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Prize-day at the Madras Forest College.

On the 30th of June 1921 a distinguished gathering of officials, and non-official European and Indian gentlemen assembled in the Madras Forest College to witness the distribution of certificates, medals and prizes to the eighth batch of successful students. The Hon'ble Sir Lionel Davidson K. C. S. I. I. C. S. presided, and Lady Davidson very kindly distributed the prizes.

Among those present were: Mr. P. H. Clutterbuck, C. I. E., O. B. E., Inspector General of Forests, Mr. S. Cox, C. I. E., Chief Conservator of Forests; Messrs. D. T. Barry, C. E. C. Fischer; H A. Latham, H. F. A. Wood, H. Tireman, Conservators of Forests, J. H. Longrigg, R. B. Cornwell, M. R. Ry. M. R. Sundram Ayyar Avl., Md. Abdul Karim Sahib Bahadur, Instructors of the College; Messrs. A. Wimbush, F. A. Seager, T. A. Whitehead, E. M. Crothers,

the Examiners; M. R. Ry. Rao Sahib, K. R. Venkatramanier Avl., Mr. W. C. Hart, and other Forest officers; Rajah Vasudeva Rajah, C. I. E. of Kollengode, Messrs. Prabakara Tamban, M. L. C., F. B. Evans, Collector of Coimbatore, G. Y. Loveband, Assistant Collector, J. J. Cotton, District Judge, R. W. Davies, Mr. and Mrs. Parnell, Rao Sahibs Ratnasabapathi Mudaliar, (Chairman of the Coimbatore Municipal Council,) M. R. Ramasami Sivan, T. S. Venkatraman, Y. Ramachandra Rao, Mr. and Mrs. Ananda Rao.

The function began with the reading of the annual report by Mr. G. C. Wilson the Principal of the College, the report being as follows :—

"SIR LIONEL AND LADY DAVIDSON, MR. CLUTTERBUCK, LADIES AND GENTLEMEN,—The College year has once more come to a close, and we have reached the day which is, in our small world, the most important day of the year. In all spheres of activity, to those who are concerned, their triumphs and troubles seem of great, often of world wide importance. It is often difficult to see things in their true perspective, and to realise of how small real import many of these matters are. On the other hand, it is perhaps equally difficult for the outsider to realise the magnitude that these triumphs and disasters assume in the minds of those nearly affected. It is the realisation of these facts that constitutes true sympathy, and the presence of the many distinguished guests that we are privileged to welcome here today is the outward manifestation of that sympathy that we know many of you have with our labours here. It is a very great incentive to industry and a striving after efficiency on the part

of all the students, not to mention the staff, at this College, to know that their efforts are watched and appreciated in a kindly spirit by their compatriots and fellow servants of the King-Emperor. What we want here is that every man shall try to do his best; some are better endowed by nature than others, but every man can do his best and anyone who really puts his heart into his work is pretty sure to make good. What we want here, then, are "triers"; and you Ladies and Gentlemen, by your presence here today, encourage us all to further efforts by this outward manifestation of your sympathy.

"An Institution such as this is greatly dependent for its smooth working on the friendly feeling and assistance of neighbouring bodies, and in its turn can do something to help them. I am glad to say that during this past year we have lived on terms of great harmony with practically all our neighbours. I think I am right in saying that the students of the Agricultural College and of the Forest College are on terms of the greatest cordiality. The two Colleges are indeed sister Institutions. I am glad also to be able to note that in our relations with the Coimbatore Municipality there has been less friction than has unfortunately often been the case in past years. We still have some small differences pending settlement but we sincerely hope that these too will be very shortly eliminated by that spirit of mutual good will and mutual help which is the foundation of all successful enterprise.

"To turn to matters that more immediately concern the College we find that the past year has been fruitful of many important changes. In the first place we must refer to a very great loss that

the Forest College has sustained. Mr. Cowley-Brown has been connected with the College practically since its first inception, and we may say that nearly the whole of the present prosperity and smooth working of the College are due to his efforts in the past. He is one of the most Senior and best known of the Forest Officers in the Madras Presidency. He joined the service in December 1891 and spent his first few years in the forests of Salem. During the latter part of his service he was Principal of the Forest College, for a total period of 6½ years, with one interval of about a year and a half during which he was Conservator in the Northern Circle He was the first Principal of the Madras Forest College at its inception in 1912, when it was situated in the discarded Municipal Hospital in Coimbatore; he left the College just before its removal to its present site and returned again as Principal in 1917 to remain with us till the middle of last year when he went home on leave fully intending to return to the work which he loved so well. The condition of his health has now necessitated an extension of leave and it is greatly feared that this may be preparatory to retirement and that we may not see him out here again. If this is so it will be a great loss to the Forest Department as a whole and the Forest College in particular. He worked devotedly and whole-heartedly for the interests of the College and everyone connected with it,—students, staff and establishment. While he was here he had few interests outside the Forest College and during the short time it was my privilege to work under him I know that he spent the whole of his spare time in the service of the College; his main form of recreation was to devise schemes for the improvement of the Institution whose

interests he had so much at heart, and one of the most outstanding results of this benevolent scheming remains with us in the form of the very comfortable students' Club, the erection of which was due mainly to his efforts His retirement, if indeed it is as imminent as we fear, will be a serious loss and will I know be deeply regretted by all his friends, and by no means least by his many friends among the old students of the College.

"To turn to the work and conduct of the students. The camping during the past year has been in accordance with the sanctioned programme; but we have added two or three one-day excursions. These were to the fuel forests of the Mettupalaiyam Range and the Coppice with standards Working Circle at Walayar, the object being to give the Junior students some idea of the practical working of the Sylviculture which they were being taught in the lecture room during their first long head quarter term November and December were as usual spent in the forests of Nilambur and Nedungayam; in January and February the Seniors camped at Dhoni where they studied the ever green forests and the modern metods of extraction which are now being introduced there; the Juniors in the meantime returned to our old camp at Kargudi in the Nilgiri-Wynaad where they spent a very profitable 6 weeks, learning fire-protection, scientific improvement fellings, assisting in the capture of elephants, bridging streams etc. The usual hill tour in the Nilgiris completed our programme and the students returned to Head Quarters for their final lectures before that most terrifying of ordeals——the final examinations

For their constant endeavours to make our tours comfortable and instructive the College is much indebted to those Conservators and District Forest Officers in whose charges we have camped. From the Ranger Officers upwards we have during the past touring season met with nothing but help and consideration. I am fully conscious of what a tax we are upon the resources of a District.

Our camping is of necessity often in feverish localities but on the whole the health of the College has been wonderfully good. But with very deep regret, I have to record the death of one student during the year: I refer to A. R. Venkataramanan, one of the most promising of the Junior students. He was a very nice boy, quiet, hard-working and full of initiative. He was a typical example of the type I have already referred to; he was a real trier. He died in the middle of last March of acute and long-standing Malaria. He had not had much fever while at the College but he had suffered from it severely previously and had been greatly weakened and pulled down by it. He was a very promising young Ranger and his death is a loss to the Department. This sad event may point a useful lesson by emphasizing the great importance of the medical examination which we insist upon before accepting students at the College. The life is a hard one and the forests are unhealthy; only a man of sound constitution can expect to make good as a Range Officer.

In the Athletic line the past year has on the whole been a successful one. In the swimming test 20 of the Seniors and 28 of the Juniors succeeded in passing. Of the Seniors 8 failed and of the Juniors 6; it is hoped that these latter will pull themselves together

and pass the test early next year. The Marathon race was won by N. S. Poonacha, a Junior student, in the very good time of 45 minutes for 7½ miles; the cup for this race, presented by the late Risaldar Major Amir Muhammad Khan. was won by the Junior Division. We were unfortunate in the sports in not improving on any of the College records. One man sprained his knee, another had no one to push him and get the best out of him, or things might have been different. The times were however on the whole good and the competition keen. The *Victor Ludorum* a challenge cup presented by Mr. Richmond was won by the Senior student S. Ramalingam.

As regards Gymnastics we have had no one of more than ordinary proficiency. As a matter of fact the students come here when they are generally well over 20 years old with their muscles already set and the majority of them have never seen, much less made use of a horizontal bar or the parallel bars or any other gymnastic apparatus. It is very difficult in such circumstances for them to excel at this form of athletics, which more perhaps than any other, requires practice when one is young and one's muscles are still flexible. During the past year, therefore, we have devoted rather more attention to Physical training and Sweedish drill than to Gymnastic on the apparatus. The students now have a quarter of an hour's physical training every morning at 7-15 before they go into their first lecture with, I believe, marked benefit to their health.

Our Hockey team got well together early in the season and succeeded in winning three out of their six Matches. We were however

unfortunate in losing one of the best of our team before the tournament; he had his leg broken in a Hockey match in which the play had become most lamentably rough, and the result was that he could not play for us in the tournament. However we had a great fight with the winners early on in the tournament and thoroughly enjoyed our game.

In the Inter-Division Hockey Match the Juniors won the Challenge cup presented by Mr. Cowley-Brown after a good game by 5 goals to nil.

All the staff have taken part to the best of their ability in the College Athletics regularly, throughout the year, and this has no doubt done a lot to encourage the students to make themselves proficient and stimulate their keenness.

We do our best here to develop the bodies and muscles of, and inculcate a sporting spirit into, the young Probationary Rangers. To assist us towards the attainment of this end His Excellency Lord Pentland the late Governor of Madras presented us with a very handsome challenge shield to be competed for annually and held by the best all-round athlete in the College. This year we have had an exceptionally close competition there being less than five marks difference between the first four students S. Ramalingam came first and C. S. Ganapathy a very close second, only 2·4 marks behind him. These two Seniors were followed by the two Juniors Bandari and Poonacha; and, as I have already stated, there were not more than five marks between the four of them.

"The discipline at the College has during the past year been satisfactory, and the general tone has been good. Two students of the Senior Division had to be dismissed for grave misdemeanour. They have, however, owing to the clemency of the Chief Conservator, been permitted to return at the beginning of next year.

"Apart from this the conduct of both years has been good and I consider them to be on the whole self-respecting, courteous and manly young men.

"Till now out of the Juniors two have had to be sent down but for no fault of their own. Their educational attainments were not sufficient to enable them to profit by the course at the College; to keep such men here however much they may desire it at the time is a mistaken kindness; for they waste two years of their life and then fail to qualify for the profession which they have chosen, and have to begin life again.

"There is however a tendency among all the students which I very much dislike to see. I refer to the tendency to form cliques and factions which are cortinually quarelling in an unimportant sort of way the one with the other. The students' Club which it was hoped would serve to bring all classes at the College more nearly together has I am afraid only served to intensify these foolish factions. I use the word "foolish" intentionally because the matters about which the quarrels arise are generally of such very small significance as to make the whole matter absurd.

" I may quote one instance of the humour of this regrettable side of our life. A certain student saw a servant stealing the property of another student. The matter in due course came to my notice and the student who had witnessed the theft quite gravely reported that he had told a mutual friend to go and call the owner of the property and inform him of the facts as he himself was not on speaking terms with him, This sort of thing is farcical and it is to be hoped we will hear little of it in the future. It is of course all due to that lack of a sense of perspective which is so useful in the affairs of this world. You Juniors must take these words to heart, patch up any differences you may have, and remember that it is up to you next August when you return as Seniors to show the new Division a good example and instil into them that tone and spirit which we strive to attain at the Madras Forest College and which is by no means the least part of your education here. You are not a bad year at all and we hope to see you do well ; but you all have a lot to learn yet, and remember, all of you, Seniors and Juniors alike, that courtesy and self respect go hand, in hand and that an off hand or impolite manner is not a sign of true independence.

" I have still a few words to say before I come to the actual distribution of the prizes. And these are words of farewell. Next year when you, present Juniors return, you will have lost three of your best friends The Officer commanding the Junior Division camp Mr. Longrigg leaves us for a well-earned rest after two years at the College. Mr. Abdul Karim, the other Junior Division Instructor and

Mr. Cornwell the House Tutor are also departing to other spheres of activity after a good many years' devoted work in the College. All three Officers have been most deservedly popular with the students and their departure will I know be a great sorrow to many.

"Mr. Cornwell in particular, as House Tutor, Vice-President of the Athletic Club and Vice-President of the Students' Club will have come into close touch with all the students. The extra work entailed by the duties of these three positions is by no means light. But Mr. Cornwell has always done everything that was necessary, and even more, with the greatest cheerfulness aud goodwill; he seems to like hard work, and, if he gets really interested in a matter, he takes a lot of stopping. He has I know been a good friend to many of the students here both present and past and all will share with me my regret at his departure.

"The present Senior year who are about to leave us have among their number several students that I am convinced will make really good Range Officers.

"On the whole, the year is perhaps slightly below the average both intellectually and in the field; there are fewer students of outstanding ability than was the case last year. No student has obtained Honours. However no student has failed to obtain a certificate, and there are, actually, fewer "Lower standard" certificates awarded, than was the case last year.

"Among the subjects that are outside their strictly legitimate course, one of the most useful that is taught here is "First Aid" to the injured.

"Of the present Senior year, 17 students have gained the St. John's Ambulance Certificate. These certificates have unfortunately not yet been received from the St. John's Ambulance Association and so cannot be distributed.

"I will now ask Lady Davidson to be so kind as to present the prizes and certificates gained to the students who have won them. As I read out your names I want you please to come up quickly and take your prizes."

List of Prize Winners:—

1 Best Senior Division Student. (Gold medal presented by the Madras Government).—T. P Palanikumaran.

2 The Campbell-Walker Prize. (Best all-round Ranger).—K. R. Murjani.

3 The Brazier Prize. (Best Outdoor Ranger).—N. M. Karumbayya.

4 The Lodge Prize. (Best student in Forest Engineering). - T. P. Palanikumaran

5 The Madras Conservators' Prize. (Best student in Forestry). —T. P. Palanikumaran.

6 The Indian Forester Prize (Past students)—L. J. Taylor.

7 The Indian Forester Prize (Present students),—B. S F Lebbai.

8 The Pentland Shield. (Best Athlete in the College) —S. Ramalingam. (Senior student).

9 Fischer cup (Best Gymnast in the College) —S Ramalingam. (Senior student).

10 Chief Conservator's Prize. (Best student in the Junior Dn). —P. Sithapathi Iyer.

"MADRAS RANGER HONOURS."

Nil.

"MADRAS RANGER HIGHER."

1 T. P Palanikumaran

2 K. R Moorjani

3 N. M. Karumbayya

4 K. Reguraman

5 D. Krishnaswamy Ayyar

9 V. N. Subramania Ayyar

7 C. S. Ganapathy (N C)

8 A. Seetharamiah

9 C. K. Abyankar

10 P. Sankunni Nair

11 C. S Ganapathy (Coorg).

12 C. K. Gulrajani

13 A. R. Manuel

14 K. Venkatesam

15 M. P. Phillip

16 B. S. F. Lebbai

17 K. Raghavan

18 T. Perumall

19 V. R Kamalapur

20 T. L F. Pereira

21 B. Krishna Rao

MADRAS RANGER LOWER.

22 T. M Krishnamachari

23 G. Venkatasubba Rao

24 S. Nageswara Ayyar

25 S. Ramalingam

26 I. Ramamoorthy

27 Noor Ahmed

28 B. N, Deva

ST. JOHN'S AMBULANCE CERTIFICATES.

1 T. P Palanikumaran

2 D. Krishnaswami Ayyar

3 A R Manuel

4 T. H Krishnamachari

5 K. Venkatesam

6 M. P. Phillip

7 A. Seetharamiah

8 K. R. Murjani

9 T. Perumal

10 T. L. F. Perera

11 N M Karumbayya

12 V. N. Subramania Ayyar
B. S. F Lebbai

13 S Ramalingam

14 C S Ganapathi (Coorg)
V R. Kamalapur
Nur Ahmed

"I will now close what has, I am afraid, been a rather tedious address, by expressing our sincere gratitude to Sir Lionel and Lady Davidson, Mr Clutterbuck, the Inspector-General of Forests, and Mr. and Mrs. Cox for making time in their very busy lives to come and visit us here and join in our small triumphs and sympathise with us in our small troubles. We very greatly appreciate their action and tender them our heartiest thanks. Our thanks are similarly due and we offer them whole-heartedly to the Examiners and Conservators who have so cheerfully undertaken the considerable extra work entailed by assisting us in our final examination and for the kind and sympathetic way in which they have performed the duties entailed"

Sir Lionel Davidson

then rose amidst cheers and delivered an interesting speech. His remarks opened with a reference to the award of the C I E. to the Chief Conservator, Mr. S. Cox in recognition of his successful administration of the Department. Referring next to the friendly relations obtaining between the Forest College and the Agricultural College, he suggested for consideration the feasibility of arranging for the exchange of lectures on forestry and agriculture specially devoted to questions where the interests of the two departments come in close contact. The Principal's report having made some mention of past friction with the Coimbatore Municipal Council, Sir Lionel stated that, whatever might have been the case in the past, he was quite satisfied that there was no reason to apprehend any future disagreements which could not be readily settled in friendly conversation; only that morning he had himself discussed with the Municipal Chairman—

whom he took that opportunity of congratulating on his recent election —one outstanding point of difference relating to the exact position of a toll-gate adjoining the Forest College premises. And the result had been an agreement to shift the toll-gate to another point in the vicinity which would remove any ground of complaint on the part of the Forest College without entailing any loss of income to the municipality or the toll-gate contractor. He had no doubt that the Chairman and the Principal would be able in a similar way to settle without friction the question of the contribution which the Forest College should make to the municipality on account of water supply if additional facilities should in future be made available under the Siruvani scheme.

He was particularly glad to learn that a visit to the Chenat Nayar Forest had formed part of the practical training of the students. He had recently visited Dhoni himself in the company of the Chief Conservator and Mr. Martin, the Consulting Forest Engineer to the Government of India, and had been much struck with the great possibilities of development through the application of modern methods of extraction and the use of mechanical appliances of the kind regularly employed in the United States and Canada. Mr. Martin had extensive practical experience of such methods and appliances and the Government of Madras had been most fortunate in being able to enjoy the benefit of his advice. A similar policy of development was perfectly feasible in other parts of the Presidency particularly in South Kanara, in

Tinnevelly and in the Agency Tracts, and given adequate supervision the prospects of increased revenue were immense. Apart from the officers in direct charge of such development schemes a Chief forest engineer would be essential for the purposes of general control and advice; and Sir Lionel much hoped that it would be possible in the future to secure the services of Mr. Martin himself for this responsible and important post. What he saw of the development works at Dhoni impressed upon him the need for constant and close attention to every detail of the working processes in order to ensure that the cost of extraction should be kept down to the lowest point. This meant that the rangers employed must possess a high standard of mental efficiency and the faculty of application. From the nature of the forests under development it was also essential that they should be men of strong physique and sound constitution. The medical examination prescribed for admission to the College ensured attention to this matter as the Principal had pointed out, and the improved methods of physical training recently introduced taught the students one method of keeping fit. But there was a danger to health to which they would be particularly exposed in the forests and against which they must always be on their guard, namely, malarial fever. They had a right to expect a certain amount of help against this from Government whose duty it was to provide them with decent housing and the best water supply available, while further assistance against the same risk had recently been furnished in the Javadis by a system of advances for the purchase of camp cots and mosquito netting. Sir Lionel regretted that hitherto as much had not been done in the former respect as the Government

could have wished, but they hoped in the future to convince the Legislative Council of the imperative need to provide proper housing for forest officers and subordinates throughout the Presidency; he was sure that Members of the Legislative Council would recognise that this was a bare necessity as soon as they became acquainted with the actual conditions of life in the forests. But that was not all. If the housing was perfect, the water supply ideal and mosquito curtains universally supplied, all this would be of no use if the men themselves were not continually on their guard against the risk of infection by mosquito bites. The precautions which it is necessary to take had, he believed, been mentioned last year in a special lecture by the Surgeon-General. Officers of great practical experience in malarious tracts were satisfied that personal care was a very strong factor, and this aspect of the case appealed so strongly to the Agency Commissioner that he had actually suggested to Government to consider whether the right to draw the special agency allowance should not be dependent upon the recipients keeping themselves free from fever. Perhaps this was going a little too far, but there was nevertheless no doubt that malarial fever was only too often the result of the neglect of proper precautions.

In congratulating S. Ramalingam on winning the Pentland Shield for athletics Sir Lionel expressed the hope that the district of Madura would take pride in this student's achievement in wresting that trophy from the little province of Coorg which had hitherto supplied all or almost all of the previous holders. Referring to the deplorable condition of the surface of the cricket ground and the inadequacy of the pavilion Sir Lionel promised to do all that was in his power to secure Government assistance towards removing these two serious defects.

The Principal's remarks on the general excellence of the discipline and tone of the College suggested to him that this admirable feature owed its origin to the permanent Principal, Mr. Cowley Brown, who possessed in a high degree the faculty of combining a high standard of discipline with the closest association with the students under his care. He was satisfied that it was because of this true sympathy, or fellow-feeling as he would prefer to style it, that it was possible for Mr. Cowley-Brown to keep the standard of discipline so high. No student who had experience of Mr. Cowley-Brown's methods could ever feel that there was anything derogatory to his own independence in orderly behaviour and the observance of discipline. As Mr. Wilson had pointed out in his report, courtesy and self-respect go hand in hand and impolite manners and rudeness are not synonymous with a spirit of independence. At the College the students and the staff had constant opportunities of association and learnt how to co-operate with members of other races, under conditions which showed that there was no real difficulty in such cooperation. Sir Lionel sincerely hoped that when the students went out into the world they would not allow themselves to be led astray by the will-o' the wisp of non-cooperation. Their training at the college should have taught them to avoid that danger, but attempts might be made to persuade them to join in the non-cooperation movement and there was the risk that some of them might find themselves exposed to the harassments and annoyances by which unscrupulous adherents of the movement sought to intimidate loyal servants of Government. There had been recent cases of intimidation in the Guntur district directed particularly against the forest staff and he desired to say publicly that if active manifestations of that kind

should hinder forest officers in the discharge of their duty it was the firm intention of the Government of Madras to do all that was in their power to put a stop to them.

In the report the outgoing year was described as perhaps slightly below the average, both intellectually and in the field. Sir Lionel was glad to find this description recorded. For, from what he had seen of the students it seemed clear to him that this implied that the College set a high standard. Further evidence of this conclusion was to be found in the fact that no "honours" certificates had been awarded; for this meant that the college staff and the Board of Examiners were determined to maintain the high standard of the past. How that standard compared with those obtaining in other Indian provinces was a matter in regard to which Mr Cuitterbuck might be able shortly to express an authoritative opinion.

