing scented wood were cleaned and transported to Sandal depots, the sapwood chips resulting from the cleaning also being burnt. Though this method of prevention was carried out annually with due care in the infected areas, the disease only extended further to neighbouring reserves. The disease was next noticed in Thally R. F. about 5 miles away from the original spike area, the forests intermediate showing no traces of it. Here more elaborate experiments at an enormous cost were conducted by clearing a very large area of all growth of sandal and Zizyphus Oenoplia. Thousands of healthy and diseased sandal trees were extracted and were either burnt or removed to Sandal depots but still the Spike developed in the most mysterious way. For the third time the disease was noticed in a new area in the same R. F. but nearly 4 miles away from the second infected area. Again no trace of the disease was noticeable in the areas lying between. Thus the disease spread over all the important sandal areas of the Range doing considerable damage to the most promising growth.

A special staff was deputed in 1916 to study Spike from observations made in different infected areas of the Range and [redacted] interesting experiments carried out are being continued with good prospects of success. The latest theory given out by the Special Officer

7. There is a decidedly greater percentage of Nitrogen in healthy leaves than in spiked leaves. Page 16, para 2, table 2.

8. On the other hand the soil in infected areas is richer in Nitrogen than in healthy areas. Page 18, table 3.

9. Similarly with lime (calcium)

10. Symptoms of spike in certain other plants, e.g. Zizyphus œnoplia are almost identical with those of Sandal spike, internal as well as external.

11. The products of carbon assimilation are translocated in the form of soluble carbohydrates such as sugar (maltose etc.); but starch is formed and deposited if the sap in the leaf cells become over saturated with sugars, and that it requires the presence of a special dissolving ferment (diastase) to reconvert it into soluble carbohydrates. Page 29.

12. The disease is communicable by grafting, and is in all probability produced by a virus whose active principle is an ultramicroscopic organism. Page 51, para 6.

13. Experiments made to cause infection by inoculating healthy trees with an extract made from spiked materials, did not produce infection. (page 42, para 3 and page 43, para 1) Evidence so far obtained points away from the possibility of attaining the object in view. Page 43, last para.

14. Dr. Coleman concludes that the cause of every really infectious disease will eventually be traceable to some specific organism or organisms.

15. The cause of the disease of Sandal still remains unknown.

PARASITISM OF SANDAL.

It is not stated what the exact nature of the parasitism is though Dr. Barber's researches show that the function of the haustoria of Sandal must be the absorption of crude sap from the roots of the hosts, and that a ferment is active in dissolving the cell walls of the host roots. What the constituents are that are required by Sandal are, not known. They may be certain elements that are necessary for the production of the scented wood. There are trees that do not produce any heartwood; are these parasitic.? Bourdillon in the "Forest Trees of Travancore states that for a time the Sandal plant obtains the whole of the mineral constituents direct from the soil, but in a few years its roots begin to attach themselves to the roots of other trees and shrubs and that it probably obtains the whole of the mineral constituents from these other plants, and that it is capabable of establishing new root connections with some other plants if the host plant is killed.

If so, and there is reason to accept that it is so, it indicates that the parasitism of Sandal is not obligatory, for it must take some time before it could establish fresh root-connections while it continues to live in the interval.

Bourdillon further states, that Sandal found growing in private gardens hardly produced any scented wood, which I think, is probably on account of its not being able to establish sufficient root-connections for the absorptions of the elements necessary for the production of the scented wood.

I have seen a Sandal tree in a railway station compound, a few stations from Bangalore Cantonment, with no trees or any growth around it, growing quite normally on a mound about 2ft. in height, with

is that the disease is caused by the attack of an insect named the Red Spider. This is a very small insect pale red in colour and can be seen with the naked eye, moving about in an infected sandal leaf. Swarms of these tiny insects can be seen on sandal trees in infected areas and other species besides sandal such as Dodonea Viscosa, Argeria, Zizyphus, etc spiked by the attack of these insects.

In the early stages it was asserted that Spike in sandal was the result of contracting the infection from its host trees and several root-systems of infected trees were dug up to find the haustoria either dead or healthy in some cases and hence no definite ideas could be made out from the experiments.

Apart from this the first attack of spike is always noticed to appear on the very top of the tree and gradually develops downwards until layers of branches get infected. This observation combined with the results of examination of sandal haustoria would mean that the disease is caused by some external influence and not contracted from the hosts of sandal and under the various experiments being carried out at Denkenikotta on this theory we may hope that ere long we would be able to make out the present perplexing nature of the spike disease.

K. P. Chathu Nair,
Junior student.

[In his interesting article our contributor is incorrect in assuming that all sandal progress in this Range dated from 1915. As far back as 1892 Mr. Brasier initiated the first real attempt at coping with the situation by insisting on the extraction of roots, the numbering and assembling of billets to form a complete tree, and on the substitution of Government tolas for odd bits of stone, fancy "maunds" with hollowed bottoms, and other fakements which had previously passed as "weights". Before Mr. Brasier's time the roots were usually left in the ground as worthless. Editor.]

Spike Disease of Sandal.

The following is a summary of the results of not only Dr. L. C. Coleman's investigations but, also of the work of other investigators who have been in the field from time to time, including several Forest Officers. The conclusions arrived at and presented in Dr. Coleman's note on spike disease of Sandal are however mainly Dr. Coleman's, and they form the subject of the present article.

1. Young trees are as readily attacked as old ones. Page 5.

2. The production of new leaves in healthy trees is periodic, whereas in spiked trees, there is no periodicity, but the production is continuous throughout the year. Page 9.

3. Spiked trees produce paler leaves then healthy trees, and in many cases the spiked leaves take on a reddish colour. Page 10.

4. Spiked trees do not produce flower or fruit, but in a few cases especially in the early stages of the disease, the flowers show a tendency to develop the phenomenon known as Phyllody, floral structures being reduced to leaflike bodies. Page 10.

5. The root ends and haustoria are invariably dead in advanced stages of the disease. Page 13, para 1.

6. There is a marked deposition of starch in the leaves especially, and also in branches and roots of spiked trees, but in a healthy tree, there is no such deposition in the leaves, though there is a deposition of starch in normal twigs (which has not been satisfactorily explained in the report) (pages 13 to 14, para 3) while the presence of starch is the most important histological characteristic of the disease. Page 16, para 1.

all the earth excavated to a depth of 2ft. to provide for the station master's quarters.

The tree appeared to be about 10—15 years old about three or four years ago the girth being about 18 inches then.

The experiment made in Vellore District and the above instance go to show that Sandal could exist even when its roots are isolated from those of other trees. Further investigations as to whether such trees produce scented wood would establish whether the parasitism is obligatory for this purpose.

CAUSE OF SPIKE DISEASE.

The cause of the disease has not been traced yet; one more theory may be added to the list of the existing ones, and the theory advanced by me, I shall support by certain facts recorded in Dr. Coleman's note Sandal is a parasite on the roots of other trees.

It is a root-parasite as it requires some element from the soil through the haustoria. Its requirements from the soil may be NITROGEN.

Tables 2 and 3 of the report show that there is a preponderance of Nitrogen in the **soil** in a spiked area as compared with an unspiked area; and also the proportion of Nitrogen in healthy Sandal **leaves** is greater, than in spiked leaves. One conclusion that one is led to is that healthy leaves (and therefore healthy trees) require more Nitrogen and are able to get it, whereas in a spiked area the leaves (or trees) are unable to utilize the available Nitrogen (in the soil) probably owing to the action of some agency in the soil attacking the source or channels of absorption.

Dr. Coleman quotes a paper by Bonequet on the "Presence of Nitrites and Ammonia in diseased plants" (not Sandal) tracing the causes of the disease to be due to bacterial organisms capable of reducing nitrates to nitrites and Ammonia, and so rendering Nitrogen unavailable for these plants.

It will not be rash to suggest that the disease in Sandal may also be due to a nitrate-reducing organism in the soil, from the fact that there is a larger residue of Nitrogen in the soil, in an infected area, and less of Nitrogen in the diseased leaves of Sandal. Where there is a reduction of the nitrates, it implies that oxidation takes place, the oxygen being probably required for the support of life of a living organism either in the soil or in the tissues of the Sandal plant. To test this a microscopic examination of the soil to isolate the organism should be made.

DEPOSITION OF STARCH.

The presence of starch in the tissues of the healthy plant (except in the leaves) indicates that starch is required and is normally deposited in them, while the excessive accumulation of starch shows that it is not being utilized for some reason, and therefore accumulates, clogging the cells and thereby retarding growth, and finally causing death.

The sugars and starch are required for building up plant tissues after conversion into cellulose, and in combination with Nitrogen forms the complex proteids of which the living matter of the cell tissue is composed. Without Nitrogen the utilisation of starch and the growth of the plant are impossible.

Nitrogen is therefore essential for the removal and conversion of starch; the accumulation of starch may be traced to the supply of Nitrogen being cut off.

Summarising the conclusions arrived at from the reasoning above as to the cause of the disease, the following statements may be made :–

1. That the immediate cause of the disease is the accumulation of starch in the tissues of the plant. It is not merely a symptom of the disease.

2. That the above abnormal condition may be caused by an organism reducing the nitrates in the soil for the utilisation of oxygen for the support of its life.

3. That the organism resides in the soil or in the conducting organs of the plant, and that it is capable of existing in the sap, and circulating with it in the early stages of the disease.

The last conclusion will be referred to again in connection with the grafting experiments.

Against the theory advanced the following objections may be raised,

1. Why is the disease infectious? if it is merely due to an abnormal physiological condition viz., the deposition of starch.

2. Why are not the host plants infected by the organism causing the disease in Sandal?

3. Why was it not possible to cause infection by inoculating with the extract of the infected materials, if it is admitted that the nitrate-reducing agent is capable of circulating in the sap, and was able to cause infection in the grafting experiment.

These objections may be overcome by the following explanations :- In the experiments to cause infection by inoculation, it will be observed that, the extracts were first filtered through filter paper, and there was

the possibility of the organisms being removed from the extracts wholly or partly; or the injections were not in sufficient strength to cause infection. Information on the subject is meagre.

In the case of grafting the organisms remained in the spiked scions, and caused the disease in the healthy plant as soon as a connection, was established between the two.

Here again a few observations with reference to these experiments are necessary :-

1. The disease produced by grafting was found to travel downwards to the roots.

2. That it manifested itself by an accumulation of starch in the infected tissues, before the external signs of infection had appeared.

3. The "period of incubation" of the disease extended from 3 to 5 months.

In the three experiments described on pages 37—39, the stocks did not exhibit any sign of the infection, from 100 to 180 days after grafting; The stocks were severly cut back before grafting, leaving one or two branches; though the cutting back could not have caused the disease, it accelerated it as the next experiment shows (page 40). In this case only a few of the lower branches, were pruned leaving the top of the tree undisturbed, there was no evidence of infection in the stock, for 240 days after grafting, and then the disease was indicated only by an accumulation of starch, and not the production of spiked leaves or death as in the three previous cases.

The following inferences may be drawn from the above results :–

1. If there was a poison or virus, its effect would have been

vitiated as time advanced, whereas the disease became more marked. (Plants possess the power of counteracting the effect of deleterious substances; iron and calcium, from the soil, act as antidotes.) As the disease took a long time to develop and as a small twig from an infected tree could infect a whole tree, it points to a living organism, capabable of multiplying being the source of infection, and as the "period of incubation" extended from 3 to over 5 months, it was capable of existing in the sap and circulating with it.

2. The production of spiked leaves was the result of an excessive accumulation of starch.

3. Another point of interest to be noted is that the disease invariably spread to the roots and killed the root-ends and haustoria. The organism could not live in the exhausted tissues of the plant for want of food, and therefore had to find its way back to the soil where it probably resides.

The disease is infectious in so far as the organism causing it is able to spread and exhibit its activity viz., reduction of the nitrates in the soil or in the sap. Why are the host plants immune? It is possible that they are also attacked, but as their resources and means for obtaining their requirements from the soil are much greater or do not depend on other plants, they are in a position to withstand the attacks. Sandal has a limited root system and has to depend on its hosts for the supply of the soil salts. If an analysis of the tissues of the host plants in a healthy and in a infected area, similar to Dr. Coleman's with Sandal is made, and if there is a similar relation in the proportion of Nitrogen in the plants, it could be established that the cause of the disease is a nitrate-reducing organism. If the experiment proves that there is no such variation it will only show that the hosts are not appreciably affected owing to their greater resources.

Another experiment that may be made is to try to cause the disease by replacing the soil around a healthy sandal by soil from a spiked area.

PLAGUE AND SPIKE DISEASE IN SANDAL.

Looking at the map in Dr. Coleman's Note (page 3) and following the history of Spike, there appears to be some connection with the spread of Plague in Southern India-one appears to have followed in the wake of the other.

The Spike disease of Sandal was first observed in Coorg and Mysore in 1898—99, and travelled down to Coimbatore, Salem and Trichinopoly.

Plague, I am informed started in Bombay in the year 1896, and then made its appearance in Southern India, first in Mysore Province between 1898 and 1900, and spread gradually into the district where Spike has also travelled.

The coincidence is striking. I am not in a position to say whether the Plague bacillus is an inhabitant of the soil; we know however, that fleas through their hosts, rats, cause the infection to spread from place to place, and the latter are known to migrate in large numbers during an outbreak of Plague.

We have till now no information as to the mode of spread of Spike disease in Sandal or in other species. It may be the same agent as in Plague or a similar Agency that spreads the infection over isolated and uninfected areas at a great distance.

The following observation made by me at Mundanthurai may be of interest in this connection :-

A line of Pithecolobium dulce, planted for a fence are all attacked

with spike; the infection spread from plant to plant and followed the exact line of the fence. Holes were found in the underground portion of the stem and in the roots, in which white ants and a species of bug laid their eggs and lived.

In spiked Zizyphus oenoplia in Koilteri W. C. I found

(1) round whitish galls, like excrescences on the roots. They looked like the Sandal haustoria and under each of them a thin slit in the bark was found.

(2) In another tree the excrescences were withered revealing the slits in the bark, the tree being almost dead.

(3) In a third tree large punctures with no trace of the excrescences were found; this tree was also almost dead, white ants were found around the roots but were not living in them.

Insects like white ants may be the agents in spreading infection locally.

The galls or nodules on the roots may be the residence of the organism causing the spike. Dr. Coleman has not found these bodies in the Zizyphus examined by him. (page 19, last para) Having caused the disease by grafting he is led to the conclusion that "the disease can originate in the above ground portion of the tree" and does not attach much weight to the possibility of the disease originating in the roots (page 27) as there has been no satisfactory evidence to support this view and therefore investigations in this direction have been limited

The disease as occurring in nature does not originate in the stem, but in the root system, as nearly all the symptoms indicate, viz., the death of the root-ends and haustoria.

2. The altered chemical composition of the leaves, due to the excess or deficit of the soil salts.

3. The presence of starch in excessive quantities, indicating that the leaves are performing their normal function.

4. The phenomena of Phyllody and cessation of flowering and fruiting indicating a diminution of the mineral constituents rather than a surfeit.

REMEDIES AND PREVENTIVE MEASURES.

To suggest a remedy for the disease would be premature at the present stage of our knowledge of its cause. Whether any remedy will be found is very doubtful so long as the tissues of the plant are filled with insoluable carbohydrates, and even were it possible to render them soluble, how are they to be translocated when the means of absorption of water have been destroyed as the result of the disease? Injections of dilute sulphuric acid may be made either to destroy the organism in the tissues, or to render the starch soluble in early stages of the disease.

Germicides may be applied to the soil or even aeration and exposure to direct sunlight may be tried, as certain germs causing disease are destroyed thereby.

It is hoped that those who have the facilities to carry out these experiments will be inclined to do so, and if any of them succeed we shall be able to prevent the loss of a lakh of rupees per annum in the presidency caused by the disease.

R. E. LEMOS
Forest Ranger,
Ambasamudram.

Water Divining.

The world has become so materialistic now-a-days that any thing, savouring of the mysteries, receives scant attention. Yet I have to relate of the revival of a mysterious gift, which some Human beings acquire through some process of training.

The exact nature, of the spiritual exercises, which culminate in the acquisition of the gift, I know nothing about, nor have I been able even to get a faint idea of them. The mysterious gift, I refer to, is that of water divining. Up to quite recently I was amongst those who discredited any such performance. But the most incredulous person cannot dispute the evidence of his own eyes; When you see water being produced at the spot, indicated by the Diviner, and at about the depth indicated by him, then disbelief in the process must be thrown over board.

On the 5th August last there arrived at the Madras Forest College by previous arrangement Mr. Arnatt a Canadian who had undertaken to locate points at which wells might be dug. We walked out into the porch, three of us, the Principal, the water Diviner and my self. "Where would you like to have you well"? asked our wizard. "Wherever you can find it" was the repiy. "Very well" said the wizard and walking up to the nearest Babul tree, he broke a green forked twig something similar in shape to a Catapult Y holding the arms of the Y with his palms upwards, fists tightly clenched, the point of the Y being horizontal and away from the body, the Wizard began walking towards us. We were standing in front of the College Porch. Within a few yards of the Porch the twig assumed a vertical position. "Here is a

spot where you may have a well" said our wizard. A well inside or near the College porch would be rather inconvenient, so it was suggested we might try some more convenient spot. The perambulation of the Estate began. Here it must be clearly stated that this gift of water Divining has nothing to do with what is known as Black Art, nor does the Diviner profess to produce water where there is none. All he can do is to detect the presence of water-bearing strata, should any exist in a given locality. During a few hours of perambulation of the college estate—area about 200 acres—9 points were located as being likely spots for well sites. The Diviner gives also the depth to which the well should be dug, the depth given by him being the bottom of the water-bearing strata. This he decides as simply as he locates the points over the water bearing stratum. When the twig assumes a vertical position it does so with a considerable degree of force-the Diviner then turns at right angles to his previous line of progression, and paces on till the twig returns to its horizontal position; *the distance from the point of location is the depth required.* All the points located were accurately plotted on the College Estate map, pegs and stone cairns marking the position on the ground.

One of the points located was the junction of two converging lines of water bearing strata. Consequently it would give the largest volume of water available. The boring was commenced at this point—(Those familiar with the college will remember the plot of ground between the gas house and the Tent godown ; it is in that plot)— with a hand boring plant obtained from the Engineering branch of the Agricultural Department.

The water Diviner gave the depth of the water bearing stratum at this point as 87′. At 50′ from the surface water began to trickle into the boring tube, the water increased with the depth of the bore till at

70′ there was 30′ of water in the bore hole. A depth of 30′ of water seems sufficient of the spring is a good one, so boring was discontinued. Now we await the arrival of a pump to put our supply of water to the test. If the supply is not sufficient, in fairness to Mr. Arnett, we should go down to the depth indicated by him. Personally I don't think it will be necessary to bore any more. The season has been an abnormally dry one—so dry indeed that Forest fires have occured in September—the underground water now must be at its lowest point, so that 30′ of water represents the minimum supply. After a few showers of rain I would not be surprised to find it within 15′ of the ground level *i. e.* 45′ of water in a bore hole 70′. This is the test that converted me to belief in water Divining.

Meeting this [illegible] acquaintance, I was informed by him that there was no difficulty whatever in acquiring the gift of water Divining, that he would call the next day and teach me the process in half an hour. I gratefully accepted this Offer and eagerly awaited the appointed hour of instruction. I was badly disappointed. The Gentleman had evidently forgotten, either his appointment, or the process of water Divining.

E. M. C.

What Elephants think of us.

Standing one fine evening near an elephant Kraal I suddenly discovered that somehow (I know not how) I was able to understand the language of elephants; the following conversation between 2 elephants was in progress.

The elephant in the Kraal (recently captured) was carrying on a conversation with a domesticated elephant.

"This imprisonment bores me stiff, especially as I have done nothing to deserve it" said the recent capture. Why have these Humans determined to torture us in this manner? he continued.

"They don't really mean to harm us" said the domesticated one. "They want us to do what they themselves cannot do as easily without us, lift and drag logs and so forth." "That is hardly any excuse for all the ill treatment I have recently had to endure and perhaps hundreds of elephants have had similar experiences", said the recent capture. "Just listen to what I have to say and then decide whether these humans have any excuse for all the mauling I have been through".

"I lived in a herd with 10 other elephants. We spent our days happily never harming any Humans we came upon, nor did we ever damage their crops or tresspass in their plantations.

"We contented ourselves by keeping to the Forest, seeking the dense cover of bamboo jungle moving into swamps at night for a pleasant and necessary change of diet, and visiting the deepest streams to bathe and drink. We knew of the existence of pits in the forest cleverly covered over—but not too cleverly to deceive us altogether—we located them by their slightly different colouring and avoided those parts of the forests.

"To the misfortune of the herd the streams in our locality dried up due to the prolonged drought, so we had to find some other convenient locality to live in. After a march of a whole night we scented water some miles away, we had to press on keeping to the path leading through the densest shade. Towards the afternoon our Leader stopped,

and pointed out to us, a cleverly covered pit across the path, its one defect being that somebody had left a few inches of its edges uncovered. That was the edge nearest to us. It was decided to walk round this pit Our Leader swerved to the right and had gone but a few paces when we saw him sinking as it were into the ground, then with a crash he disappeared. Oh! Horror!! he had fallen into a pit. I and the remainder of the herd immediately turned to the left of the visible pit, and in doing so I fell into another pit. Our Leader, being a big fellow, nearly 10′ high, dug himself out, during the night, after considerable exertion, but I being unable to do so was left to my fate.