The students of the senior class were now about to leave the college and to enter upon their life work. There were great openings before them if they honestly endeavoured to keep up a sustained interest in their work and always tried to do their best. The first great advance possible was promotion to the provincial service and if in that service they continued to be real triers and ability was commensurate with effort, there was the further opportunity of rising to the Imperial Branch of the department; but this rise, they must remember, was dependent upon a rigid process of selection; only the very best could hope to achieve it. Sir Lionel was aware that both services, the Provincial and the Imperial, had grievances. He did not propose to refer on this occassion to the subjects of grievance, though he had hoped

that it would have been possible for him to have made some definite announcement on the subject of the representations recently made to him by a deputation of the senior officers of the provincial branch. Unfortunately this was not possible as the matters in issue were still engaging the consideration of the combined Government and a final decision had not yet been arrived at. He desired, however, to assure those members of the Provincial service who were present that every endeavour would be made to meet such of their demands as seemed just.

Sir Lionel concluded by apologising for having kept his audience so long from hearing the advice which he knew they were all anxious to receive from their distinguished visitor, Mr. Clutterbuck, the Inspector General of Forests.

Mr. CLUTTERBUCK

then made the following short and interesting speech.

"As this is my first glimpse of Madras, I do not yet feel qualified to say much about forest work in this Presidency. I may say, however, that I have been much struck with the liveliness of the department here, and with the keenness of all the officers. Each one I have met seems to be toeing the line, ready to press forward with development as soon as opportunity offers. In such competent hands I feel sure that forestry here has a great future before it.

"I am greatly impressed with this splendid College. I have not yet seen all the Forest Colleges, but I feel safe in saying that the Madras Forest College is second to none in India. The whole institution and organisation is excellent, and I consider the discipline, and smartness of the students reflect great credit on all the officers and instructors concerned. I congratulate them heartily on the results obtained.

"And now with your permission, I should like to say just a few words to the outgoing students, but my remarks may also prove useful to past students, and to the juniors who have only completed half their training." The speaker proceeded to discuss the necessity of continuing to learn after they had left College, and of exercising their imagination while at work. * * * *

He went on:

"Another point I should like to refer to is the importance of the career you have chosen. At the present time the greatest wish of all patriotic Indians is to help on India towards ultimate self-government. I think that the one thing that will help in this direction as much as anything will be the working up of India's natural resources. The development of the vast possibilities of the forests in India has hardly been begun yet, and we foresters must all work together to develop them to the utmost. In that way you will surely be devoting yourself to the true progress of India. It is a great thing for you to know that in your forest career you can help on your country more than you could do in most other careers.

"The definite aim of working up to ultimate self-government in India has changed many things, and we have to consider our usual procedure in many ways In the past, the Forest department has generally been content to leave its actions and work to speak for themselves, but now it behoves us to show our cards, so that the public may know what our ideals and objects are; for it is more necessary than ever, to win over the confidence of the people.

"I am very glad to have had this opportunity of saying a few words to you. I hope you will find some of the advice useful, and I wish all of you very successful and happy careers

"I am indeed grateful for the very kind welcome that has been accorded to me. I have been greatly impressed with all I have seen here and hope that before long, I shall be able to make a tour into some of the forests of your presidency I thank you all very much for your hearty welcome, and for all the kind hospitality that I have received."

Mr. S. Cox, the Chief Conservator of Forests then called for three cheers for Sir Lionel, and Lady Davidson, which were enthusiastically given A move was then made to the open space in front of the College where there was a large gathering of official and non-official Europeans and Indians, who had come in response to the invitation of the Board of Visitors and Staff of the College Mr. C C. Wilson, the Principal, received them, and introduced them to Sir Lionel and Lady Davidson.

Refreshments were then partaken of, and shortly afterwards the gathering broke up and the guests departed.

"Tectona grandis"—Winning Essay for the 'Indian Forester' Prize for present students.—By B. S. F. Lobbai 1919—21 Division.

When seasoned, teak timber is brown, mottled with darker streaks, and turns grey on exposure. The annual rings are distinct and regular. The weight may for practical purposes be taken as 45 pounds per C. ft. The timber is moderately hard, strong, and characteristically scented and containing an oil which is easily preceptible to the touch

Teak is the chief export timber of Burma and India, also the chief building timber of the country. The wood is exported chiefly for ship building, especially for the backing of armour plates and for the decks of most vessels, also for the construction of Railway carriages and for the best class of house carpentry, being admirably suited for door and window frames furniture etc. In India it is used for all purposes of house building, bridges, sleepers etc. It is an excellent wood for carving, the Burmese carved teak wood being especially noted. Burmese carved idols of Buddah are prominent in almost every village in Ceylon. The wood is very durable as is shown by the Specimens in Colombo museum, still sound and good though about 500 to 600 years old. The durability is probably due to the large amount of oil in the wood.

The distribution of Teak in India can be classified into 2 Seperate regions viz:—The penisular area and the Burmese area. The Peninsular area has for its northern limit the rivers Nerbudah and Mahanadi but here and there it may occasionally be found north of this line while south of it, it scarcely occurs in Orisse or the circars. It is found in deciduous forests but seldom gregarious; and the most important forests found are (1) north Canara (2) Wynad, especially the tract known as Benue and Mudumalai (3) the Anamalai hills and 4) Travancore. There is also considerable extent of teak forest in other parts of Bombay, Central provinces, South Arcot and mysore and the Nallamallais Hills of Kurnool. It is found sporadicaly throughout the Indian region and even in such dry apparent rocky hills of west Kurneol, patches of stunted more or less gregarious teak are not uncommon. Teak has been planted largely about stations all over India and Cylon. The chief of these platations is that at Nilambur n South Malabar.

The experience I had in some of the teak plantations assures ne that it thrives well with a mean annual temperature of 72 to 81° nd a rainfall of 50" and does better with a considerably heavier ainfall It grows on various soils being best on sandstone and netomorphic rocks; but it may also be found on trap on which it grows well; on laterite, on which however, it is usually poor as in Nilambur; also occasionally on limestone; while on alluvial soils t sometimes shows a tendency to form nearly pure forests.

Teak in favourable localities if allowed to grow attains a very arge size. In the Anamalais trees of 20 feet girth and 80 feet clear bole

are not uncommon It has very little tendency to branch lower down and has usually a clean straight bole surmounted by a large crown. Young saplings have a strong terminal shoot enabling it to pierce overhead cover, to obtain light. The size of exploitability is generally 7 feet in girth; or in the driest forests, 6 feet. I believe 150 years will in most cases be sufficient to attain this girth. In plantations with a suitable soil, climate and rainfall as in Nilambur a girth of 6—7 feet may be obtained even at the age of 70.

Teak is above all, an extreme light demander requiring full overhead light and free circulation of air. It seeds freely when quite young. I have seen in Ceylon, plantation-grown teak seeding even when 5 years old. Seeds germinate well if they get sufficient warmth and moisture to rot the corky outercovering and enable the hard nut to open. Seeds sown in nursuries often take a long time to germinate. In my experience germination is best if the seeds are simply mixed with sand and dead leaves after being thoroughly soaked, when a certain amount of fermentation probably sets up, and germination takes place; but directly this happens plants must be picked up and put in nurseries. This method is mostly followed in Ceylon. As Teak has a long tap root which resents being cut, it should not be kept long in the nursery, but must be planted when quite young. It has got a marvellous power of throwing stool shoots even up to a very late age. I have seen in Kargudi a stump with 231 annual rings throwing healthy and vigorous stool shoots. As with Sal and other species teak shoots usually die down yearly; they may be burnt or scorched by the sun, but others shoot up again to die down in the next hot season; this takes place

yearly, until finally the tap root reaches a good permanently moist stratum, the shoots sent out are stronger and the plant gets the start as a tree. The management of natural Teak forests to ensure good reproduction and to increase the proportion of Teak is a difficult matter compared with other kinds ; but it has been ascertained by experience that great improvement takes place if certain well defined operations are carried out. They are, (1) not to girdle isolated trees unless with the object of reieiving seedlings (2) to leave sound trees likely to improve in localities whence large timber can be extracted and (3) to begin tangya plantations with energy and to pay much attention in weeding such plantations In Indian Teak forests where there is little demand for the timbers of most of the companion trees, there is a tendency for teak, if it alone is cut, to disappear, so that improvement thinnings ought to be taken in hand in order to relieve the poles and saplings and seedlings of teak and allow them to grow.

The adoption of the system of concentrated regeneration fellings in Teak forests is a question which has already received a certain amount of attention particularly in Burma and it is one in which more tangible progress is required. Here we have a strong light demander of great value the supply of which is totally inadequate to the demand. The tree is ordinarily found amongst a mass of miscellaneous species many of which are of little or no value ; at all events the proportion of Teak might be increased without any risk and valuable teak producing ground which is at present lying unproductive might be stocked with a reasonable proportion of teak This can never be effected by means of selection fellings, hitherto in vogue whereby the proportion of teak will

tend to diminish rather than to incease The numerous teak plantations in India and Ceylon prove that teak can be grown artificially in a pure state with success The oldest of the famous Nilambur plantions which were formed about 1842, now contains trees of about 7' feet girth in spite of frequent defoliation by insects.

The artificial regeneration of teak under a regular system deserves more attention than has hitherto been paid to it. Results of recent works go to show the great advantages to be derived from combining regeneration with tangya cultivation. Not only the success is as good as, if not better than, the natural regeneration but the cost (a very important matter) is considerably reduced. Should it be found that planting with tangya proves to be successful—and I can see no reason to doubt that it will—the method to be adopted will be to regenerate by planting with tangya. I believe that in future natural regeneration will give way to artificial regeneration as the latter is so much more certain and more easily tended.

The Nilambur plantations are an illustrative lot of concentrated regeneration fellings and the lessons to be learnt from them cannot be ignored They are situated in an extremely favourable locality for economic working, in which there is a strong demand for teak logs and poles of all sizes. There are great variations in the quality of localities in which they have been established and that taking all localities in which a full stocking is maintained up to a fairly advanced age 70 years a net annual rental varying between Rs. 5—70 per acre per annum is being obtained. These figures are only approximate but they give a

rough idea that in localities suited to good quality teak the net annual rental is as high or higher than that obtained from any acre in any other timber forest in the world. On an average 1st quality really good locality an average girth of 6 feet has been attained in 70 years. Experience shows while maintaining the height growth and length of the bole, that by better tending, an average girth of 7 feet in the same period and in the same locality is possible. This however is only obtainable by the provision from an early age by means of thinnings at successive and correct intervals of an equal and adequate growing space for the proper development of the crown of every tree. Owing to the very rapid height growth of Teak at an early age, 15 -- 30 feet in 3 or 4 years in fairly good to very good soils and the extreme sensitiveness of teak to drip and to overhead and even lateral shade, the establishment of compiete regeneration within the 1st year becomes essential for the provision of an even growth at the time of the 1st thinning which is required at 5 or 6 years of age. Naturally even spacing from the very start can be obtained only by artificial regeneration, but this is of minor importance compared with the establishment of complete regeneration within the 1st year. Whether this can be attained by natural regeneration is entirely a local question At Nilambur local conditions necessitate artificial regeneration even when regenerating pure teak plantation. The main factors in this instance are the low rainfall early in the growing season, April and May, and the relatively late burst of the monsoon only by 15th June as compared with some parts of Burma and this presidency, whereby natural seeds cannot generate before the beginning of July, thus losing 2 months, growth compared to nursery plants. In the majority of the irregular

teak forests of this Presidency in which the proportion of teak is poor due to the depletion and fallacious management in the past, artificial regeneration must unquestionably be preferred.

The case of the extensive teak forests of Burma and India is an important matter and by no means an easy one owing to the enormous area to be dealt with. These forests vary greatly in type The teak trees which as a rule form a comparatively small proportion of the growing stock are scattered singly or by groups amongst accessory species many of which are of no value. Hitherto fellings have consisted in cutting of teak trees which have reached maturity, a minimum girth limit being fixed with the proviso that seed bearers should be left where teak regeneration is absent .In the moistser type of teak forests where the tree reaches its best development, continued fire protection often does harm and encourages the growth of inferior species so that the regeneration of Teak has been effectually checked. Improvement fellings with the view of saving existing teak trees from suppression have been carried out to some extent but the enormous area generally to be dealt with prevents the operations being carried out to the extent desirable. The method of treatment hitherto followed for most teak forests is in no sense of the term a sylvicultural system. It doesn't provide for the establishment of normal regeneration nor does it tend towards the attainments of normal state; even sylvicultural requirements of the species do not receive sufficient attention.

The teak tree has several insect enemies one of the most important being the caterpillar, *Hyblaea puera*, which often appears by June and defoliates trees. The wood is also liable to very serious

depreciation in value from the presence in it, of tunnels bored through the wood by an insect. These holes are caused by the caterpillar of a Heterocerous moth which bores right through the heart wood of the tree This cause of injury is not confined to dead or dying trees as this insect attacks green trees of any age.

"Trust in Him— He wouldn't fail."

Business Methods in Forestry.— Winning essay for the "Indian Forester" Prize for past students; by Mr. L. J. Taylor R. O. Ambasamudram:

That the forests of the Madras Presidency are a source of vast industrial wealth is undoubtedly true, though very little attempt has been made in the past, to exploit this wealth in the most advantageous way.

This lethargy on the part of the Department, is the outcome of the policy of Government, who in spite of the large surplus, obtained from the revenue of the forests, returns a very small share of this revenue, for improvements, and general exploitation.

People in all parts of the Presidency are beginning to realise and feel, that there *are* benefits to be drived from our forests, and there is not the slightest doubt, that this feeling can be increased a hundered - fold by a proper management,

and exploitation of our forests, and this we can only do, provided that Government sanctions the necessary allotment to the department, for the work.

The recent war has played a great part in the Industrial and Commercial activity now prevailing, and among other things, it has opened the eyes of the public, to the vast industrial possibilties, contained in our forests.

Mr. A. W. Lushington's book on "Madras Timbers" has helped a great deal to stimulate this idea, as it shows, by comparison, the relative merits of our Madras Woods, to those of other countries, and specifies the uses for which they are suitable.

To large commercial and trading concerns, the production of the book should be very gratifying, as it should enable them to obtain locally and at a reasonable price, timber, which previously they had been importing at a far greater cost.

The working of our forests, is after all, a commercial concern, and worked under sound commercial principles, should realise the maximum possibility.

How then, is this to be done ?

As long as Government maintains its policy, of returning into the forests for improvement, the small percentage of its surplus revenue, as it is doing at present, we shall not attempt to answer that question.

No one will dispute the fact, that the utilisation of our forests is a sound industrial concern, and that any amount of money, initially spent to launch it on its progress, will ultimately pay itself back Initial expenditure in any great undertaking must necessarily be great, and if, instead of the "Streaky Bacon" method as the "Madras Mail" calls it, Government would only launch out the sum really necessary, for the proper industrial development of our forests, forestry would soon be a flourishing concern, instead of the year by year, "As you were" state, it is in at present.

That Government are at last beginning to realise the true state of affairs is evident by the sanction accorded, at the recent Council Meetings, to the project of the Russelkonda Saw-Mills, in spite of the violent opposition against it. But this is not sufficient and very much more of this sort of thing is necessary, if our forests are to be worked, as a really paying concern.

To gauge the possibllity of our forests, we should know them thoroughly, and to know them thoroughly, they should be made accessible. What we want then, are more roads and other means of communication. Where it is possible and will be of advantage, wire-rope-way, and tramways should be constructed, and all streams which would be suitable for the rafting or floating down of timber, should be utilised to their fullest extent. Drag paths and slides should also be constructed in all inaccessible places for the extraction of timber as in the Doni valley of Central Coimbatore Division.

At convenient and accessible centres saw-Mills should be constructed, and at the outset, all timber converted departmentally, and sold from there. This is only to show the commercial public, that the concern will pay.

The Research and Utilisation Officers, should work out the possibility and out-put of the forests down to details, and these details should be made available in the Chief Conservator's and all the Circle Offices, for reference, when contractors are advertised for.

Immediately it can be definitely stated that the thing is paying, enterprising contractors of large commercial firms, should be advertised for, and these contractors should be shown all the working details, expenditure, out - put etc. Once they are brought to realise that they are on a good thing, the whole concern, can be handed over to them, on contract, and not only will the departmental staff be then able to devote more of their time to their more legitimate work, namely the sylvicultural development of the forests, but the industrial development of the forests, will also be assured.

To turn now to the actual working of the department, another point in which it is defective, is in the drawing up of its working plans. The preparation of a working plan is in theory, quite a simple matter, but to actually apply and practice the prescriptions of it, is quite a different thing altogether. In

some cases it is almost impossible to do this, with the result that there is an endless amount of correspondence and the plan has got to be modified.

It is very often the case that forest storage depots are specified in the plan, and according to the plan, the contractors are to use these only. These depots are often chosen at hazard, with the result that a depot of one series, is quite close to the depot of another series. This causes friction between rival contractors, who suspect one another of poaching. There also arises a competition in rates, for labour, the best paying contractor, getting most of it. This generally results in petitions to the District Forest Officer, and Conservator, and more correspondence.

If in drawing up plans, conferences are held, with all local contractors, and their collective opinions taken, on all the points, on which there is likely to be attached any doubt, it ought to be possible to draw up a plan, so that no difficulties will arise later on, when it is being worked.

Take again a working plan or a scheme, drawn up for planting operations. The scheme prescribes that a certain area is to be planted up every year. This prescription is strictly adhered to, irrespective of the fact, whether the last planted, was a success or not, very likely, fifty or even seventy five, per cent, was a failure, but the plan prescribes that an area is to be planted up every year, and so the work goes on. Possibly an attempt is made to replace casualities on this area, concurrent with the

new work. This means, that the concentration and supervision on the new work is lessened, and things get from bad to worse.

Why not, when there is a failure, stop the planting in the new area, and go over the old area again? If there is continuity in this, and we see that each area planted is stocked, and in a fair way of establishing itself, before we go on with the next, our planting operations would be much more of a success, than they are at present.

Though forestry, it may be argued, has no bearing on work in the office, the two are not incompatible. Thoroughness and expediency in the former, mean efficieny in the latter

Office work in a Range, is generally as much, or more, than the Range Officer, and his clerk, can conjointly manage. It is very improbable that District Forest Officers do not realise this, and yet, work is unnecessarily created in their offices on matters, which a little trouble on the part of the District Forest Office Clerks, would elicit from that office itself. Another example of this, is the submission of the Annual Administration Report. The Range is the Unit, from which emenates most of the data, for the compilation of this report. These data, are submitted monthly by the Range Officers, in the form of statements and returns, and yet, in spite of this, at the end of the year the Range Officers are called on to submit again, in a consolidated form, what they had already been submitting every month. Why could not these monthly statements and returns be consolidated

in the District Forest Office itself? The mere fact that it is not, suggests to one, the shirking of responsibility, which is thrust on the Range Officer. Is this fair? Again, look at the waste of stationery involved, by the submission of these unnecessary reports. And yet, there is talk of paper shortage and waste!

To sum up then, the measures necessary for the working of our forests on more business-like principles firstly, Government should relax their policy of stinting money to the Department. The Chief Conservator, as the head of the department, knows exactly, what is wanted for the progress of the department, and all schemes sent up by him, should receive the consideration of Government, and the necessary allotment sanctioned for them. Secondly, the forests should be opened up, by roads, tramways, wire rope-ways etc., Saw-mills established at convenient centres and the forests worked on more commercial lines; Thirdly working plans should be prepared in a more definite and practicable manner, and lastly, office work in Ranges, should be minimised to the fullest extent.

A ranger is an executive Officer, and if he is to be burdened with office work, he cannot be expected, to devote as much time as is necessary, for executive. By cutting down then the office work, he will have more time to devote to the improvement of his forests, which, if they are to be worked as an industrial concern, is an absolute essential.

"SPERO MELIORA."

Forest Life in India;—(continued).

II ON TOUR.

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When the District Forest Officer goes out into camp, as already explained, he takes with him several cartloads of furniture and a lot of servants. His work is going to keep him occupied during pretty well the whole of every day, and he will be moving camp on an average once every four days. To be continually packing and unpacking his own baggage is out of the question, as he has not time for it. He therefore takes with him a 'dressing boy,' whose duty it is to take care of, and pack and unpack all his personal effects, and clothes, make his bed, and do his room. He also takes a 'camp boy,' or 'butler,' to superintend the running of the whole establishment. And on the competence of this individual depends the whole comfort of the tour. It is also necessary to take a cook and a waterman; this latter, as his name implies, devotes his life to carrying water for his Master's baths, which are many.

In addition to these, every pony taken into camp—must be accompanied by a 'syce,' or groom and a grass-cutter, as hay is rarely obtainable. For official odd jobs, such as taking messages, keeping the office table tidy, packing and unpacking the office books and papers, which have to be taken into camp, each District Forest Officer is provided by Government with four peons. It is usual to

take two of these on tour to help in moving camp and to leave two in the office in head-quarters to bring out official letters and papers, known by the general name of 'tapal.' The arrival of the daily tapal is a matter of some moment, as on the size of it depends whether the next 24 hours is going to be a pleasant or an unpleasant time.

It will thus be seen that a considerable retinue follows a forest officer who is in charge of a district when he goes on tour. When a probationer first goes out to India he is put under a senior D. F. O. (District Forest Officer), and he goes on tour with him, to learn the work and see the way things are done, and generally acts as personal assistant to him for the first few months As, however, he at first knows little or nothing that is useful, he rather adds to his senior's work than otherwise. He is then put in charge of a range, and later on of a sub-division, or he is put on special duty such as preparation of working plans, finally rising to the position of D. F. O. himself. The position is reached with a rapidity, that varies in the different provinces, and in those that are short-handed the 'assistant conservator' may find himself in charge of a district within a year or eighteen months of landing in India.

Now that the position has been more or less described let us follow out a typical tour. Having sent on his baggage on the previous day the D. F. O. gets up about 5.30, has a light breakfast known as "chota hasri" and proceeds in the cool of the day on horseback or by motor bicycle to his first camp. This will probably be in the traveller's bungalow of some big native town

within seven or eight miles of his forest, which is the head quarters of the "Range" he intends inspecting. Each district is divided up into "ranges," four or five to the district, and in charge of each of these is a "Range Officer" usually an Indian. On his arrival at the traveller's bungalow he has a bath and breakfast, and then the Range Officer is interviewed and receives his orders, and a general plan of the tour is arranged One or more days may be spent here according as there are timber or fuel depots to inspect or outlying patches of forest, within easy reach, to be visited. In these native towns there is often much that is of interest apart from forest work. One day a couple of little brown men may appear, clothed in what would scarcely make two decent sized handkerchiefs and armed with curious musical instruments made of gourds or reeds, who will assure you that the prickly pear edges round your compound are infested with poisonous snakes. For a few annas they will get to work with curious solem dancing and weird tunes to charm the snakes into the open and will catch them in their naked hands with wonderful dexterity, and bear them away, with profound salaams to the "master"—the profoundness of the salaams being in direct ratio to the amount of the present they have received. I have never known any of these men fail to catch at least one snake, but whether or not they have put their quarry in place beforehand it is difficult to say. They will never allow one to kill the snakes they catch in this way, their

ostensible reason being that their captures must be slain decently and in order, with the proper rites and ceremonies, or they will lose the power they have over their kind.

Another day a quaint figure clothed in most voluminous robes will arrive and squat down on your verandah and proceed, if allowed to do so, to show you the most wonderful conjurring tricks. you may sit as close as you like and watch as carefully as you can but never will you detect the slight of hand by which nearly all the tricks, are done. Or a tall Mahommedan may appear with an unfortunate half-starved bear, that he will put through its paces for the usual tip of eight annas or so.

Then, when the necessary work in the range headquarters is finished everything is packed up again and camp is moved to some forest rest house, situated in the heart of the jungle, and here the real forest life begins, and the Forest Officer is more at home. The hill men all know him, and come to him for medicine, advice and help. He wanders out in the early morning or the evening with his gun and his native 'shikar,' through the glades and by the pools he knows so well; and in the evening after dinner he sits in his verandah and listens to thousand noises of the jungle, the cries of the animals, and the buzzing of the teeming insect life. The hill man is much nicer and simpler and more honest than his semi-educated brother of the plains. I remember one little hill man, a 'forest guard' who caught a timber thief redhanded, and promptly ran him in. The offender was the son of a wizard of some repute, and dire were his threats of what would happen, to

any one who interfered with him. However he was handed over to justice, and punished and the matter passed out of my mind. Some month or so later I was out with this same forest guard, who was a great shikari and he seemed tired and unhappy. On being questioned he revealed this trouble. The result of interfering with the son of the wizard was beginning to manifest itself. The great one's threat had been that his captor would die within a year, and that he would die slowly, beginning from his feet and legs so that he couldn't walk, and now the curse was beginning to make itself felt, and he was feeling very weak. My promises of medicine—even of burning bitter medicines—were of no avail. This was a matter that no medicines could help. Next day my boss, a senior District Forest Officer of long experience, arrived to inspect the forests, and I mentioned the matter to him. He advised giving the little forest guard some coloured Christmas candles to burn in front of his hut, as he had always found them efficacious charms.

I wrote off for some at once, and in the course of a week or ten days, they arrived. By this time I had changed camp; however I sent for the afflicted one, and he came, doing the ten miles march with apparent difficulty. Then I gave him the four coloured candles —wonderful charms I had concocted—and instructed him to place one in each corner of his hut and with suitable incantations light all four at precicely the same moment. Then they were to be allowed to burn right out, and *if* all expired at the same moment he would surely die and nothing could save him, *but* if they went out one

after the other all would be well and his enemy the magician's spell would be broken. He took them and wrapped them up tenderly in a dirty end of his cloth, and went away more hopefully. Next time I met him he was radiantly grateful, and with 'cubber' of a fine stag, and willing and able to walk me off my legs in search of it.

In these jungles there are of course no shops and the Forest Officer lives on milk, eggs, and tasteless stringy chickens, a continual supply of which has to be arranged for. These supplies may be purchased in any native village, and when right out in the jungle a runner has to be paid to carry them two or three times a week Apart from such food and the tinned stuff he may have brought with him, neither the Forest Officer nor his followers get anything except what he may shoot. There is, therefore, an extra inducement, apart from sport, in any shikar the forest may have to offer. And great is the rejoicing in camp when the master kills a bull or a stag. Even the big red jungle squirrel does not come amiss after a continued diet of curried chicken, chicken chops, and roast chicken and jugged or roast squirrel, or squirrel soup, is quite an addition to the menu. After a month or six weeks of this sort of life some matter usually crops up that requires the District Forest Officer's presence in head-quarters, and then everything is once again packed up and the return journey is made to civilisation with its attendant joys of tennis, bridge, and society.

CHOKRA.

Three years among the sholagas.

Of the many tribes that inhabit the western Ghats, the Sholagas are as important as any other. They form the main source of labour in all forest works, and as such, it is only meet that we should be acquainted with their life, manners and customs, a study of which is as useful as it is interesting.

The home of the Sholagas is the forests of the Coimbatore district, where only they are known by this name. Their villages are extremely small and isolated, and are generally situated in the close proximity of some deity perched by the side of a gentle running rivulet, where the worship of it and the hope of being protected by it might have induced them to settle down.

One of the most backward of all classes, the Sholagas have not yet come under the sway of civilization. The unhealthiness of the climate, the wild characteristics of the surrounding country the difficulty of access into their mountain dwellings and the timidity of their character are some of the main obstacles in the path of civilization. Their huts are very dingy and narrow, built by themselves on rude and antiquarian principles. Dirty in their dress, their persons are still dirtier. Their occasional trips into the neighbouring villages of any considerable size for earning their livelihood and purchasing provisions, bring them into contact with higher civilization and this they inculcate into themselves in course of time. They 'speak' a

dialect of Canarese, with a peculiar accent, that cannot be easily imitated by any other than a Sholaga. None of them knows how to read and write, though much is being done for their education.

The climate of the country has much influence upon their personality. Malaria is a common visitor among them. A person laid up with Malaria will care for it no more than an event in the ordinary course of every day life. The mountain herbs constitute their principal medicine and they serve them equally well for fracture broken heads, headache, stomachache and fever. It is only on the direst necessity that a Sholaga will apply for help to a village doctor of any pretensions.

Whatever it may be, brought up under hard conditions and subjected to the extremes, the Sholaga is generally hardy and strong We will not be far from right if we picture to ourselves the Sholaga as a stalwart man of medium stature of black mein, with unruly curly hairs tied into a knot, his head shaved in the front and the moustaches trimmed to order, dressed in meagre and threadbare clothes having a blanket thrown negligently on one shoulder and on the other a weighty axe his inseparable companion placed at rest, his eyes always on the alert to catch the slighest movement among the bushes or of bees from the honey-suckle, and walking with steady steps on the rugged paths of his mountain home. Able bodied as he is, he is more timid than he is brave. He is not so much atraid of the wild animals as he is of an outsider. He dreads goblins and ghosts more than anything else.

The occupation of the Sholaga consists mainly of podu cultivation, daily labour and poaching. In his podu the Sholaga cultivates ragi' cucumber, pumkin and such other food materials When Mr. C. M. Hodgson was the District Forest Officer of North Coimbatore Dn. the sholagars were encouraged to grow wheat and mustard in their podus, the seeds for which were given them gratis. This attempt was crowned with complete success, so much so the sholagars made a good profit out of it.

Of handicrafts the sholaga knows none. As an axeman he is unrivalled. In constructing his huts, squaring timbers and converting them into planks it is the axe that plays the main part. But for his efficiency in this respect, the sandal wood extraction which is carried out on an extensive scale in the North Coimbatore and Kollegal divisions, would not have been so well executed as it is.

It is the Forest Department that chiefly takes in sholaga labour. The sholagas are given podus for cultivation and settlement, inside a Forest, free of any assessment. In return for this they are bound over to the Government to serve as coolies, whenever called upon, accepting the normal wages. Thus the Forest Department is much benefitted especially in the unhealthy and remote regions, where, to get coolies from outside would have been highly expensive, inefficient and difficult. In earth work, the sholaga is not in his element. My attempts at times to repair roads etc, when 'Wodders' from the plains were not to be had, were thorough failures. The sholaga is known best as an axeman.

Coming to their manners and customs, I shall only deal with the three main charecteristics of the sholaga life, namely their fealty to the headman, marriage customs and hospitality.

The headman is the most important personage in a sholaga settlement. Generally he will be the oldest and the most experienced the wole lot. He decides their quarrels and disputes and stands for whole community when occasion arises. In many instances the lience of the rest to the headman is simply exemplary. All bad luct on the part of the tribesmen are severly censured, punished often fined by the headman. Any man acting against his decision made an outcaste Every sholaga house will shut its door against him He will not be given either fire, water or the simple foodstuffs eventhough he be starving. Neither will he be allowed the right of worship in their temples nor the privilege of messing in society. In short, he is denied even the slightest obligation. This treatment brings round the stubbornest of the sholagas, and if the bolt of excommunication is to be with -drawn from him, he has to pay a penal fine, treat the whole community in a common mess and ask forgiveness in the open assembly. When this is done, the natural feeling of hospitality inherent in the sholagas, like the redhot embers lying under the cover of a thin layer of ashes, blazes out in all its effulgence, and every help is rendered unto him to the best of their ability, so that, the unfortunate man feels remorse and shame for his past beastly conduct.

Further than this, the headman can make friends and foes, for the whole community. Any Forest subordinate or contractor

who is in need of labour, will do well to apply to the headman, for any disobedience of his classmen to his order will not end there.

Their marriage customs are anomalous and antiquitous. There are three different kinds of marriages in vogue among them. The first is the best of the three and that is marriage with the full consent and best wishes of the parents and relatives. This sort of marriage is not very expensive. The bridegroom has to defray the expenses of a new set of clothes for the bride and of a single day's feasting to which all will be invited. There is no luxury what-so-ever in a Sholaga feasting. There we can see frugal fare in plenty. The use of spirited liquors is considered sinful. After a sound helping at the rude victuals, the merry men will sing and dance to their ancient lays. Then, there will be plenty of blessings and little presents on the part of the guests and the whole will retire.

The second mode of marrying is abormal even though it be interesting. When a Sholaga falls in love with a girl and finds that either the love is not returned or that the parents of his dear one are not a party to it, he takes recourse to violence. He lies in ambush near the stream or well whence water is usually taken and when the girl in question comes to take water, he carries her off into the interior of the forests and there marries her in secrecy. After a day or two, he returns with his bride into the village and there the marriage is celebrated.

I shall not describe here the third method of marrying, lest it may appear horrible to the minds of the gentle reader. It will

suffice if I say that their marriage ties are very loose and both men and women are allowed remarriage when love fades and beauty decays, no matter whether the husband and wife be healthy or unhealthy, dead or alive. This custom is much in practice among the Sholagas. In such cases the new husband has to pay a sum of nearly Rs, 100 to the late husband of his new wife which is five times the actual expenses of a marriage of the first order.

If their marriage customs want reformation, their hospitality draws forth admiration. There is nothing so laudable in a Sholaga as his hospitality. It does not fall far short of the sweet family welcome of ancient Scotland described by Sir Walter Scott in most of his immortal novels. What little he has, he will share it with his guests. The warmest corner of the fire side will be alloted to the guest and there they will sit and chat of olden days and tell stories often told.

The religion of the Sholagas is Hinduism. They worship many Gods under various names. Very often they perform rituals and sacrifices either to please their Gods, or to wash off their sins or as an attonment for crimes comitted. They are highly superstitious and credulous.

Thus, as above described, are the life, customs and manners of the Sholagas who are so very useful to us. As a cooly in important forest works, such as sandal wood extraction, timber operations, fire line works, honey collection and last of all but by no means least, as "shikari" or guide in the forests for sportsmen, the Sholagas are

invaluable. In many ways they are being encouraged now. Some of them are employed in the Forest Department as foresters and forest guards and have given sufficient proof that the trust is not misplaced in them. Mr. C M. Hodgson wanted to educate them according to the elementary principles of modern education. Two schools were started, one at Hasanur and the other at Kavalur both in the Satyamangalam Range, where the Sholaga children where not only educated but also fed. The school at Kavalur thrives very well, and special mention of it is made in a refrence published by the Publicity Bureau on the depressed classes. Systematic and punctual payment, fellow feeling, obligation and honesty are the qualities which bind the Sholaga to us, and when once we have won his heart we will know that the Sholaga is the best servant of all.

P. A. VENKATARAMAN.

M. F. C. 1921—23 Division.

Fire Protection and its difficulties in the Mudumalai Forests.

The history of these forests may be said to begin from 1857 when they were taken over by the Govt., on a short lease of 6 years from the Tirumalpad Raja of Nilambur. During this period the main object of management was to remove the maximum quantity of timber possible from these forests. No regular working plan was drawn

up prescribing the nature and the extent of the fellings to be made, and the methods to be adopted for ensuring the regeneration of the principal species. When the lease was about to expire, it was extended to a further period of 99 years, and the heavy fellings that followed resulted in a mass of branchwood and debris lying in the forest and the opening of the canopy. These again produced the inevitable result of an immense growth of grass and severe forest fire which annually overran a great part of the working circle making it appear, as though it was under a process of conversion from a High Forest to a grassy Savannah

No steps were taken to combat them. The special establishment which was at work there was slowly withdrawn until at last there was left only one Forester to look after these in addition to his other duties at Masinagudi. With this wide charge under him and a very poor labour at his command this Forester could not do much by way of preventive measures. This sad state of affairs continued without any great change down to the year 1907 when a working plan was drawn up which provided for the fire protection of the compartments worked over under Improvement fellings, for a period of 5 years, by means of fire lines 100 ft. wide. As regards the Mysore Frontier line it laid out that the entire width of the fire line was to be 300ft. which should to be fire traced in good time by the officers on both the sides working together in harmonious Cooperation. The Jenkurubars of the wynaad tracts were to be enlisted for service and encouraged to form permanent settlements inside the Government Forests. But all these worked unsatisfactorily and the Jen kurubars proved a much harder people to

deal with than they were originally thought to be. They preferred living on the uncertain remuneration of the Minor produce contractors to the more certain and peaceful life offered by the Government and went about from place to place with torches in their hands which they unscrupulously used in burning down the heavy growth of grass to make it easier for them to pick up the Minor products and to find their game more easily.

A second working plan was prepared in 1910 which laid great emphasis on the fire protection of the Frontier, and the opening up of a network of smaller lines within the forest which would enable us to localise fire or at the worst serve as good bases for counterfiring against a long line of wild fire coming in at a furious rate. In accordance with its prescription a number of fire lines were opened so much so that at the present day there are nearly 130 miles of them in these Forests. Most of them were till so late as 1919 closed ; i. e. the standing trees on them were left as they were, only the grass on the ground being cut and burnt. This method didnot ensure through burning and consequently all the trees on the fire lines are now being removed thus opening out the lines as well.

By far the worst fires in these Forests are said to come from the side of the Mysore state Forests. In spite of the continued attempts at keeping these out, the history of the last 30 years only shows very few years in which they were absent. No wonder then that after all this experience, there are still doubts expressed by some officers of the service as to the efficacy of fire protection and the best methods of

attaining the same. Not very many years ago one officer of the superior service, under whom I had the privilege to serve for a while told me that the conventional method of fire tracing could not really serve the purpose. If a man wanted to set fire to the Forest no amount of fire lines would prevent him from doing so. Neither is it possible for the small protective staff to be on the lookout for such incendiaries and bring them to book ; prejudice against the Department and its members, ignorance of the ultimate purpose of the state in reserving these Forests and a blind notion that the forester is essentially an antagonist to the agriculturist all these go a long way to explain the wilful action of such incendiaries. Any change in their attitude can only be effected by slow degrees and by the exchange of mutual good will and confidence.

It sometimes happens that fire gets in as the result of an accident, as when fire tracing the lines, and the vast store of readily combustible material in these forests really makes it an impossible task to control it effectively and extinguish it soon. The more important lines are situated in such far and out of the way parts as on the frontier line that with the poor labour available in Kargudi, their complete clearence is only of doubtful occurance in any year before the fire season sets in. The problem of finding out the requisite labour for the purpose, is one of grave difficulty and has tried the patience of not a few of the officers put in charge of these forests The Jen kurubars, as already stated, are lured away by the contractors, and, we cannot hope to get them to our side so long as the contract system is in vogue. If it is discontinued, these men will be thrown out of work

and we can by slow degrees bring them round to look upon the Department as their friend and protector. As many as possible of them should be employed by the Department on monthly pay or weekly wages, and paid in kind rather than in money. It is in their money dealings with the grain sellers that these ellicit children of the forests often get into trouble Not knowing the mysteries of accounts these men are easily entrapped by the unscrupulous dealers who, somehow manage to sell them goods above the value of their pay or weekly earnings. The excess amount not being cleared then and there, accumulates, and in a few months the poor fellows are forced to sell their cattle or pledge their plots of land to their creditors These who do not possess either kind of property try to evade as far as possible and in extreme cases run away from the localty with their wives and children if any. A similar thing happens in the trail of some of the minor Forest Produce contractors. These two classes of men are, in my opinion, largely responsible for the misery of the hill tribes in these parts, whose presence in large members is of great value to the Forest officer. When these are provided against the hill men can be brought to a permanent settlement wthin the forest, and induced by promises of appointments, or money, or land, to bring in more and more of their kinsmen to live with them in the same or similar settlements

Then as regards the operations to be carried out, there is not much to be said. The work of cutting guide lines, and fire tracing them later on, can go on as usual for all the interior fire lines. Along the frontier, and along the more distant lines early burning on a small scale may be tried. This operation is of extreme simplicity

when it is once well understood: but in the hands of irresponsible men is apt to become more dangerous than the worst fires of any season. Great care in necessary on the part of the officer in charge to see that the instructions are obeyed to the very letter by the subordinates deputed for the operations. The subordinate and a batch of well trained coolies should be constantly going over the area to be experimented upon, and wherever the grass is found to be dry enough to catch fire, it should burnt, care always being taken not to burn large patches at a time and allow the fire to spread wide and become uncontrollable The secret of success of this operation is its easy controllability when compared with late burnings. The season at which to begin this should not be later than November, which time is specially chosen as, then, the grass is more green than dry, and any fire can be easily brought under control. If this is successfully done, it may be adopted as a permanent fixture in the plan of operations of the future and can be slowly extended to all the exposed sides of these Forests.

P. SITHAPATHI AYYAR.

M. F. C. 1920 - 22 Division.

Athletics.

CRICKET.

An interesting match was played on Sunday the 7th August 1921 in Mr. Narasaiah's compound between the Coimbatore Gymkana club and our College, terminating in a victory for the club by 37 runs.

The club team winning the toss took to batting and scored 106 runs ; when the college went in to bat, the bowling of Mr. Sullivan was a bit too much for them, most of them being out of practice ; they evidently lacked confidence in playing such fast balls, with the result that all were dismissed for a poor total of 69 runs, of which Mr. E. K. Krishnan was responsible for 25 runs in good style.

HOCKEY MATCH.

Madras Forest College Vs Agricultural College, Coimbatore, at the Agricultural College Grounds.

One of our most keenly contested Hockey Matches resulted on 11—8—21 in the defeat of the Agricultural College, the runners up of last year's Hockey Tournament, by a good margin of 4 goals to nil.

The game started punctually at 5-10 p. m. The ground was soft, and this accounted for the game being slow to start with.

During the first half, our new captain (M. B. Aiyana) made several clever runs and centred the ball in spite of good defence. These centres were however not made full use of by our other forwards.

M. M. Mandanna— our centre forward— made several mistakes in the first few minutes of the first half. The ball was

apparently too slow for him ; but with a little cheering from outside the field, he pulled himself together and did himself justice by registering the initial goal with a pretty shot at 5–28 p. m. From this time forward he kept his eye well on the ball and began to attack his enemy with his usual undefeatable offence

Straight from the centre bully our forwards dashed into the opponents' ring and at 5–30 p m. Hassumudin khan added the 2nd goal to our credit. The play became more interesting now and our defence had to sustain several violent rushes, which however they succeeded in beating off

5–40 p. m. Half Time.

At 5–46 p. m. M. B. Aiyana (cap) made a clever run along the right-boundary line and centred the ball beautifully: the pass was cleverly taken by Hadi Hussain who lifted the ball and shot while it was in the air scoring a brilliant goal at 5–50 p. m. Aiyana made another fast run through two of his autogonists and with a bit of clever stick-work gave the ball to the centre forward who scored the 4th goal.

The last few minutes' game was of necessity a specially ,fast one ; and a fast shot by the centre forward (M M. Mandana) was well saved by the opponents' goal keeper.

N. S. Poonacha and K. Annappa Bandary, deserve great credit for the invincible defence they put up and for keeping the ball away from our goal line.

M. B. Aiyana (cap) played a good game. It was really a pleasant sight for the spectators to see how he dodged his opporents with his quick wrist work and fast runs Indeed we were very unfortunate last year in his breaking his left leg on the Hockey-field thus depriving us of one of our best men. We however are much pleased to see him back again in the battle field to fight for his college and we fervently hope that he will lead his men to victory at every battle and so advance the fame of his college.

16–8–21

The return hockey match with the Agricultural College team was played this evening on our grounds, play starting at 5–15 p. m and resulted in a win for the Agricultural College by 3 goals to 2.

The game was a fast one from the start, and the visitors played a better game than in the previous match, and passed on our lines several times to find our full-backs too strong for them After continued pressure however their inside left succeeded in registering the first goal to their credit at 5-23 p. m.

From the centre bully the ball was again taken into our ring and a fast shot was nicely put out by our goal-keeper inspite of a good offence. Our Captain (M. B. Aiyana) took possession of the ball and making a fast run centred the ball beautifully, but our inside left failed to take it A little later however, Hadi Hussain our outside left made a clever run and secured the first goal to our credit at 5-37 p m. Our men continuing the offence made an-

other strong raid and a shot by our centre half (Principal) was ably defended by the opponents' goalkeep. Encouraged by the continued cheering of the spectators our forwards with a litle bit of fine passing registered the second goal for the college amidst a thick defence, Hassunadin khan being responsible for the goal scored and ably supported by Bodas.

5 - 15 p. m. ½ Time.

At the opening stage of the second half at 5 - 50 p m. the visitors heavily attacked our goal which held out gallantly.