"Soon after daybreak I heard some one running to the pit I was in, he was a *mahout*, grinning at me like a fool. I grunted at him and he disappeared. For some hours I was left to myself. When I heard the sound of elephants moving in my direction, I thought the herd was returning to my rescue, that hope was short lived for almost immediately I heard Human voices, which were undisputedly proceeding from the same direction.

"In another few minutes the surroundings of the pit were alive with people and *Kumkies* as I belive you are called.

"I was given some water which was very welcome. I held my trunk up to have some poured into it which seemed to have caused a deal of interest to my tormentors. I could see dozens of people gaping at me from above. However I got some water and felt some what better, then some water was poured on my body which I enjoyed also.

"Then the torturing began, I was poked with pointed bamboos seemingly to no purpose, after some time I guessed they wanted me to stand against the side of the pit for some reason or other. I moved up against the side of the pit to get peace but soon after the poking again began and I moved away towards the centre of the pits. Then for a while I was not molested.*

"The next thing that happened was that some body was tickling my head with some white soft cloth. Now you know that this irritates even the best tempered of us. I grabbed at the cloth with my trunk, but it was pulled away only to return a few seconds later. I determined to get a hold of it and I made a desperate effort, but as I raised my trunk to catch the cloth, down fell a circle of rope over my head, on which several people were hauling from above. I had been noosed, and before I recovered from the shock of this noosing I found my left hind leg had also been tied up.

"Then came a shower of pieces of wood, twigs and lumps of earth into the pit. I made sure the Humans were going to bury me under all this stuff. I fought hard for my life, dashing from side to side of the pit, then I discovered the pit was being filled in with all this stuff; I stepped on the billets &c. and looked about. I was glad to have my head above the pit. The pit was so steamy; After a puff of fresh air, I determined to get out of the pit. I was so near the top now; With some exertion I scrambled out and at once made a dash for freedom only to be disappointed. The ropes from the noose on my neck, and the one on my leg were tied to elephants, much bigger than my self. I couldn't get away, no matter how I tried; With elephants in front, in rear and on both sides of me, I was marched some miles to this infernal prison. But after I came out of the pit I was surprised to see elephants and men standing on the spot where I had thought there was a pit across the path. There was no pit there, but only a small drain, one edge of which was made to resemble a pit. Think of my chagrin when I dis-

* [This is done to get the height of the Elephant; $\frac{3}{5}$ of his height at the shoulder is the measurement of his neck.]

covered that we had been so badly hoaxed. To avoid that wretched drain and its covering which could not have hurt any of us I and our Leader had been pitted. He escaped with a mighty effort but I was left a prisoner. What a nasty trick to play one!

"Then when I arrived at this beastly Kraal and was pushed into it the rope attached to my neck was gradually shortend till I was forced into a corner onto my kees; people then began to back at the knot on the rope with a knife from some point behind me. I could not reach the rascals, hacking at me as I thought at first, with my trunk; suddenly I found the neck rope loosening; with a jerk of my head I threw it off and moved forwards, to find that the rope on my hind leg kept me back; some more hacking at that with a knife followed which I didnot attempt to resist, so sure was I that the moment I was free—and they were actually freeing me—I would demolish the bars of this structure and make a bee line for the forest to regain the herd, but when I was free to act I discovered in a few hours that I couldn't demolish these wretched bars. My head as you see is a mass of scratches and scars from bumping it against these bars, besides receiving several sharp pokes from pointed bamboos from *mulsars* outside. I have had precious little to eat for days, fortunately I have enough water at hand. Now do you think there is any excuse to have to endure such treatment?" "Oh! but the worse part of it is over" said the domesticated animal. "You will now be given cooked food as we receive and partial freedom as soon as you show your self reconciled to your fate and accept captivity; as a matter of fact, the policy seems to be that though it may be wrong to capture us and make us work, yet the institution is a settled fact and must be accepted as such "Your mention of pits being not too cleverly concealed some times bring rather a funny incident to mind. A District Forest Officer held a similar view once like yourself and

like you I saw him fall into an elephant pit "Ha! Ha! chuckled the recent capture. I hope he was killed. Was he?" "No" replied the other; "falling on the grass cushion below doesn't hurt these Humans nor do they receive anything like the shock people of our weight do.

"Well to continue, one morning I was ridden by the District Forest Officer on an inspection. On nearing the spots where there was a group of pits, the D. F. O. dismounted and walked ahead with the Ranger. Then on spotting what he believed to be the nearer edge of a pit the D. F. O. turned on the Ranger savagely and said, "It's much too obvious, no elephant would be such a fool as to fall into that pit. If I were an elephtant you would not get—". "He disappeared into a pit, he had been looking at the further edge of the pit, so he walked into it.

"The Ranger much confused and agitated ran about, collected some men and in a little while lowered a roughly made bamboo ladder up which his D. F. O. scrambled out of the pit". "I wish he had been allowed to remain there", grunted the Recent Capture "you must really give up that vindictive spirit." Counselled his newly formed friend. "We have many grievances which I could talk on *ad lib.* But what useful purpose would it serve? I shall mention them to you later on when your temper will have improved."

The spell that had privileged me to hear this conversation up to this point vanished. The night was coming on so I moved on to my camp reflecting on what I had heard, hoping at some other time to acquire the gift of hearing some more of what Elephants think of us.

E. M. C.

Natural regeneration and propagation of Nim tree (Melia Indica) in the dry forests of circars and ceded Districts of Madras Presidency and some similar conditions of growth for Sandal.

Nim tree commences its life generally naturally under the hedges on the bunds of field borders in cultivated areas. In waste lands or low dry forests it similarly comes up on the loose loamy clean raised moulds of soil under the bushes of thorny species. It is seen only in plains and lower reaches of hills and does not seem to go up to hill sides or high elevations. These observations were chiefly from the low dry forests at the foot of hills in Yerramalais and level forests of Eastern Nallamalais in Kurnool Districts, and porompokes of Krishna, Guntur and Nellore Districts, noticed while travelling in trains and on other occasions. Either under the hedge or under bushes, the seed appears to be introduced by the birds which devour the nim fruit for its sweetness. The seed which is so dropped gets into a loose well manured natural nursery bed. Here it germinates, the seedling developes and grows under the shade of the bush which acts the part of a strong living thorny fence protecting it against the attacks of goats and other animals. Since the place is free from grass under the shade of the bush, this is protected from fire naturally. In fact, the seedling generally grows unseen and unobserved until it begins to peep out of the bush. It is seen only when it comes above the bush at a height of 5 to 8 feet still protected on all sides. At this stage, many a time, attempt was made, even with shoes on, to pick out a small branch from it but it could not be reached. The bushes are generally of low Randias, Acacias, and other thorny bushes and also often of well established prickly pear. This bush continues to protect it till the Nim grows into a tree of pole size, and under the shade of its grown up offspring ends its gradually

disintegrating life having well served its purpose of establishing a splendid nim tree.

It is peculiar that it selects only low bushy nurses and not big trees of any timber Yielding species not does it seem to grow so well in the midst of crowded and thickly stocked areas. This suggests the idea that it selects these localities simply for humus mixed natural nursery bed and nursing protective shelters in its early life and for no other object. After the disappearance of this nurse, the grown up nim tree is seen singly with no trace of the nurse and is isolated in some instances. At this stage, we happily sit under it to enjoy its cool shade in hot summer. Now we cannot even imagine that it came up under the above circumstances.

It is interesting for a forest officer to note this natural development of Nim seedlings as he travels in train through dry tracts of circars and ceded districts or when he is engaged in inspecting dry forests here, since these are seen sitting over the thorny bushes and prickly pear with their thick and full foliaged crown dancing over the bush enjoying heavy breeze. Except a few trees which are found in Railway and other compounds, a very large number found everywhere all over this dry zone, yielding good timber for house building, fodder for goats, leaf for manure, seed yielding valuable oil, and refreshing shade in hot summer dry localities, seem to have come up like this. Thus this good timber tree has been living in this dry country leading a particularly useful, extensive and economic life unseen and unwatched. From what I saw of Sandal it appears to thrive under similar conditions.

The necessity for the presence of a tree hard by and the growth of the seedling here are conditions already found necessary for Sandal for its being a parasite in its early life. It has strongly aromatic heart-

wood yielding oil making it a species very exacting on the soil to meet its peculiar wants. Nim also grows under the above conditions, though only for nursing, and with almost the same peculiarly exacting capacities as this also has medicinal properties in its oil and heartwood though bitter in taste and disagreeable as an agent of luxury.

As such it remains to be seen and established whether thowing of haustoria under these conditions is peculiar to Sandal or if this is noticeable also in other species; again if this haustoria presence is on account of Sandal being a parasite compulsorily or only circumstantial and casual; if Sandal can thrive without being a regular parasite and if it will be satisfied with only nursing protection with a good humus manured nursery bed which should be receiving additions of manure as under the loving nursing bush. If it is not a regular parasite but requires a nurse only for providing humus, shelter and protection in early life, the propogation is simplified.

As for elevation and other factors of locality, good Sandal was seen growing indigenously in Bellary District on the plain like valley in the midst of Sandur Hills and on the lower reaches of the eastern slopes there. It is also found now naturally growing in the Nallamalais in the surroundings of Duguvametta as a result of once attempted artificial propagation of previous Years. I saw planted trees growing well in a garden near a fence in Bonmalapuram fields in Markapur Taluque, Kurnool District. I understand it is similarly growing in Waltair gardens and elsewhere. The level in all the above places is about and below 1000 feet. Here Nim is seen to grow as described above. On hills near Ramandroog and on Northern Nallamalais above 2,000 feet Sandal is found in fairly good conditions. Here Nim is not common.

It is worthwhile to know how the present existing Sandal trees

are faring, single or in groups, naturally growing or artificially grown, in plains or hills, on coast or in the interior with rainfall details, size and other particulars of Sylvicultural interest to give us information as to the success in already existing conditions of differences of locality. It is advantageous that the several officers in this Presidency and neighbourhood., wherever they happen to see these in any place of differing local conditions, publish the informations, to form a record of information on this valuable species.

From what has been said it appears worthwhile to try broad cast sandal seed sowing in all prickly pear and other bushes in the above Districts, whether it is in poromboke, or wastes lands or in forests at the beginning of monsoon. This year I tried to sow these but the rains having failed, the season proved unfavourable for sowings.

From what I saw in Nallamalai Retcheruvu sowings and Sandal areas, I came to know that a large quantity of seed must be used repeatedly for some years to produce even small successful results of regeneration in any place. If once it is established it propagates itself naturally. A large quantity of seed was used persistently in the same locality and it began to appear naturally. It now sows its own seed and produces its own seedlings in these places. Here the quantity of seed and the repetition of the operation are the only factors to be considered and these are comparatively too cheap and easy to be cared for, considering the value of the species. This appears necessary for the reason the species appears to be tender and the influences of varied factors of locality have all their individual importance. The seed has a kernel sweet nearly like almond and is eaten away by squirrels. There is germination crisis, summer heat crisis, unfavourable soil crisis and other difficulties for the seedling. Besides if we follow nature, we should use much seed in sowings, especialy Boardcast sowing or dibbling and we

item 1 and trace out their roots on the south side and either bruise the surfaces of or deeply wound with a billhook all roots so traced, each tree to be numbered and notes kept showing which trees had their roots bruised and which had their roots deeply wounded.

6. This was commenced at the end of July 1918 and partly completed by the first week of August; owing however to the complete failure of the south-west monsoon, the work was found to be very difficult as the soil was as hard as it could be and consequently only the following work was done :—

(1) North of the main line of trees and 20′ away from it:
1st trench 110′ long, 1½′ broad and 1¾′ deep.
2nd trench, 23′ long Do.
3rd trench, 56′ long, Do.
4th trench, 69′ long, Do.

(2) North of 8 isolated trees numbered 15 to 22, short lengths of trenches 10′ to 12′ long and same dimensions as above were dug 10 to 12′ away from the trees.

(3) South of 14 trees (in the main line referred to in item (1)) numbered 1 to 14 the roots were traced and either bruised or wounded.

NOTE.– Trees Nos. 1 to 5 had their roots traced and bruised and then lightly covered with soil.

Trees Nos. 6 to 14 and their roots traced and deeply wounded with billhooks and then lightly covered with soil.

N. B. — (1) On all the above works the Ranger spent Rs. 27-8-0

(2) Subsequent to the work being done there was absolutely no rain till the 3rd of November 1918.

7. I inspected again on 18–11–1918 and made the following notes:-

(1) FIRST TRENCH 110′: The following root shoots have come up:

NORTH SIDE (away from mother trees).
9 small Vepam(Melia indica)
9 large Do.
9 very small Unjal (Albizzia amara)
8 large Do.

SOUTH SIDE.
5 large Unjal
1 small Do.

(2) SECOND TRENCH 23′
North side 1 small Unjal
South side 1 large Do.

(3) THIRD TRENCH 56′
North side 3 small Unjal
South „ 1 small and 2 large Unjal

(4) FOURTH TRENCH 69′

NORTH SIDE 5 small Unjal
2 large Do.
4 small Vepam
7 large Do.

SOUTH SIDE 3 small Unjal
1 large Do.
2 small Vepam

have enough for this. In nature every tree of any species produces abundant seed. Of this only a very small percentage produces seedlings though all the other portion goes without helping regeneration. Where it is possible this may be dibbled liberally.

As for land for sowing there are thousands of acres of suitable Village poromboke with prickly pear and other places. In using these for sowings we will be only utilizing the places which are left waste and this is all Govrnment land. If this proves successful prickly pear intead of being a nuisance in these Districts will turn out into an object of utility.

B. V. JOGESWARA RAO,
Ranger.

[We understand that broadcast sowing in Coorg has proved a failure owing to the depredations of rats. The seeds are planted into the ground to a depth of 3" and covered over with soil so as to present a natural appearance. EDITOR.]

A Note on an Experiment conducted to induce the development of Root Shoots with a view to re-stocking a poorly clad dry area by Root Shoots.

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1. In 1917 the Ranger, Erode range, was instructed to plough over 2 acres of blank in the Kanjikoil reserve of that range and sow it with avaram seed, the work was ordered to be done entirely with a view to seeing what such an operation would cost, because estimates had to be prepared for ploughing and sowing large areas with avaram with a view to increasing the supply of avaram bark the supply of which was said

to be running very short and also with a view to putting that bark on the market at a cheap price to enable Madras to keep its place in the competition with other tanning materials discovered in North India. (For further information in this respect, I would invite attention to Board's Forest Reference No. 2001/17—2, dated 5th September 1917.)

2. The Ranger did his ploughing and sowing in November 1917, far too late to produce a crop of avaram, because, subsequent to the sowing, there was hardly any rain and very few of the seed germinated; that however is beside the point for purposes of the present note.

3. When I inspected this 2 acres plot in January and March 1918, I noticed some small unjal (Albizzia amara) coming up and when I wanted to examine and see if they were seedlings, I was told by the Watcher in charge that they were root shoots which had developed from unjal roots damaged by the plough; I satisfied myself by examination that this was true and waited some months to see if they would come to anything.

4. I again inspected the Kanjikoil reserve in July 1918 and then found that there were 6 shoots and that those previously seen were coming on very well indeed though there had been scarcely any rain in the interval. I then decided on carrying out an experiment to see which species would produce root shoots and which not and what would be the best method of inducing the production of such shoots.

5. My instructions to the Ranger (given on the spot) were first to take up a certain line of trees and dig a long trench on the north of that line 20′ away and 18″ deep; secondly, to dig short lengths of trenches 10 to 15 feet away from isolated trees of as many species as he could find, and thirdly, to take up the line of trees dealt with under

(5) Tree no. 20 Unjal. Trench on north of tree 13′ long and 11′ away from tree.

North side of trench (away from tree) — 4 small and 4 large Unjal shoots

South side Nil.

(6) Tree No. 21 Tamarind — Trench on north of tree 12′ long, 12′ away.

North side 2 small Unjal
South side 2 Do. Do.

Note.—No Tamarind shoots; the Unjal shoots are evidently from trees some distance away on the north and south.

(7) Tree No 22 Unjal. Trench on north of tree 12′ long, but there is an Unjal tree on north of trench also.

North side 1 small Unjal.

South side 2 large Do. and 1 large Unjal from bottom of the trench.

(8) Tree No. 19 Unjal Trench on north of tree 9′ long.
North side 1 small and 1 large Unjal.
South side Nil.

Tree No. 18, Unjal Trench 10′ long on north of tree.
North side— 2 large and 1 small Unjal shoots.
South side Nil.

Tree No. 17 Velvelam. Acacia leucophlœa.
Trench on north-east of tree. No shoots.

Tree No. 16 Unjal Trench 10′ long on north-east of tree.
North side 1 small and 3 very small Unjal.
South side Nil.

Tree No. 15 Unjal Trench 11′ long on north of tree.
North side 2 large Unjal.
South-east corner 1 large Unjal.
South side Nil.

8. From the above it will be seen :—

(1) That neither Tamarind nor Velvelam produces any root shoots, or rather, that I have got no results from those species, but on the other hand, Vepam and Unjal produce root shoots freely.

(2) That the bulk of the shoots appear on the side of the trench which *is away from the tree*; in other words, the ends of roots attached to the mother tree do not as a rule produce shoots whereas the ends of the roots completely separated from the mother tree produce shoots pretty freely; this is because from the side away from the tree the sap is coming *up* to the cut; from the other side it is flowing away from it.

(3) That, despite the extraordinarily dry season we have had with a total failure of the south-west monsoon, the roots began to produce shoots in the hot weather though it is evident that a large number of small ones have very recently put in an appearance, probably since the commencement of the rain early in November.

9. It is unfortunate that Kanjikoil produced so few species to experiment upon but even all such as were available were not experimented upon by the Ranger; I found a Palai (Wrightia tinctoria) near tree No. 21 (Tamarind) and cut a trench on the east of it and severed

many Palai (Wrightia tinctoria) roots; the results will be watched. I again cut a trench around another Palai (subsequently numbered 44). Both these were cut on 13—11—1918).

10. Under my instructions the Forest Guard cut trenches *all round* 21 isolated trees numbered 23 to 43; this work was done on 15th, 16th and 17th November 1918 and the species are as follow :—

23	Velvelam	34	Unjal
24	Vepam	35	Do.
25	Unjal	36	Do.
26	Do.	37	Do.
27	Do.	38	Vepam
28	Do.	39	Kuni (Salvadora)
29	Do.	40	Velvelam
30	Do.	41	Karuvelan (acacia arabica)
31	Velvelam	42	Velvelam
32	Unjal	43	Unjal
33	Do.		

On that, the Forest Guard spent Rs. 10–2–0; of course there are no results from these latest trenches yet.

11. My own opinion is that it is still too early to accept as final the results noted on the 18th from the Ranger's trenches, because obviously the bulk of the shoots have only come up recently and it is reasonable to expect a large number more as a result of recent rains.

12. On 24—11—1918 I again inspected the Kanjikoil reserve and at a cost of Rs. 4–8–0 I trenched around 2 trees Nos. 45 Unjal and 46 Unjal and cut long lines of trenches (for 450 feet) 30 to 50 feet away

from mother trees to see what possibility there is of appreciably increasing the stock by root shoots.

13. So far only a few shoots have been thrown out from bruised and wounded roots but it may be yet too early to judge of the results, anyhow the expense involved in tracing roots is much higher than in trenching.

A. C. LITTLEWOOD.
District Forest Officer,
Central Cimbatore.

[These are original and interesting experiments. The trenching is expensive for the results obtained, as apparently it is necessary to go down to some depth.

I believe this system might pay handsomely, applied to sandal; not only from the greater value of the growth produced, but because the root system is very close to the surface—barely 6 inches down and the trenching would consequently cost much less.

(Sd.) C. D. McCARTHY,
Conservator of Forests,
Western Circle.]

Dated: 27th December 1918.

Opening of the Alangayam–Komattiyeri Ghat Road, now known as the "Gillman Road", on the Javadi Hills, North–Arcot District.

—o—

The above-named road was opened by the late Hon'ble Mr. H. F. W. Gillman, C. S. I., on the 9th August 1918.

The late Hon'ble Mr. Gillman, and Mr. P. M. Lushington Conservator of Forests, Southern Circle arrived at Alangayam by Motor Car at 1-30 P. M. and were met there by Mr. F. J. Marshall Forest Engineer, and Mr. K. R. Venkatramana Ayyar, District Forest officer, South Vellore, and after a halt of about 10 minutes, proceeded to the beginning or zero of the new road, where an address of welcome was read in Tamil by Mr. K. R. Venkatramana Ayyar, before a large number, of the inhabitants of Alangayam, and some of the surrounding villages. He also explained the object for which the road had been built.

Then the late Hon'ble Mr. Gillman cut the ribbons stretched across the road, and declared the lower part of the road open for traffic. After this ceremony, the late Hon'ble Member, the Conservator of Forests, the Forest Engineer, and the District Forest Officer, proceeded by Motor Car to Komattiyeri, where they arrived at 3. 45 P.M. and were received by the District Forest Officer, West Vellore, Range Officers, Engineering Staff, and others. Both the Conservator, and the late Hon'ble Member made short speeches here, and complimented the Forest Engineer on the very good alignment of the road, and the way in which he had carried out and completed the work on the new road. Mr. K. R. Venkatramana Ayyar, then translated the speeches into Tamil, and explained to a large number of Malayalees (Hill tribe) who had gathered at the place, the object for which the road had been built, and the benefit they would derive from it. After this, all the Officers were garlanded, and the late Hon'ble Mr. Gillman, then proceeded to cut the ribbons stretched across the end of the road, with a silver knife, presented to him by the officers, on the spot, for the occasion, and declared the whole road open for traffic. He very kindly consented to the road being named after him, and his car was the first to go up the Javadi Hills. There was great excitement, especially among the Malayalees, at seeing a Motor Car actually on the top of the Javadis.