The inside left of the opposite side secured the ball and dodging our men made a fast run persued by one of our men K. A. Bandary who was just in time to hook him just as he raised his stick to shoot an easy goal, and sent the ball with all his might far away from our circle: and it was unfortunate that he gave "sticks" at this moment as he tried to give a strong drive, and the visitors succeeded in shooting the second goal against us off the penalty hit given for the "sticks", and this made the score equal.

For the following 4 minutes: our men kept on pressing their opponents and Hassunadin khan just failed to net the ball. Our men made great efforts to put in a third goal but failed. M. M. Mandana—our centre forward –with the help of his partners threatened the opponents' goal and the custodian in trying to clear gave us a short corner which however we failed to convert.

The opponents secured the ball and dashed into our open line and from the middle of a confused scrimmage in the goal mouth scored their third goal against us thereby gaining the lead.

The passing of our forwards was too wide and the shooting bad, and their biggest mistake was failure to part with the ball in time K. A. Bandary and N S Poonacha played splendidly for their side. Havildar Kader Bachah deserves special mention for his brilliant defence of the goal.

S C. RAMALINGAM,
Athletic Secretary.
M. F. C.

Miscellanea.

Balsa-Wood.

During the war 'balsa' wood was the material used for the 70,000 mine buoys which stretched across the North Sea, proved so effective a barrier against German submarines.

When we wish to express the limit of lightness, we say that a thing is 'light as cork;' but balsa which is the wood of a tree native to the tropics of America, is lighter by one third than cork

It is not at all like any other kind of wood. Instead of having a fibrous structure, it is composed of hollow, thin walled cells containing

nothing but air. To prevent it from rotting it has to be treated chemically by a process, which, incidentally renders it water-proof.

The Navy Department during the war, equipped our fighting ships and transports with large numbers of ring-shaped liferafts made of balsa wood and covered with canvas.

This curious wood is used for hydroplane pontoons, for toy airplanes, for surf boards and for sportsmen's decoys. Relatively to weight, it has far greater structural strength than any other kind of wood It is coming into extensive use for refrigerator compartments on ships, and is thought likely to prove equally serviceable in refrigerator cars, and cold storage ware houses.

Extracted from "The Madras Mail"

* * * *

New Sources of pulp and paper

The Direction in Which the paper Maker Will Turn When His Timber Supply Is Gone—By Thomas J. Keenan, F. C. S,

The growing scarcity and ascending cost of the raw materials used in the manufacture of pulp and paper are reflected in the prices which consumers are required to pay for the finished product. The larger city dailies appear to be less affected than the country weeklies and trade journals, for the reason, perhaps, that most of them obtain their supplies direct from the paper mills on long-term contracts or else control mills of their own, the entire output of which is absorbed by them.

The body of all newspaper sheets consists of pulp produced by a mechanical process of grinding logs of spruce, balsam or hemlock against revolving stones in the presence of water. This pulp alone can be formed into paper with the addition of a small proportion of clay, but it is customary to strengthen the sheet by incorporating with the groundwood pulp a definite proportion—10 to 20 per cent—of chemical pulp made by the sulfite process. The preferred wood for the manufacture of sulfite pulp, which is made by boiling the wood under pressure, in bisulfite of lime solution, is spruce, though other woods, as hemlock, balsam fir, white fir and tamarack, are also used commercially.

The spruce and fir forests of the northeastern states, where our pulp and paper industry has had its greatest development, have been practically exhausted, and American paper manufacturers have been forced to seek supplies of this raw material in Canada. The Canadian pulp and paper industry has forged ahead of late years until its production of pulp and paper has reached enormous proportions, putting pulp and paper manufacture at the head of all the Canadian industries.

In addition to the pulp manufactured in our own mills for conversion into paper, a large volume is now imported from Scandinavia and Germany, as well as from Canada, our home production being wholly inadequate to meet the demands for the many kinds of paper which are manufactured in addition to newsprint paper.

Coincindentally with a diminising supply of the woods which form the basis of newsprint paper, there has been more than a normal increase of consumption of this class of paper, owing to a greater use of newspaper advertising on the part of merchants and manufacturers.

Although there has been a good deal of ill-informed speculation concerning possible new sources of paper making material, and many futile attempts have been made to utilize various reeds and grasses, waste paper, etc, the experiments of Brand, under the auspices of the United States Department of Agriculture in 1910, demonstrated the feasibility of converting cereal straws into a satisfactory paper pulp and commercial applications of the process or processes similar to it have already been made.

It is inevitable that paper manufacturers will turn eventually to sources of pulp other than timber, though for numerous kinds of paper, trees will remain the preferred material. The use of cotton linters is a new and promising development. In the pulp and paper laboratories of the Forest Service at Madison, Wis., it has been proved experimentally that many western woods heretofore unused are well adapted for conversion into paper pulp by the processes ordinarily employed. Spruce can be replaced for pulp manufacture by twenty or more different woods, but the fact that it and trees similar to it take thirty-five or forty years to reach maturity is still a hindrance to their constant use Timber trees cannot be treated as the agriculturist treats crop plants and be sown, cut and grown again as annual harvests, though some of the larger paper manufacturers have undertaken forestry work looking to the reproduction of wood

on cut-over areas. The West Virginia Pulp and Paper Company, in this country, and the Laurentide Company, in Canada, were pioneers in conducting operations for timber conservation and insuring future supplies of papermaking woods.

The solution of the problem is however, to be looked for in another direction. For years there has been used in the manufacture of tough papers, bag and wrapping papers, a fiber called Manila hemp, which is no hemp at all but a species of banana, belonging to the Scitamineae family, the genus being Musa. Manila hemp is known to botanists as *Musa textilis*, while the edible banana of commerce is *Musa sapientum*. The leaf stalks of the various species of banana are rich in cellulose membranes which give them first place as available sources of paper stock, and it might be a profitable undertaking to plant the waste areas of the subtropical regions of our country, lower Florida and California, with the wild banana or other fiber yielding plants not heretofore employed as raw material for paper making. They could be treated as annual crops to yield a steady supply.

An American company has been formed for the utilization of fiber extracted from the wild banana by a new method involving the use of a fiber-decorticating machine which separates the fibers mechanically, and leaves them clean of incrusting material and ready for cooking in the pulp mill. The promoters of the enterprise are confident of developing within a few years a tropical industry capable of furnishing pulp and paper mills in the United States with a plentiful supply of papermaking material. Operations are now being

conducted on a commercial scale in the Republic of Panama, near the Canal Zone.

Athough reeds and grasses as raw materials for papermaking are of little importance at the present time, it may be said in favour of their use that the harvest is large and the plants are less subject to decay and rot in keeping than, for example, bamboo, banana and similar solid stalks which allow no ventilation in piling. Reeds and grasses are characterized by hollow cylinders which permit the passage of air and so obviate the decay resulting from the breaking down of vegetable matter which is more solidly massed in the bamboo and other plants named.

In reeds and grasses the cellulose membranes are less permeated with lignin and a smaller quantity of alkali is consequently required for their reduction to paper pulp than is the case with woods or plants of solider stems. In Germany, Czechoslovakia, and Roumania, the stalk sheaths and leaves of Phragmites and Typhá have been used for the preparation of cellulose with satisfactory results. The root stock of Phragmites is made to yield alcohol before being pulped.

The reeds used in this country for the manufacture of floor mats, etc, might prove a good source of paper pulp, and the waste from mat factories might also be experimented with. The dried plants are best adapted for use, since the green material contains coloring matter which makes bleaching difficult and expensive Before harvesting the plant it should be allowed to stand from the actual time of ripening until winter sets in. This permits a more

thorough drying and the mechanical action of air and cold favors the rupturing and weathering of all the cell constituents. The stalk and sheaths of the plants are considered the most suitable materials for pulp on account of their higher yield of cellulose fibers, amounting to between 30 and 35 per cent.

The cells of which the fibers of reeds and grasses are composed are short, rather wide in proportion to their length, and thin - walled. While these characteristics render the fibers unsuitable for conversion into the finer grades of bond and writing papers, they facilitate and cheapen the production of the pulp for purposses for which it is suitable.

It is not an idle dream to look forward to a time when pulp and paper manufacturers will have abandoned their present methods of obtaining cellulose fibers and treat paper pulp as a by-product of manufacture rather than a main product From the tree or plant a whole range of valuable organic derivatives might be first extracted, leaving the cellulose, cell walls or skeleton of the plant to be utilized last of all. It is the tendency of modern methods of manufacture to proceed in this way, but it must be confessed that it is a far glance into the future where the paper industry is concerned.

As has been pointed out by Steinmetz, it is not so long since the coal tar produced in coke ovens was thrown away as a uselese waste material. In the manufacture of sulfite pulp, the waste liquor of the cooking process is regarded similarly and the great bulk of it is washed into rivers and water courses to

their pollution, only a small quantity of the available material being utilized as roadbinders, or for cementing foundry cores and still less as a source of alcohol after fermenting the sugars contained in it. May it not be, that like the former waste product, coal tar, sulfite waste liquor may yet be made to yield many valuable organic chemical substances and evolve a new and profitable industry ?

Extracted from 'The Scientific American' for June 11, 1921.

List of Books received for the Madras Forest College Library from 15-6-21 to 22-8-21.

A. General Library :

1. List of Forest officers in Madras corrected upto 1—7—05.
2. Do. do. do. 1—4—08.
3. Report of public instruction in the Madras Presidency for 1919—20. (2 Volumes)
4. Report on Forest Administration in the Andamans for 1918—19.
5. Report on Forest Administration in Central Provinces for 1918—19.

6. Quinquennial Review of Forest Administration in British India for 1914—15 to 1918—19.
7. Progress reports of the Forest Administration of (1) N. W. Frontier Province and (2) The Punjab, and (3) Ajmere, for 1919—20.
8. "Road construction and maintenance"—*By Paul.*
9. "W. P. of 1914 for the Haldwani Forest Division, U. P. and Agra and Oudh."—By T. V. Collier.
10. "The Kiln drying of Jarrah"
11. Note one Pyinma, Aghar or Jaral wood and Lagerstroemia Flos Reginae.—By Pearson I. F. S. F. L. S.
12. "Some Madras Trees"—By a. Butterworth.
13. 'Forestry in British India'—By Ribontrop.
14. 'Forest Products ; their manufacture and use' —By W. C. Brown.
15. Report on Forest Management in Germany, Austria, and Gt. Britain.—By C.C. Walker.
16. Supplemental Reports on Forest Management in France, Switzerland and Lower Austria.

17- Fauna of Chilka Lake No. 7. Oct 1920.

18. Do. do. No 8. May 1921.

19. Note on weights of Seeds—By, S. H. Howard.

20. Indian Forest Records—Vol VII. Part 7.

21. Summary of the Report by Mr. F. A. Leete, Conservator of Forests on his visit to Canada The United States and England.

22 "British Empire Forestry conference, London 1920, Statement of Forest condition in British India."

23. Note on a tour of Inspection on some of the Forests of the Kashmir state—By Sir George Hart.

24. Administration report of Forest Department, H. E. H. the Nizam's Dominions—By F, A. Lodge Esq., for F. 1328.

B. Students' Library.

1. "Arabian Nights"—By A. R. Times.

2- "New India"—By Chandavarkar.

Occasional Notes.

Senior student, S. C. Ramalingam, is appointed Secretary of the Athletic Club and Secretary of the Athletic Sports. Senior Student, Bandari is appointed Captain of Foot ball. Senior Student, Narayana Rao, is appointed Captain of Cricket.

Students S. C Ramalingam and J. K Bodas are awarded colours for Cricket.

* * * *

REVIEWS.

(*a*) "*The practice of Silviculture*"—*by Ralph. C. Hawley*, Professor of Forestry, Yale University.

Among the latest additions to the literature in Forestry is "The Practice of Silviculture" by Prof. Ralph C. Hawley of Yale university U. S. A. The book should prove of great help to those engaged in the teaching of Silvics. The different methods of scientific treatment applied to Forests have been dealt with in a very concise manner, and the chapter on *thinnings* shows in detail the various methods practised in European forests. A summary of the several injuries done to forests with measures of protection is also given at the end of the book. The book will be of much assistance in the field if notes on artificial reproduction are also added.

(b) *"Studies in French Forestry"—by Theodore S. Woolsey Jr,* with two chapters by *William B. Greeley.*

This volume affords interesting reading of Forestry as practised in France. The chapter dealing with erosion is very instructive. The insertion of the photos makes the book attractive.

M. R. Sundram Ayyar.
Instructor in Sylviculture.
Madras forest College,
Coimbatore.

Contributions to the Gass Forest Museum.

Serial No.	Contribution.	Contributor.
1.	Sample of *'Vallam'* pebble from the Tanjore District.	J. Shortt Evers Esq D. M. S, O.
2.	Balk of *Buckiandia populnea Br.* and 3 bark samples.	M. R. Ry. C. Sankunni B, A., R. O. Coonoor
3.	Leaves and Fruits of the Para Rubber tree.	F. R. Vincent Esq. Kutikul Estate Mundakayam.
4.	One short panel and one block of *Xylia dolabriformis.*	F.A Seager Esq. I. F. S D.F.O. L. Godaveri.

5.	One box of English Butterflies.	H.A. Latham Esq. I.F.S Conservator of Forests. IV. circle.
6.	One large, and five small, "Queen White-ants"	Mr. R. B. Salisbury Instructor V. T S. IV. circle.
7.	Three sections of burrs of *Pterocarpus marsupium*	H F.A. Wood Esq I F S Conservator of Forests V. circle.

Students' Club Fund.

Statement showing amounts promised and still due by old students, towards the Students' club:—

		Rs.	A.	P
Mr.	C. S. Ramanathan	10	14	0
,,	M. R. Doraiswami	3	0	0
,,	Kerala Varma	10	0	0
,,	Gulam Dustagir	9	0	0
,,	S. A. Dawson	11	0	0
,,	N. T. Tambi	4	0	0
,,	P. Karunakara Menon	9	0	0
,,	Dhananjeya Rao	13	0	0
,,	Kesava Pillai	12	0	0
,,	I. Ramalingam	8	0	0
,,	L. A. Krishna Ayyar	7	0	0
		10		

,,	S. Krishna Ayyangar ...	...	15	0	0
,,	T K. Parameswaram Pillai	...	15	0	0
,,	P. Krishnan ...	...	10	0	0
,,	T. E. Varadhachari ...	...	15	0	0
,,	K. G. Sundararaja Rao	...	10	0	0
,,	M Krishna Ayyar ...	...	10	0	0
,,	S. V. Sigbhatullahi ...	...	10	0	0
,,	Gulam Rassool ...	....	10	0	0
,,	T. R. Naganatham ...	...	10	0	0
,	W. Balakrishna Mudaliar	...	10	0	0
,,	Aiyappa Asari ...	...	15	0	0
,,	D. Patel,, ...	...	18	0	0
,,	K. Jayaraman ...	...	12		0
,,	P. V. Ramanna Rao	...	12	0	0
,,	R E. Lemos ...	...	50	0	0

Gazette Notifications

7TH JUNE 1921.

M. R. Ry. Rao Sahib K. R. Venkataramana Ayyar Avergal, Forest Research officer, Coimbatore, is granted extension of privilege leave by 24 days in continuation of the leave already granted,

21ST JUNE, 1921.

M. R. Ry. S Venkataramana Ayyer Avergal Assistant Engineer, Public works Department to act as Forest Engineer, Vice Mr. F. J. Marshall.

28TH JUNE, 1921.

(1) M. R. Ry. A. Hanumantha Rao Avergal D. F. O. west Cuddapah, is granted privilege leave for 4 months from date of relief,

(2) M. R. Ry A. R Narasimha Ayyangar Avergal. D. F. O, North Mangalore, is granted privilege leave for 3 months from date of relief.

(3) Mr. J. A. Master, D.F.O. South Cuddapah, is to be in charge of west Cuddapah division in addition to his own, during the absence of M. R. Ry. A. Hanumantha Rao Avergal on Leave.

5TH JULY, 1921

(1) Mr. J. H Longrigg Deputy Conservator of Forests, and Senior Instructor, Madras Forest College, is granted combined privilage leave and furlough for 1 year and 3 months from or after 1st July 1921.

(2) Mr. B. K. Boy Assistant Conservator of Forests is granted privilege leave for 14 days with effect from the 12th June 1921, and furlough for 4 days in continuation thereof.

(3) Mr G. S, Lasrado D. F. O. South Mangalore, is to hold charge of the North Mangalore Division in addition to his own during the absence of M. R. Ry. A. R. Narasimha Ayyangar Avergal on leave.

(4) Mr. G. C. Robinson, Deputy Conservator of forests, on return from leave is posted to be Senior Instructor Madras Forest College, Coimbatore, Vice Mr. J. H. Longrigg granted leave.

(5) Mr. Charles Mahony is confirmed as Extra Assistant conservator of Forests with effect from the 18th March, 1919.

12TH JULY 1921.

(1) Mr. A. B. Jackson, Conservator of Forests, is granted an extension of furlough on average salary for 2 months in continuation of the leave already granted th him.

(2) Mr. C. E. C. Fischer, Acting Conservator of Forests, III Circle, to continue to be in additional charge of II Circle during the absence of Mr. Jackson on leave.

(3) Messrs. A. R. Brand and P. W. F. Walpole are confirmed as Extra Assistant Conservators of Forests.

The undermentioned officers of the Public Works Department are oppointed to discharge the functions of Forest Officers under Section 52 (d) of the Madras Act, in respect of Forest Offence in the areas mentioned against each of them.

(1) Executive Engineer Trichinopoly Dn. } Kuruvadi Forest in the Udayarpalayam Taluk, Trichinopoly Dt.

(2) Executive Engineer Cauvery Dn. } Sattambadi Forest in the same area.

19TH JULY, 1921.

M. R. Ry. B. S. Kesava Vittal Avergal. E. A. C. of Forests, is granted privilege leave for 6 weeks from date relief.

2ND AUGUST, 1921.

Mr. B. K. Roy E. A. C. of Forests is granted an extension of furlough for 2 days in continuation of the leave granted to him.

9TH AUGUST 1921.

(1) M. R. Ry. E. V. Padmanabha Pillai Avl. D. F. O. Central Coimbatore Dn. is granted combined privilege leave and furlough for one year from date of relief.

(2) Mr. F. L. C. Cowley-Brown, Dy. Conservator of Forests has been granted by the Secretary of state an extension of furlough on Medical Certificate for six months from 25—8—21.

(3) Saiyid Abdul Qadir Sahib Bahadur, D. F. O. West Vellore, to be also Deputy Collector in the North Arcot Dt.

(4) Mr. R. E. Lemos, Ranger II grade, is appointed as Temporary E. A C. and is posted to special duty in connection with the development of the Ambasamudram Range forests of the Tinnevelly Dt.

(5) Mr. W. C. Hart, Forest Research Officer, on relief, to be Instructor Madras Forest College, Coimbatore, until further orders.

(6) Mr. R B. Cornwell, Instructor, Madras Forest College, on relief, to be D. F. O. Central Coimbatore, until further orders, *vice* M. R. Ry. E. V. Padmanaba Pillai Avl. granted leave.

(7) M. R. Ry. P. Govinda Menon Avl., E. A. C. to be D. F. O. Central Coimbatore ; until relief by Mr. R. B. Cornwell.

(8) Mohammed Abdul Karim Sahib Bahadur, Instructor, Madras Forest College, Coimbatore, to be D. F. O. North Vellore until further orders.

(9) M. R. Ry., E. K. Krishnan Avl., D. F. O. North Vellore, on relief to be Instructor, Forest College, Coimbatore, until further orders.

(10) Messrs. V. J. Van Hacften and C, M. Kushalappa Extra Asst Conservators of forests on probation, are confirmed with effect from 26th March 1921.

16TH AUGUST 1921.

Messrs. M. R. Sundaram Iyer, and P. W. F. Walpole are confirmed as Extra Assistant Conservators of forests with effect from 10th July 1917.

Notifications relating to Range officers :—

(a) FIRST CIRCLE :—

1. (13—6—21) On expiry of the Vernacular Training School course M. R. Ry. T. E, Varadachari, Ranger IV grade, *sub protem*, is posted to Ganjam District for duty.

2. (24—6—21) The privilege leave for 6 weeks and 15 days granted to M. Subba Rao Ranger VI grade is extended by 9 days.

(b) SECOND CIRCLE.

3. (31—5—21) The following arrangements are made to fill up vacancies in the Rangers' cadre :—

No.	Name of officer.	Present scale.	Grade to which promoted.	Remarks
10.	P. Chengal Reddi.	VI grade *Sub protem*	VI grade permanent	—
13.	Abdul Rahim Khan Sahib.	Supernumerary Ranger.	VI grade *Sub protem.*	Vice No. 10.

4. (1) (1—6—21) Ranger, B. K. Krishna Rao, III. Grade, on return from leave (expiring on 14—6—21) in posted to Gundlakamma Range South Kurnool.

(2) Ranger P. V. Krishna Rao Naidu on relief by No. 1 to do duty under the orders of the District Forest Officer, South Kurnool.

(3) Ranger, B. V. Jogeswara Rao, V. Grade on return from leave (expiring on 10—6—21) is posted to Kalyandrug Range, Anantapur District.

(4) Ranger Abdul Rahim Khan Sahib in charge of Kalayandrug Range on relief by No. 2 to work under the orders of the District Forest Officer, Anantapur.

5. (7—6—21) M. R. Ry., O. Venkataramana Iyer, Ranger in charge of Bapatla Range, Guntur District to Gooty Range of Anantapur District on relief.

6. (7—6—21) N. E. Kanakiah Naidu. Ranger in charge of Gooty Range Anantapur District, to be on special duty on relief in the same district

7. (1) (13—6—21) M. R. Ry., B. Krishna Rao, Ranger III grade, on return from leave is posted to Harpanahalli Range of Ballary Dt.

(2) M. R. Ry., G. Rama Rao, IV Grade, Harpanahalli Range is posted to Gundlakamma Range, Kurnool South Division. To join on relief of by No. (I)

8. (18—6—21) M. R. Ry., S. Varadarajulu Reddi, Forester, I Grade, and acting Ranger VII. Grade on special duty in Kurnool West Division is granted privilege leave for five weeks.

9. (30—6—21) M. R. Ry. N. E. Kanakayya Ranger, Gooty Range, Anantapur District, promoted to IV. grade permanent, with effect from 1—5—21.

10. (30—6—21) M. R. Ry. K. Thiruvenkata Chary Ranger, Nandyal Range, Kurnool District, promoted to V grade permanent, with effect from 1—5—21.