Subsequently, at a Durbar held in front of the Forest Bungalow at Komattiyeri, where all the Malayalees had gathered, it was proposed that a school for Malayalee children, and a park to be named after Mr. P. M. Lushington, should be established at Komattiyeri, and this was accepted by the late Hon'ble Mr. Gillman. Then the Malayalees sat down to a feast, which had been previously arranged for them, and which they seemed to enjoy thoroughly.

The new road starts from Alangayam village on the plains, and ends near Komattiyeri village, on the Javadi Hills, and is 13.77 miles in length. It was entirely aligned, estimated for, and constructed by Mr. F. J. Marshall, Forest Engineer, and after much care and trouble a very good alignment was obtained, without a single zigzag, and with easy gradients. The ruling gradient is 1 in 18, this gradient being only adopted for short lengths where unavoidable. There are 70 masonry works on the road, of which three are Girder Bridges of 1 × 20' span. The traffic on the "Gillman Road" has, within the short space of four months, increased by over a hundred and fifty per cent, which proves how much the road was needed, and is appreciated by the inhabitants of the surrounding country, and the Forest Contractor.

Occasional Notes.

We beg to congratulate the following Forest Officers on receipt of honours conferred on them in the New year's day list :—

C. I. E.

Mr. C. G. Rogers, Chief Conservator of Forests. Burma.
Mr. T. R. D. Bell, do Bombay.

Mr. W. F. Perree, Conservator of Forests, U. P.
Mr. B. B. Osmaston, Forest Research Institute Dehra Dun.

O. B. E.

The Hon. J. W. Best, Dy. Conservator, Hoshangabad Central Provinces.
Mr. A. Rodger, Imperial Forest Service, Burma.
Mr. Collier, Dy. Conservator of Forests Haldwan, U. P.

* * *

In the Presidency Cricket Match (Jan. 12th to 14th), Mr. R. D. Richmond I. F. S. was Captain of the Europeans' side. He scored 41 in the first innings and 60 (top score) not out in the second innings. Mr. Richmond is not likely to be seen again for some time in Madras matches as we understand that he is shortly leaving this presidency for Simla, where he has been selected for the important appointment of Assistant Inspector General of Forests to the Government of India.

Mr. Richmond was for 6 months in 1913—14, Principal of the of the Forest College. He has examind in the finals on several occasions and has always evinced a keen interest in, and enthusiasm for the College. His advice, local knowledge and help have always been at the disposal of the Principal and staff while the College was on tour in the Nilghiris. Consequently no camps were more comfortable and instructive than those in his division. A challenge cup for the best man at the Athletic Sports is evidence of his encouragement of the Physical side of the College Training. Our congratulations to Mr. Richmond on the official recognition of his professional merits are only tempered with regret that his versatile capacity will be for a time deflected to a wider sphere than the direct needs of the Forest service in Madras. Yet we solace ourselves with the confident assurance that he will be far from the Forest College not in heart but in distance only.

* * *

Mr. R. Fourne I. F. S. who examined at the finals of 1918, has been posted to Dehra Dun as instructor, and House-Tutor of the Provincial Service class.

* * *

Mr. C. E. C. Fischer I. F. S. Principal of the Forest College 1915–17 and examiner at the Finals in 1915 and 1918 has on arrival in England been selected by Sir W. Schlich K. C. I. E. to assist in the instruction of undergraduates reading Forestry at the University of Oxford.

We understand that Mr. Fischer has approved of, and has despatched the Challenge Cup for Gymnastics presented by him to the College.

* * *

Mr. H. B. Bryant, Conservator of Forests has been granted two years' combined leave, preparatory, we understand, to retirement.

Mr. Bryant's absence from the Board of visitors will be a severe loss to the College. His industry, his sound grasp of finance, and his retentive memory for precedents, rendered him a strong and valuable ally to the College, for whose welfare he was ever ready to sacrifice his personal convenience but never his convictions of right or wrong. The College is the poorer for his departure.

* * *

The Principal has been authorised to become a Member of the Agri-Horticultural Society Teynampet, Madras.

* * *

Sanction has been accorded to the project for acquiring a site for college camp at Komattieri, Vellore South Division. The D. F. O.,

M. R. Ry. Rao Sahib Venkatramana Ayyar Avl, who was Instructor at the College 1912—15, is about to lay on water by a system of pipes to & through the camp.

* * *

Government have sanctioned the marks for Botany being increased from 200 to 300 and an allotment of 100 marks to conduct and efficiency.

* * *

Two cases of boxes of matches manufactured by Messrs. Lim Soo Hean & Co. Rangoon have been received for the Museum.

In appearance the matches and the boxes are almost equal to the best European makes, and are far superior in finish to any Japanese matches that we have seen.

The timbers used by the Rangoon factory (Bombax Malabaricum for the boxes, and Sterculia fœtida for the splints) are supplied from the reserved forests of the Pegu Division.

A full account of the factory is to be found in the September 1918 number of the 'Indian Forester.'

* * *

Two dozen partridges have been presented to the college estate by Mr. C. M. Hodgson, I. F. S. The gift of other birds (eg. jungle fowl, Pea fowl) will be welcomed. Expenses of transport will be paid.

* * *

Mr. A. B. Fenn M. R. H. (1916—18) and student N.S. Eswaran have lately undergone treatment at the Pasteur Institute, Coonoor.

* * *

We have received a letter of helpful and friendly criticism from Mr. F. A. Lodge C. I. E., in which he points out that the adaptation of a watch for the purpose of a compass, as deseribed in the last number of

the magazine, is only suitable for Northern latitudes, and that certain modifications are necessary for the success of the expedient in latitudes as far South as Coimbatore.

* * *

We regret to have to record the death from influenza on 5-11-18 at Royapuram Hospital, Madras, of ranger C. M. Kunhiraman Nair.

The conservator, central circle, with reference to the fatality observes "He was a very promising man and I much regret his loss to the circle".

Mr. Kunhiraman Nair had a distinguished Career at the College. He passed out head of his year (the only Honours Student) in 1916 being the winner of the following prizes :—

(*a*) As a junior student :

Prize for Best Junior student
" Forestry
" Survey

(*b*) As a Senior student :

Prize for Honours.
" Best second year student
" Forestry
" Survey
The Campbell-Walker prize.
The Lodge gold medal
" Brasier "
" Indian Forester "

Volume XXVII Numbers complete.
Volume XXVIII Numbers complete.
Volume XXIX Numbers complete.
Volume XXX Numbers 2, 3, 4, 6, and 8.

Miscellanea.

THE RELATIVELY SMALL EXTENT TO which the various provincial administrations have exploited the valuable forest estates they possess has often been the subject of adverse criticism, and the Holland Commission expressed the very definite opinion that "the actual yield has hitherto lagged far behind its possibilities and is, in most areas, greatly in defect of what the natural increment must be." It described the chief needs of the Forest Department as "the development of transport facilities; the exploitation of forests on more commercial lines; and the extension of research and experimental work." It added that these deficiencies point to the necessity for more staff. The accuracy of this diagnosis is confirmed by the resolution of the Punjab Government on its latest forest report. The shortage of establishment, accentuated by war demands, necessitated the postponement of much work of considerable importance; the lack of adequate means of transport prevents the full exploitation of several valuable sources of revenue, while the development of the forest property as a paying concern is retarded by the small use to which mechanical appliances for extraction and transport are at present put. A condition precedent to progress is a substantial strengthening of the staff, and it is satisfactory to learn that a re-organisation of the cadre has already been sanctioned and will be brought into effect as soon as men become available. The scheme provides for an increase of

three major and eight minor charges, among the former being included the post of research officer. So far it has not been possible to fill this appointment which His Honour the Lieutenant-Governor justly describes as one of the greatest importance. Simultaneously it is proposed to increase the subordinate executive agency and comprehensive proposals to this effect have been submitted to the Government of India. An instance of the commercial potentialities of the forests is furnished by the resin factory established at Jallo near Lahore. In the course of a few years it has developed a strong commercial connection and during the past year it earned net profits amounting to the very handsome sum of Rs. 1,68,000. The quality of its products now compares very favourably with imported articles, but for the present at any rate the prices at which they are sold are appreciably less. For the period of the war, Government departments have been supplied at concession rates, while the prices charged to the general public have been recently sanctioned at approximately one-sixth less than those of the corresponding imported articles. Although considerable expansion is still necessary before the Indian market can be wholly secured, the prospects of the industry are described as exceedingly bright. The main obstacles to early development are scarcity of labour, shortage of staff and difficulties of transport from forest to railhead, the last two being defects commonly associated with the past policy of forest exploitation. With adequate transport facilities the outturn of the factory can be increased to five times its present amount, and it may be remarked that not the least valuable result of a successful concern of this character is the fact that it facilitates the establishment of transport for other purposes by contributing towards the interest charges on capital expenditure. It is of interest to note that the Holland Commission singled out the Jallo factory as an instance of the correct methods to pursue in linking up research and commercial activities. It attributed its success largely to the fact that

We much regret we learn of the recent death of the following old students :—

B. Krishnasamy Rao M. R. H. (1912—14)
N. Vijiarangam M. R. H. (1913—15)
S. Jothinayakam M. R. H. (1913—15)

While at the College each of these officers enjoyed the reputation of doing his best.

* * *

We regret to have to announce the death of C. Ponnu the servant of Junior student M. B. Subbiah at Nedungayam camp. The servant proceeded to bath or wash cloths in the deep pool after the students had left the camp & being either unable to swim or a poor swimmer, got out of his depth and was drowned. The body was brought in to Nilambur for the Police Inquest and subsequently buried with the customary rites under the supervision of Mr.Swami Kutti the Range officer. (1914—16)

* * *

In December last at Manjeri the Principal visited Mr. Kunnirayan (M. R. H. 1914—16) who we regret to say has recently undergone a serious operation. He is we are glad to learn doing as well as possible with capable hands of the Assistant Surgeon in charge of the Manjeri Hospital. We hope to welcome Mr. Kunnirayan and many other Ex-students on the Prize Day of 1919.

The 'Indian and Eastern Engineer' for December 1918 contains a photogravure illustration of the Madras Forest College from the North east aspect. From this position the College looks its best as the full length of the shaft of the tower is seen; but the reproduction hardly does justice to the photograph.

*

The project for building a students' club, or Recreation room has been sanctioned by Government. A sum of Rs. 2000 has been allotted for the purpose provided that a similar amount is raised by subscription. About Rs. 1000 has already been provided by ex-students and others interested in the College. The work will be carried out by the principal. It is hoped that the remaining balance will be collected, and the building finished by the commencement of August. A circular on the subject will be issued at an early date. The principal will be glad to receive contribution from those wishing to subscribe to this object, which will so materially ensure the comfort and welfare of the students. Amounts will be acknowledged in the columns of the magazine.

* * *

The following numbers, of the Indian Forester have been kindly presented to the Students' Library by F. A. Lodge Esquire C. I. E., Inspector General of Forests, Hyderabad.

Volume XIII	Numbers 1 3 to 12.
Volume XIV	Numbers 5 to 8 and 11.
Volume XVII	Numbers 1 to 7 and 12.
Volume XIX	Numbers 1. 3 to 12.
Volume XX	Numbers 4 to 6, 9 to 12.
Volume XXII	Numbers complete.
Volume XXIII	Numbers complete.
Volume XXIV	Numbers 1, 2, 5 to 12.
Volume XXV	Numbers 1, 2, 3, and 7.
Volume XXVI	Numbers 1 and 11.

"the officer who was to design and work it was given the opportunity of acquiring expert knowledge of turpentine distillation under commercial conditions in other countries." It may also be added that the Local Government was particularly fortunate in its choice of an officer.

* * *

Mr. H. W. A. Watson, Forest Divisional officer, Zigon, Burma, reports that the water hyacinth, which has obstructed navigation on several canals and rivers in the province, dies if raked out of the water and stranded away from moisture during the dry season. So dangerous had this plant become in Burma that special legislation had to be enacted to enable the authorities to cope with it.

[We understand that the ash of the Hyacinth has valuable properties as manure.]

Contributions to the Gass Forest Museum.

Serial No.	Contribution.	Contributor.
1	25 Sample barks ...	Mr. A. B. Fenn M.R.H.
2	9 ,, ...	M. R. Ry. M. R. Doraisamier M. R. H.
3	5 species of long panels ...	The Range officer Chandragiri
4	Two packets of Matches ...	Messrs. Lim Soo Hean & Co. Rangoon.
5	One panel of Hymenodictyon excelsum.	M. R. Ry. K. Venkatramanan M. R. H.
6	2 Sample barks ...	M. R. Ry. A. Manicka mudaliar M. R. H.
7	One short panel of Bassia latifolia	Do.
8	9 Sample barks ...	The Range officer Satyavedu Range.
9	1 ,, ...	M. R. Ry. P. S. Varadakrishnachari M. R. H.
10	3 long panels ...	Mr. A. B. Fenn M. R. H.
11	One short, and two long panels ..	M. R. Ry. E. K. Krishnan avl.
12	Twelve panels (six long and six short) and six blocks.	M. R. Ry. S. Vasudeva Rao R. O. Bapatla.
13	Two sample barks. ...	M. R. Ry. B. T. Sitarama Ayyar M. R. H.
14	34 Sample barks. ...	M. R. Ry. E. V. Padmanaba pillai avl.
15	Two long panels ...	,, S.G. Venkatramanan M.R.H.

Serial No.	Contribution.	Contributor.
16	5 long & 5 short panels ...	M. R. Ry. B. S. Ramasamier.
17	Specimen of Mica & plumbago from Sivasailam	Mr. R. E. Lemos, M.R. Hons.
18	4 Sample barks ...	M. R. Ry. J. Sadasiva Ayyar avl. B.A.,
19	2 long & 2 short panels and 6 barks.	Mr. L. Govindasamy R.O. Chittoor.
20	An abnormally grown Margosa tree.	„ R. B. Salisbury M.R.H.
21	4 species of bark ...	E. C. M. Mascarenhas Esq.
22	Do. ...	Mr. Govinda Rao. R. O. Cuddalore.
23	A branch showing the force of apo-geotropism of shoots.	Mr. R. B. Salisbury. M. R. H.
24	A twig of Morinda Citrifolia nearly severed into two by the attack of an insect, (of the order Coleoptera.)	M.R.Ry. G. N. Subba Rao B.A.
25	A mango panel ...	„ K. S Ramiah R.O. Udumalpet.
26	A Ficus-bound palmyra ...	S. V. Silgatullahi Sahib R.O. Alangayam.
27	About 200 botanical specimens...	Sayyid Abdul Qadir Sahib Bahadur E. A. C.
28	Three Spur-fowl eggs. ...	G. C. Robinson Esq. I. F. S.

The following books have been lately added to the Students' and General Library of the Madras Forest College :—

A. Students' Library :—

(i) "Why Germany made War" by Col. The Earl of Denbigh.

(ii) Presented by F. A. Lodge Esq. I. F. S. C. I. E. :—

Indian Forester :

Volume	XIII,	Numbers	1, and 3 to 12.
„	XIV,	„	5 to 8, and 11
„	XVII,	„	1 to 7 and 12
„	XIX,	„	1, and 3 to 12
„	XX,	„	4 to 6 and 9 to 12
„	XXII,	„	Complete
„	XXIII,	„	„
„	XXIV,	„	1 2, and 5 to 12
„	XXV	„	1, 2, 3 and 7.
„	XXVI	„	1 and 11
„	XXVII	„	Complete
„	XXVIII	„	„
„	XXIX	„	„
„	XXX	„	2, 3, 4, 6 and 8.

B. General Library :—

Purchased :—

(i) 'Ferns of South India' by Major B. H. Beddome. 1873.

(ii) 'Complete Science of Wrestling' By George Hackenschmidt.

Presented by :—

C. E. C. Fischer Esq. I. F. S. 19 books.

M. R. Ry. C. Srinivasa Rao

R. D. Richmond Esq. I. F. S. 'Indian Forester' Vol. XIII

P. M. Lushington Esq.

'Indian Forestor' Vol. I July 1875 to April 1876.

Do. Vol. IX Jan. 1883 to Dec. 1883.

A large number of old lists of Forest officers have been added to the General Library by the courtesy of conservators and D. F. O.'S.

Advertisement.

The following volumes and numbers of the *'Indian Forester'* are wanting to the General Library of the Madras Forest College. The undersigned will be glad to receive any of the above as a gift or on purchase :

Apply to :

THE PRINCIPAL,

Madras Forest College

Lawly Road P. O.

Coimbatore. South India.

—o—

INDIAN FORESTER.

Vol. II 1876—77

„ III 1877—78

The following numbers of the 'Indian Forester' are required for

the *Students'* Library. The Principal will be glad receive any that officers can spare :—

1. Volume 1, 2, and 3 for 1875—76, 1876—77, and 1877—78.
2. Volume 6 for 1880—81.
3. Volume 13 for 1887—February Number.
4. Volume 14 for 1888—January, February, March, April, and December numbers.
5. Volume 15, 16, for 1889, and 1890.
6. Volume 17 for 1891—August, September, October and November numbers.
7. Volume 18 for 1892.
8. Volume 19 for 1893—February number.
9. Volume 20 for 1894—January, February, March, July and August numbers.
10. Volume 21 for 1895.
11. Volume 24 for 1898—March and April numbers.
12. Volume 25 for 1899—April, May, June and August to December numbers.
13. Volume 26 for 1900—August number.
14. Volume 34 for the year 1908—July number
15. Volume 36 for the year 1910—August number.
16. Volume 38 for the year 1912—January, March, October and December Nos.
17. Volume 39 for the year 1913—January, April, September and October Nos.
18. Volume 40 for the year 1914—June number.

19. Volume 41 for the year 1915—April and September numbers
20. Volume 42 for the year 1916—May, June, November and December numbers.
21. Volume 43 for the year 1917—January, February, April, November and December numbers.

NOTICE.

The December issue of Volume III of the Magazine despatched to the following subscribers by V. P. P. for Rs. 1-1-0 (towards subscription for 1918—19) has been returned to us as an *unclaimed* or *refused* packet as shown below :—

UNCLAIMED BY :

1. Mr Krishnan, Dy. Ranger Andiyur
2. ,, P. Velayudhan Nair, R. O. Kalkulam Travancore.
3. ,, T. Kondathu Goundan, R. O. Erode.
4. ,, W. Balakrishna Mudali, R. O. Misiri Trichinopoly.
5. ,, A. K. Anantharama Ayyar R. O. Sriviliputtur.
6. ,, D. Ramakrishna Ayyar R. O. Madura.
7. ,, C. S. Nanjappa C/o. chief Forest officer Coorg.
8. ,, C. S. Ramanatham R. O. Kudligi Range.
9. ,, Abdul Azeez R. O. C/o. I. G. of Forests, Hyderabad.
10. ,, T. Balaramasamy R. O. Chikacole Ganjam.
11. ,, Rama Hebbar R. O. Bandar Range Krishna.
12. ,, S M. Badshaw Dy. Ranger Lakkavaram range Godaveri.

REFUSED BY :

1. Mr. P. F. Andrade R. O. Vandse. Coondapur range.
2. ,, Anjaneyalu Dy. Ranger Kurnool.

3. M. R. Ry. K. Gajaraja Mudaliar Avl. (E. A. C.) D. F. O. [East Kurnool.
4. W. A. Woodhouse Adolphus Esq., E. A. C. D. F. O. Madura.
5. Mahamud Hussain Dy. Ranger Bandy Shola Nilghiris.
6. W. C. Hart Esq., E. A. C. Old staff lines Secundrabad.

The failure of the 'unclaimed' copies to reach the subscribers is doubtless due to changes in address. The adressees concerned are therefore requested to claim the copies by intimating their correct address as soon as possible. Complaints as to the non-receipt of copies arise chiefly on this account.

We learn from experience that in many cases copies have been returned to us as 'refused' packets by a mistake on the part of the postal authorities, there having been no genuine refusal at all. It is therefore hoped that those who have not really refused to accept the copies will now apply to the undersigned for the same.

E M CROTHERS,
Manager.
Madras Forest College Magazine.
31—3—19.

"A Prize allotted from the 'Indian Forester' Fund will be awarded to the past student of the Madras Forest College who submits the best Essay (limited to 2000 words) on the following subject :—

"Forest Guards, their recruitment and control: Corruption of lower Forest Subordinates and how to prevent it."

No award will be made unless a satisfactory standard is reached.

The Essays should be clearly written or typed *on one side of the paper only* and must reach the Principal, Madras Forest College not later than 1st June 1919.

Each Essay must bear a Motto: the motto is also to be written on a sealed envelope containing the name of the competitor and a statement to the effect that the essay is his bona fide unaided work: the name of competitor *is not to be written on the Essay.*"

Gazette Notifications.

OCTOBER 29TH 1918.

Consequent on the retirement from Government Service of W. A. Mekkeri Sahib Ranger IV grade, and the deputation to the I. A. R. O. of Mr. C. H. Ashe, Ranger VI grade permanent, and V grade *sub-pro-tem*, the following promotions are ordered with effect from 1st Sep. 1918.

(1) Mr. J. S. Rowland Dy. Ranger, II grade permanent, and Ranger VI grade *sub-pro-tem*, to be ranger IV grade on probation for one year.

(2) M. R. Ry. T. E. Varada Acharya from VI grade permanent to V grade *sub-pro-tem*.

Mr. J. H. Longrigg is posted to the Nilghiri dt. to assist the D. F. O under further orders.