11. The Ag. Conservator of Forests, II Circle, is pleased to sanction furlough on Medical certificate to Ranger B. V. Jogeswara Rao from 10—6—21 till the date of his joining duty in Kalyandrug Range, provided he joins duty at once.

12. The following reversions of Ag. Rangers are ordered to take effect from the 1st July 1921.

(1) Abdul Gallack Sherif acting in the Dornal Range, Kurnool East to his permanent post Forester I grade.

(2) S. Varada Rajulu Reddi on special duty in Gundlabrahmeswaram Range (Kurnool West) to his permanent post as I grade Forester.

(3) N. Narasinga Rao, in charge of Pecheruvu Range Kurnool West to his permanent post as I Grade Forester,

13. The following transfers of Rangers are ordered :—

(1) Ranger M. R Ry., C. Ramaswamy Naidu from Gundlabrahmeswaram Range, Kurnool West to Palnad Guntur Dt. To join without unnecessary joining time.

(2) Ranger, M. R. Ry. N. E Kanakieh from Anantapur Dt. to Gundlabradmeswaram Range, Kurnool West.

14. (1) Ranger M. A. Ghatala Sahib, Sattenapalli Range, is granted leave on loss of pay for 1 year from date of relief.

(2) Ranger B. N. Subramania Iyer on special duty is posted to Sattenapalli Range, Vice No, (1) to join at once.

15. (13—8—21) M. R. Ry. N. C. Mahadeva Ayyar, Range Officer is transferred to V Circle. He should report himself to Mr. R. E. Lemes Ag. Extra Assistant Conservator of Forests, at Ambasamudram, Tinnevelly District.

(*c*) THIRD CIRCLE :—

16. (3—6—21) M. R. Ry., T. S. Narayanaswami Chetti Ranger VII. (now on leave) is granted an extension of leave without allowance for 1 month from 21st May 1921 to 20th June 1921 on Medical Certificate.

17. (1) (6—6—21) M. R. Ry., K. R. Visvanatha Ayyar Ranger IV grade on return from the combined leave is posted to the charge of Chittoor Range Chittoor Dt. for 15 days in relief of M. R. Ry., L. Govindaswami Pillai Ranger VI grade and them for special duty under the orders of the District Forest Officer Chittoor.

(2) M. R. Ry., L. Govindaswami Pillai Ranger VI. grade in charge of Chittoor Range, Chittoor District on relief by No. (1) is granted privilege leave for 15 days.

(3) M. R. Ry., K R. Krishna Ayyar Ranger IV grade on return from privilege leave for 5 months granted in this office S. O. No. 131/20 dated 26—11—20 is posted to the charge of Udayagiri Range Nellore District in relief of M. R. Ry, A. Siddhan Pillai Ranger IV grade.

(4) M. R. Ry., A. Siddhan Pillai Ranger IV grade in charge of Udayagiri Range, Nellore District on relief by No. 3 or date of relief is granted combined privilege leave and furlough for one year

18. (1) (8—6—21) M. R. Ry., P. S. Varadakrishnamachary Ranger V. grade on return from the three months privilege leave with effect from 1—5—21 granted in this office S. O. No. 45 of 21 dated 21—4—21 is posted to the charge of Badvel Range, North Cuddapah Dt.

(2) M. R. Ry. V. P. Narayana Menon Ranger IV grade in charge of Badvel Range North Cuddapah division od relief by No. (1) is granted privilege leave for 4 months.

19. (1) M. R. Ry. D. Venkateswarulu Ranger VI grade in charge of Mamundur Range Chittoor Dt. on relief posted to the charge of Chamala Range Chittoor Dt.

(2) Mr. E. W. Fernandez Ranger V. grade in charge of chamala Range Chittoor Dt. on relief is posted to work under orders of the District Forest Officer Chittoor until further orders.

(3) M. R. Ry, L Govindaswami Pillai Ranger VI. grade in charge of Chittoor Range Chittoor Dt. on return from the 15 days privilege leave granted to him is posted to the charge of Sriperambudur Range, Chingleput Dt.

(4) Mr. Henry MacBride Ranger IV grade in charge of Sriperambudur Range Chingleput Dt. on relief is posted to the charge of Chittoor Range Chittoor Dt. in relief of M. R. Ry. K. R. Visvanatha Ayyar Ranger IV grade temporary posted to the charge of Chittoor Range, Chittoor Dt.

20. (24—6—21) M. R. Ry., K. R Krishna Ayyar, Ranger IV grade who was transferred to Udayagiri Range Nellore Dt. is granted an extension of privilege leave for 1 month in continuation of 5 months' leave already granted to him.

(1—7—21) M. R. Ry., T. S. Narayanaswami Chetti Ranger VII. grade is granted an extension of leave without allowances for 2 Months in continuation of the leave already granted to him.

22. (2—7—21) M. R Ry., A. Siddhan Pillai Ranger IV in charge of Udayagiri Range Nellore Dt. is granted combined leave and furlough for 4 months from date of relief.

23. (2—7—21) The following promotions of Rangers are ordered with effect from 1—3—21 consequent on the restoration of Ranger M. R. Ry. R. Gurusw amy Ayyar from III to the I grade on appeal and the appointment of M. R. Ry. C. M. Belliappa Avergal Ranger I grade as E. A. C on probation :—

(1) Mr. A. Ranganayakulu Ranger III. grade and Ranger II *sub protem* to be Ranger III.

(2) Mr. A. Ranganayakulu Ranger III. to be Ranger II Sub-protem.

24. (1) (5—7—21) M. R. Ry., T. N, Seshagiri Rao Ranger I grade on return from the 2 months privilege leave granted to him with effect from 18—4—21 is posted to the charge of Chinglpet Range Chinglput Dt.

(2) M. R Ry. S. Vasudeva Reddy Ranger I grade in charge of Chingleput range on relief by No. 1 is posted to the charge of Chitvel Range South Cuddapah Dt. in relief of M. R. Ry. T. Paramesivam Pillai Ranger V grade granted leave in this office S. O. No. 54 dated 15—5—21.

(3) Mr. S. M. Razvi Saheb Ranger IV. grade on retu rn from the 2 months, combined leave with effect from 29—5—21 is posted to the charge of Sathiavedu Range Chinglepnt Dt.

25. (15—6—21) (1) M. R. Ry. B. V. Vaideeswara Ayyar Ranger V grade in charge of Sathiavedu Range Chingleput (on relief by Mr. Razvi Sahib posted to Sathiavedu) is posted to the charge of Sreeperumbudur Range of the same district as a temporary measure.

(2) Mr. Henry MacBride Ranger IV grade in charge of Sriperumbudur Range Chingleput Dt. on relief by No. 1 to proceed at once

to the charge of Chittoor Range Chittoor Dt. as already ordered in relief of Ranger L. Covindaswami Pillai granted privilege leave for 15 days.

(3) M. R. Ry. L. Govindaswamy Pillai Ranger VI grade on return from leave is posted to Sriperumbudur Range Chingleput Dt. as already ordered.

(4) The posting of M. R. Ry. K. R Viswanatha Ayyar Ranger VI grade to the charge of Chittoor Range Chittoor District as a temporary measure is cancelled and he is posted to relieve M. R. Ry. M. P. Halasyanatha Ayyar Ag. Ranger VII grade at Vayalpad Chittoor Dt

(5) M. R. Ry. M. P. Halasyanatha Ayyar Ag. Ranger VII grade on relief by No. 4 to work under the orders of the District Forest Officer Chittoor.

26. (14—7—21) M. R. Ry. S. Vasudeva Reddy Ranger I grade in charge of Chingleput Range Chingleput District on relief by M. R. Ry T N. Seshagiri Row is posted to work under the orders of the District Forest Officer Nellore and eventually to take charge of Nellore Range. (This cancels the posting of the Ranger to Chitvel Range South Cuddapah Dt.)

27. (14—7—21) M. R Ry. P. Chengal Reddi Rager VI grade on special duty under the orders of the District Forest Officer South Cuddapah District is posted to the charge of Chitvel Range South Cuddapah District in relief of M. R. Ry. T. Paramasivam Pillai Ranger V granted leave.

28. (15—7—21) M. R. Ry. C. R. Rajagopalan Ranger VI grade West Cuddapah District is granted privilege leave for 35 days with effect from 12th June 1921 the date of relief by Mr, J, M. Abraham Vempelli Range.

29. (21—7—21) Mr. E. W. Fernandez Ranger V grade in charge of Chamala Range Chittoor Dt. is granted privilege leave for 4 months with effect from date of relief (21—7—21).

30. (26—7—21) Mr. T. T. Ansep Ranger IV grade Senior Instructor Vernacular Training School North Cuddapah District on relief of his duties as such is granted privilege leave for two months.

31. (26—7—21) The three months privilege leave granted to M. R. Ry. P. S. Varadakrishnamachari, Ranger V grade in Nellore Dt. is extended by one month with effect from (1—9—21).

32. (26—7—21) The one month's privilege leave granted to M. R. Ry. B. Chenchurama Nayudu Ranger IV grade Nellore Dt. is extended by 15 days with effect from 14th July 1921.

33. (7—8—21) Mr. S. M. Razvi Ranger IV grade North Cuddapah Dt. is granted an extension of furlough for 2 months on average salary in continuation of the combined leave granted to him.

34. (7—8—21) (1) Mr. T. T. Ansep Ranger IV grade on return from the privilege leave granted to him is posted to the charge of Rajampet Range South Cuddapah Dt.

(2) M. R. Ry., A. Ranganayakulu Nayudu Ranger II grade in charge of Rajampet Range South Cuddapah Dt. on relief by No. (1) is granted privilege leave for 3 months.

35. (7—8—21) The following reversions are ordered :—

(1) M. R. Ry. M. P. Halasyanatha Ayyar Ag. Ranger VII grade on special duty Chittoor Dt. is reverted to his permanent appointment as Forester I with effect from 1—8—21 and ordered to work under orders of the District Forest Officer Chittoor until further orders.

(2) M. R. Ry. B. H. Anandathirtha Rao Ag. Temporary Ranger VII grade doing duty as Junior Instructor of Vernacular Training

School North Cuddapah Dt. is reverted to his permanent appointment with effect from 1—8—21 and is posted for duty under the orders of th District Forest Officer North Cuddapah Dt.

36. (8—8—21) Mr. T. T. Ansep Ranger IV grade Senior Instructor Vernacular Training School North Cuddapah Dt. on relief of his duties as such is granted privilege leave for 1 month instead of two months granted to him.

37. (8—8—21) The following postings are ordered :—

M. R. Ry, T. S. Narayanaswami Chetty Ranger VII grade on return from the combined leave on 20—8—21 is posted to the charge of Sreeperumbudur Range Chingleput Dt. in relief of Mr. H. MacBride. posted to Chittoor Dt. This cancells the posting of Ranger B. V Vaideeswara Ayyar to Sreeperumbudur Range Chingleput Dt,

38. (12—8—21) M. R. Ry. C. R. Rajagopalan Ranger VI West Cuddapah Dt. is granted an extension of privilege leave for 1½ months in continuation of the leave already granted to him.

39. (11—8—21) M. R. Ry., S. Chinnadurai Pillai Ranger II grade in charge of Madanapalli Range Chittoor Dt. is transferred to V Circle to work under the orders of Mr. R. E, Lemos Extra Asst. Conservator of Forests posted for the development of the Ambasamudram Forests Tinnevelly Dt. He should on relief report himself before Mr. Lemos at Ambasamudram.

40. M. R. Ry. K. R. Viswanatha Ayyar Ranger IV grade on special duty Chittoor Dt. is posted to the charge of Madanapalle Range Chittoor Dt. in addition to his special charge of Vayalpad Sub Range of the same District.

(*d*) Fourth Circle :—

41. 2—8—21. Supernumerary Ranger S. Nagalingam Pillai is granted privilege leave on medical certificate for 3 months from 6—4—21

42. 7—6—1921. M. R. Ry. R. Thangavelu Pillai, Supernumerary Ranger in charge of Gingee Range, South Vellore is permitted to draw a Cycle allowance at Rs. 5. per mensem from 14-5-1921

43. 7—6—1911 M. R. Ry. K. Jayaraman, Ranger VI grade is posted to South Vellore Division.

44. 8—6—1921. M. R. Ry. P. A. Krishnaswami Mudaliar, Ranger V. grade will on return from leave resume his investigation duty at Denkanikota.

45. 18—6—1921 (1) M. R. Ry., K. L. Muniswami Ayyar, Ranger I grade Sub-protem is on return from leave posted to Salem Range, Central Salem Division.

(2) M. R. Ry., C. D. Parthasarathi Chetti, Ranger IV. grade is on relief by No. 1, transferred from Central Salem to East Salem Division for protection duty.

(3) M. R. Ry., S. Ramanujam Sesha, Ranger VI. grade is on return from leave transferred from South Vellore Division to the Central Salem Division.

* * * *

46 5—7—1921. (1) M. R. Ry., P. A. Krishnaswami Mudaliar Ranger V grade is granted an extension of sick leave for two months in continuation of the leave granted to him ;

* * * *

(2) M. R. Ry. V. Narayanaswani Ayyar, Ranger V. grade on relief by No. 1, is posted temporarily for Spike Investigation Duty, Denkanikota Range until Ranger M. R. Ry. P. A. Krishnaswami Mudaliar returns to duty.

47. 7—7—1921. M. R. Ry. K Jayarama Ayyar, Ranger V. grade is permitted to draw a Cycle allowance at Rs. 5/- per mensem from 24—12—1920 to 11—4—1921 during which he held charge of Thammampatti range.

48. 9—7—1921. M. R Ry., Doraiswami Ayyar, Ranger VI grade is on return from leave transferred from North Salem to South Vellore Division for the charge of Gingee Range.

49 16—7—1921. M, R Ry. K. Jayarama Ayyar, Ranger VI grade is transferred from West Vellore to South Vellore Division.

50. 20—7—21. The action of the District Forest officer, East Salem, is posting M. R. Ry., C. Rajagopal Nayudu, Ranger II. grade who joined duty on the expiry of his leave on 14—7—1921 to the charge of Atur Range, Vice Ranger T. V. Govinda Rao proceeding on leave on medical certificate, is approved.

51 20—7—1921. M R. By. T. V. Govinda Rao, Ranger V. grade, is granted privilege leave on medical certificate for two months from date of relief.

52. 26—7—1921. The five months, combined leave (privilege leave for 4 months and 1 months's furlough on medical certificate) form 12—2—1921 granted to M. R. Ry., S. Ramanujam Sesha, Ranger VI grade, is extended by 1 month.

53. 29—7—1921. M. R, Ry., M. Muthuswami Ayyar, Ranger II grade will on return from leave report himself to the District Forest officer, Central Salem Division.

54. 29—7—21. The five months' combined leave granted to M. R. Ry. P. A, Krishnaswamy Mudaliar Ranger V grade, is commuted into:—

(1) Privilege leave for 2 months and 25 days, and

2) Furlough on average salary for 2 months and five days

55. 3—1—1921. M. R. Ry. T. Kesavelu Naidu, Acting Ranger VII. Grade and Assistant Instructor, Vernacular Training School will be considered to have acted as Instructor, Vernacular Training School from 7—2—1921 to 20—2—1921.

56 10—8—1921. M. R. Ry. S. Ramanujam Sesha, Ranger VI. grade is on return from leave on 12—8—1921 posted to Central Salem Division.

57. 10—8—1921, (1) M. R. Ry., V D. Ramalingam, Ranger VI grade is placed under suspension pending disposal of charges against him.

(2) M. R. Ry. C. Rajagopal Naidu, Ranger II. grade in charge of Atur Range, East Salem Division, is transferred to the charge of Harur Range to join forthwith on relief No. 3.

(3) M. R. Ry. V. Narayanaswami Ayyar, Ranger on spike duty, is on relief by Ranger M. R. Ry. P. A. Krishnaswamy Mudaliar, posted to the charge of Atur Range, East Salem Division. He should join forthwith.

57 (a) 18—8—1921. On return from leave, M. R. Ry. M. Muthusami Ayyar, Ranger II. grade is posted to Cauvery Range, *vice*, M. R. Ry. G. N. Subba Rao, whose services have been dispensed with.

FIFTH CIRCLE.

58. 2—9—21. Mr. A. Culas, Range officer, Kollegal, is considered to have been on privilege leave from 4th to 21st May (both days inclusive.)

59 14—3—21 Ranger M. R. Ry. Easwara Ayyer who was posted to South Coimbatore for special labour duty is reposted to North Coimbatore as his services regarding Labour are no longer required.

60. M. R. Ry. M. Sankaran Nair, Ranger VI. grade, *sub protem*, Kollegal Division is granted Combined leave for 3 months and 11 days privilege leave for 3 months and furlough on medical certificate for 11 days—from 21st March 1921.

61. 23—3—21. The postings of the following students who are coming out of the Forest college after the completion of their course are ordered :—

Name.	*District to which posted.*
M. P. Philip ...	... Tinnevelly,
A. R. Manual ...	... South Coimbatore.
P. Sankunni Naiyar	... Madura.

62. 24—3—21. The following postings are ordered :—

(1) M. R. Ry. R. Gurusami Ayyar, Ranger I grade after the closing of the V. T. School 1921 session is posted to charge of Mettupalayam Range, North Coimbatore District.

(2) M. R. Ry. K. Kunhiraman Meon, Ranger VII. grade, after the closing of the V. T. School is posted to work under Madura District Forest officer.

(3) Mr. B. R. Salisbury, Ranger II grade after the closing of the V. T School 1921 session IV circle, is posted to charge of Cumbam Range Madura District.

(4) M. R. Ry. S. Chidambara Ayyar, Ranger IV. grade on relief by No. 1. is posted to South Coimbatore District to work under the orders of the District Forest officer.

(5) M, R. Ry. A, N. Penniah, Ranger VI on relief by No. 3 will work under the District Forest officer's orders.

63. 29—6—21 M. R. Ry. R. Gurusami Ayyar, Ranger I. grade after the closing of the Vernacular Training School in North Coimbatore Division, is posted to South Coimbatore District.

This cancels his posting to charge of Mettupalayam Range and the transfer of M. R. Ry, S. Chidambara Ayyar, Ranger, IV. grade from Mettupalayam Range charge to South Coimbatore Division to work under the orders of the District Forest officer.

64. 1—7—21. The following reversions and promotions are ordered with effect from 1—5—1621 consequent on the restoration from the III. grade to the 1st grade of Ranger M, R. Ry. R. Gurusami Ayyar, and the appointment of M. R Ry. C. M. Belliappa, Ranger 1st grade as Extra Assistant conservator on probation.

(1) Mr. L. J. Taylor, Ranger II. grade subprotem to revert to III grade (permanent) (Tinnevelly)

(2) M. R. Ry. P. Velayutham Nair, I grade *Sub protem* to revest to II grade permanent.

65. The following reversions and promotions are ordered with effect from 1—5—1921, consequent on the restoration of Ranger M. R. Ry. R. Guruswami Ayyar, from ihe III. grade to I. grade on appeal, and the confirmation of M. R. Ry. V. Narayana Ayyar, Ranger II. grade as Extra Assistant conservator of Forests.

To III gradepermanent *with effect from* 1—5—1921.

Mr. A. Antony culas.

66. (9—7—21) Ranger Mr. B R. Salisbury on relief from the Vernacular Training School is appointed to be Range Officer Kodamady in Tinnevelly District.

This order cancels his appointment to Madura.

67. (16—7—21) The privilege leave for one month granted to M. R. Ry. A. Krishnamachari, Ranger III grade Tinnevelly is extended by another month.

68. (16—7—21) M. R. Ry. A. Krishnamachari Ranger III grade Tinnevelly is transferred, on return from privilege leave, to North Coimbatore to be in charge of Talamalai Range.

(2) Mr. A B. Fenn, Ranger VI grade in charge of Talamalai Range is transferred on relief by No, (1) to Tinnevelly where he will receive orders from the District Forest Officer to whom he should report himself.

69. The privilege leave for 2 months granted to M R Ry. G. M. Krishnaswamy Ayyar Ranger IV grade in this office S. O. No. 58 of 21 dated 2nd May 1921 is extended by 1 month.

70. (9—8—21) The period of absence of M. R. Ry. M. Sankaran Nair, Ranger, Kollegal, from 21st March 1921 to 30th July 1921 is treated as privilege leave.

71. The privilege leave granted to M R Ry. K. S. Ramiah, Ranger V grade from 5th to 29th July is extended by 5 weeks.

SIXTH CIRCLE :—

72, (4—6—21) The combined leave for 5 months and 21 days granted to M. R Ry, M. N. Raman Pillai is extended by three weeks.

73. (8—8—21) Mr. J. A. Aranha, Ranger I grade is granted combined leave from 19—11—20, privilege leave for 3 months and furlough on average salary for 1 month and 18 days.

M. R. Ry. K. L. Govindakrishna Ayyar, Ranger VI grade is granted privilege leave for two months with effect from 1—7—1921.

74, 20—6—21 The following transfers of Rangers are ordered:—

(1) M. R. Ry. A. Nicholas, Range Officer, Ootacamund to Coondapur range. To join on relief.

(2) M. R. Ry. A. Swamikutti, Range Officer Nilambur to Ootacamund range. To join as soon as possible and relieve Mr. A. Nicholas.

(3) Mr J. S. Rowland, Range Officer, Amarampalam to Nilambur range. To join on relief.

(4) Mr. K. Kunhiroyan, special duty Ranger Nilambur to Amarampalam and relieve Mr. Rowland.

(5) Mr. B. Sambanmuthi Ayyar, Ranger, Coondapur to Segur range Nilgris District. To join on relief by Mr. A, Nicholas.

75. K. Raghavan student, Madras Forest College, on completion of the course to Nilambur range on special duty. To relieve S. V. Doraiswami Ayyar, Supernumerary Ranger.

(2) S. V. Doraiswami Ayyar, Supernumerary Ranger to charge of Chedleth Range, Wynaad. To join on expiry of 2 months' privilege leave granted to him.

76. The following arrangements are made to fill up vacancies in the Ranger's cadre with effect from *1st May 1921*.

* * *

A. C. Jesudasan Pillai from VI grade to V grade.

* * *

M. P. Subbayya from VI grade sub protem to VI grade permanent.

* * *

K. Appayya, from VII grade permanent to VI grade sub protem.

77. 20—6—21. The following promotions and reversions of Rangers are ordered with effect from 1—8—1921 consequent on the restoration of Ranger M. R. Ry. R, Gurusami Ayyar from the III to I grade on appeal and the confirmation of M, R, Ry. V. Narayana Ayyar, Ranger I grade as Extra Assistant Conservator of Forests.

(a) Reversions

M. R. Ry. C. Sankunni, Ranger I grade to be Ranger II grade permanant and Ranger I grade sub protem.

* * *

(b) Promotions.

To I grade permanent.

M. R. Ry. C. Sankunni.

* * *

To VI grade permanent.

K. G. Monappa.

78. 6—7—21. Mr. T. I. Chakko, III grade is dismissed from service with effect from the date on which he was suspended.

Advertisements.

The following is a list of timber species required for the Gass Museum. Such of them as are procurable may be sent to the Principal ***together with botanical specimens pertaining to each species and a sample of bark about 8" square.***

The long panels should be as broad as available, 6 ft long and 3" thick. The short panels 2 ft long and 1" thick. (breadth, maximum available.)

Aglaia Roxburghiana	Grewia asiatica
Albizzia procera	Hardwickia binata

Albizzia stipulata	Holoptelea integrifolia
Acacia dealbata	Hydnocarpus Wightiana
Acrocarpus fraxinifolius	Hereteria papilio
Chickrassia tabularis	Litsaea zeylanica
Carallia integerrima	Machilus macrantha
Dillenia indica	Michelia Champaca
Diospyros tomentosa	Premna tomentosa
Diospyros paniculata	Sterculia fœtida
Diospyros ebenum	Sterculia villosa
Dalbergia sissoo	Sterculia guttata
Erythroxylon monogynum	Stereospermum chelonoides
Gmelina arborea	Tetrameles nudiflora
Gluta travancorica	

* * *

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 14 for 1888 - January, February, March, April September, October, and December numbers.
4. Volume 15, 16, for 1889 and 1890.
5. Volume 18 for 1892 August, September, October, November
6. Volume 19 for 1893 February number.
7. Volume 20 for 1894 July and August numbers.
8. Volume 21 for 1895.
9. Volume 24 for 1898 March and April numbers
10. Volume 25 for 1899 April, May, June and August, September, October and December numbers.
11. Volume 26 for 1900 August number.
12. Volume 39 for year 1913 - January, April, September and October Nos.
13. Volume 44 for the year 1918 - March number.

* * *

Wanted :

No. 228, Volume XII of the Standard History of the War and eight copies Gamble's "Manual of Indian Timber" Apply stating Edition, Price, Condition etc. to :

PRINCIPAL, MADRAS FOREST COLLEGE,
Lawley Road P. O. Coimbatore.

The Principal will be glad to receive trophies for the Gass Museum either as a permanent gift, or, on loan for not less than 18 months ; also any old records, maps, etc. of historical interest to the Department, for the College Library.

* * * *

A TIMBER 'SLIDE' AT DHONI.

(Reprinted from the 'Madras Mail.')

ont Timber Depôt in Palghat district is an active centre of Forest exploitation. e most modern methods of extraction are employed in the forests above, hich feed the timber slide shown. Down this the logs travel at such a rate that it has been found necessary to divert a stream into the slide to prevent the cross pieces from taking fire.

C.C. Wilson.

THE

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The Ceylon Sleeper Supply

IN Ceylon, unlike other countries, the Railway forms a separate and independent department. Some years ago, the Railway Department had to get sleepers from Australia at a great cost, resulting in the drain of a large sum of money from the country as a large quantity of sleepers was consumed every year. Later, the Ceylon Forest Department undertook the supply of sleepers and the money was retained within the country.

As a result of Government taking up the supply, not only is the cost of sleepers much reduced, but also they are being supplied within a short period in any part of the year

at any required station. The Forest Department began the supply on a small scale and at present is able to meet the whole demand though sleeper operations are carried on in almost all the nine forest divisions of the Island.

There are only two kinds of railway lines in the Island the broad and narrow gauges, for which only broad and narrow gauge sleepers are required whose dimensions are 9′ × 10″ × 5″ and 5′ × 10″ × 5″ or 5′ × 9″ × 4½″ respectively.

A sleeper should possess the qualities of durability, hardness, strength, seasoning power and elasticity and therefore only from those woods which have these qualities the sleepers are to be converted.

The sleeper conversion is given on contract and carried on under strict supervision of the Forest Department.

The begin with, the sleepers were converted from *Mesua ferrea* and *Chloroxylon swietenia* (satinwood)—a first class timber used largely for furniture, ornamental work etc owing to its beautiful silver grain. When this timber is distinctly "flowered" — i. e. silver grained—it is known as one of the most beautiful timbers in the world. Satinwood sleepers are said to last even thirty years. As this species is more costly than other woods and would become rare if extensively felled, *Vitex altissima* and *Mimusops hexandra*; are now being used in its place. At present almost the whole supply of sleepers is from these two species throughout the Island as they have proved satisfactory and are found abundantly

Owing to the present increasing demand of sleepers by the Railway Department, the Forest Department experimented in the conversion of sleepers from *Alseodaphne semicarpifolia* a large tree common in the hot drier parts of the Island—to increase the supply. Sleepers from this species were tried and found satisfactory and a year or so ago the first supply from them was given to the Railway Department. The sawing of this kind of timber is found to be easier than the other mentioned species and as a result the sawing charges are less.

The contracts are given by calling for tenders and the lowest bid for the conversion and delivery of a broad gauge and a narrow gauge sleeper in the tender is accepted, and an agreement is then made for the supply of the required number of sleepers in a given period within a specified portion of a forest. When an area of forest is under work another area is being inspected for the coming year as there are no selected forests to work in a rotation. After a forest is inspected and found suitable for conversion of sleepers, the boundaries of the area are fired and all the required species of trees of 4′ 6″ and over in grith are enumerated for felling and converting into sleepers. Only trees enumerated are to be felled and as low as possible not exceeding six inches above the ground.

The successful contractor is to establish his saw mills in a suitable locality in the forest and transport all the felled timber there. The sleepers may be converted either by sawmills or scaffolding or pit system. The contractor is not allowed to dig

pits or put up scaffolds any where he likes in a forest, and the sawing operation should be confined only to one spot.

While felling trees the saw has to be used and not the axe at all as otherwise there is wastage of timber and the stumps are rendered unfit for producing shoots.

The sleepers are sawn in a rectangular form with flat even surface without depressions having paralled sides well defined edges, free from shakes. Trees that are attacked with fungus or are hollow are rejected and only from sound trees sleepers are sawn When a log is sawn into sleepers the outside slabs —known as "poravat" left as waste, are sawn into scantlings of not less than ten feet in length having cross sections of $4\frac{1}{2}'' \times 2''$, $4\frac{1}{2}'' \times 3''$, $5'' \times 4''$, $6'' \times 5''$, $6'' \times 4''$, $7'' \times 2\frac{1}{2}''$, $7'' \times 3''$, $8'' \times 3''$, $9'' \times 2\frac{1}{2}''$, $9'' \times 3''$, $9'' \times 4''$, $10'' \times 3''$, $11'' \times 2\frac{1}{2}''$, and $11'' \times 3''$. Scantlings sawn to the above dimensions are sold to the Public Works Department If there be defective or hollow trees among the trees enumerated, they should be felled and converted into scantlings of above sizes. In order fully to utilize and economise in timber the trees are logged into ten or eleven foot lengths from which good broad gauge and narrow gauge sleepers can be obtained by allowing a margin for cracking and splitting. So it enables the conversion of scantings of required length, breadth and thickness from outside slabs. The contractor is paid for sawing scantlings according to the number of cubic feet they contain

The converted sleepers are immersed in water whenever possible for water seasoning or stacked under shade for air seasoning in such a way that these is free circulation of air all round them. The method of stacking sleepers is by laying them at the bottom edgewise a little apart from one another and then over them a layer breadthwise at a similar distance and again over them another layer similar to the first layer and so on. Sleepers stocked in this manner are not subjected to cracks and warps as the wind that blows in one direction passes off freely from the other side drying the sleepers uniformally and as there is weight equally distributed over sleepers. The assistant conservator of Forests—District Forest Officer—in charge of the division inspects the sleepers when the contractor is to be paid and selects only those that are converted according to the prescribed manner and the rest are rejected The contractor is given the privilege of turning a bad broad gauge sleeper into a good narrow gauge one at the saw pit before the assistant conservator of Forests of the division comes to take over. Though the rejected sleepers are not poid for, they are taken over by the government. The sleepers are delivered to the Railway Department after the inspection by a Railway Officer Meanwhile, the scantlings converted from the outside slabs are given over to the Public Works Department. The remaining outside slabs out of which no scantlings are converted, are sold by public auction or sent to Public Departments when required.

The sleeper operations are confined only to Other Crown Forests though there are three more kinds of forests in the Island. viz:— Reserved Forests, Proposed Reserve Forests and village Forests.

H. WIJESINGHE.

M. F. C. 1920—22 Dn.

Formation of a fuel working circle in Chandragiri range.

The formation of a fuel working circle was for some time a great want for Chandragiri Range. The working plan prepared for the range became a failure in that the coupes of most of the felling series were not sold in auction for want of demand. If a coupe was taken at all only the plain portions were exploited and the hilly tracts left untouched which continued so during the subsequent years. Situation of the coupes at remote places and on tops of hills or valleys enclosed all round by hills, want of means of transport of the produce and the unwieldy size of the coupes were the nearest causes for the failure of the working plan. Demand for fuel is felt keenest only during certain parts of the year, i. e. from July to Febrary all around villages for cultivation of sugar cane and preparation of jaggery. The villagers satisfy themselves with their own needs and care little for the convenience of other villagers. The cost of labour is great and felling the whole coupe and leaving the produce unsold causes contractors much inconvenience and damage.

The range consists of a long parallel series of hills over three-fourths of its extent and the remaining southern corner is also all hilly with villages enclosed in them. In the open valleys groups of villages could be seen with strong sturdy inhabitants

tending their cattle and ploughing their fields. Along the valley between the long series of hills, a railway train may be seen enveloped in smoke stuggling along in its ascent or sometime hence another train gliding along the railway line with great speed in the opposite direction. Now and then motors can be seen racing with the train along the local fund road which runs by the side of the railway line.

The fuel extracted from the coupes should inevitably take one of these routes. The villagers care for their own need and the contractors of coupes care for these villagers only.

Though the forest could not boast of any valuable timber species, it has in its own way good timber trees which are unfortunately not within easy reach or removal. ***Tectona grandis*** has grown on the plateaus intermingled with ***Chloroxylon Swietenia***, ***Anogeissus Latifolia***, ***Hardwickia binata***, ***Terminalia chebula*** and ***Diospyros Ebenum***. On the slopes of the hills and on the plains ***Chloroxylon Swietenia***, ***Diospyros Ebenum***, ***Albizzia amara*** and ***Acacia Sundra*** are prominent among other species.

Many defects were noticed by lapse of time in carrying out the provisions of the working plan. Large areas of sheetrock, rocky soils devoid of any vegetation and localities containing very poor growth not fit even for fuel were included for exploitation. It so happens that the major portion of a coupe has any one of these defects. The coupes to be worked are usually located far away from the villages and sometimes cover the tops of hills. Further

there are no roads or carttracks up those hills for the removal of produce. It may be suggested that cart-tracks constructed along these places would considerably facilitate the removal of produce, but the meagre income derived from the sale of these coupes at the heights does not compensate for the great cost of constructing cart tracks, which during winter, are liable to be washed off by mountain torrents or defaced by boulders rolling from above. Moreover each of the coupes was from 120 to 160 acres in extent and as experience has shown, this was too unwieldy to be worked within a year.

The preparation of the present working plan is an improvement in various respects on the original. It forms one fuel working circle for the whole range and consists of 11 fuel felling series arranged around the villages all over the range. Each felling series surrounds a number of villages and the coupe auctioned supplies fuel for its nearer villages. Proximity to the villages, easy accessibility and removal of the produce, exclusion of blanks, and compactness of each coupe are the essential characteristics on which the present plan is based. No coupe is far away from the villages for which it is intended, no cart-track need be constructed for the removal of the produce, no blanks have been included and lastly the area of each coupe is small and easily workable within a year.

For forming a felling series the whole of the forest is first inspected with a view to note the composition and consistency of the forest and the suitability for forming a felling series. Starting from the reserve boundary a straight line is cut up the slopes of the

hills from where good growth starts to a point of reasonable and easily accessible height whence a contour line i. e. a level line at that height is cut with the aid of the ghaut tracer all along the slope of the hills until a satisfactory area of not less than 1500 acres is obtained when this is joined to the reserve boundary by another straight line

The lines are then surveyed and plotted. Since a felling rotation of 30 years is fixed for fuel coupes, the area is dvided into 30 coupes of 50 acres each. When compensation area is allowed for some coupes on account of lesser growth in them than others, the area varies from 50 to 60 acres for each coupe. The coupes are then divided on the plan and each coupe is marked on the ground a year previous to its being put to auction.

Thus the present working plan has improved on the original. It has proved a success and the first significance of success has been shown in the high sale of the first coupes of each felling series.

S. Sankaran,

1921-23 Course.

M. F. C.

Teak.

"TEAK THE ORGANIC STEEL."

By—S. C. Ramalingam M. F. C. (1920—22 Division)

Second Essay for the Indian Forester Prize for present students.

DISTRIBUTION :—

This tree botanically known as Tectona grandis is indigenous in the peninsulas of India, Indo—China, and in the islands of the Indian Archipelago. However, it is not uniformly distributed all over, on account of the varying elevations and other climatic conditions. It grows in Burma, Java, and Siam and is also found in Central and Southern India. But Burma is said to produce the best teak.

REQUIREMENTS AND HABITAT : -

(a) Elevation. It thrives from sea level up to an altitude of 2,500 ft,, beyond which it seldom or never does well, though a few stunted ones may be seen at an elevation of about 3,000 ft. The best growth is obtained between 300 and 800 feet above mean sea level.

(b) Climate and Rainfall. For a moderate growth it requires about 60 inches of rain in the year, and with a heavier fall, grows better. It thrives best at a temperature ranging

from 60 to 80 degrees Fah, with a mean annual temperature of about 75 degrees.

(c) Soil. Though it is not generally a gregarious species, yet its liking for alluvial soil is so much that it tends or form patches of almost pure crop on alluvial soils

The two essentials necessary for its successful growth are:—

(i) Good drainage

and (ii) A dry and deep sub-soil

Though it accomodates itself both in sandy and clayey soils, thrives best on sandstones and entirely avoids laterite soils. The want of a well drained and deep sub-soil may be clearly exemplified by comparing and contrasting the Teak trees in the Plantations at Nilambur, which are a Paradise and Treasure to a Forest Officer, with the stunted, stag-headed, dilapidated, and deteriorated Teak trees of the Madumalai Natural Forests. The former yields a clean sound bole of 70 to 80 feet in length and 6 to 8 feet in girth, while the latter is not capable of producing a single straight bole of 15 feet length and 4 feet girth; the former protects and betters the soil with its complete canopy, while the latter impoverishes the soil more than protecting it for want of enough foliage during a major part of the year.

Here I may mention, that the Teak Plantations at Nilambur are divided into three classes, according to the height

growths they attain, which are in their turn proportional to the nature of the soils on which they grow. The crops growing on pure alluvial soils are classified under the first class, those on a mixture of alluvium and gravel under the second class, and those on laterite soils under the third class.

Teak is a strong light demander and as such does not at all do well under the shade of other trees. In good soils, Bamboo and Pterocarpus Marsupium are two of its chief associates and in laterite soils, Xylia takes their place.

REPRODUCTION :—

Teak flowers early in August and the fruit ripens in the latter part of December, and falls off by February or so. Its fruit is almost round, with a hard nut of about half an inch in diameter. It starts fruiting when it is very young, and seeds abundantly every year. The hard shell of the nut is of a great advantage, for its successful resistance against fire. The germination of these seeds is very slow even in moist climates. Hence, in dry regions, it is hastened by soaking the nut in water before sowing, Sowing is generally done by putting three to five seeds in a hole, an inch, or an inch and a half deep and lightly covering same with loose earth. The germination takes about two to three weeks. Natural Regeneration also is effected by the germination of the fallen seeds under the parent tree.

invariably in almost all parts, being the Clear felling method. When grown in close crop, this being an extreme light demander employs all its energy in pushing its head up in search of light. If not grown close it would naturally obtain the required light from the sides by shooting out lateral branches lower down. This is clearly seen from the Epicormic branches appearing all of a sudden, when a crop had been opened by a heavy thinning. These branches come out from dormant buds on the sides, which are stimulated by the sun falling on them when the crop is opened. The shooting of the lateral branches not only hinders the height growth but also results in the appearance of several twists and knots on the bole. Therefore, Teak planting is often done 6′ × 6′, thus having a crop of nearly 1,200 seedlings to the acre. For the first two years these seedlings require weeding and enough care should be takan to see that they are not overtopped or covered by any other plant or shrub, lest they should wither away for want of enough light. They are allowed to grow thus for about 5 years, when the thinning operations are started with an ultimate object of having a final crop of 36 trees to the acre when the crop is nearly 35 years old. The thinnings are done slowly and at regular intervals of 6 to 10 years, the interval being the time that the standing trees would take to fill up the opening in the canopy caused by the thinning. The thinning may be done mechanically by removing alternate trees or by selection according to the nature of the crop, when the work is taken up. In second class soils, thinnings are often

Teak also reproduces profusely by coppice shoots with enough overhead light. The young coppices are very sensitive to rain drops falling on them from other plants. Hence, enough care should often be taken while cutting for coppice to see that no drooping branch of any other tree overhangs the stump. This is my experience gained during the Improvement Fellings, we did at Kargudi, during February last.

SHAPE AND SIZE :—

The young seedling has a very long tap-root, which is very soft and sensitive. The terminal shoot of the young seedling is very strong, and this enables it to pierce through overhead cover to secure light. It grows very fast when young, and usually has a clean straight bole with a large crown. The seedlings take about ten years to establish themselves. On good soil and favourable climatic conditions, Teak has an exceedingly rapid growth in the young stage. The usual exploitable size is 7 feet in girth. The height of a large Teak tree is said to be about 140 feet, and for a tree of this height a clean bole of 70 feet length is not extraordinary. However, when grown in irregular crops, the stems are often fluted, buttressed or otherwise illshaped. The annual rings on a cross section are very distinct and regular.

TREATMENT OF TEAK FORESTS :—

This species, being used more as timber than fuel, is often worked under the High Forest System, the method applied

done with a view to have a final crop of 45 trees to the acre Care should also be taken to see that the thinning is not improportionately done and the canopy heavily opened, lest it should result in the appearance of Epicormic branches as seen at Nilambur, on account of the dormant buds present on the sides getting stimulated by the action of the rays of the sun. These Epicormic branches are also attributed to the defoliation caused by caterpillars: but this however is not definitely ascertained. The best treatment prescribed for this so far is under-planting of some other species, such as Xylia Xylocarpa, which, on first class soils, grows much slower than Teak. The above points, facts and figures regarding planting, treatment, and Epicormic branches are from my short experience at Nilambur.

External Injuries:—

The external dangers, that are liable to attack Teak, are wind, frost, fire, wild animals, defoliators and Loranthus. Wind, as a rule in close crops, does little harm and this is further minimised by the maintenance of a wind-belt of some strong and windfirm species.

As for frost, little or no danger is had in Central and South India, which are the chief homes of Teak.

Though Teak resists fire considerably on account of its thick and fibrous bark, yet fire is the worst of the above

enemies: but little has to be feared, if a sufficient staff under proper management is provided for fire protection.

Of all the wild animals, Elephants and Sambar are the worst for Teak. They strip off the bark and break the leading shoot thereby making the tree entirely useless. This difficulty may be overcome by providing for a trench 6 feet wide and 6 feet deep along the boundaries of the Plantations.

The effect of defoliators was clearly seen at Nilambur: Up till now no proper remedy had been found out for this and as such, it is difficult to keep them entirely out of the way

Loranthus too is one of the chief enemies But, under proper care, this is overcome by cutting away the branches attacked with this pest and smearing the cut end of the stump with tar.

Timber and Utility:—

The Green timber is said to be over 60 lbs in weight per cubic foot and will not float in water. Seasoned wood weighs 45 lbs per cubic foot The wood, when dry, is light. Its timber works easily and takes in a good polish. It is moderately hard, strongly scented, and contains an oil, which is easily perceptible to the touch and preservative Its sapwood is white and usually small and the heart-wood is dark, golden yellow turning dark brown and finally almost black with age. It seasons readily and

shrinks little and for strength and durability, it is superior to every other wood whether in or out of water. It does not crack, warp, shrink, or change its shape when properly seasoned.

Being of an oily nature, it preserves iron works and is therefore of great value to ship builders. It is rarely attacked by white ants or fungus. This is the chief timber employed in buildings for beams, trusses and rafters, door and window frames and all kinds of interior furnishing such as flooring, staircases, etc. It is also vastly used for ship-building, coach-building Railway sleepers and various other purposes. It is also used for carts and *agricultural* implements. The wood is said to last extra-ordinarily long when continually immersed in water.

The wood oil is very important. It is used as a varnish for rubbing over other wood works and is also used for cleaning and preserving guns and rifles from corroding.

The facility of being easily worked, together with its exceeding strength and durability and the medium state regarding hardness and weight have earned this timber such a good fame and demand in the market, that it has become the object of all Forest Owners and Managers, State or Private, to cultivate Teak. Among artificially raised Forest Crops, Teak stands foremost, forms the major portion and receives the greatest care and attention.

Forest Life in India (*Continued*)

III. Elephants.

(*Reprinted from 'the Varsity' May 20, 1913.*)

As special work in his district the District Forest Officer may have to look after a small herd of elephants, which are used for dragging and stacking timber. This is most interesting work, and when you come to know him the elephant needs as much looking after as, and is certainly more delicate than, the horse.

As every one knows, the elephant is unusually teachable, though the extra-ordinary tales of his intelligence one hears should be taken with a grain of salt. He can, with patience, be taught to do a great deal, but I have never known one with the power to think out a course of conduct such as is ascribed to him in the yarns one hears repeated and believed.

The Government elephants in a "Circle" of districts usually have a Government veterinary surgeon in charge of them who tours round and inspects and reports on them, prescribing special diet or treatment for those that are sick or out of condition. This by no means relieves the District Forest Officer of

his responsibilities in regard to the elephants under him, but is merely an additional safeguard.