M. R. Ry. M. Subroil Nayadu, Ranger III grade on return from the one year's combined leave granted to him is posted to Kavali range, Nellore dt. vice ranger M. Kuppusami Naidu deceased.

NOVEMBER 5TH 1918.

Mr. H. J. McLaughlin, retired E. A. C., will be re-entertained in service, and posted as D. F. O. Krishna.

NOVEMBER 5TH 1918.

(1) M. R. Ry. K. Tatachari, Ranger V grade, U. Godaveri, is posted to L. Godaveri for the charge of Gokavaram range.

(2) M. R. Ry. K. Balakrishna Rao, Ranger V grade, L. Godaveri is posted for the charge of the Gokavaram range in addition to his duties till arrival of No. 1.

The posting of M. R. Ry. M. Subbarayulu Naidu, Ranger III grade to the charge of Kavali range, Nellore district, is cancelled and he is posted to the charge of Nellore range on return from leave.

NOVEMBER 12TH 1918.

The period of probation of M R. Ry. A. Hanumantha Rao avl. E. A. C. is extended to two years with effect from the date of his appointment.

Mr. H. W. A. Gaudoin D. F. O. N. Cuddapah is deputed to Military duty for employment on grass farms work at Cuddapah under the Deputy Assistant Director of grass farms, Bangalore, M. R. Ry. M. R. Sundram Ayyar avl. E. A. C. to be D. F. O. N. Cuddapah.

Mr. R. D. Richmond D. F. O. Nilghiris to be D. F. O. Ganjam with effect from or after 15th December 1918.

Mr. J. H. Longrigg Assistant Conservator of Forests, to be D. F. O. Nilghiris, vice Mr. R. D. Richmond.

M. R. Ry. E. B. Ramachandra Rao avl. D. F. O. Krishna, on relief by Mr. H. J. McLaughlin, to be D. F. O. N. Salem.

Mr. A. Wimbush Dy. Conservator of Forests now employed as Instructor, Dehra Dun to be D. F. O. South Coimbatore with effect from or after 3rd January 1919.

Mr. C. D. McCarthy, Conservator of Forests II grade to be Conservator of Forests I grade with effect from 10th October 1918.

Mr. H. A. Latham, Conservator of Forests III grade to be Conservator of Forests II grade with effect from 10th October 1918.

The one year's combined leave granted to M. R. Ry M. Subroilu Nayudu Ranger III grade is further extended by six months with effect from 7—11—18.

Mr. V. T. Staggs, Ranger III grade Vizagapatam is granted privilege leave for one month from date of relief.

M. R. Ry. K. Tatachari Ranger V grade on return from leave is posted to Kurnool West for special duty in connection with bamboo operations.

M. R. Ry. P. A. Krishnaswami Mudaliyar Range VI grade is transfered from West Vellore to Madura district for Cumbum range charge.

M. R. Ry. L. R. Narayana Ayyar, Ranger III grade, Cumbum range, Madura district is granted combined leave for eight months, *i.e.*, privilege leave for three month and leave on medical certificate for the remaining period, from 5th August 1918.

One month's privilege leave granted to ranger B. Sambamurthi Ayyar is extended by three weeks.

The leave granted to M. R. Ry. K. R. Krishnan Nayar, Ranger IV grade, the Nilghiris is extended by six months.

NOVEMBER 19TH 1918.

Mr. J. S. Scot, Dy. Conservator of Forests is granted combined privilege leave and furlough on medical certificate for one year, one month, and seven days, with effect from 26th September 1918.

Mr. S. Cox, Dy. Conservator of Forests to be Conservator of Forests, third grade, Northern Circle.

Mr. H. A. Latham, Conservator II grade Northern Circle, on relief by Mr. Cox to be Conservator II grade Southern Circle.

Mr. H. F. A. Wood, acting Conservator III grade, Southern Circle on relief by Mr. Latham, to be D. F. O. S. Coimbatore.

(1) Mr. H. Thammayya, Ranger V grade in charge of Gooty range Anantapur district is transferred to Rapur range, Nellore district.

(2) Mr. N. E. Kanakiah, Ranger V grade on relief by No. (1) is posted to Gooty range.

M. R. Ry. T. V. Venkateswara Ayyar avl. probationary E. A. C., on relief in Kurnool West, by Mr. Starcey is posted to Kurnool East, with head quarters at Markapur, to work under the orders of the D. F. O.

(1) Mr. S. Sankara Alwa is posted to the charge of Ganganapalle range, West Cuddapa district.

Mr. O. Venkatramier, Ranger I grade in charge of Ganganapalle range, on relief by No. (1) is posted to Bapatla range, Guntur district.

M. R. Ry. A. R. Narasimha Ayyangar avl. E. A. C. on return from leave, is posted to South Kanara, for special duty, on selection of areas for reservation in Mangalore South division.

DECEMBER 10TH 1918.

Under articles 260, 233, & 338 (b) of C. S. R. M. R. Ry. K. Gajaraja Mudaliar avl. E. A. C. is granted combined privilege leave and furlough for two years with effect from date of relief.

Mr. H. F. A. Wood acting Conservator of Forests, third grade, Southern circle, to act as conservator of Forests, third grade, Central circle, vice, Mr. H. B. Bryant, granted leave.

M. R. Ry. V. Narayana Ayyar avl. Forest Ranger, second grade, Ganjam to be Extra Assistant Conservator of Forests *sub-pro-tem.*

DECEMBER 17TH 1918.

Under articles 260, 233 of C. S. R Mr. H. B. Bryant Conservator of Forests, is granted combined privilege leave and furlough for two years with effect from 3rd January 1919.

M. R. Ry. M. R. Sundram Ayyar Avl. D. F. O. N. Cuddapah will be granted privilege leave for 15 days with effect from 3-1-1919.

M. R. Ry. A. Hanumantha Rao avl. D. F. O. W. Cuddappah, will be in charge of the N. Cuddapah division also in addition to his own during the absence on leave of M. R. Ry. Sundram Ayyar or until further orders.

M. R. Ry. A. Raju Nayakar avl. D. F. O. Vizagapatam will be considered to have been compulsorily recalled to duty from leave in Board's Reference No. 1433 Gl/18-1 dated 26th June 1918.

The following promotions of rangers are ordered with effect from 1st December 1918 to fill up the vacancies which have arisen consequent on the retirement or deaths of (1) R. Jeevappa Nayak (dead) (2) M. Srinivara Ayyangar (retired) (3) M. Kuppusami Naidu (dead) (4) C. M. Kunhiraman Nayar (dead) (5) B. Sannayya (dead) (6) N. Vijiarangam (dead) (7) B. Krishnasami Rao (dead) (8) S. Jothinayakam Pillai dead :—

(1) M. R. Ry. P. Velayudhan Nayar from II grade *sub-pro-tem* to II grade permanent.

(2) M. R. Ry. Shanmugakumaran Pillai from III grade permanent to II grade *sub-pro-tem.*

(3) M. R. Ry. B. V. Nagaraja Ayyar from III grade *sub-pro-tem* to III grade permanent.

(4) M. R. Ry. R. Manikkam from III grade *sub-pro-tem* to III grade permanent.

(5) M. R. Ry. C. P. Garudachala Mudaliar from III grade *sub-pro-tem* to III grade permanent.

(6) M. R. Ry. B. K. Krishna Rao from IV grade permanent to III grade *sub-pro-tem.*

(7) Mr. L. J. Taylor from IV grade permanent to III grade *sub-pro-tem.*

(8) M. R. Ry. A. Ranganayakulu from IV grade permanent to III grade *sub-pro-tem.*

(9) G. Rama Rao from IV grade *sub-pro-tem* to IV grade permanent.

(10) Mr. A. Nicholas from IV grade *sub-pro-tem* to IV grade permanent.

(11) Mr. J. A. Paul D' Cruz from IV grade *sub-pro-tem* to IV grade permanent.

(12) Mr. C. S. King from IV grade *sub-pro-tem* to IV grade permanent.

(13) Sayyid Ibrahim Albeiz from IV grade *sub-pro-tem* to IV grade permanent.

(14) M. R. Ry. D. Ramakrishnayya from V grade permanent to IV grade *sub-pro-tem.*

(15) M. R. Ry. S. Chidambara Ayyar from V grade permanent to IV grade *sub-pro-tem.*

(16) S. M. Razvi from V grade permanent to IV grade *sub-pro-tem.*

(17) M. R Ry. S. V. Sundram Pillai from V grade permanent to IV grade *sub-pro-tem.*

(18) M. R. Ry. K. M. Gopala Acharya from V grade permanent to IV grade *sub-pro-tem.*

(19) M. R. Ry. N. E. Kanakayya from V grade *sub-pro-tem* to V grade permanent.

(20) M. R. Ry. K. Balakrishna Rao from V grade *sub-pro-tem* to V grade permanent.

(21) M. R. Ry. K. S. Ramayya from V grade *sub-pro-tem* to V grade permanent.

(22) Mr. C. H. Ashe from V grade *sub-pro-tem* to V grade permanent.

(23) Mr. K. C. Joseph from V grade *sub-pro-tem* to V grade permanent.

(24) M. R. Ry. T. E. Varadacharya from V grade *sub-pro-tem* to V grade permanent.

(25) M. R. Ry. S. Srinivasa Rao from VI grade permanent to V grade permanent.

(26) M. R. Ry. M. N. Raman Pillai from VI grade permanent to V grade permanent

(27) M. R. Ry. P. S. Varadakrishna Acharya from VI grade permanent to V grade *sub pro-tem.*

(28) M. R. Ry. C S. Ramanathan from VI grade permanent to V grade *sub-pro-tem*

(29) M. R. Ry. P. Dhananjaya Rao from VI grade permanent to V grade *sub-pro-tem.*

Mr. P. M. Mathew acting Ranger, sixth grade, in charge of Sanipaya range West Cuddapah district, is posted to the charge of Vempalle range in addition to his own, vice M. R. Ry. R. Krishnasamy Ayyar on leave or until further orders.

M. R. Ry. C. R Rajagopalan, temporary probationary Ranger VI grade in charge of Udayagiri range will hold charge of Kanigiri range, Nellore district, in addition to his own, vice Mr. E. W. Fernandez permitted to undergo drill.

M. R. Ry. P. Doraisamier Ranger IV grade U. Godaveri is granted privilege leave for two months with effect from 24th November 1918.

R. V. Perumal Nayadu, Deputy ranger second grade, Kurnool South, is transfered to U. Godaveri for the charge of the Cherla range temporarily.

Mr. K. P. Benjamin Ranger III grade Kistna, is transferred from Krishna to Ganjam for the charge of the Kukulaba range.

Mr. K. Kunhirayan, Ranger V grade North Malabar division is granted three months' privilege leave on medical certificate with effect from 29th November 1918.

DECEMBER 24TH 1918.

Under articles 260, 233, & 336, C. S. R., Mr. T. N. Hearsey is granted

combined privilege leave, and leave on medical certificate for three months, with effect from date of relief.

M. R. Ry. P. Venkataramanan avl. D. F. O. U. Godaveri is granted combined privilege leave and leave on medical certificate for three months with effect from date of relief.

Under article 199 (a) of C. S. R. Mr. D. A. Stracey is granted privilege leave for 16 days with effect from 3rd January 1919, with permission to prefix the Christmas and New Year holidays.

M. R. Ry. V. Raman Menon avl. D. F. O. Guntur is granted privilege leave for one month with effect from 3rd January 1919 with permission to prefix the Christmas and New Year holidays.

(1) M. R. Ry. P. K. Kuttappan Pillai, in charge of Kavali range, Nellore district is posted to the charge of Sriperambudur range, Chingleput district.

(2) M. R. Ry. N. C. Mahadevan Pillai Ranger IV grade on relief by No. 1 is posted to Mamandur range Chitteor district.

(3) M. R. Ry. T. T. Ansep Ranger IV grade to Palmaner range, Chittoor district on relief by No. 2.

(4) M. R. Ry. B. Chenchurama Nayudu, Ranger IV grade to Kavale range Nellore district on relief by No. 3.

Kavali range officer must be relieved again by. M. R. Ry. V. N. Seshagiri Rao, E. A. C. who will temporaily hold charge pending arrival of No. 4.

JANUARY 7TH 1919.

M. R. Ry. S. Chinnathurai Pillay Ranger III grade, S. Cuddapah dt. is granted sick leave from 2nd Dec. to 15th Dec. 1918.

M. R. Ry. S. M. Srinivasagam Pillay, Ranger VI grade is transferred from S. Salem to North Vellore for hay operations.

Mr. R. E. Lemons, Ranger III grade is appointed Instructor, Vernacular training school to be held in Tinnevelly district during the Session 1919.

Mr. A. P. Mckoy Dy. Ranger, I grade is promoted to act as temporary ranger VI grade from 15th January 1919 or from the date on which he takes charge of the duties of Assistant Instructor, Vernacular Training school to be held in Tinnevelly.

M. R. Ry. K. Jayaraman, Ranger VI grade *sub-pro-tem*, is transferred from North Vellore to Tinnevelly, for the charge of Ambasamudram range.

M. R. Ry. C. Srinivasa Rao, Ranger IV grade The Nilgiris, is granted privilege leave for one month from date of relief.

M. R. Ry. K. L. Govindakrishna Ayyar Ranger VI grade, The Nilghiris is granted privilege leave for 2 months.

M. R. Ry. Muhammad Habibulla Sahib, E A. C. on handing over charge of the S. Coimbatore will be attatched to that division for the completion of the revision of fuel working plans on which he was engaged before.

Mr. D. E. Lewin is promoted from sixth grade to fifth grade *sub-pro-tem*.

JANUARY 14TH 1919.

M.R.Ry. B. V. Vaidiswara Ayyar, Ranger V grade in charge of Kalyandrug range, Anantapur district will be considered to have been on privilege leave from 4th to 14th December 1918.

K. Sundara Raja Rao Deputy Ranger *sub-pro-tem* first grade, Chingleput district, is appointed to act as Ranger VI grade and to hold charge of Chingleput Range, vice M. R. Ry. S. Chidambara Ayyar appointed as junior Instructor, Vernacular traiping school of 1919.

THE
Madras Forest College Magazine.

Published Quarterly.

Vol. III June 1919. No. 4.

Ourselves.

The combined camp at Sadivayal was as usual characterised by interesting events. The Marathon race—an ordeal which all the students have to undergo—over a distance of about 6½ miles of hill and plain was run on the 15th. February, a detailed account of which is published elsewhere. The winners, students V. Narayanasami Ayyar, M. B. Subbayya, C. B. Chengappa, B. S. Chengappa and A. Rama Rao, are to be congratulated, and the leader in particular as he broke the college record by finishing the race in 51'—12", the previous record being 52'.

The social gathering held in the same camp on the 19th February was another attractive episode that tended to create and foster a communal spirit among the students, and the farce played afforded them opportunities for the display of latent talent.

We take this opportunity of expressing the hope that ex students of the college will make a special effort to attend the Prize day and garden party on June 30th.

On June 29th the students propose to give a variety entertainment.

* * *

The following corrections should be made in No. 2 of Vol III.

On page 95 read *1000 oz.* instead of 100 oz against the weight of 1 c. ft. of water.

On page 96 read *32·1 tons.* instead of 3·25 tons as equivalent to 7200 galls.

On page 99, last line, read '*two* goals to one' instead of '*four* goals to one'.

We regret that in the March issue of the Magazine the author's name (Mr. F. J. Marshall) of the article on "The opening of the Aiangayam—Komattiyeri Road" was not acknowledged. The articles on the Punjab Forest Department and on water Hyacinth were taken from the '*Pioneer*'.

* * *

Mr. K. Ramasami Ayyar a retired trained ranger has been appointed overseer of the College Estate on Rs. 50.

* * *

Forest Management; Ceylon.

Though I have chosen this as the subject of my talk, I do not mean to deceive myself or others with the idea that all I say here is the sum total of the administration of the Forests of Ceylon; nor do I pretend to have a full knowledge of the Forest Department in all its branches of life and in different parts of the Colony.

It would rather amount to nought were I to begin a history of the Forests from the Portugese and Dutch eras, suffice it here to say that time or that evolution in nature acting harmoniously with the excellent climatic and soil conditions of the Island has reserved for us virgin high forests with plenitude of vegetation and valuable produce as good as those found in the Madras Presidency.

Ceylon awoke to the necessity of Forest Conservancy long after Madras and that does little prevent us from making the best for the time lost, in the future. We now stand a semi-government Dept. with one conservator as the head of the Dept. 2 Deputy conservators, 10 Asst. conservators, 8 Foresters (who are also subdivisional officers), about 60 Rangers and a few hundred guards and watchers. The subordinate staff is given quarters and no uniforms and those are considered privileges. The guards are of better mould than those found here; a shade more honest, majority of them educated, knowing to read and write English to an extent of usefulness and are of wealthy people in their own way. This last quality haply acts as a good cure against bribery, underhand dealings and corruption—not to speak of 'mamuls' the practice of which I am glad to say is not current in Ceylon. There is no grade to correspond to the Forester of the Presidency. In heavy Ranges an additional Ranger is often allowed. This corresponds in office to the Dy. Ranger of Madras.

The staff receive comparative salaries with annual increment according to their grade, position and service but in all cases the scales are much lower than the salaries of the superior staff officers of the Pre-

sidency, Our guards are however better paid. They start from 15-30 and watchers from 10—15.

The Forest charges of the administrative executive and protective officers are the same as those of the Presidency.

Now for something about the Forests. Ceylon has a very evenly distributed rainfall and this with other favourable local conditions largely account for the absence of fires in our Forest. They are mostly semi-evergreen Forests with the ground always thick with moist litter and humus and a full canopy. I have never yet heard of any Forest fires in Ceylon nor of any fire protective measures adopted. I believe there are none. To make things clear let me say that Ceylon has a country division, the central protion covering the hills is known as *'up-country'* and the plains as *'low-country'*. The latter is warmer having a maximum temperature of 98° rarely going up to 99° and upcountry an avarage of 85° *Nuwara Eliya* is the health resort of Ceylon at an altitude of 6020' and is much colder than Ooty. These hill stations especially those at higher altitudes have poor forests. Exotics such as those found in Ooty are grown in Estates and gardens. The Forests near the towns had been ruined by fellings for town and Estate fuel. Foreseeing the danger of a fuel shortage and the probability of the destruction of the Forests interfering with the rainfall of the Island, Government constituted a a Reserve of all these Forests and also ruled that no land over an elevation of 4000' should be sold. Thus every acre outside the Reserve was clearfelled and is now either a plantation of tea, coffee, Rubber cocoa or cardamam, each Estate having its own factory; as was inevitable, the fuel from private lands was soon consumed and the Dept. has since the supply of fuel in the central provinces; a system of reafforestation is carried out. Long narrow strips of Forests suitably chosen and protected by wind-belts, are demarcated annually, clear felled and sown

in patches with seeds of either Acacia decurrens or A. melanoxylon as fast fuel-producers. The fellings are done by contract at a certain fixed rate per cubic yard (all fuel reckoning is by the cubic yard) approved on tender to fell and cart the produce to the Government fuel Depot; at the completion of the fellings payment will be made to the contractor according to the quantity extracted. Extraction of the fuel to cart-tracks is almost always by wire-shoots. Great quantities of fuel are also supplied to the Ceylon Government Railway from suitable forests, and delivered at sidings directly by wire shoots; Reafforestation was here deemed a a success and the contract system as explained above was not a failure. But the staff for supervision of work all over the Province was short and hence the fuel supply to Estates took a more serious turn. The demands were great and the staff inadequate to work the demand. The Government therefore apportioned out Forest areas to each estate on condition that they handed back the lands fully stocked with seedlings of Acacias after the fuel had been extracted. In short the estate had to fell the trees, fence and sow up the areas given to them as a return for the estimated value of the produce given to them at a rate of concession. This is exactly what is being done and is a saving of the labour difficulty.

The supply of Railway sleepers from the Forests of the Northern, North central and Sabragamuva Provinces both departmentally and by contract is immense. Chloroxylon Swietenia (Satin wood) formed the principal and best sleeper wood. The importance of this wood from a commercial point of view has greatly lessened the supply to the Railway; now other woods such as Berrya Ammonilla (Trinco wood), Vitex altissima, Mimusops hexandra, Terminalia glabra, Persea semicarpifolia and Bassia longifolia are largely used.

Large quantities of timber are sent to the 'central Timber Depot,' Colombo from all parts of the island. The most valuable are Diospyros

swimming one of the qualifications for every student of the college. It was not an optional subject neither was it a compulsory one, nevertheless he made every student swim. Let me now try a little logic; say, 'Cause and Effect': something causes the boat to rock and the overturning is the effect of that cause; swimming is the remedy against the effect or effectant result, drowning. Why not remedy the cause and the rest would be a reserve. It is easy enough. It is done in Ceylon as is always safe, as dry land. I mean the fixing of an 'out-trigger'. It can be tied on to the present boat of Malabar with 3 pieces of small, light, round timber, two with a slight curve and one straight. One end of one bent pole tied to the front of the boat and across it with the bent end just touching the water and to the right of the boat a similar piece tied about $\frac{2}{3}$ down the length of the boat: the 3rd piece allowed to float in the water and tied to the two projecting ends: the lengths of these pieces of round timber may be $\frac{1}{2}$ the length of the boat. This done the boat is rendered quite stable and rarely or never overturned. Planks can be nailed on across the boat at convenient distances according to the number of persons the boat is capable of carrying. This construction in tamil is known as the 'Kolia' in Ceylon. The boats thus secure perfect comfort and insurance. I have known these boats in Ceylon brave the the roughest lake and breast the more boisterous waves of the sea. How much more then, would it not do in a river?