Elephants should not be put into full working until they are at least twenty years old; before this they may be given light work or short hours. For instance our "nursery elephants" were put on to weeding out, from the plantations, the 'Lantana' —a prolific and destructive weed, rather like a very exaggerated raspberry cane, but without its succulent fruit—or on to dragging small poles for a few hours a day. The full working elephant does about six hours' work a day three in the morning and three in the evening. The usual method is to harness him to the log he has to drag, and provide him with a partner who pushes behind. The pushing is done with the tusks and base of the trunk. When the log is brought to its destination it may have to be piled on others, and if it is small enough it is then lifted up bodily by the elephant and placed on the pile. Great nicety is shown by the animals in fitting such logs into place, and it is here, in my opinion, that they show their greatest intelligence, as they will, without direction, arrange the logs in a stack firmly so that they will not roll down. An elephant lifts a log of this sort by kneeling down on his fore knees (for, an elephant also has knees on his hind legs,) pushing his tusks under it and then while holding it in place with his trunk, raising himself from the ground. It is therefore his tusks that bear the whole weight of the log, and there is considerable danger of his

breaking them if urged to lift too heavy a weight. Needless to say, it is only "tuskers" that can do this work and they are therefore the most highly prized. Elephants may in this connection be divided into three classes: (1) cows, who have no tusks, (3) 'Muknas," bull elephants with embryo tusks; and (3) 'Tuskers' which are also bulls. The reason for the "Mukna" having no tusks has not yet been satisfactorily explained.

During the heat of the day the elephants do not work, are turned loose, and they wander off and graze on bamboo leaves and reeds. They eat a vast quantity of greenstuff and in the wild state they spend about 20 hours out of the 24 in grazing They usually sleep standing, and it is very unusual to see a healthy elephant lie down voluntarily.

In the evening after their work is over they are brought back to camp and washed. For this purpose they are taken to a shallow pool and made to lie down in it and their mahouts scrub them with cocoanut shells. This is a performance of which they are very fond, and it is a most amusing sight to see them lying like half-submerged rocks, with the tips of their tongues stuck out of the water for the purpose of breathing, and their little brown attendants scraping away at their rough hides.

They are then formed up in line and fed with half of their daily rations, the other half being given before they go out to work in the morning. Their rations consist of cakes made of boiled rice, grain, etc, and pieces of cocoanut. Each elephant has two attendants, a "Mahout" and a "Cavadi." The mahout is the chief and the cavadi is under his orders, and it is the latter who feeds the animal. He bears a great lump of food on his hand up to his elephant, and pushes it into his mouth with a motion rather like that of "putting the weight" The elephant stands ready for the purpose with his head up and his mouth open, and then when he has received the dainty mouthful, he munches away with much deliberation and evident enjoyment, while his cavadi stands by with another lump until his mouth is sufficiently empty All this while the mahout remains by his elephant's heap of cakes to see that none are surreptitiously removed by one of his confreres, to be devoted to the nourishment of the latter's particular charge.

After their evening meal is over the elephants are turned loose to graze through the night, each with a long chain attached to one of his hind feet so that if he strays far afield he will leave a track that is easy to follow when he has to be caught and brought in for work on the morrow.

In addition to their timber work the elephants are used for carrying baggage and also as a means of transport for the District Forest Officer, when necessay. Much the most comfortable way of riding an elephant is to sit on his neck and drive him yourself; this it is not at all difficult to learn to do when he gets used to you; you guide him by words of command and by pressing with your toes behind his ears; if you are riding him for purposes of shikar you employ the latter method only, so as to avoid making a noise. However, stalking deer or bison on an elephant is hardly legitimate sport, as they will allow him to come up quite close without any fear, thinking him to be a known and trusty friend, though there is, of course, no objection to adopting this course for purposes of photography, or when beating for or following up dangerous game such as tigers or panthers.

Elephants are all strictly preserved by the Government and none may be shot There is an exception to this rule, namely when one becomes dangerous. This happens usually when an old bull has been turned out of the herd and goes musth or when an elephant has been badly wounded and then not killed. Such rogue elephants are very dangerous, and entirely lose their fear of man, and when one is without doubt in this state the District Forest Officer reports the fact to Government

and recommends that it should be "prescribed" and a price set on its head. Then anyone *may* shoot it, but there are not as a rule very many candidates for the honour. It is usually left to the District Forest Officer himself, or some sporting planter, as it is a very dangerous game and generally means a week or fortnight of constant shikaring and tracking. However, to the lucky man who brings such a brute to book the Government generally presents the tusks as well as the reward they have offered.

The reason for this strict preservation of elephants is that they are wanted for timber work, and for this purpose they are caught and trained, the capturing, of course, being done by the Forest Department: and of all the varied work that falls to the lot of Forest Officers in India this is, in my opinion the most interesting.

CHOKRA.

Notes on an experiment carried out to test the effect of poisoning sandal seeds on germination etc.

An experiment to find out the effect of poisoning sandal seeds with Redoxide of mercury and Perchloride of mercury was started in April last in the compound of the rest house at Panapakam with a view to ascertaining whether rats attacked peisoned seed and whether poisoning affected germination. The results were as follows:—

On 8—4—21, 600 good seeds were selected, 200 of which were soaked for 3 hours in a solution of Red-oxide of mercury formed by mixing 10 grains with 2 oz. of water. The seeds were then taken out and spread on the ground with the exception of 20 which were sown in a pot 200 other seeds were soaked in a concentrated solution of Perchloride of mercury for 3 hours and taken out and spread on the ground, 20 being sown in another pot. The remaining 200 seeds were not in any way specially treated and of these latter 200 were spread on the ground and 20 were sown in a third pot. The pots were regularly watered

Till 3—5—21, nothing happened but I could not come to any conclusion therefrom because the fact that even unpoisoned seeds were not touched by rats or squirrels appeared to show that there was an absence of these animals just about there (compound of Panapakam rest house) All the three sets of seeds were then shifted to the Ranger's house at Chendragiri where rats were said to be plentiful. On examination of the seeds again on 27—5—21 it was found that all the seeds had been eaten by rats but no germination was observed even till 4—6—21 in any of the pots in which seeds had been sown.

A further experiment was tried in the Ranger's house using a more concentrated solution of each poison Perchloride of mercury being 1 in 30 and Red oxide 10 grains to 1 oz. of water. 120 seeds were soaked in each for 36 hours and then taken out and kept in zinc buckets. As a result of even this experiment it was found that all the seeds had been eaten up. The seeds sown in pots did not however germinate even till 26—7—21.

I think the experiment is interesting as showing that it is not easy to keep rats away from sandal seed. Of course I have no record to show if any of the depredating rodents died as a

result of their feat, possibly some at least did, but that does not affect the main points that the seeds were destroyed and that those sown did not germinate.

A. M C. LITTLEWOOD;

5—10—21 District Forest Officer,

Chittoor.

[The experiment is interesting, and instructive. Seeds were treated in a variety of similar ways in South Vellore district this year and dibbled in the forest. Hardly any germinated, and it is assumed that rats and squirrels ate them. From the fact that we find natural seedlings more in thick thorny hedges than in other places it seems probable that the predatory rodents find it less easy to find the seeds in such places. It is, therefore, being arranged that all patches of dibbled sandal seed on the Madras Forest College estate are to be covered with a thick mass of thorny material in the hope that this may save the seeds— *Editor.*]

Madras Forest College Sports.

(Wednesday the 7th September 1927: successful meet)

The annual athletic sports of the College were held on the 7th September on our athletic grounds commencing at 3 p.m. sharp, and proved a very successful meeting

The weather could not have been better It was a cool afternoon, rather on the dull side. This allowed the bulk of the spectators to sit or stand in the open while the two tents were filled with ladies (1 with European Ladies and the other with Indian Ladies) who were interested spectators of the sports.

The ground was well laid out by the senior Division students and the arrangements altogether reflected much credit on our Vice-President (Mr. G. C. Robinson).

Mrs Wilson kindly undertook the arrangement of the European tent, and the entertainment of visitors, and carried out in a most successful manner the task which must have entailed a vast amount of labour.

The following were the several officials who contributed to the smooth working of the programme: Messrs H.F.A. Wood; C.E.C. Fischer; F.R. Parnell; M.R. Ramaswamy Sivan; C.S. Ratnasabapathy Mudaliar; E. Stanes; C. C. Wilson (Principal) E. K. Krishnan; W.G. Dyson; W.C. Hart; and Revd. F.R Jambeau.

The sports were on the whole interesting and the existing record 5′—30″ for the one mile flat race by M.B. Subbiah in the year 1919 was broken by our Hockey captain M.B. Aiyanna who did the distance in good style and wind in 5′—29$\frac{4}{5}$″.

Several surprises were witnessed during the afternoon and we congratulate Hasanuddin khan on winning the 100 yards flat race and M.M. Mandanna on winning the Hurdles and Long Jump events which were expected to fall to other competitors. It is a pity that in the Relay Race one runner forgot that he was merely a unit in his team and by giving up the race, thereby prevented the rest of his team from running.

Results.

The following were the results :—

(1) 100 yards flat race
1. M. Hasanudin khan—11$\frac{2}{5}$″
2. M B. Aiyanna.

(2) High Jump
1. M. Hasanudin khan—4′—7$\frac{3}{4}$″.
2. A. K. Bose.

(3) Hurdle Race 120 yds
1. M M. Mandanna-19⅘″
2. K A. Bhandary.

(4) 120 yds servants' Race
1. A Unni Nedungadi
2. Chinnaswamy.

(5) ¼ mile flat race
1. M. B. Aiyanna.
2. M. M. Mandanna.

(6) Invitation ½ mile
1. A Eling (Stanes school)–2′–27″.
2. Subba Rao (London Mission).

(7) Sack Scrimmage — Winning Team :—
1. M.B.K. Molegoda.
2. A.A Arunachalam.
3. P.A. Venkataraman
4. Gurchan Singh.
5. S. Sankaran.

(8) 1 mile flat race
1. M B Aiyanna 5′–29″.
2. N.S. Poonacha.

(9) Long Jump.
1. M,M. Mandanna–16′ 1″.
(2) M. Hasumudin khan.

(10) Visitors' children's Race
1. Miss. Gladys Dee.
2. John Dee.

(11) ½ mile flat race.
1 M.B. Aiyanna–2′ 30″,
2. Poonacha.

(12) Obstacle Race
1. J K. Bodas.
2 B Kotilingham

(13) Relay Race — Winning Team :—
Ceylon & Coorg Students.

100 yards flat race for past students was not run this year as the required number of students (4 the least) were not present to run the race, as passed in the general meeting.

The following two students, Mr. M B. Aiyanna & M. M. Mandanna won their athletic colours by obtaining the required number of points for the same

S. C. RAMALINGAM,
Athletic Secretary

21-9-21.

Hookey Match.

The third Hockey match this year was played with the Agricultural College on 23-8-21 on their ground. In spite of the fact that the full strength of our team was not represented, we scored an easy win by 3 goals to 1.

Play starting at 5-25 p.m., our opponents made a swift run with fine passing among their forwards towards our ring and if not for the timely stroke by Dempta—the left ½ back—, the invaders would have found no difficulty in making their attempt a success. Dempta however gave sticks and a corner was declared against us which our opponents failed to score off.

M.M. Mandanna—our centre forward—with an able partnership of Hadi Hussain—outside left—took charge of the ball and made a fast run and clearly put the ball into the net of our opponents inspite of their good defence, and thus registered the 1st goal for us at 5-30p.m. Being encouraged by his success he made another goal attempt in which however he failed as he was doing it by himself Had he however sought his partner's help he would have found little or no difficulty in his 2nd attempt.

Balakram Anand who filled the place of full back vacated by one of the instructors fell on his left wrist while attempting to hit a ball, with the result that he broke his wrist and play had to be suspended for 5 minutes.

The Agricultural College captain kindly allowed us to play a substitute for the injured player. No further score was made during the reminder of the first half of the game.

Half Time.

2nd half starting at 6-5 p.m., our captain (M.B. Aiyanna) taking charge of the ball from the centre bully made a fast run and passed the ball with a strong drive to the opposite extreme wing. The ball was nicely received by our outside left—Hadi-Hussain—who in his usual style drove the ball towards the net, but it was well stopped by our opponents' goal keeper. From here our opponents made a fast unattacked run and their Inside-left succeeded in scoring their 1st goal making the game equal at this juncture. Had our right-half been more brisk than he was, our opponents could not have scored their first and the only goal in such an easy manner as they did.

The play at this time became very exciting and shortly afterwards our centre forward (M.M. Mandanna) showed a clever bit of his wrist work and in partnership with Hasunudin khan—Inside-left—registered the 2nd goal for us amidst much applause.

Our opponents having become desperate made a good attempt straight from the centre bully from which however they failed to score.

The play became faster and faster and in the middle of a hard struggle within our ring Bhandary—one of our full-backs—was badly hurt, and was compelled to leave the field though the play was not stopped on account of this. Taking advantage of this handicap our opponents pressed on us very much and kept the ball within our ring and had not N. S. Poonacha—our left half —gone in time to the help of the surviving full back, and driven the ball far away from our danger zone, our opponents would have managed to register their 2nd goal against us. Our forwards following the ball from this hit succeeded in breaking through our opponents' defence, and we hoped we were going to score another goal, but were pulled up owing to one of our opponents giving sticks.

Bhandary returned to his place in the field within a few minutes and seemed no worse for his injury.

M. B. Aiyanna (captain) now succeeded in making one of his usual fast runs and deposited the ball safely into our opponents' net, thus adding the 3rd goal to his side. Within the last 3 minutes of play we made yet another attack on their goal, thanks to another run by our captain who passed the ball to the centre forward but the latter missed his shot.

Havildar Kunnhu and N.S. Poonacha played well for their sides, and K.A Bhandary deserves special mention for the brilliant defence he put up for his side.

C. S. RAMALINGAM,

Athletic Secretary.

Investigation of a Sandal tree.

(Isolated 5 years ago for the purpose of testing the theory of Root-parasitism.)

Certain healthy sandal trees on the Javadies were trenched 5 years ago with a trench approximately 4½′ deep and some 2′ wide, excluding all other growth; the platforms so formed were carefully cleaned, all growth being uprooted and they have been kept weeded. This experiment was carried out by Mr. K. R, Venkataramana Ayyar, Rao Sahib, at the request of Mr. C. E. C. Fischer, then Principal of the Madras Forest College. Its object was to discover whether sandal is dependent on its

hosts for its existence or whether it can live alone in case of necessity.

For the first year or two the trees so treated appeared to be growing normally; then they began to show signs of ill health, the colour of the foliage became bad, and the leaves scanty, and whole branches in some instances died off.

This year, 1921, it was decid' to investigate the condition of the root system of one particular tree that had been kept under careful observation by the Senior Division of the Madras Fosest College, which camps at Komattiyeri in the Javadies, every year

This tree was "No. 6" of the trenched trees in the Special Tending Area in Coupe I of the Komattiyeri Felling Series.

In 1919 and 1920 careful drawings of this tree were made from exactly the same spot, by Mr R, B. Cornwell, the Officer commanding the Senior Division of the Madras Forest College, showing the decrease in condition as regards quantity and quality of foliage. This year, 1921, another drawing from exactly the same spot has been made by Mr. M. R. Sundaram

Ayyar, Instructor in Sylviculture to the Senior Division, which shows that the tree has improved very considerably in condition. And this is the case as I can state from my own personal observation. Last year the tree appeared to be moribund. This year it appears to be fairly healthy.

I was surprised at the improved condition of the tree, as to my mind, it is obvious that a tree which naturally always forms root connections with other species will not thrive without such. I have never yet found a sandal tree that had not many such connections, and I have examined the root systems of several hundreds. I discussed the matter with Mr Sundaram Ayyar and we came to the conclusion that it was probable that the sandal tree had, in its search for hosts, driven its roots right down below the trench, contrary to its natural habit,—for the sandal is an eminently shallow rooted species,—and had so formed root connections with trees outside the trenched area. We proceeded to investigate, being assisted by the students of the College, and we found that our theory was nearly correct. The roots at first followed the usual habit of sandal and spread out a few inches below the surface of the soil, until they reached the edge of the trench, then they turned downwards, and in some cases returned a short distance on their course; two roots we exposed completely and they had burrowed to nearly the

depth of the trench when they came in contact with the roots of two trees growing outside the trenched area. and had immediately formed numerous root connections by means of the usual haustoria with these roots. In the one case they were attached to the roots of a big Chloroxylon Swietenia, 25 feet from the edge of the trench, and in the other to those of a small Eugenia Jambolana, some 3 feet from the trench.

It seems therefore, that we can see clearly what the life of this tree has been since it was trenched. For the first two years or so it remained stationary, existing on its reserves, and extracting a certain amount of nourishment from connections with the numerous small roots that must unavoidably have been left when clearing the platform. Then during the next two years it began to die slowly owing to lack of hosts. During all these four years it was making desparate efforts to find hosts, driving its roots deep down into the soil, and forming very many connections with its own root system in doing so. Of these we found many examples, in fact we did not come across a case in which two of the roots of this tree came into contact with each other without forming haustoria. I have frequently found the roots of sandal parasitic on another sandal but never before have I found them parasitic on the roots of the parent tree itself. The

desperate need felt by this tree for a host was further evidenced by the fact that a single small root of some foreign plant, which had inadvertently found its way on to the platform, had a sandal root lying along it connected by no fewer than 7 haustoria in a distance of 4 inches.

Well, at last the efforts to find hosts which had been made for 4 years by this tree were rewarded, and at a depth of some $3\frac{1}{2}$ to $4\frac{1}{2}$ feet it came in contact with the roots of the Choloroxylon Swietenia and Eugenia Jambolana referred to above, immediately seized on them and formed root connections with them, and immediately began to recover its health, thus accounting for its present improved condition.

As further evidence, if any is needed, of the necessity of host plants for the existence of sandal may be quoted the instance of another of these trenched trees. This was a young sapling in the compound of the old Rest House at Komattiyeri. This after a year or two showed unmistakable signs of dying; last year Mr. Abdul Qadir, the District Forest Officer, planted some Jatropha curcas beside it; this year the sandal sapling is in a flourishing condition.

To my mind then, apart from the fact that it is natural for it so to do, and therefore good it, it has been proved conclusively that sandal will not thrive without hosts

C. C. WILSON.

Co-tract system in Fuel coupes.

A novice, as yet, in the art, and practice of sylviculture, I quite feel my incompetence to write on this subject. Lest I should be thought too presumptuous, I, here, preface that I am just giving expression to some ideas which have struck me lately, as being worthy of a little consideration by men, better qualified than myself, and whose views matured, as they will be by experience, will prove highly instructive.

When a fuel coupe is sold in auction, the price it fetches depends upon the nature of the growing stock therein, the facility of its removal, and, to a great extent, also on the competition fo the bidders. Where this is keen, sometimes a very good price

is realised, but in no case does the Department suffer any loss on account of such sales. I know of a working circle which, according to its working plan, should be worked at a net loss, but is really fetching a net profit of some hundreds of rupees every year. This fact must surely cause a certain amount of agreeable surprise to its author.

The working of the forests of India, as one officer has remarked, is a semi-commercial concern in the management of which the same principles as are applied in any business enterprise shall also be applicable equally and well. Quite reasonable does this sound. But, the highest aim of the Government, nay, the greatest purpose for which it exists, and is suffered to exist, is to serve the greatest good of the greatest number. I believe, nobody will deny this statement. Judging from this standpoint how then, do we behave towards these greatest numbers in the matter of the fuel coupes? By selling these to the highest bidders, we leave the multitude to the mercy of the contractors whose main object is always to make the most of the bargain. They can never sell their stock like the Government at their cost price, but often put their profits as high as 25 and 30 per cent of their total outlay.

Not only this. The materials which they offer to the public are not often the best of their kind. Billets of all sizes

are mingled together without any sort of classification. When one contractor takes 2 or 3 coupes in 2 or 3 adjacent felling series he does not open as many depots and near the villages or group of villages which are intended to be benifited by them in the first instance. What usually happens is that he removes the produce of all his coupes to one depot situated in or near his own village. This affects the small consumers often very badly.

In the details of his working too, the contractor very rarely fulfils all the conditions of his agreement, and I am sure that a perfectly satisfactory coupe is a rare exception His coppicings are never above criticism. His billets are stocked at random on the whole coupe and wherever a tree has been felled. The carts that come to remove these do not confine themselves to one particular track, but are very often taken through the area to get at the scattered stacks. The soil is thereby badly ruptured, the seedlings on the ground are damaged, and the stools, and the coppice shoots in the earlier worked portions are also injured. Added to these, there is the danger due to grazing by the bulls and buffaloes belonging to these carts. Though these acts are prohibited in the agreement, in practice, it is very hard, to enforce them, and the occasional attempt of the subordinates to do so only lead to constant misunderstandings and ruptures with the contractor or his men.

There is yet another and a more serious feature of the working under this system I refer to the heaps of branchwood and brushwood (often thorny), very irregularly scattered over the whole area, and

in such a way that it is practically impossible to make one's way through them inside the coupe. They are so badly and recklessly thrown, that it cannot be known how heavily they hinder the natural growth of seedlings on the ground, and how badly they suppress also the advance growth It sometimes also happens that the workmen cover their bad working with a mass of brushwood of this kind. The contractor cannot find sale for all this stuff; and he is therefore, not prepared to collect and stack them. Their presence will prove a source of serious danger in the Fire season; and especially so, if there happen to live in the vicinity some hot-headed incendiaries like those Moplahs of Malabar, who had, out of pure mischief, burnt down, not long ago, the buildings and some other belongings of the Govt. and of our Department in and round about Nilambur and Manjeri. It is therefore doubly necessary that all this easily inflammable material should be carefully collected and laid down along the coupe or strip lines, forming some sort of a fence round it. How much is its protection also facilitated thereby!

In consideration of these points, it seems to me, that the ultimate aims of Government in general, and of the Department in particular, would be better achieved by Departmental management than by the contract system. Our accounts are kept in a more open manner, and every purchaser can have access to them, if he suspects the price at the Depot. He has also the privilege of bringing any fraud or misdemeanour on the part of the subordinates to the higher authorities, who will instantly look into them and remedy the defects, if any. Complaints against the contractors are not so easy to be dealt with

One thing more to add, which is partly politics: and I hope to be excused for indulging in it here. All my readers know that the atmosphere of the whole of India is at the present moment surcharged with the unhealthy vapour of Non-co-operation. Propagandists are busy everywhere exhorting the people not to take part in any of the Government sales. Their attempts have not been successful so far neither can they succeed in ever rousing the peaceful millions of India whose safety, happiness, health, wealth and prosperity are for ever dependant on the stability of the established Government. Yet, it is only prudent that we should be prepared for a contingency of that kind, by taking back under our own control these and similar works, now being done by contractors. And for this, we have, surely, enough men, well trained in the technical details necessary for the purpose.