COIMBATORE.
10—3—19.

E. S. W.

*[An excellent idea if the conservative Malayali could be persuaded to adopt it. Editor.]

[We welcome our contributor's description of Forest co[illegible] factory [illegible] in Ceylon and we should be glad if Hyderabad, Coorg etc. students would [illegible] enlighten us as to Forest life in those provinces.] Editor.

The Marathon Race.

The annual Marathon Race was run along the usual course 6 miles 5 furlongs and 100 feet during the combined camp (of b. Seniors and Juniors) at Sadivayal on 15—2—19. The start was given by the Principal at the College camp at 7. 10. A. M.

From the very beginning C. B. Chengappa and V. Narayanaswami Ayyar were together, closely followed by M. B. Subbiah, B. S. Chengappa and Narayana Rao. It was at first, impossible to tell who would win the cup. But while getting down the stiff hill from the first obligatory point C. B. Chengappa had to fall back a little owing to a mishap and M. B Subbiah went in advance of him, V. Narayanaswami Ayyar leading. C. L. Narayana Rao senior student was among the 1st five till he came to the point at which the road turns to the compartment line leading to the second obligatory point, when he missed the point and proceeded along the road to a good distance. He found out his mistake after a time and retraced his steps to the turning. It was thus very unfortunate for him to have lost his place and he had to come fourteenth. The winners of the race in the order of merit are V. Narayanaswami Ayyar, M. B. Subbiah, C. B. Chengappa, B. S. Chengappa and A. Rama Rao.

From the very start most of the juniors acquitted themselves well, owing to the good practice they had previously and they won the Inter-divisional cup which was so kindly presented by the late Rissaldar Major Amir Mohammed Khan Bahadur, whose death which occurred lately, we learnt very much, to the [illegible]

The Principal with his wonted paternal kindness towards the students supplied them with cold drinks which was very much enjoyed and felt grateful for by the students after the hard run.

Ebenum (Ebony) and Chloroxylon swietenia (Satinwood) which are commercially equivalant in value to the sandal and Rosewood of India. These are put in the market and exported to Europe.

Plantations of Teak, Artocarpus integrifolia (Jack) and Pericopsis Mooniana exist and are maintained in the northern and western Provinces but about these I am unable to give much information. Large plantations of Teak are now being started in the Eastern Province.

The extraction of timber is unlimited in the low country; all the largest girth classes have been and are being felled. The extraction or working of the forest is as far as I know not restricted by any system or method of working. The marking officer generally the Ranger is to select and hammar-mark trees and this he does according to what he thinks as sylvicultural. The pure high forests, the excellent growth and abundance of large sized timber has apparently looked largely in the eyes of previous exploiters and the Permit system is having its sway. I hope it will not be long ere the permit system is aboiished.

A FEW SUGGESTIONS :—

The first is that the present pocket tapes and chains should be replaced by steel tapes. We measure and remeasure many sample plots annually and periodically with metallic tapes. How long these tapes keep good is easily said from the present condition of the tapes in use and what amount of accuracy is arrived at our experience alone can tell; chains are similarly used for measuring and in survey and they give no better results; they stretch as badly as cloth tapes and have to be checked before every day's work. Why not improve these unsatisfactory conditions by using steel *tapes? They are strong not capable of either shortening or lengthening, durable, as easily handled as the ordinary metallic

*[We understand that steel tapes have been ordered for the College.—Editor]

tapes and above all they give very accurate measurements. They are obtainable in chain lengths as also in smaller lengths. Those used in Ceylon for measuring trees of Sample plot are of 9′ lengths. Rolled up it is about the size of the 8′ tapes sold in the college stores. It would be of immense value if these pocket steel tapes were introduced in the college as then the students will not any more be troubled with that puzzle of indicision so often met with in the field as to which has put on the 'current annual increment' the tree or the tape? To think that the former has grown less in size or the latter longer in length is equally surprising if not absurd. Would not a pocket steel tape decide this?

One more thing before I finish. Let me allude to another hope, an improvement to the life-saving factor of Malabar, the suicidal boat. How many of us like Malabar, its waters, and its surroundings, yet how many other othan Malabarians flinch to cross one of its rivers in those boats where even the most ungodly force themselves on God's mercies with low murmur of invocations. The boats have no seats to make one comfortable and worse still they are unstable even in still-water. To be candid, one has to squat down into it, first fix his centre of gravity and maintain an equilibrium; a single motion of the hand to scratch his nose makes one wear his heart in his sleeve and the boat threatens to rock him from the cradle to the deep. It is appalling to shift the destined man's formal burial to a watery grave; and if saying is true to phantasmagoria, that all the past deeds good and bad of a drowning man is visioned out to his eye just where his spirit or Soul which ever it is, whispers a hurried good-bye to his body, how many of us would prefer to die on land, gladly forgetting all the evil deeds of his past, and passing away not in the drowning man's *Karma* but in peacefulness, the comfort of a doctor and a home. This hazard to life did not escape the keen foresight of our Principal, and as a measure to combat it, he made

The principal then delivered a short speech. He felt very glad and congratulated V. Narayanaswami Ayyar for having beat the record of the College in this race. He appreciated the general finish of the race as a whole and said that it was as good as ever. This year the first winner was not given a medal but a cup. He expressed his opinion very aptly—that medals are more for the military men who win glory at the mouth of the Cannon, and it is more fitting for them if they wear the Medal on their breasts. The best of the races in England, the Oxford Boat race is much competed by great men not for the Medal (for no medals are given) but for the honour. The Marathon race itself was first instituted in Greece and no medals were given but the winner carried honour and glory with him. He expressed his regret that the Instructors posted at the two obligatory points had no chance of witnessing the winners reaching the goal. But it could not be helped for no better course could be selected.

He then called upon Mrs. Crothers to distribute the cups. She gave away the cups very kindly amidst loud cheers. The pleasant meeting then came to a close with cheers to Mr. Dawson who coached the Juniors to win the Marathon Race.

The Range officer Mr. A. P. Sreenivasa Iyengar, very kindly gave tea to all the students which refreshed them much and he was highly thanked for it.

The times of the 1st five winners are :—

1.	V. Narayanasawmi Ayyar	...	51′ 12″
2.	M. B. Subbiah ...	...	53′ 10″
3.	C. B. Chengappa ...	...	56′ 15″
4.	B. S. Chengappa ...	...	56′ 25″
5.	A. Rama Rao ...	...	57′ 0″

A comparative statement of the times of the winners of the Marathon Race during the past 4 years is given below :—

1919.	V. Narayanasawmi Ayyar	... 51′ 12″
1918.	P. K. Parameswaram Pillai	... 54′ 45″
1917.	C. S. Nanjappa ...	... 52′ 0″
1916.	C. S. Nanjappa ...	... 56′ 15″

The Juniors won the Divisional cup by 78 marks against 141 of the Seniors. It is interesting to note that the present seniors won the cup last year against their seniors.

Although none were absent for the race, two students could not complete the course.

M. Umapati.

The Social Gathering at Sadivayal.

The combined camp at Sadivayal is a great blessing to the students for developing mutual sympathies both among themselves and with the Instructors. All live closer together than at other camps and understand each other much better. The social Gathering was one of the chief events at this camp. During the previous years, it used to be held during the latter part of February after the Principal left the camp. But this year we have departed from that rule and celebrated it on 19—2—19 when the Principal was still at Sadivayal. He was requested to take the chair to which he very kindly consented. The presence of Mrs. Cowley-Brown was an additional source of pleasure to the Students. Mrs. Crothers and her family and the Instructors were all invited to which they readily responded and gave the Students much joy. The guests were entertained with songs, both English and

native, humorous recitations and a pretty little farce. The singers were Jurianz, Muliyil and Subba Rao. The humorous recitation of Sheshagiri Rao amused the audience to a great extent. Lastly after the guests partook a little of tea, Jurianz and his Company, other members being Abdul Rahiman and the "little Maiden" Rama Rao, acted the farce and entertained the guests with their wits.

The Principal, on behalf of the other guests thanked the Students very much for the entertainment they gave them and said that they were all immensely pleased with it. He further said that the gathering gave a clue as to what the students are capable of in the way of reciting and acting and that there was still a vast field among them if gradually explored. The happy function ended with enthusiastic cheers to the Principal and with "God Save the King."

M. Umayyr.

The Causation and Prevention of Malarial Fevers.

The most common and dreadful diseases one suffers in a Camp are the Malarial Fevers.

In the following statement I shall endeavour to describe as clearly as possible the cause of Malarial Fevers, the method by which they are contracted, their chief symptoms, treatment, and the means by which they may be prevented.

This statement will perhaps be useful to students and officials of the Forest Department, whose life is mostly spent in unhealthy camps, situated mostly in dense forest, where medical aid is not *readily* procurable.

The cause of malarial fevers.

In the year 1890 Laveran a French Army Doctor discovered that Malarial fevers are caused by the presence of a large number of Micro, organisms in the blood of patients suffering from the disease. These micro-organisms which live inside the blood corpuscles are small animals belonging to a grade of the animal Kingdom called the Protozoa which name is applied to the lowest grade of the animal Kingdom and these micro-organisms are called the Malaria parasites, which are the chief cause of malarial fevers.

The animals in which a parasite passes its life, and at whose expense it lives, are called its hosts, and the hosts of the Malaria parasite are man and mosquitoes In man the organism is found in the red blood Corpuscles and in the mosquito in the tissues of the stomach wall and in the salivary glands.

These malaria parasites multiply themselves by two methods. Firstly by an asexual method, consisting of the simple division of a parasite, after it has grown to a certain size, into a number of small parts each of which can enter a new corpuscle and become a young parasite, exactly similar to the original one: and secondly by a sexual method, consisting of the union of two cells, which have acquired different properties (male and female), and the resulting fertilized cells, grow and divide themselves into a number of parts which are capable of becoming young parasites, exactly similar to the original ones. But as a general rule all the parasites at the commencement of their life multiply themselves only by the asexual method, and that after a certain number of generations have been thus produced sexual forms appear, which are capable under suitable conditions of carrying on

multiplication by the sexual method. Without sexual reproduction the organism would after a certain number of asexual generations become worn out and die. Man is only the intermediate host of the Malaria parasite, because in his blood only asexual multiplication by cell division of the parasite occurs, and if the organism had no other method of multiplying itself than this, it would die out with the death of the man.

The mosquito is the definitive host, because in its body sexual multiplication, by which the parasite is enabled to start its life afresh whatever may afterwards happen to the mosquito, takes place.

A young parasite when seen under the microscope will appear to be, as a small unicellular mass of protoplasm, manifesting amaeboid movement and occupying but a small portion of the whole corpuscle It gradually grows larger, feeding upon the substance of the red blood corpuscle and converting the haemoglobin into dark granules of pigment, which may be plainly seen in the parasite. When it has grown to its full size, so that it nearly or quite fills the corpuscle, the grains of pigment collect together into a mass and the parasite begins to divide up into a number of small parts, each of which is capable of becoming a new parasite identical in all respects with the original one. These parts or segments called "spores" remain in contact with each other for a short time, and then burst through the red blood corpuscle and become free in the blood. Each of them now seeks out and enters a fresh red blood corpuscle in which it begins to grow in the same way as the original one did, ultimately reaching its full size and dividing up into a fresh number of embryo parasites which again enter other corpuscles and go through the same cycle. This is the asexual method of multiplication, and it is clear that even if originally only one corpuscle contained a parasite, a very large number of corpuscles will, by this method, soon become infected.

After this method of multiplication has gone on for a certain number of days, some of the parasites in the red blood cells instead of going on to their full size and dividing up into a number of segments, proceed to the formation of sexual forms, composed of Male and Female forms. Having attained to their full size they appear as coarsely pigmented round or crescent shaped bodies enclosed within the thin shell or envelope of the red blood corpucle. In the blood of man they undergo no further developement. If, however a mosquito bites a man with these sexual forms in his blood, some of them are carried into the mosquito's stomach with the blood which the insect extracts. If the Mosquito is of the *Anopheles* genus, further development of the parasites in its stomach occurs, and thence they are conveyed by the circulation to the salivary glands, and penetrating the outer wall of the gland cells they come to rest in them and in the salivary duct which has its external opening at the point of one of the piercing stylets of the proboscis which enter the skin in the act of biting. When the mosquito next bites a man it injects some of these parasites into his blood with the salivary fluid. Having got into the blood of man again, the sporozoites after a certain time are found in the red blood corpuscles, as young parasites identical in all respects with those forms in which the cycle was commenced.

The Method by which Malarial Fevers are contracted.

A mosquito of the *Anopheles* genus bites a man who has been suffering for some days from malarial fever, and who has sexual forms of the parasite in his blood. These sexual forms are taken into the mosquito's stomach with the blood which it sucks in, and there they undergo the development that I have just described, resulting after some

days in the formation of numerous sporozoites which lodge themselves in the Salivary or poison gland of the mosquito. When this mosquito next bites a healthy man, it injects some of these sporozoites into his blood with the salivary fluid and so produces a malarial infection in him similar to that of the man from whom it originally sucked blood. It has been proved almost beyond any possible doubt, that there is no other method by which malarial fevers can be contracted than by the bite of a properly infected *Anopheles* mosquito. We cannot contract malarial fevers from drinking impure water, or from the soil, or by breathing impure air, and water and air are only indirectly connected with malarial infection, in the sense that they are the homes of the malaria carrying mosquitoes.

The general characters of Mosquitoes.

The general appearance of a mosquito is probably well known to all. It has a long sucking apparatus called the proboscis. The wings of a mosquito are covered with scales which can be plainly seen with a small magnifying glass.

The different stages through which Mosquitoes pass before they reach the adult state:— An adult female mosquito lays its eggs on a pool or other collection of water. In a few hours, these eggs hatch into small animals, called *larvæ*, whose life is spent entirely in water. After a varible time, depending chiefly on the temperature, the larvæ change their shape and character, and become small comma-shaped creatures called *pupæ* which spend their time struggling to the bottom of the water and floating up to the surface again to breath: After one or two days the *pupæ* are transformed into the adult insect or *imago*, which

emerges at the surface of the water. After resting for a while on the surface of the water, the adult mosquito flies away to seek its food from the blood of some animal or man. The appearances of the various kinds of mosquitoes differ in all these stages of the insects' existence, and it is important to know these differences in order that we may be able to distinguish the Malaria-bearing from the harmless mosquitoes. There are different species of mosquitoes but for the present purpose, it is only necessary to have a knowledge of two species (1) The *Culex* genus and (2) *Anopheles* genus.

The difference between *Culex* and *Anopheles*:—The eggs of *Culex* genus of mosquitoes are laid on water in small black masses consisting of several hundred eggs joined together like rafts. These egg rafts look like a small lump of soot floating on the surface. They can be seen on almost any tin or tub of stagment water that has been left lying about out of doors.

The eggs of *Anopheles* genus of mosquitoes are tiny rod shaped bodies which as each egg is laid separately can only be seen plainly with the aid of a lens.

The Larvæ of *Culex* are a number of small active creatures about 1/16 to 1/4 of an inch long, which wriggle about in the water, now diving to the bottom and then coming up to the surface to breathe, which they do by means of an air-tube attached near the tail. When they come to the surface to breathe, they hang obliquely with their head downwards and with only the tips of their air-tubes at the surface of the water.

The Larvæ of *Anopheles*, have no external air-tube and the result of this is, that they lie flat at the surface of the water. They move along at the surface when disturbed in backward direction by a series of darting, jerky movements.

(1) The Malignant Tertian parasite

(2) The Benign Tertian parasite

(3) The Quartan parasite.

I shall describe first the result of an infection with Benign Tertian parasite, because this is the type most commonly met with in India; Supposing a man to have been bitten by a mosquito infected with the Benign Tertian parasite, he will probably not feel any ill effects until about 12 or 14 days afterwards. This is the incubation period during which the parasites have been gradually multiplying in his blood but have not been present in sufficient numbers to cause any symptoms. Towards the end of this period he may feel some aching of the bones, headache, or other premonitory symptoms, and his temperature may be somewhat raised. After these indefinite symptoms have gone on for a day or two the regular attacks of "Ague" begin. These consist of a series of attacks of fever which recur, in infections with the simple or Benign Tertian parasite at definite intervals of 48 hours. Each attack is represented by a cold, hot, and a sweating stage. At the beginning of cold stage the patient feels chilly; after a short time the feeling of cold spreads all over his body, and becomes so intense that his teeth chatter and he shakes from head to foot. His temperature, however, in spite of the feeling of cold begins to rise. After a time the shivering stops and the patient begins to feel hot, the skin becomes dry, and burning, and the temperature rapidly rises to 103° F or 104° F or more. After an hour or so the hot stage passes off, the patient begins to perspire profusely, the fever quickly declines, and in a short time all the acute symptoms have disappeared and the patient feels almost well. As a rule he is able to get up and go about his occupation, until the next day but one, when he will again have another attack of fever

similar to the first one. If untreated the attacks may recur every other day for many weeks, gradually declining in severity as time goes on. In the meantime the patient's spleen has become enlarged and he has become pale, and anæmic. After the fever has apparently left him for good it may return at irregular intervals for many months (Relapses). The relapses of fever may be brought on by almost any exciting cause, such as chill, over-fatigue, over anxiety, exposure to sun etc., and have no connection whatever with mosquitoes. They are simply due to the fact that all the parasites of the first infection have not died out, and when the patients resisting power is lessened by any of the exciting causes just mentioned, the parasites are able to develop rapidly again and produce their ill-effects.

Quarton infection:— The symptoms produced by an infection with the Quarton form of the Malaria parasite are similar to those produced by the simple Tertian form except that the interval between the onset of the attacks of fever is one of 72 hours instead of 48 hours. The reason of this is that the Quartan parasite takes 72 hours to complete its asexual cycle instead of only 48 hours, as is the case with the Tertian parasite.

The after effects of Malarial infection:— After a succession of attacks of untreated or insufficiently treated malarial fever, a patient develops the condition called Malarial Cachexia. The chief signs of this condition are marked anæmia, great enlargement of the spleen and sometimes of the liver, a sallow earthy complexion of the skin a tendency to swelling of dependent parts and the presence of chronic irregular low fever ranging from 99° F to 101° F or more for many weeks or months; As a rule, no malarial parasites can be found in the blood of these patients and for this reason they are not amenable to quinine. The chronic low fever from which they suffer is due to the secondary result of their general condition.

The pupæ of Culex — The pupæ are small comma shaped creatures bearing no resemblance to the Larvæ, and they breathe by means of two trumpet-shaped projections attached to the head, so that they lie with their heads at the surface and their tail downwards.

The trumpet-shaped breathing tubes of the *pupæ* of *Culex* are longer and more slender than those of the *Anopheles* genus.

The difference between a Male and a Female Adult Mosquito: In the male variety, you have a feather-like tuft in front of the head which is called the Antennæ, in female mosquitoes the Antennæ have no long hairs and are nearly bare. Again in females very often the abdomen is distended with eggs or the stomach may be full of blood, whereas the male doesn't bite and hence the stomach will be empty.

The difference between the Adult Culex and Anopheles Mosquitoes: In *Anopheles* the palpi are long while the *Culex* have short palpi. The attitude of *Anopheles* when resting on a wall or roof is, that it keeps its head, neck and abdomen in one line and the hinder part of its body projects outwards from the wall, so that the insect frequently appears to be standing on the tip of its piercing apparatus or proboscis, while with *Culex* the body is either kept parallel or the tail end is even nearer to the wall than the front part of the body, so that *Culex* appears hunch backed. *Anopheles* have spotted wings, while *Culex* have plain and uniformly coloured wings.

The Characteristics of Malarial Fevers :— It is well known that the most prominent symptom caused by an infection with Malarial parasites is fever of a very definite and peculiar character, which may be termed Intermittency and Periodicity. By Intermittency is meant the fact that the fever ceases at intervals; the temperature alternately falls to normal or below, and rises again. This is called Intermittent Fever.

By Periodicity is meant the habitual tendency of the fever to recur at stated intervals of time. Thus the fever may recur at intervals of 24 hours called the Quotidian type or at intervals of 48 hours, called the Tertian type, or at intervals of 72 hours, called the Quartan type — all cases of fever due to presence of malarial parasite in the blood will if left untreated, sooner or later exhibit these two characteristics of Intermittency, and Periodicity.

It has been already described how the parasites in the red blood corpuscles gradually grow larger and larger until they attain, their full size and divide up into a number of segments which burst through the thin remnant of the corpuscle and become free in the blood ready to enter fresh corpuscles. It has been found that the onset of the attacks of fever from which the patient suffers always corresponds in point of with the stage of segmentation of the parasites. During the interval of fever only young and medium-sized parasites are found in the red blood corpuscles and it is only when the parasites are in the segmenting stage and escaping from the corpuscles that the attack of fever begins.

There is thus a very intimate connection between the segmentation of the parasite and the attack of fever, and it is probable that during the growth of the parasite, in the red blood cell it produces a pyrogenetic or fever producing chemical substance, which when the parasite bursts from the red cell, in the act of segmentation is liberated into the blood and so becomes able to exert its influence and cause fever.

From the above it will be seen that a parasite which segments every 24 hours, will produce Quotidan fever, one which segments every 48 hours will produce Tertian fever, and one which segments every 72 hours will produce Quartan fever. There are three varieties of malarial parasite which segment at the above intervals, and they are respectively called :—

The treatment of Malarial Fevers:— Quinine is the only reliable drug in Malarial fevers, and if given in a proper manner and in sufficient doses it seldom fails to effect e. If quinine is given in small doses at the beginning of an atta malarial fever, it may continue in an irregular manner in spi f the usual doses of quinine.

As soon as a man gets Malarial f it is best to begin the treatment with quinine at once, irrespective of the stage of the fever and to keep the patient slightly cinchonised, (*i. e.* until buzzing noises in the ears and deafness exhibits) by repeated doses of the drug until he is cured.

Quinine acts most effectively on the parasite when it has escaped from the red blood corpuscles in the act of segmentation; As we have already stated that this corresponds in point of time with the onset of the paroxysm (the cold stage), and whatever other doses of quinine is taken by the patient during the day, we should always make sure that he takes one large dose (say of 20 grains) shortly before his paroxysm is expected. One dose taken at this time will, in the ordinary regular Tertian and Quartan fevers, probably stop all future paroxyms.

Quinine which is tasteless, is quite as effective as ordinary quinine and can be easily given to children. It must be given in the shape of the powder, otherwise if dissolved in acid, its bitter taste returns.

Quinine is much more effective, if given hyphdermically. Tabloids of the bi-hydrochlorate or some other soluble salt should be used dissolved in distilled water, but as this requires great care to thoroughly boil the needle, syringe, and solution, and to render the

skin thoroughly aseptic before carrying out the operation. The aid of a medical man is essentially necessary. As in syphilis, continuous treatment is necessary for some months after all symptoms have passed off to ensure freedom from relapses.

Prophylaxis.

Under this heading we must consider 1st how to prevent malarial fevers. and 2nd how to extirpate malarial fevers. These consist of:—

(1) The extermination of Anopheles Mosquitoes.

(2) The protect on of every one from thh bites of Anopheles Mosquitoes.

(3) The use of prophylactic drugs. The extermination of Anopheles Mosquitoes is much more easily dealt with in their larval condition in water than in their Adult state, by getting rid of all places where they can breed.

This is done by draining away large areas of water, and filling in of all small tanks and pools and the removal of stagnant water wherever it may be. Any superfluous water which cannot be drained away may be made an impossible breeding place for Anopheles, by covering it with a layer of Kerosine Oil, which not only kills all larvae but also any adult mosquitoes that may come to lay their eggs on the water.

The plan of attempting to protect every one from the bites of infected Mosquitoes is by covering in the doors and windows of houses and beds with mosquito-proof netting; and to protect the the whole body from mosquito bites, while going out in the evening or sitting in the house or verandah by wearing sfficient clothing. The use of prophylactic drugs consist of taking a dose 15 grs. of quinine combined with 2 drams of magnesia sulphus for two successive days and repeated at intervals of 8 days throughout the period of 3 months.

If during the course of the treatment the individual gets a relapse of fever, he should take 5 consecutive days' treatment with quinine given as follows; on each of 1st and 2nd day 30 grs. of Quinine *i. e.*, 15 grs. in the morning and 15 grs. in the evening and on each of the 3rd, 4th, and 5th days 15 grs. of Quinine. The after treatment is then continued in the same way as before, *viz.*, 15 grs. on two successive days; every 8th day for 3 months small doses of Quinine 3 to 5 grs. combined with Arsenic may be taken daily to prevent relapses.

J. E. D'Cruz,
Medical Officer,
Senior Divison,
Madras Forest College.

Rabies and Anti-rabid treatment.

The greatest of imaginable problems on the face of the earth is well-known to be the struggle for existence. This is common to all things human including man. His is too delicate a machine to stand any slight careless handling which causes permanent or temporary derrangement. He is put to suffering to a greater or less extent as the nature of the case may be, has to gradually lose his game in life, and uitimately has to cease to live for ever. Many are the diseases he is subject to and of these, rabidness is one of the worst and most deadly. Unlike many poisonous bites whose signs of bad development are immediate, the development of the rabies takes a comparatively long time to put the human system out of order, ultimately involving the patients in the greatest imaginable sufferrings to end in irremediable death.

The thought of the serious nature of the disease and the attendant horror have called upon the energies of scientific heads to arrive at the means for a very effectual treatment. Nothing curative has yet been found and preventatives are only very few. Experiments are continously being made to hit at the farmer which yet is said to remain a mystery. It is far beyond the pale of the writer's little knowledge to dwell even shortly upon the different scientific means adopted to secure the preventatives. To be brief, the Pasteur system of injecting attenuated poison sub-cutaneously to persons bitten before the disease shows any visible sign of development has till now been found the most *favourable*. The doctors in our immediate neighbourhood counsel us to take to immediate caustic treatment of the wound which they say is eminently desirable, pure carbolic acid furnishing the most effective cautery. The appliance of the caustic is said to have an easy way for the success of the preventative treatment; so much for the learning of the West. Attempts are not wanting in the native quacks, to secure preventatives.

This is the one in vogue at Malabar and of which the writer has practical experience. As soon as the bite is over, warm water, made warm by pouring cold water over the smouldering embers of a burnt fuel, is applied to the surface of the wound. Also the bitter juice of tender *Memordica Charantia* (Tamil *Pagal*) is applied to the surface of the wound. These two perhaps take the place of the caustic in preventing the injected poison from gaining early and effective admission into our delicate system. The earliest possible opportunity is availed in getting what is known as 'Kopam oil' a medicinal one procurable at a country place. Early in the first morning the patient is asked to drink half a measure of the oil and another half a measure is smeared all over his body. He is not to touch the ground, nor to taste anything. He is to keep a complete fast till the end of the day when he is given a clean cold bath. Finishing this, he is allowed to take food. From that day for 90 days continously he has to abstain from preparations oily, and those savouring of salt, chillies or tamarind. The simple unobjectionable food is pure cow's milk and rice with a little sugar. Any slight violation of the principles of the fast subjects the patient to serious sufferings, ending in death. This system is found to be too strict to follow for men of business and hence the Pasteur system of treatment is now taken to.

To the writer's knowledge, there are two places in India where the Pasteur system of treatment is freely given. One is in Northern India and the other at Coonoor in Southern India. This system of treatment to take good effect seems to require a cold climate. There seems to be also a proposal to have an institute at Ceylon the climate of which seems to be suitable for the treatment.

The admission for treatment in Coonoor Pasteur Institute is free both to the rich and the poor, of all creeds and castes. The Institute is a purely Government Institute, working on public donations for the

benefit of the public. The treatment consists in injecting some serum to the patients for 14 days continuously without any break and with two injections a day. In the preparation of this serum, the rabbits of European breed, play a great part and a continuous supply of them is secured through a contractor who is said to have a farm to rear them at Pondicherry. The injection of serum is not very painful. Really there is a very little pain in the injected part for a little time till the serum is absorbed. It often takes a little time and when the absorption takes place a little scratching sensation is felt at the injected part. The patient is not then to scratch the part but to apply hot fomentation which quickening the absorption nullifies the pain and the scratching sensation. At the time of the injection the patient is to a certain extent to practise abstenance which consists in avoiding indulgence in alcoholic drinks, sumptuous and luxuriant food, long wakefulness, and in other bad human weak tendencies which the patient is expected to know would be weakening his system for the moment.

Prior to his procedure for treatment to the Pasteur Institute the patient is expected to take certain precautions which alone would entitle him for a treatment in the Institute. As soon as he is bitten by a dog he is to ascertain somehow whether it is mad or not. Many are the dogs that bite and that are not mad and hence do not develop rabies in the man bitten. There are certain causes for a dog getting mad. There are certain seasons in the year when dogs have a tendency to bite which leads to the development of the rabies. At other times the bites are not effective. The weather for dogs in Madras is considered to be between June and October. All dogs go mad at other times when being bitten by rabid animals. There are many sure signs of their having developed the rabies in consequence of that bite. They attack men unoffended. They are characterised by an unnatural

tone in their barking. It is a popular saying that the rabid dog has a stright stiff tail, slender body reduced to a skeleton and an ugly face. The collection of foam in its mouth is a sure indication of its being rabid. The surest sign to indicate the rabid nature of the dog is its agonising death within 10 days after it bites a man. The patient is expected to thus watch the dog carefully and to ascertain its madness. If the dog is found to be alive after ten days, having developed no sure signs of rabies he is not to undergo any treatment, for, the dog is not a rabid one. On reaching the Institute queries are eagerly made as regards the circumstances under which the man had the bite and the result of his careful watch over the movements of the dog. Only after the query is made the institute starts treatment. Any delay exceeding ten days after the bite is viewed with serious apprehension.

To conclude, many are the facilities provided for the rich as well as the poor both private and in Govt. service to undergo this treatment without being in anyway deterred for the moment by peemiary difficulties.

N. S. Iswaran,

Junior Student.

[The writer having been bitten in camp, underwent treatment at the Pasteur Institute in December 1918—Editor.]

Under Planting in Nilambur.

In an article by Mr. Umapathi Mudaliar under the heading of "Under Planting in Nilambur", he advocates the introduction of bamboos, as an under storey to Teak. (Last para Page 53, Vol. III No. 2 of M. F. C. Magazine).

To me the introduction of bamboos presents certain difficulties and I request the help of some one to aid me to surmount these. Is it

to be introduced by sowing or dibbling in seeds or by planting rhizomes? The former is difficult, nay, impossible, as one could not be getting seeds of bamboos year by year to suit our requirements as bamboos are a species which flower and seed gregariously. With regard to the latter method of introduction I have to say that the bamboos introduced by means of rhizomes will flower and fruit at the same time as the parent clump from which the rhizomes have been removed. This statement of mine is very easily proved. We notice the culms coming out of the rhizomes taken from the parent clump and planted out is of the same size as the culms of the parent clump of the previous year or as big as the culms sent up by the parent clump in the very year. Probably the growth of a year may be retarded by the shock caused; but this will never go to put a year more in the life of the clump which had been singled out from the parent. It will flower and fruit along with the parent.

If the difficulty of the introduction of bamboos at Nilambur in plantation after plantation as an under-storey to teak be overcome we would have solved a difficulty which we may feel (hereafter) for want of stuff for making rafts for floating over teak down to Kallai, Calicut and other markets on the Coast. The Sylvicultural advantages are proved and varied. Summarized it is financially and culturally desirable.

A. B. Fenn,

Forest Ranger,

19th Feb. '19. North Coimbatore Dt.

Memecylon edule.

The importance of this small tree which occurs in almost all the dry forests of South India is not commonly known. The wood is of

great value as fuel. The leaves dried and crushed into a powder are essential for dyeing cotton cloths with Alizarine dyes. In certain districts the collection of these leaves is leased out.

In the Madura District the minor forest produce contractors collect the leaves very largely and the powdered stuff finds a ready market at Madura where dyeing is a cottage industry.

The leaves are collected all the year round but the best quality is available between December and June. leaves of all ages are useful and collected.

The ends of twigs are broken off and dried in the forest itself or in adjoining fields in prepared grounds. The leaves turn a golden yellow colour when dry and the woody portions are carefully picked off. It takes about 4 days for the leaves to thoroughly dry. The leaves are then crushed in a mill and bagged ready to export. It retains its qualities for 6 months deteriorating in value afterwards until at a year after collection when it is perfectly useless. Rain or dew spoils the leaves. Iron salts are apparently harmless as the leaves are very often dried in loamy soils where iron salts abound. It is essential that the picking and drying should be clean and the powdered stuff free from dirt and sand.

A maund of 25 lbs. costs Re. 0-6-0 to 0—8—0 for collecting drying and crushing the leaves and sells at Madura for 0—12—0 to Re. 1

The exact process of dyeing is laborious but not of forest importance.

Nattam, 6—2—1919.

T. G. SANKARAN NAIR.

A Six months' practical training.

It was on a bleak December night in 1916 that I caught the train at Hyderabad Station, bound for Kareemnagar, my home for the next six months, for I was proceeding on my 6 month's practical training, prior to joining the Madras Forest College at Coimbatore.

Early next morning I arrived at Kazipet, the nearest station to Kareemnagar and there found a large Motor bus of the Hyderabad Motor Service waiting to carry me to my destination. Arrived at Kareemnagar I was told that the D. F. O. was camping some 20 miles away. I started that same night for camp in a cart, and after a sleepless, bone-racking journey arrived, and reported myself. Kareemnagar is a moderate sized town situated on the left bank of the Maner a tributary of the Godavery. It is the head quarters of the D. F. O. and is one of the Major Districts of the Dominions.

The general outline of the country is level, rising here and there in rugged rock-bound hills with scanty tree growth, the home of the panther and the bear. The country thus stretches in alternating plain and hill to the banks of the Godavery the boundary, of Kareemnagar Division. The forest growth of this District is as is generally the case in all Districts, scanty except for an area bordering the banks of the Godavery where the best teak growth in the Dominions is found. Other valuable species found in these forests are Rose wood, Pterocarpus Marsupium, Satinwood, Diospyros melanoxylon, Terminalia tomentosa and some others.

These species are found growing more or less in conjunction with such species as Bombax, Sterculia Urens, Odina Wodier, Cassia fistua,

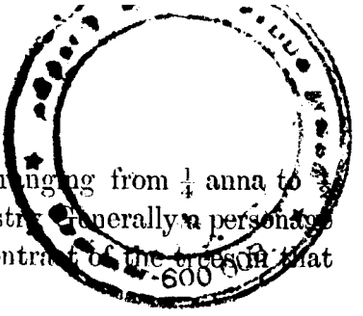
and others. Tall toddy palms in the distance marks the site of some village and thither a cart track winds its way.

It was in such surroundings I found myself. I was soon initiated on the mysteries of surveying and found myself taking a survey of a small hill, covered with tree growth, the timber of which was to supply the neighbouring village with fuel and agricultural implements.

That little area was to be worked under the 'Coppice with Standards' method. The yearly requirements of the neighbouring village are first calculated, taking 2 lbs. of fuel per house per day. The yield per acre, less the standards, which are generally 25 per acre, is then found by actual experiment, and the number of acres required for the yearly supply of fuel to the village arrived at. This area is then marked out the Coupes allocated and working under the Coppice with standard method commenced. This method of working is known as Village Forest System. Thus the working of the forest throughout the District. Grazing is allowed in certain areas and for these privileges the villagers are required to help the forester in fire protection works, Demarcation, as Survey coolies etc.

The minor forest produce collected in this District are Beedi leaves from Diospyros melanoxylon, which yield a large outturn of revenue, Honey, Wax, Cassia auriculata and C. fistula bark for tanning purposes, Mohwa (Bassia latifolia) flowers for distillation into the natives favourite beverage "Schrab" and other produce too numerous to mention.

The method of collecting the Mohwa flowers is as follows: In the month of March and April when the trees are in flower women and children go out early in the morning to collect the fallen flowers in



baskets. These baskets they sell, the prices ranging from ¼ anna to ½ anna per basket according to its size, to a Maistry generally a personage from the nearest distillery, who has taken a contract of the trees in that particular village from Government.

In some convenient spot the ground is cleared and here these flowers are spread to dry. When quite dry they are carted to the distillery.

It was in 1917 that steps, towards, the propagation of lac, were taken in hand by the orders of the Inspector General of Forests, and I had the good fortune, to tie on many a stick lac to the juicy twigs of Butea frondosa. The fauna of this District are many and varied and often while lying in bed on a cold night have I heard the bark of a Sambur and the call of a chital (spotted deer) alternating with the snarl of a panther and the majestic roar of a tiger.

The ponds and tanks adjoining many a village afford the sportsman the pleasurable excitement of duck and teal shooting, while the cultivated fields standing under water with the tiny blades of the rice plant rising above, afford a just sufficient cover for snipe.

It is thus with pleasure I recall the happy time I spent in the first and only District of the Nizam's Dominions to which the order of the Inspector General of Forest sent me to.

C. M. EDWARDS,

1st May 1919. *Senior Student.*

"Talk" of Elephants.

On reading the article in the Madras Forest College Magazine about the talk of elephants I got the same inspiration (I know not how,

probably from the writer of the previous article) when I had a chance to go to an elephent camp where there were two new captures who were talking to each other (talk, I mean by making signs which no one can understand except myself and the one from whom I got the inspiration). The talk in a very interesting one the purport of which is given below. Of the two elephants one was a female and another a young tusker.

Female— My dear comrade in bondage, those junglers (Forest officers of the Range establishment) are very glad at our capture because they get a paltry few rupees, reward. I think they must be doing so at every time our tribes man falls in their power and they don't realise the serious blunder they are committing.

Tusker— What is that blunder? They are making a profit of thousands of rupees on every one of us and they must have hoarded a good lot of money up to this by capturing a good number of us.

Female— My dear comrade, you quite understand that they captured a good number of us since a very long time and that is why I say that they are committing a serious blunder.

Tusker— What is that blunder then?

Female— Tarry a while; I am now explaining what you have asked:— We dont' feel ourselves quite at home here though we are treated here kindly and given to eat things which we taste very rarely (*i. e.* by damaging paddy, ragi crops, plantain gardens etc.); but all these things are not at all conducive to our robust health. We can never live here long, not even half the period which we would live in Nature's Home (Forest) because you see that we are not in bondage there, and we can roam about leisurely as we like and eat the choicest

and best fodder and that in varieties which would never bring us indigestion and such kind of fodder these people will never be able to supply us. The net result is that we go down in condition daily and lose half the strength which Nature had kindly endowed on us. Further being in bondage we can't multiply ourselves. Do you understand me?

Tusker— Oh yes! you have come to the point. I feel I have not even half the strength now though I can boast of being in the prime of life and you are quite right in saying that we can't multiply ourselves at all (under charge of Humans).

Female—Don't be inaccurate in your statements & don't condemn the Humans & especially so the junglies. We can multiply ourselves when we are in charge of Humans but to a very limited extent. There may be a few solitary instances of new-born young ones among us (when under charge of Humans) but this number is quite insignificant in comparison with the number they capture every year and the number that die in doing so. So our tribe will diminish and in course of time our race will be wiped off the face of the earth; did you not see that we had only a few comrades to walk about in our company of late whereas we used to have hundreds of our race some time back. By this the Humans will have to suffer very much.

Tusker— Why should they suffer? They had already made up as much money as they could and they don't care whether we die or live after we are sold.

Female— Don't be hasty in drawing conclusions. Did you not hear from our comrade (kumki elephant) who is already a friend of Humans that we are made to drag logs from these forests which they can't do by any other means. That is why they are so much in need of us and that is why I say that our tribe vanishes which is not far off.

They will have to mourn our loss in sack cloth and ashes. Irretrievable blunder; but alas! repentance will come but too late, but still it is not too late to mend. They can even now make amends for their foliy. Instead of becoming avaricious and capturing us in great numbers every year in pits or in Keddahs, they (forest officers) can capture a few of us as occasion arises every year just for the sake of their work (Forest Dept). Look at the damage done among us when we are caught in Keddahs because more than half among those caught die fighting for liberty.

Tusker— Humans are very wise. They will devise some other means to do their work after we disappear. These means may be by force of power or steam engine or electricity.

Female :—As you say they may device means because they are wise but by those means they will never be able to get the work done (what we do for them so very cheap). Even if they have wonderful means I think from what I hear they can't dispense with us altogether because those wonderful contrivances they can't bring to our regions and every part of it (Forests) and even if they do it will never pay them and what is most important there must be at the beginning a very big outlay which these humans are not prepared to lay out.

I do impress on you, my dear comrade, in bondage that you might have heard from our ancestors that we were used to fight for men and they used to take us in thousands and how you are quite aware that there may be scarcely a hundred or two at our dear native home (Mysore). We call this still our dearest home though we are plundered there (by Keddah operations) May God give them (Humans) power to cover the loss that will be sustained by giving up capturing us on a very large scale and also inspiration to every one of them to understand what

we talk. Let us talk, more about them next time. My word! there is one of the Humans who seems to have understood us and laughing heartily and I don't know what the consequence will be and he may take revenge on us.

Tusker — Don't be afraid. No harm will come to us because we have spoken the truth. Even if evil may come remember the saying "Out of evil cometh good".

"WISE TUSKER."

From the above talk I think capturing operations may not be carried out on such a large scale as is done now: they need be carried out on a very limited scale for fear of the tribe being extingushed in course of time.

"WISE TUSKER."

Extract from "POPULAR SCIENCE SIFTINGS" for 22nd October 1918.

"Flowers that Fertilise Themselves."

Cross Breeding Exceptions.

A frequent statement in biological work is that cross fertilisation is almost essential in order to prevent weakening and consequent deterioration of the species. Such a statement, however, it is pointed out in a 'Scientific American' paper, by Albert A. Hansen, is not always verified by facts. Many of our cultivated plants have long been vegetatively propagated; thereby the effects of fertilisation are eliminated with no apparent degeneration or deterioration. Also there are several plant species which are habitually parthenogenetic (producing seed without fertilisation), particularly the hawkweeds, *Hieracium* sp., and the Dande-

lions, *Taraxacum* sp., and have apparentiy retained all of their vigour. even though fertilisation has ceased altogether. Some of the finest animal breeds, as for instance, the Royal Coach Horses of Austria, have been maintained by close in-breeding.

Perhaps the greatest stumbling block to those who argue for the necessity of cross-pollination is presented by the plant phenomenon termed "cleistogamy." Many plants produce flowers which never open; hence self fertilisation is necessary. Such flowers are known as cleistogamous flowers. In fact instances have been reported, as in the Sage, *Salvia cleistogama*, where dependence for reproduction is placed entirely in these self-fertilising flowers. Often where plants produce both the ordinary and the cleistogamic flowers, the latter are by far the more productive, as is well illustrated in the wonderful violet, *Viola mirabilis*. The derivation of the word from the Greek *cleistos*, closed, and *gamos* marriage, is very suggestive.

Some of the facts concerning this type of self-ferlitisation are extremely interesting. Cleistogamous flowers are usually smaller than the normal ones, and practically always show either entire abortion or much stunted development of the petals. Since the petals are normally useful for the attraction of insects, the reason for their suppression in cleistogamous flowers in obvious.

Another characteristic of cleistogamy is the reduction in the number of pollen grains produced by each flower. Thus in Cut Grass, *Leersia oryzoides*, about fifty pollen grains are produced in each cleistogamous flower, as compared with over three million counted in the normal flower of the Peony. Since insect pollination is wasteful, the reason for the reduction of the number of pollen grains in cleistogamous flowers is apparent. Even the number of stamens may be reduced, as is

illustrated in the Rockrose *Helianthemum canadense*, a plant possessing both normal and cleistogamous flowers In the former, the stamens are normally indefinitely numerous whereas in the latter they have been reduced to from three to ten.

Another phenomenon presented by cleistogamy is the frequent production of functioning pollen tubes from pollen grains which never leave the anthers, the latter remaining closed. This is further facilitated by weakened spots in the wall of the anther, frequently illustrated in the violets, through which the pollen tubes penetrate. The close association of the anthers and the stigmas in these unopened flowers readily explains the cause of this interesting phenomenon

Many forms of cleistogamous flowers are subterranean, as is illustrated in species of violets, Bitter Cress, *Cardamine chenopodifolia*, and the Milkwort, *Polygala polygama*. The advantage of such a situation are many. The seeds are practically planted on maturity, with little loss from the depredations of seed-eating animals. The pollen is also well protected from pollen eating insects and from the loss occasioned by wind and rain.

The conditions leading to cleistogamy are many and varied. On the Balsams, *Impatiens*, sp., the presence of a fungus has induced cleistogamy and the same effect has been observed on *Biscutella* when attacked by certain parasitic insects. Nutrition seems to be another factor, as indicated by the fact the Touch-me-not, *Impatiens noli tangere*, which ordinarily produced both open and closed flowers, will produce only the latter when the plant is transferred to a habitat affording but poor nutrition, as for instance in sand.

The sun also exerts its influence. Certain species of violets when grown in the shade will produce only cleistogamous flowers, but when

transferred to a sunny environment will produce petaloid flowers in abundance.

Perhaps the strongest factor to influence cleistogamy, however, is temperature. A cool temperature seems to induce the production of the self-fertilizing type of flower, whereas a warmer temperature seems to influence the forming of the petaloid flowers. Thus species which are ordinarily cleistogamous in England become normally of the open-flowered type in Italy. The temperature factor is well suggested in the Dead Nettle, *Lamium amplexicaule*, which is cleistogamous during the cool spring and autumn, but which becomes chasmogamous (of the petaloid flower type) during summer.

A situation similar to cleistogamy is presented by many species, particularly in flowers of mountain habitat when continuous rainfall during the period of floral maturity drives away the pollinating insects. Such flowers frequently fail even to open under such conditions but successfully mature seed through the agency of self-fertilization.

A wider knowledge of the facts related to cleistogamy may possibly have influence on experimental genetics. The phenomenon at least suggests that the necessity of cross-pollination has in past been too strongly emphasised. In the light of our present knowledge it may be stated that for some plants and animals cross fertilisation is beneficial, while for others self-fertilisation is preferable.

E. M. C.

Extract from 'The Pioneer.'

THE ASSAM FORESTS.

The year ending the 30th June 1918 was a particularly difficult one for the Assam Forest Department, for not only were nearly three-quarters of the Imperial officers away on military service, but restricted expenditure and a general depression on the timber trade also adversely affected the administration of the department. Yet it continued to do good work and the wonder is not that progress was retarded but that officers remaining were able to carry on as well as they did. * * * * * * * *

This lack of cohesion is not peculiar to the Assam forest report; we have noticed the same thing in the reports of other provinces where there are more than one Conservator, and we venture to suggest that, in the absence of a chief Conservator, the senior Conservator should be made ressonsible for the report, and should deal not with each circle separately but with the forests of the province as a whole. In this way we should be given not only a more readable report, but one which would be of far greater value to the world at large.

There is little question that Assam possesses in its forests an asset of enormous potential value, for the total area of forests, amounting to over 22,000 square miles, is roughly 45 per cent of the whole province, and there can be no doubt that a great deal of this area is capable of being much more profitably worked than it is at present. Of the total area of forest land only some 5,000 square

miles, is roughly 45 per cent of the whole province, and there can be no doubt that a great deal of this area is capable of being much more profitably worked than it is at present. Of the total area of forest land only some 5,000 square miles have been reserved, the remainder, which forms by far the greater part, being unclassed. Much of the latter is undoubtedly doomed to destruction, for every year unregulated *jhuming*, that is temporary cultivation, causes enormous damage both in the hills and in the plains. During the year covered by the report attempts were made, especially in the Darrang division, to check the extensive destruction of valuable tree forests by squatters, but the Conservator of the Eastern Circle has to admit that it appears doubtful whether much can be done without further legislation. In some cases, particularly in the more accessible forests, reservation is necessary in the interests of the people themselves, in order to insure their future domestic requirements, but although the importance of this is fully realised, little progress has so far been made in this direction owing to the difficulty of finding suitably situated areas of sufficient extent.

It is becoming more and more the policy of Government to hand over to local management, usually subject to the control of the revenue authorities forests which are of little use except to provide fuel and pasture to the village communities. In this way the Forest Department is relieved of the control of areas from which it derives no benefit and it is hoped that the villagers will take more pains to protect the forests in which they have a direct interest. The policy is being steadily persevered with in parts of the Punjab, and in Assam a very similar experiment is now being tried. A number of blocks of jungle, situated in the vicinity of villages and suitable for the supply of fuel and other petty forest produce, were selected in the

Sibsagar district, and rules having been issued for their management, they were handed over to the control of local committees. The results of this experiment will be watched with interest.

Probably the most serious aspect of the retarded progress caused by the absence of so many of the superior establishment was the delay it involved in the preparation of working plans. At present only 20 per cent of the reserves are under regular management and working plans are required for no less than 2,000 square miles of forest. It is to be hoped, therefore, that when the cadre of the department is again brought up to full strength this work will be pushed on without delay, for on nothing does the future of the forests depend so much as on the preparation of working plans and the introduction of scientific systems of management. The problem of regenerating the *sal* forests both of Assam and Bengal, has, however, been engaging the attention of Forest Officers for many years, and it is a problem which will probably entail much more laborious investigation before it can be said to have been solved. But its importance cannot be minimised, for the forests of the Duars are are some of the most valuable tree-bearing lands in India. Almost flat and extremely fertile, much of this area is capable of producing *sal* of the highest quality. Yet under the old methods of treatment it is recognised that this species is almost certain ultimately to disappear. From this it must not be imagined that Forest Officers of a generation ago were responsible for introducing a faulty system of management. At the outset it was necessary first to adopt a system of management which would bring the forests into a more suitable condition for the introduction of more scientific forms of treatment. There can be no question that past treatment has greatly benefited both the growth and development of the *sal* which stood on the ground when that treatment commenced, but it also cannot be denied

that it has very largely failed to give a new crop to replace the trees felled. It is obvious, therefore, that something more is now necessary and that the time has come when, if the productivity of the soil is to be utilised to as full an extent as possible, more intensive methods of management must be adopted. The forests of the Duars were visited both by the Inspector General of Forests and the Silviculturist in 1915 and as a result of their inspection the conclusion was arrived at that the treatment most likely to give successful results in the future would be to clear, fell and then to restock artifically in conjunction with field crops. This system has not yet been introduced on a large scale in Assam, though it will doubtless find a place in the new working plans. During the year uuder report several experiments were made to raise a crop of *sal* in conjunction with *jhuming*, but the results so far have not been altogether a success. This was largely due to lack of proper supervision; where this was adequate the results were more promising, and in this we may perhaps find the keynote to all silvicultural work in India. Regeneration, be it artificial or natural, is largely, as one Forest Officer expressed it, a matter of "master's eye" and one thing is certain, namely that without constant care and attention no system is going to give satisfactory results. There has hitherto been far too great a tendency on the part of Forest Officers in India to leave the restocking of their forests entirely to nature, and when she has failed to help, to throw the blame on the system of management. This tendency is now fast disappearing as it is being realised that regeneration, on which, needless to say, the whole future of our forests depends, cannot be obtained without a great deal of time and labour being devoted to careful and continued tending after the fellings have been made.

A few of the lessons learnt in the Madras Forest College.

Diverse are the lessons that we, the students, learn in this College in addition to the practical training given to us. It is my purpose here to give two of them, not that they are the chief ones, but because they struck me during our last camp at Sadivayal. The first one is the illimitable power of mind over matter. Mind, I here understand as will. It cannot be easily defined like many other combined mental faculties. It is a mode of motion of the intellectual faculties. It is a mental power of choosing and by which we determine something to do. A strong will is one's ability to carry wishes into practice and a weak will shows a flabbiness of purpose, indecision &c. The will with the Madras Forest College student is the power of carrying out the orders given to him and completing the work laid down in the programme within the specified time. I may cite here a few examples. During our camp at Nedungayam (South Malabar) we were asked to complete the formation of a new road within a fixed time. On the evening of that date, about 4 hours of work was still remaining. The Students went out with lanterns for work and fortunately it was a full-moon night and we were helped a great deal. The work was completed by mid-night and to the great satisfaction of our Instructor, he saw the work completed on the next morning. Again, at the Sadivayal Camp it was proposed to uproot a large tree (An Albizzia) about 3′ in girth by a 'Monkey-Jack' whose capacity was only 5 tons. It was not very fair to extract such a large tree with the Jack of low capacity. Still, the work was started and there was no going back, down must the tree come. On the 1st day the tree was tilted a bit and it [redacted]the to give way before the Jack. But

there was the 'will' at the back of the 'Monkey-Jack' and on the second day in spite of the resistance offered by the tree, down it fell. This was a great lesson to us. Technically we learnt how to use a Monkey-Jack and that it was a very useful machine and that it was worth-while introducing it in our ranges should an occasion rise for it. The second and the greatest lesson was that some works would give us trouble but we should exert our will and must carry out our purpose and that if we only tried it heartily, success is surely ours.

The second of the great lessons, which I would point out is 'Dignity of labour.' In the College, we do a lot of work which to the outsiders may seem not very useful. We ourselves form roads, do the digging and filling in of earth. Almost every work that is started by us is finished by us. Technically we learn how much work can be turned out in a fixed time, the nature of the work and so on. But this is not much. There is dignity in work. Passers-by look on, when we carry the earth in baskets and form roads. They look surprisingly at us and at our khaki uniforms and we in turn, look at them with dignity with the satisfaction that we are doing our duty. "Blessed is the man that hath found his work." The Students are happy in their work and have learnt to earn their bread "in the sweat of thy brow." It is only the shallow minded men that esteem labour as a curse. The love of idleness is characteristic of the unenlightened and we are taught to love labour, to honour and appreciate it. We now consider that labour is a necessity and a blessing. It develops our physical and mental powers and gives a clue to our superiors as to our ability and competency.

One great advantage here, is that our desires *i. e.* what we should do, are weighed and judged by more experienced men and we are trained to express our will in carrying them out. Such great mental powers, where could we have [illegible] and in such a practical

way? Any number of lectures in halls would not have taught us a fraction of it. Everything here is practical and we are made better practical men and worthy citizens even after our service in Government.

M. UMAPATI,
Asst. Editor.
5—5—19.

A brief note on Hyderabad forests.

The forests of Hyderabad in general represent a varied growth, ranging from compact high forest, as may be seen along the bank of River Godavery, to scattered patches of growth varying in densities, inlaid or bordered by other tracts diversifying in extent and which sometimes bear an identity to a vulture's neck, with regard to their bareness, being deprived of all the growth on them, grazed by fire and over grazed by cattle, these tracts seem to revenge for their loss, not only by destroying valuable buildings but also invaluable lives in thousands. The great Moosi flood which occured in Hyderabad city on 28th September 1908 bears witness to this effect. The type of forest that is generally met with in the 'Nizam's Dominions is very similar to the growth seen in Walayar Revenue of the Central Coimbatore Division consisting of more or less the same species which, are divided into two main classes, namely Irsalee and Ghairee, meaning classified and unclassified respectively.

Amongst the Irsalee species are the Teku (Tectona Grandis) Bilgw (Chloroxylon Swietenia) yeppa (Hardwickia binata) Peddayeggei (Pterocarpus Marsupium) Abnas (Diospyros Ebenum) Nulla

Muddi (Terminalia tomentosa) Dargu (Ougenia dalbergioides) chinanje (Lagerstroemia parviflora) Shishum (Dalbergia latifolia) chundun (Santalum album) and a few others.

The last two named are however rare, but the rest are found in fair abundance in localities, suitable for their respective growth, attaining a girth which varies from 2 to 12 feet and over. Yeppa and Pedda yegei in particular attain the large size mentioned above. The soil in these forests varies considerably both in physical and chemical properties and is generally hard with no trace of humus on it, thus presents a bed quite unsuited for germination of seeds, consequently the natural regeneration almost amounts to nil. As regards the artificial means, plantations of Teku, Pedda yegei and chundan have been started on an experimental scale in Warangal and Aurangabad Divisions.

The method of treatment under which some of the forests are being worked at present is coppice with standards. The annual coupe is disposed of in the very way as is generally done in Madras Presidency in cases of forests worked under the above method. Permanent, timber and fuel depots have been formed at railway stations, wherever it was possible and suitable.

There are also forest areas, for which working plans have not been prepared, and which can possibly be worked under selection method of the high forest system, after undergoing some suitable provisional treatment, which would not have been necessary, had these areas not been worked under permit system in past.

In order to safe gaurd and improve the existing condition of the forests, the village forest system is gradually being introduced.

Besides timber and fuel there are several products of economic importance on which considerable revenue is realized, the the chief being *beedi* leaves, myrabolams lac and flowers of God mahwa (Bassia latifolia.) *Beedi* leaves are collected entirely from root suckers of Tumki (Diospyros Melanoxylon), the right of collection is sold by public auction to contractors taluk war the time and the area within which the collection is to be made being specified. Each contractor then announces by means of tom-tom in his respective area, his right, and the payment that he would make to the villages, who collect beedi leaves and hand it over to the agent employed by the contractor whose duty is to go round the villages within his limit in a rotation as it were. The payment generally made is about 2 pies for a bundle of 100 beedie leaves or so. The same process applies to the collection of chebulic and Emblic myrabolams.

Collection of lac is but in its infancy and is being nursed departmentally.

Gul mahwa occurs in great abundance throughout the Telungana districts and is under the direct control of the Abkari Department. Flowers are collected in the months of April and May and are used for distillation of liquor and manufacture of acetone.

A single flower is said to produce as much as 1/10 of it weight of acetone.

The methods of collecting the above products, no doubt causes frequent forest fires & as such are very detrimental to the welfare of forests. Induk (Boswellia Serrata) presents a very good chance to be tapped for its valuable gum oleo-resin, and it would be worth while to try and develop this industry.

The game of Hyderabad forests, is so plentiful and varied, that it would require a separate article to be described in detail.

ABDUL HAMUDKHAN,
Student, (1917—19 Division)
Madras Forest College,
Camp Bandy Shola,
Coonoor.

5—5—'19

The experiences of a probationer.

After a lapse of nearly two years and a half it gives me great pleasure to recall to my memory the few incidents of my probationery period, the changes that have imperceptably come over me and the few facts that have come to my knowledge during that period when I was under practical training for six months prior to my being sent to the Madras Forest College.

It was in the early part of January 1917 that I emerged out of the Central College and the busy bustle of a city life into the depths of Forests of Mysore District. I had but a poor idea of the nature of our training and the life that I am to lead. The famous lines of many a poet of Nature were ringing in my ears when I entered the Forests and nothing but the charm of Nature could interest me for a time. The few days in the beginning of my new career, I think, I felt myself much elated by the prospect of a life, the path of which was strewn with pleasure. I had great joy in rambling through the Forests all day long and it was neither tiresome nor dis-agreeable. The absence of the usual courses of coffee, tea, breakfast etc was forgotten on account of the spell

thrown by Nature. When I began to think of the amount of exercise that I daily gave to my body in these aimless wanderings I realised the fact that in this I was really training my body to with-stand a great amount of exersion and control hunger and thirst with ease.

The first lesson that I learnt from my instructor — to whom I owe much gratitude for the interest he took in moulding me for the training in the College — was to cultivate the power of observation. This faculty was to a great extent improved by the effort made to recognise the innumerable species found in the Forests. At first all was confusion but gradually the eye got accustomed to the task and I could with ease recognise the principal species of the forest. This development of 'The Forest eye' as our much beloved and esteemed Principal calls it has had its beginning during the probationery period and takes perhaps years to mature. The keen interest that is created in us in the College contributes a good deal to the development of 'The Forest eye'.

The next and most important training perhaps is the physical training. As I was under the instructor who was in charge of the V. T. School I had an opportunity to note the dignity of labour. The Foresters and Guards received a thorough practical training in the construction of roads, bridges, kilns and felling and extraction of timber. In every item of these I took part though at first I did not realise the importance of such a training. Few may think it below one's dignity to handle an axe, a mamti or a pick-axe but I am of opinion that a Forest Officer should himself be well versed in works which he is to supervise. No amount of theory would be of avail unless backed by the practical side of it. This idea of mine has been confirmed by the training in the College. After my training in Mysore during the probationery period I never blushed to be seen working with a mamti by any one. Here I might say that I took an active part in the construction of a Forest

Road, in building a wooden bridge, in the construction of a paraboloidal kiln, in felling and coppicing are acre of Forest and in opening a nursery. Though I had a great deal to learn, about the practical side of the work above enumerated, in the College the training that I had in Mysore has at least prepared me to undertake such duty as a matter of course.

The next item in my training I could think of is the descipline which is essential for one's own happiness and for carrying out the responsible work entrusted to us. Though there was no set rules for my conduct I soon realised that unless I desciplined myself properly and brought inclination under the control of will and the sense of duty I could never prove myself worthy of the responsibility and trust placed in our hands by the Government. It is a well known fact that descipline in the Madras Forest College plays an important part in the training. Leaving alone the fact that it produces capable Forest Officers it also moulds one's character, helps one to exercise perfect control over his passions and tends to make one's life smooth and happy. During the latter half of my probationery period I was placed under Mr. H. S. Narayana Rao, B. A., the then Working Plan Officer in Shimoga District to whom I owe much gratitude and love for the finishing touch he gave to my practical training. He gave me perfect lessons on all subjects dealt with before. Under him I was in charge of improvement felling in sample plots and had good practice in laying sample plots, measuring sample plots, communication surveys and such other works connected with the preperation of working plans.

By this time I realised the enormity of public good that the protection of Forests bestows. Forest Department is not so much for realisation of revenue as for the preservation of the whole country from denudations etc., preservation of the health of a locality, for a continued supply of water to streams and rivers, and, to keep up a continued

supply of the necessary fuel and timber to the public. Besides it ever remains a paradise on earth where Nature reigns supreme.

To sum up the impressions that have taken deep root in my mind I might remark that I shall ever remain proud of my training these two years and a half, and of serving in a department which makes duty a pleasure and which gives me an opportunity to devote the best part of my life to public good.

C. L. Narayana Rao,
Mysore Student.
M. F. C.

A probationer's ideas about Mysore Forests.

Sandal has its home in Mysore and the best quality of Sandal wood is grown there. It is fairly distributed all over the Province but widely found in Shimoga and Kadur Districts. It is found growing on clayey, loamy and sandy soils and it is difficult to say in my limited knowledge where it grows best. It has for its associates Lantana, Zizyphus, Albizzia, Pterocarpus, Acacia intsia, Hymenodyction and numerous other species. It attains to a size of 7 to 8 feet in girth. Sandal seeds have been dibbed in various parts of the Province with varying successes but planting out sandal seedlings has not met with any success. About 12 or 13 years back sandal seeds were sown all round the compound of a Rest House having for its host an Acacia spp. and in April 1917 the trees measured from 6″ to 12″ in girth. Some had been suppressed by overhead branches of the host plants. The method workings for Sandal is the same as that in vogue in Javadis.

The dead and dying trees are extracted. Before the starting of the Sandal distilleries in Mysore and Bangalore Sandal used to be sent to the Continent. Now all the sandal extracted is sent to the two centres Mysore and Bangalore. A small quantity is consumed by the people for caste mark and for worshipping God. A certain quantity is used for carving, for cures and dolls. In Sorab a taluq in Shimoga District a set of people who go by the name of "Gudigas" are very skilled in carving work and they live entirely by their skilled work.

The existence of Sandal is very seriously threatened by the 'spike decease' which is rapidly spreading. It is to be hoped that in the near future the efforts made by the Government to discover the cause of the disease and finding a remedy will meet with success. Sandal regeneration is in some parts poor on account of fire and excessive grazing. Sandal seems to withstand a certain amount of fire after it has reached a height of about 12 to 15 feet. Fire protection and limited grazing will surely tend to increase regeneration of sandal and add to the wealth of the Forests.

The best type of Forests are found in Mysore, Kadur and Shimoga Districts along the Western ghats. The most important Forests are Kakanakote, Lakkuvaili and Sukrebyle Forests. Giant teak trees were common in Mysore District but all those trees seem to have been cut under permit system. There are teak stumps of about 3 feet high measuring 28 to 32 feet in girth. Such living trees must indeed have been the pride of the Forests. On account of ill-treatment in the past the regeneration of teak has been endangered. Large areas are run over by bamboos and efforts are being made to clear the areas of bamboos and plant them with teak plantations have been started both in Kakanakote Forests and Sakrebyle Forests but they are yet young to draw any conclusion regarding their growth. Blanks in those Forests are utilised for dibbling teak seedlings.

Large sized Terminalia spp, Lagerstroemia, Dalbergia lalifolia and Pterocarpus Marsupium are of deciduous type. Near to the Western Ghats there are found evergreen Forests in which large sized Dalbergia latifolia, Hopea parviflora and other species are found. Only a few of these species are extracted on account of the enormous cost of transport and the difficulty for labour. Those Forests have to a great extent remain unworked. Government is encouraging people to inhabit such places and the Malnad Improvement Scheme has done great good in that line. Places where people would have been afraid of going and inhabiting have now been filled with men and many a new village have found their existence in the depth of Forests. Labour to those places will have to be imported. There is also a proposal to lay tramways through these Forests and when these schemes are successfully carried out the Forests as yet unworked will have a bright future.

Now the fire protection in Mysore Forests is very successful and only a very small area of Forests is burnt every year. This is mostly done by irresponsible villagers for getting early grass.

In Mysore District labour is very cheap. A set of hill tribes who go by the name of 'Kurubars' inhabit the Forests and they are very useful to the Department. They are a set of quiet-going harmless people. They sometimes subsist on roots and fruits available in the Forest and grow their corn in blanks. They know every inch of the Forest and serve as very good guides and are very useful in locating any game. They fearlessly live in a Forest where there are herds of elephants. They are excellent axemen and fell and dress timber quickly and nicely. The Department has given them certain concessions for which they are to work; of course, they will be paid at a fixed wages. Many guards and watchers are picked out of them and efforts are made to educate them and make them look on civilisation without fear.

In Shimoga District labour is dearer than in Mysore. Lambanis and Madigas are to be had in certain places. In other parts it is very hard to get labour. Near the western ghats labour is got from South Canara and Malabar but they do not permanentiy remain there Thus to carry on Forest works becomes a matter of great difficulty. Concessions are shown to these men to colonise in such places and gradualiy they are settling down.

One of the activities of the Forest Department is Khedda operations. Forest officers play the most important part in this operation as they are better informed of the Forests and their inhabitants. The catching of the elephants is for the public good. Herds of elephants are found devastating the paddy and sugar cane fields of neighbouring villages and as a preventive measure Government spends a large amount of money to catch some of these herds. The herds are driven into barrickades constructed in suitable places. These are hobbled with the help of tamed elephants and after a time auctioned. The money spent in the operation will generally exceed that got by auctioning the captives. For a number of years after this operation the elephants that are not caught do not molest the people, perhaps on account of the fear created in them of having to share a similar fate as their friends.

L. Narayana Rao.

Mysore Student.

M. F. C.

Athletics side of the College.

The chief athletig events during this half year were the Marathon Race; the six-a-side foot-ball tournament, four foot-ball matches and one cricket match.

This year the Marathon Race was run as usual in Sadivayal on the 15th February 1919. This year's race is a noteworthy one for more than one reason. To begin with, all the 59 students of the college ran the race. In all previous years, a few had to be kept back being in the sick-list. Incidentally it may be said this is noteworthy considering the general unhealthy nature of the camp and as especially, this year the camp was placed under the application of certain special rule, making all the adjoining villages out of bounds and the getting of milk, vegetables &c from them out of order; due to the prevalence of cholera in them. That all students kept good health in spite of all these inconveniences is noteworthy. A detailed account of the race will be found elsewhere in this number.

Six-a-side Tournament in foot-ball.

As usual, the six-a-side tournament in foot-ball was played in Sadivayal camp; semi-finals and finals had to be played at Head quarters as the matches dragged on for a longer time than expected. Eight teams captained by students Seshagiri Rao, Narayana Rao, T. V. Thayuman, A. Joseph, Muliyil, Vajravelu, Jurianz and J. D. Theodore were formed by selection of students for each team. In the semi-finals, the four teams that met were those captained by C. L. Narayana Rao and

A Joseph and Jurianz and Theodore, the rest of the teams having been defeated in the preliminary matches. The finals were contested by the teams of Narayana Rao and Theodore—the two winners in the semi-finals. These two teams had to meet twice, the first match ending in a draw. At the second match played on the 1st April, Narayana Rao's team won by 2 goals to nil.

The prizes of the year consisted of 1 thermos flask for the captain of the winning team and 5 fountain pens for the rest of the players in the winning team and one fountain pen for the Captain of the defeated team (consolation prize). The Donor — the Imperial instructor, being unable to be present, the prizes were given away by the Vice President of the Athletic Club. The winners were — 1. C. L. Narayana Rao, (Captain).

2. A. Rahimkhan.
3. K. G. Monnappah.
4. N. C. Mahadevan.
5. M. Umapathi.
6. T. D, Ponniah.

Captain of defeated team J. S. Theodore (consolation prize).

Matches. Four Matches at *football* were played during the month of March on the 4th, 18th, 20th and 27th respectively two against the Agricultural College, one on their grounds and the other on our grounds, and two against the Stanes' High School, one on our grounds and the other on their grounds. Of the Matches against the Agricultural College, the first was a draw by 3 goals to 3 and the second a defeat by 2 against 4 goals for them.

The two Stanes' Matches were won by us, the first by 2 goals to nil and the 2nd by 3 goals to one.

Cricket. On the 13th April, a match at Cricket was played by our College against 'Young Men's United Cricket Club, Coimbatore.' We had a defeat by 69 runs for us against 130 runs for the opposing team.

General. Badminton was played by students in all the camps of both the Divisions. At Head-quarters, Foot Ball, Tennis, and Badminton, were played. The Juniors had a swimming race in Mundanthurai, the first man being awarded a prize.

Students Vajravelu and Jurianz (both juniors) have been awarded colours in foot-ball during the team. Student Jurianz has been appointed Vice Captain for Foot-ball.

T. D. PONNIAH,
Secretary & Treasurer,
Madras Forest College Athletic Club.

Coonoor,
4—5—19.

Students' Club.

As mentioned in the March number of the Magazine, the project for building a students' club or recreation room has been sanctioned by Government. A sum of Rs. 2000/- has been allotted for the purpose provided that a similar amount is raised by subscription. The building of the club will be carried out by the Principal.

After some months of delay the following information has been elicited as to the amount already promised or collected. Rs. 1109 has been promised by old students. Of this sum, Rs. 247—10—0 has been actually collected, and Rs. 140—1—0 has been spent for a purpose connected with the club. A sum of Rs. 107-9-0 consequently remains in hand.

Circulars are now being addressed to those who have promised but not yet paid the Rs. 1109 minus Rs. 247—10—0. A circular is also being issued to all others likely to be interested in the College, and to be willing to subscribe to this object, which will so materially contribute to the comfort and welfare of the students. It is proposed that all subscribers of Rs. 100/- and upwards shall be styled 'Patrons' and if desired their names will be shown on a tablet in the club. The Principal will be glad to receive subscriptions, the actual payment of which will be acknowledged in the pages of the Magazine as well as by letter.

Occasional Notes.

Mr. P. M. Lushington, Conservator of Forests, retired from the service on 18th November 1918 and then held the post of Deputy Controller of Timber supplies until February 28th, 1919.

As a member of the Board of Visitors, Mr. Lushington took a keen interest in the College, and on more than one occasion rendered valuable service by the weight of his personal influence and professional reputation. His advice and help will be greatly missed on the Board.

Mr. Lushington's retirement removes from the Madras Cadre the last of the Nancy-trained officers. His enthusiasm for sylviculture was but typical of the officers that came from that famous College, where, the training based on a familiarity with almost normal forests conduced to an inspiration, and to a realisation of the ideal, impossible in any Indian College.

The Silver Cup presented by Mr. Fischer for gymnastics has been received. It is a handsome specimen of the silversmith's craft.

* * *

On the 21st February 1919, the Senior Provincial Service class of the Dehra Dun Research Institute and College visited the Madras Forest College. The assistant instructor and students were accomodated in the first three blocks of the hostels. On the 22nd, accompanied by the instructor, Mr. Bourne, they were taken over the College and Museum by the Principal. On the same day Mr. P. M. Lushington late member of the Board of Visitors, and Mr. C. E. C. Cox (member of the Research Staff at Dehra) also paid a visit.

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The Principal requests that if acknowledgements for contributions to the Museum do not reach the donors the matter may be brought to his notice.

* * *

Mr. S. Cox, Conservator of forests, and the Principal Forest College, were deputed to attend the recent meetings of the Board of Forestry at Dehra Dun. The Board sat from March 31st to April 8th, and dealt with a large variety of subjects including the triennial programme of the Forest Research Institute. For this purpose the conference was divided into Sub-committees; Mr. Cox served on the Sub-committee dealing with Working Plan Headings, and the Principal on the Sub-committee for the Economics, and Chemistry programme. On the subject of suggestions for future Forest Colleges, important resolutions were recorded.

The Proceedings of the Board will subsequently be published.

* * *

An excellent account, with illustrations, of the Burma Forest School will be found in the last Christmas number of the Rangoon Times which has been recently added to the Students' Library.

* * *

We are glad to learn that Mr. J. A. P. D'Cruz, 1913–15 Student now holds the appointment of "Forest Assistant to the Agent, Balliguda" on a pay of Rs. 150 per mensem. The appointment is a temporary non-gazetted one sanctioned for 1 year from 1–10–18.

* * *

It is with regret that we say good bye to Mr. and Mrs. McCarthy who have left for England with the intention, we understand, of retiring. Mr. McCarthy has always taken a keen interest in the Athletic side of the College and has on several occasions generously presented prizes. To Mrs. McCarthy we are specially indebted for her unfailing courtesy in responding to the many calls upon her time, energy and convenience whereby the winners on Prize-day and Athletic sports have so often been rendered the happier and the prouder for the graceful charm and kindly felicitations with which she presented the trophies gained. Long shall we miss her.

* * *

The College warmly congratulates Mr. S. Cox upon his selection as the first Chief Conservator of Forests in the Madras Presidency.

Mr. Cox *ex officio* becomes President of the Board of visitors. Under his direction the department, and the College will now enter upon a new era, in which a speedy development of professional skill and energy may be anticipated.

Mr. Cox is the youngest chief conservator in India as well as the most junior in length of service.

* * *

Owing to the kindness of Mr. Butcher Vols. II and III of the Indian Forester have been added to the General Library which now contains a complete set from the commencement of the Magazine.

* * *

The Government of Bengal propose to lease to the India Paper Pulp Co. Ltd. the right to extract for 21 years, bamboos for the manufacture of Paper pulp from the Kesalong Forest Reserve in the Chittagong Hill Tracts Division on certain concession rates.

* * *

On the recommendation of the Vice President, Athletic club, M. P. Subbayya is awarded his colours for Tennis and is nominated Vice Captain.

C. Vajravelu has been awarded colours for foot-ball.

* * *

'One of the prizes of the Marathon race for 1919 was purchased out of the donation kindly presented by C. D. Mc Arthy Esq. Member of the Board of Visitors.

* * *

The value and importance of potash as a manure for jute and rice are explained to the people by the Superintendent of Agriculture.

The following are the additions to the Libraries.

STUDENTS' LIBRARY.

1. "Red Air Fighter" presented by F. L. C. Cowley-Brown Esquire.
2. "Treatment of British prisoners of war in Turkey" presented by F. L. C. Cowley-Brown, Esquire.
3. "Kanana Prahasanam" (a telugu drama) presented by C. E. C. Fischer, Esquire.
4. "The interests of India" presented by F. L. C. Cowley Brown, Esquire.

GENERAL LIBRARY.

1. French Forests and Forestry — Tunisia Algeria Corsica.
2. Sedition Committee 1918 Report.
3. My Mission to London 1912—1914.
4. Catalogue of the Museums of the Forest Research Institute Dehra Dun.
5. Catalogue of Timbers in the Madras Museum.
6. Forest Flora for the Punjab.
7. Working plan for the upper Thanngyin T. C.
8. Indian Forest Act.
9. Madras Treasury Manual.
10. Journal of the International Institute of Agriculture Rome 1915.
11. Administration Report of Forest Dept. Madras Presidency 1918.

12. Revised Catalogue of Economic Museum of F. R. I and College Dehra.
13. Indian Forest Records Vol. VI part VI.
14. Proceedings of Govt. Bombay 1918 Sept.
15. Travancore Administration Report 1917.
16. Proceedings of Govt. Bombay 1918.
17. Progress report of the Forest R. Institute 17—18.
18. Progress Report of the Imperial Forest College Dehra 17—18.
19. Home Canning, and drying of vegetables and fruits.
20. Working plan for South Dangs Forests, Surat, Agency.
21. A note on some of the Ship building woods of Burma.
22. Indian Forest Records Vol 6 part V.
23. Report of the Indian Industrial Commission 16—18.
24. Fauna of British India, Rhynchota Vol. VII.
25. Rules re. selection, felling, classification etc. of Sandalwood.
26. Nizam's Dominions Administration Report.
27. Kiln drying of Lumber.
28. The Graphic Souvenir of the German Navy's Surrender.
29. Proceedings of Government of Bombay, November 1918.
30. Annual Report of the Woods and Forests Dept. 1917. W. Australia.
31. Indian Forest Records Vol. VII part I.
32. Report on Public Instruction in Madras Presidency 17-18.
33. Report and working Scheme of the Nilambur Teak plantation.
34. Christmas number of Rangoon Times containing an illustrated account of the Burma Forest School.

Note — Numbers 27, 28, and 34 are commended to the notice of Students.

MARRIAGE.

BENNETT - CARMICHAEL. On the 4th March, 1919, at the Catholic Cathedral, Coimbatore, by the Rev. Father Perrin, Herbert Charless Bennett, Imperial Forest Service, third son of Mr. and Mrs. James Bennett, Elgin, Scotland, to Barré Grace, only daughter of the late Mr. C. D. J. Carmichael, D.I.G. of Police, Madras, and of Mrs. Carmichael, Thorntord, Sherborne, Dorset.

Miscellanea.

We translate the following from the '*Revue Des Eaux Et Forêts*':—

Quick Work: The armistice was signed on November 11th. On November 15th the Personel of the Civil administration for Alsace and Lorraine was appointed. On November 26th an Inspector-General of Forests and three conservators were posted to those provinces.

On November 17th General Mangin Commander-in-chief in Alsace and Lorraine, on his way to take over the command, halted at Nancy to lay a wreath on the monument erected in the court of the Forest School to the memory of those Forest officers who died during the Franco-Prussian War of 1870.

FRENCH FOREST SERVICE SUPERIOR ESTABLISHMENT.

	No.	Pay.
Director-general	1	
Inspector generals	3	£ 440 — £ 520.
Conservators	32	£ 320 — £ 480.
Dy. Conservators	191	£ 220 — £ 280.
Asst. Conservators	188	£ 160 — £ 220.
Extra Dy. & extra asst. Conservators	143	£ 96 — £ 140.

* * *

Chroma lagopus a West Indian Timber weighs 7 lbs. per cubic foot.

* * *

In the U. S. America there is one telephone to every nine persons.

* * *

During the War the French Forest Service has lost 100 officers.

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Under the supervision of the Superintendent of Agriculture the manufacture of potash from the water hyacinth was recently undertaken at the Sonaimuri centre in the district of Noakhali as an experimental measure. People supplied the ash at a nominal price and about fifty-six maunds of potash in the form of crystals were obtained.

Contributions to the Gass Forest Museum.

Serial No.	Contribution.	Contributor.
1	Two bark samples	M.R.Ry O. Venkatrama Ayyar R. O. Bapatla Range
2	15 „ „	M.R.Ry. C. M. Narayanan R. O. Kollegal range.
3	Specimens of Cyperus pexastachys	Mr. R. E. Lemos, M.R. Hons R. O. Ambasamudram.
4	Section of a log of Cadaba trifoliata	Do.
5	An abnormal coppice shoot of Teak with leaves in whorls of three.	Do.
6	A model of a chenchu hut prepared by Muhammud M. Hussain Khan, R. O. Markapur	F. R. Madan Esq D. F. O. East Kurnool.
7	Two long panels of Pterocarpus santalinus.	M. R. Ry. S. Chinnadorai Pillai R.O. Balapalli range.
8	Two long panels of Shorea Tumbaggaya.	M. R. Ry. T. Parameswaran Pillai R. O. Chitvel range.
9	Seven long, and five short, panels.	M.R.Ry. E. K. Krishnan avl. D. F. O. North Vellore.

Serial No.	Contribution.	Contributor.
10	Four long panels and samples of barks of the same.	M. R. Ry. A. G. Jesudasan Pillai R. O. Maumurghat Range.
11	Four sample barks	The Range officer Santavasal
	Five „ „	M. R. Ry. B. Krishna Rao R. O. Venukonda Range.
12	Honey comb on Prickly pear found in Strip No. 28 of M. F. C. Demonstration Forest.	K. Appiah Student M. F. C. 1918—20 Division.
13	Two long panels of Gluta Travancorica	Mr. R.E. Lemos M. R. Hons R. O. Ambasamudram.
14	Three specimes of Vegetable pathology	M.R.Ry. K. A. Chengappah avl. D.F.O. West Vellore.
15		

Advertisement.

The following numbers of the 'Indian Forester' are required for the *Students'* Library. The Principal will be glad to receive any that officers can spare:—

1. Volume 1, 2, and 3 for 1875—76, 1876—77, and 1877—78.
2. Volume 6 for 1880—81.
3. Volume 13 for 1887—February Number.
4. Volume 14 for 1888—January, February, March, April, and December numbers.

5. Volume 15, 16, for 1889, and 1890.

6. Volume 17 for 1891—August, September, October and November numbers.

7. Volume 18 for 1892.

8. Volume 19 for 1893—February number.

9. Volume 20 for 1894—January, February, March, July and August numbers.

10. Volume 21 for 1895.

11. Volume 24 for 1898—March and April numbers.

12. Volume 25 for 1899–April, May, June and August to December numbers.

13. Volume 26 for 1900—August number.

14. Volume 34 for the year 1908—July number.

15. Volume 36 for the year 1910—August number.

16. Volume 38 for the year 1912—January, March, October and December Nos.

17. Volume 39 for the year 1913–January, April, September and October Nos.

18. Volume 40 for the year 1914—June number.

19. Volume 41 for the year 1915—April and September numbers

20. Volume 42 for the year 1916—May, June, November and December numbers.

21. Volume 43 for the year 1917—January, February, April, November and December numbers.

NOTICE.

WANTED for the Library a copy (mounted if possible) of the June 1916 College Group. Rs. 2—4—0 will be paid for it.

Madras Forest College,
Coimbatore.

F. L. C. COWLEY-BROWN,
Principal.

* * *

"A Prize allotted from the 'Indian Forester' Fund will be awarded to the past student of the Madras Forest College who submits the best Essay (limited to 2000 words) on the following subject:

"Forest Guards, their recruitment and control: Corruption of lower Forest Subordinates and how to prevent it."

No award will be made unless a satisfactory standard is reached.

The Essays should be clearly written or typed ***on one side of the paper only*** and must reach the Principal, Madras Forest College not later than 1st June 1919.

Each Essay must bear a Motto: the motto is also to be written on a sealed envelope containing the name of the competitor and a statement to the effect that the essay is his bona fide unaided work: the name of competitor *is not to be written on the Essay.*"

The services of Mr. H. C. Bennett, Dy. Conservator of Forests, are placed at the disposal of the chief commissioner of Coorg.

Mr. T. L Chakko, Ranger III grade doing duty under E. A. C. on special spike investigation duty, is posted to Thammampati Range, S. Salem Dn.

M. R. Ry. K. Parthasarathi Iyyengar (M.R.H.) to act as Ranger VI grade, vice Ranger S. M. Srinivasagam Pillai, on other duty in connexion with hay operations and posted to S. Vellore Dn.

Mr. Syed Munaver, Ranger, VI grade is on return from privilege leave posted to the charge of Ambasamudram range, Tinnevelly District.

M. R. Ry. K. L. Govindakrishna Ayyar Ranger is transferred to Mammarghat Range, S. Malabar.

Mr. A. G. Jesudasan Pillai Ranger is transferred to Segur Range Nilgiri district.

APRIL 8TH, 1919.

M. R. Ry. E. V. Padmanabha Pillai Avl. D. F. O. Chittoor to be D. F. O. Central Coimbatore, from or after 23rd April 1919.

Mr. C. C. Wilson, Deputy Conservator of Forests on return from military duty to be D. F. O. Chittoor.

Muhammad Abdul Hafiz Sahib Bahadur, Extra Assistant Conservator of Forests and D F. O., upper Godaveri is granted privilege leave for 26 days from 22nd March 1919.

Mr. F. A. Seager, D. F. O. lower Godavari, will hold charge of the upper Godavari Dn. in addition to his own, during Muhammad Abdul Hafiz Sahib Bahadur's absence on leave.

M. R. Ry. T. N. Seshagiri Rao Ranger, Nellore Range will hold charge temporarily of Rapur Range in addition to his own till the arrival of Ranger M. R. Ry. H. Thammayya from Gooty Range of Anantapur Dist.

Mr. P. M. Mathew (M. R. H.) Ag. Probationary Ranger, VI grade in charge of Sanipaya range, W. Cuddapah, is confirmed is his appointment with retrospective effect 8th January 1918.

APRIL 15TH 1919.

Mr. F. A. Seager, D. F. O. Lower Godaveri will hold charge of the Upper Godaveri division in addition to his own during Muhammad Abdul Hafiz Sahib Bahadur's absence on leave.

Muhammad Asadulla Ghatala Sahib Ranger V grade, Kurnool West is granted combined leave for three months with effect from date of relief.