P. Sithapathi Ayyar,

M. F. C.

1920. 22 Do.

Gluta travancorica.

This is a Shola species; its growth is strictly confined to evergreen forests. It is known as '*Shenkurinchi*' in Tamil and derives its specific name *travancorica* probably from its abundance in the forests of Travancore. In the years past, this species seems to have been left in the back ground; its importance as a timber-tree is imperceptibly gaining ground and this fact is evinced by its growing demand in the locality in which it occurs. The winsome bright red colour of the heartwood, its comparative lightness coupled with its durability and above all its easy manipulation, have attracted the attention of cabinet-makers. One would really be enraptured at the beautiful sight of the straight, and stupendous stature of the Gluta boles with their gigantic girth and far spreading crowns, standing as they are in the midst of the Sholas. The virgin nature of the forest, the cooling green colour of the foliage, and the silvery sun peeping through the canopy of the stalwart Glutas infuse into the minds of the looker-on a spirit of happiness which is unique in its nature.

Gluta travancorica belongs to the order *Anacardiaceae*; its seeds yield a black acrid juice analogous to that found in divers other trees pertaining to this order. Botanically Gluta is next door to the mango. The early stages in the growth of the two species are almost identical. Both the young seedlings start life almost in a similar manner.

This species is commonly found in the Shola forests of Kanni-katty and Kodamady of Ambasamudram Range in the Tinnevelly Dt. The elevation that is congenial to the growth of this species seems to be between 2000 ft. to 3000 ft. Besides Travancore, Gluta seems to occur in the Tinnevelly District near the higher Sholas almost bordering on the Travancore forests. In the Shola forests attached to the Ambasamudram Range, Gluta trees of great height are copiously found. Trees of 100 ft. height and 10 ft. girth are to be seen in those forests

The seed requires about three months to strike a tap root of some appreciable length, say 6 inches and in the interim, there is hardly any growth above the surface of the ground. When the radicle is sufficiently established, the seed sends out a knitting-needle-like plumule which attains a length of about 6 inches in 6 or 7 weeks. Then the leaf-bud situated at the apex of the plumule slowly sprouts out into a whorl of leaves. This is all the progress which the plant seems to show in the first year of growth. Its pronounced tap-root precludes the seedling from planting but the seeds can be easily dibbled.

The period that is best suited for the dibbling of Gluta seeds in the Ambasamudram Range is between the middle of May and the middle of June. It is difficult to procure adequate seeds before May, and after June the heavy rains set in, and the dibbling operation cannot be effectively carried out owing to the presence of leeches. It is really an unpleasant task for coolies to labour in the forests with leeches swarming about on their legs drinking and wasting their warm blood. It is a painful sight to look at the coolies with the smoking blood oozing and

trickling down their legs and with the bloody leeches tenaciously clinging on to their legs. The labourers are likely to while away their time in pulling out these pests. It is rather hard to obtain coolies during rainy season. Besides it is not prudent to dibble during rains, as an old saying current among foresters, forbids, "Sow dry and plant wet"
In August the weather changes and then the dibbling may be done.

Natural regeneration is splendid where conditions of soil and climate are ideal. Under the older trees, seedlings in all stages and saplings in abundance can be seen, forming a thick carpet. In a typical plot of about one acre, about 7000 seedlings were enumerated. Seeds lying on the ground under the parent trees, germinate sooner than those collected, preserved for sometime and then dibbled.

Gluta seems an extreme light demander, wanting the maximum overhead light available. As a seedling, this thrives even in grassyland if the grass is prevented from suppressing it. The preference of shade may be due to the fact that it serves the double purpose of impeding the growth of grass and simultaneously preserving the richness of the soil with regard to humus, moisture and fertility and thus eventually stimulating and fostering the rapid growth of the plant. The leaves of some young seedlings, of about one year, in an open nursery, were observed to be yellowish and unhealthy. This may be presumably due to the fact that the seedlings require some shade to help them to tide over the first hot weather. The poles seem to be provided with terminal shoots to cut through the overhead cover to obtain their necessary light.

Leaves are 4 to 6 inches long and 1 to 2 inches broad, simple crowded at the ends of branches, rigidly coriaceous, spathulate, entire thick; subsessile, with pronounced veins; Gluta seems to blossom from February to April. Its inflorescence is in terminal panicles. Flowers are cream-coloured. Petals 4 to 6 and stamens also 4 to 6. Style is filiform; ovary is superior. The ripe fruit is probably formed about three months after flowering. The fruit is globose; it has a rough brownish rind and is about 1¼ inches in diameter. Seeds lying on the forest floor under one parent tree, were heaped up and measured and it was found that there were over 35 measures of seeds produced by one single Gluta tree, and one measure held about 84 seeds. Some of the seeds are small and others are big. From calculation, we derive the average volume of a seed * to be 1⅓ cubic inches approximately. It is quite easy to pick out good healthy seeds from rotten unsound ones. If the dibbling of the seeds, is executed at four feet apart, then we require per acre 2722 seeds, which come to 32 measures. Now this number appears to be a fairly large one The seed yields a black blistering juice acid to the taste and this prevents animals from molesting the seeds unlike the sandal seeds which are to be guarded against rats, squirrels, pigs and birds.

[* The average volume of a Gluta seed is certainly much less than what is given The *fruit* has evidently been mistaken for the seed in the calculation referred to—Editor.]

Gluta seems to possess a tendency to form a straight clean bole surmounted by a spreading crown without branching lower down. In the forests, we meet with a number of dead and fallen trees in preference to other trees with which the Gluta is associated From this it follows as a corollary that this species. attains age earlier than the rest of the species This fact is likely to become corroborative, from the fact that Gluta is a light demanding species.

The age of exploitability is about 150 years. Its bark is smooth pinkish grey and about ½ inch thick. Sapwood is white and the heartwood is bright red. The latter is close-grained, beautifully streaked, and takes a fine polish after seasoning Its annual rings are quite distinct and are about 6 to 10 per inch. This handsome wood is generally found in inaccessible places and on high elevation So the transport of timber, is very difficult. This wood in the Government forests in the Ambasamudram range is not as yet for sale. Now the forest department is opening the forest by connecting a net work of roadways for the extraction of timber. When the project is over, wood will be found in the market for sale. At present, the Kattalaimalai estate belonging to the Jesuit Fathers, in the Ambasamudram range, in the Tinnevelly District, has this species in their forest and they cut and remove some good trees of Gluta to their depot at Uchankulam about 4 miles from the Ambasamudram railway station. They sell at Re 1 to Rs 2, per cubic foot. The wood is chiefly used for cabinet-making, for making light furniture, for inlaying, for making picture-frames and to some extent for carving. Carpenters find the wood easy to handle like teak.

The flaw about this wood is that it is amenable to the depredations of the white ants Th se ants easily eat away the wood, despite the fact that it yields a blistering juice. It is also subjected to the attacks of a borer; sometimes the borer tunnels through from one extremity of the wood to the other. Sambhurs peel off the barks of the saplings of Gluta with their horns as the acid exudation probably helps to shed their horns the sooner. In the Gluta plantation at Kannikatty, we see some saplings whose barks are torn off owing to the same cause. This tree is receiving the attention of the forest department In the long run, it may become one of the popular timber species that can be easily procured, owing to departmental enterprise.

S. Doraraja,

M. F. C, 1921—23 Dn.

Occasional Notes.

Dipavali Celebration in The Forest College Estate.

This all-India festival was observed with much mirth and gaiety in our little Estate on the evening of the 30th October, last. Hostel Blocks, and the students' Club were well illuminated in the familiar orthodox Hindu style, and a variety entertainment was got up for the evening's entertainment.

In response to our invitation, the staff and the students of the college and of our sister college of Agriculture, came to spend a pleasant evening with us. There were also some ladies in the front row of chairs. Mr. and Mrs. Wilson, and Mr. G. C Robinson of the Forest College, also honoured us by their presence.

The hall was well decorated, and when the guests arrived, they were received, and conducted to their seats by Messrs. Sundaram Iyer & E. K. Krishnan of the college, assisted by some of the students as well. Precisely at 5-30 P. M. the function began with the distribution of sandal, flowers, fruits, and pansupari to the guests. The performance on the stage included an interesting series of songs, both comic and serious, in a variety of languages A scene of drunkards exhibited by four students from the Punjab was also much appreciated.

These took us till 7-30 P. M. At the end of the show Mr. Sundaram Iyer, who organised the whole function of the evening, spoke in brief about the significance of the festival, and then thanked the guests for their ready response and sympathetic appreciation of the performance. Mr. Wilson of the Forest College, and Mr. Ramaswamy Sivan of the Agricultural college, returned the compliment on behalf of themselves and of the other guests of the evening.

The pleasant function then came to an end with the singing of the "Mangalam" and the National Anthem in English:

Out of the collections realised for the celebration we were able to spare a sum of Rs 10 to the Malabar Relief Fund.

P. Sithapathi Iyyar,

M. F. C. 1920-22 Dn.

Miscellanea.

I. (a) More about "Balsa" (the lightest wood in the world.)

"*Balsa* is now on the American market for a variety of special uses that require buyancy, non-conductivity for heat, smoothness, softness, lightness, and speed in working. It averages in weight about one-third less than cork. This lightness results from its peculiar cellular structure. In its natural state, Balsa rots quickly and ordinary methods of preservation by painting or otherwise are ineffective in preventing deterioration. After extended experimentation in the treatment of Balsa, a process of wood preservation has been developed, which meets the requirements of Balsa. and its uses, giving adequate protection and permanency of quality to the wood. This process thoroughly impregnates all parts of the wood with a thin coating which does not appreciably increase its weight. Treated Balsa is water-resisting, and is not subject to the attacks of insects or the bacteria of decay.

Combined with its light weight and its quality of insulation against heat, Balsa possesses a structural strength, which, pound for pound, is greater than that of any wood." (*Extracted from "The Modern Review" for September 1921.*)

I. (b) Bamboo shoot and its uses.

"A giant grass four inches thick that grows a foot a day until it is 50 ft. high—such is bamboo. Its sprouts rival the sweet corn in succulency and flavour; its towering stem will furnish timber to make furniture fans and fish rods tent poles, trellises, and tooth picks; its

graceful outlines and green and golden beauty rival that of the white birch.

"One plant will form a grove, for it grows and spreads much in the manner of its smaller cousin Asparagus. It needs no cultivation whatever once it is established. An acre of bamboo will produce one thousand sprouts each year for 40 or 50 years

You first encounter Bamboo as an edible in that chinese dish known as Chop Suey. It is a morsel of firm, wholesome texture and delicate flavour cut from the tender sprout.

"The food value of the bamboo shoot is high (about equal to that of onion) In preparing the shoots for the table the brown outer husk is stripped off, the tender sprout sliced lengthwise, and boiled for an hour in salted water. It is served with drawn butter

—Extracted from The Modern Review for September 1921.

[Note: There is another preparation familiar to people who have had some experience among the hill tribes of this part of India. The shoot is stripped of its outer husk and sliced into convenient size The slices are put in cold or lukewarm water and allowed to soak there for 24 hours after which they are taken out and cut into still smaller pieces. These are then cooked well with milk and sugar, or with salt only, in which case, spices are also added. This preparation forms a dainty dish on festive occasions.]

P. Sitkapathi Iyer.

II. How Japanese Dwarf Trees Are Raised.

The little Japanese trees exhibited in the windows of the better radeg Japanese novelty shops never fail to excite considerble interest, because they are so unusual. In fact, in Japanese horticulture the art of landscape gardening on a miniature scale plays an important,

if not a leading rôle. A village or a single home, surrounded by beautiful country, will be formed within a plot of ground a few yards square by the Japanese artisans. A river with its bridges, a lake with tiny ships on its silvery surface, roads, gardens, fields—all these features are to be found in the more pretentious Japanese miniature works. Hence it is not surprising to learn that the Japanese, in order to carry out their miniature landscape gardening with the utmost realism and fidelity, have had to raise dwarf trees for this purpose.

So the custom of dwarf trees has become an established one in Japan, some of these trees attaining the age of 200 years. The whole system of culture of these tiny trees may be summed up as the reversal of nature's method. It really consists not in the survival of the fittest, but rather in the survival of the unfittest, so to speak. A poor, week seed is usually chosen and planted. As soon as it has attained some growth, the leading shoot is trimmed off. The little plant then grows two other shoots, and these are carefully watched. When one shoot exhibits a strength that is vitally greater than its fellow, it is at once cut off and the weaker shoot left untouched in order to form the future dwarf tree's main stem or trunk. This system of trimming and cutting is followed punctiliously. Water is seldom used—only in such small quantities as to keep the little plant actually alive. The tree is kept in a pot too small for its full development and the roots are constantly pruned. The shoots are carefully trained and bent to follow the growth of a large tree.

All of which, it goes without saying, requires great patience; but this is a commodity with which the sons of Nippon are endowed to a degree approached by few of the Caucasian races, and the Japanese horticulturist never tires of watching the growth of his tiny trees. When such a tree has been growing for about five years, it can be left

to take care of itself, since it has become accustomed through its training to follow the rigid course laid out for it, and can then be trusted not to strike out again in the pursuit of its natural size and vigor. In this manner magnificent specimens of dwarf trees are produced which compare favorably with anything found among their big brothers in the untrained forests of Japan.

Extracted from Scientific American for 11—6—21.

Contributions to the Gass Forest Musuem.

Serial No.	Contribution	Contributor.
1.	Root and leaf specimens of *Cascaria esculenta*	M. R Ry. P. Sankuni Menon R. O. Dhoni.
2.	Root specimen of *Salacia prinoides*.	The Surgeon General with the Government of Madras.
3.	One French horn	F L. C. Cowley-Brown Esq. I. F. S.
4.	100 Botanical specimens 15 seedlings showing different stages in germination. 2 Fruit specimens, 2 Short panels each of 11 species of timber.	M R Ry. Rao Sahib. K. R Venkataramanier avl. I. F. S. Forest Research Officer

5.	One mounted specimen of the *Indian Pangolin*	J. H. Longrigg Esq. I. F. S.
6.	One long panel, one short panel and one book of *Nyta dolabriformis*	R. H. Mitchell Esq. D. F. O. Upper Godaveri.

Contributions to the Madras Forest College Library from 22-8-21 to 20-11-21.

A General Library:—

1. The sylviculture of Indian trees - 3 copies—*By R. S. Tro-pe M. A., C. I. E.*
2. Code for the collecting & tabulation of statistical data—*By S. H. Howard B. A.,*
3. The Madras Treasury manual. Vol. I Third edition.
4. Structural Botany Vol I—*By Asa Gray.*
5. Text Book of Botany (Indian edition)—*By Lawson and Willis.*
6. The fauna of British India; Vol. III.
7. Memoirs of the Indian Museum; Vol. V. Fauna of Chilka Lake No. 9 (September 1921).

8. A hand book of some South Indian Grasses—By Rai Bahadur, K. Rangachariar avl. M. A., L. T,
9. Inland trade of India—(1919-20.
10. Revised working plans for (1) The upper Hill Forests of the Darjeeling Forest Division & (2) The Kulu Forests for 1919-20 to 1943-44.
11. Working plan for Buxa Du. Bengal Forest Circle.
12. Indian Forest Records; Vol. III Part I.
13. The common Birds of Bombay II edition.
14. Civil Account Code; Vol I. 8th edition.
15. Moore's Family Medicine; revised edition 1921.

B Students' Library.

1. Miscellaneous writings & speeches (*By Lord Macaulay*).
2. Vanity Fair—*By. Thackeray.*
3. The Boy's book of health & strength—*By Garden Stables M. D.*
4. The optimistic Life—*By Marsden*
5. The Modern Letter-Writer.
6. The Elements of Book-keeping—By K. Subramania Ayyar B. A., L. T,
7. The Theosophist—*By Annie Besant.*

Students' Club Fund.

Statement showing amounts promised and still due by old students, towards the Students' club:—

		Rs.	A.	P
Mr.	C. S. Ramanathan	10	14	0
,,	M. R. Doraiswami	3	0	0
,,	Kerala Varma	10	0	0
,,	Gulam Dustagir	9	0	0
,,	S. A. Dawson	11	0	0
,,	N. T. Tambi	4	0	0
,,	P. Karunakara Menon	9	0	0
,,	Dhananjeya Rao	13	0	0
,,	Kesava Pillai	12	0	0
,,	I. Ramalingam	8	0	0
,,	L. A. Krishna Ayyar	7	0	0
,,	S. Krishna Ayyangar	15	0	0
,,	T. K. Parameswaram Pillai ...	15	0	0
,,	P. Krishnan	10	0	0
,,	T. E. Varadhachari	15	0	0
,,	K. G. Sundararaja Rao ...	10	0	0
,,	M Krishna Ayyar	10	0	0
,,	S. V. Sigbhatullahi	10	0	0
,,	Gulam Rassool	10	0	0
,,	T. R. Naganatham	10	0	0
,,	W. Balakrishna Mudaliar ...	10	0	0
,,	Aiyappa Asari	15	0	0
,,	D. Patel	18	0	0
,,	K. Jayaraman	12		0
,,	P. V. Ramanna Rao	12	0	0
,,	R. E. Lemos	50	0	0

Gazette Notifications.

23rd Aug. 1921.

(1) M. R Ry. A. Raju Nayakar Avergal, District Forest Officer, Central Salem Division, is granted privilege leave for three months with effect from date of relief.

(2) M. R, Ry. V. Narayana Ayyar Avergal E. A. C. of Forests, on return from leave, to be D. F. O. Central Salem Division.

(3) Saiyid Abdul Qadir Sahib Bahadur, E. A. C. of Forests, and D. F. O. South Vellore, to continue in additional charge of West Vellore Division.

(4) Mr. R. Bourne, Dy. Conservator of Forests, Instructor at the Forest Research Institute and College, Dehra Dun, is granted privilege leave for six months, combined with furlough on average salary for 4 months and furlough on half average salary for 5 months, with effect from the 15th September 1921 or subsequent date.

13th Sept. 1921.

(1) Mr. T. Clear, Dy. Conservator of Forests, has been permitted by the Secretary of state to return to duty.

(2) Mr. T. Clear, on return from leave to be District Forest Officer, Guntur.

(3) Mr. D. L. Sathe Dy. Conservator of Forests, on relief by Mr. Clear to be D. F. O. Lower Godaveri, *Vice* Mr. F. A. Seager proceeding on leave.

General notification:— The present Arcot Range of North Vellore Division, will be known henceforth as the Vellore Range.

4TH OCT. 1921.

(1) Mr. B. K. Roy, Assist. Conservator of Forests is granted combined privilege leave and furlough for 28 days with effect from date of relief.

(2) Mr. D. L. Sathe, Deputy Conservator of forests is granted privilege leave for 2 months with effect from date of relief.

(3) Mr. R. H. Mitchell, D. F. O. Upper Godaveri Dn. to hold charge until further orders, of the Lower Godaveri Dn. in addition to his own duties vice, Mr. F. A. Seager proceeding on leave.

This cancels the Notification in the Gazette of 13th September 1921.

11—10—1921.

M. R. Ry. A. R. Narasimha Ayyangar avl, Extra Assistant Conservator is granted privilege leave for two months and fifteen days in continuation of the leave already granted to him.

Mr. B. F. Rigold Deputy Conservator of Forests has been granted by the secretary of state an extension of furlough on Medical Certificate by one month, and permitted to return to duty at the end of it

25—10—1921.

(1) Mr. F. R. Madan on return from leave, to be D. F. O. South Mangalore.

(2) Mr. G. S. Lasrado on relief by Mr. F. R Madan, to be D. F. O. North Mangalore.

(3) The Item in the Notification of the Gazette of 3rd May 1921 appointing Mr. H. C. Bennet as acting Conservator of Forests (Seconded), is cancelled.

1—11—1291.

Mr. B F. Rigold, Deputy Conservator of Forests, on return from leave, to be District Forest Officer, Upper Godaveri Division.

Mr. R. Mitchell, Extra Assistant Conservator of Forests, on relief by Mr. Rigold, to be District Forest Officer, Lower Godaveri Division.
(Sir George Hart, K. B. E, C. I. E, Inspector-General of Forests, is permitted to retire with effect from the 14th October 1921.

From the same date, Mr. P. H. Clutter-buck, C. I. E., C. B. E., officiating Inspector General of Forests, is confirmed in that post.

8—11—1921.

M. R. Ry. P. Venkataramanan Avergal, District Forest officer, East Salem Division, privilege leave for two months with effect from date of relief with permission to affix the Christmas and new year holidays to his leave subject to the conditions of article 220 of the C. S. R.

M. R. Ry. A. Hanumantho Rao Avl. E. A. C. of Forests, extension of privelege leave for two months in continuation of the privelege leave for four months already granted to him.

M. R. Ry. B. S. Kasava Vittal Avl. E. A. C. of Forests, extension of privelege leave for sixteen days and furlough for one month and seven days in continuation of the leave already granted to him.

18—11—1921.

Mr. F. D Ardagh, Assistant Conservator of Forests, to act as District Forest Officer East Salem Division, *vice* Mr. P. Venkataramanan, granted leave.

Mr. A. Raju Nayakkar. E. A. C. of Forests, on return from leave, to be District Forest Officer Central Salem Division.

Mr. V. Narayana Ayyar, District Forester, Central Salem Division, on relief by Mr. A. Raju Nayakar, to be District Forest Officer West Vellore Division.

Notifications relating to range officers:

First Circle.

15—8—21

1. M. R. Ry. B. S. Sankara Iyer, Ranger VI grade, Godavari Upper is granted privilege leave for one month with effect from 10th September 1921 or date of relief.

22—8—21.

2. (1) M. R. Ry. B. V. Nagarajan, Ranger III grade, on reinstatement is posted to Upper Godavari division for the charge of the Cherlah Range.

(2) W. E. Timasfieldt, acting Ranger VII grade will revert to his permanent post of Forester I grade with effect from date of relief by No. 1.

26—8—21.

3. M. R. Ry. N. L. Narasimham Pantulu, Ranger IV grade, Kurnool East division, is transferred from the II to I Circle for the charge of the Sarvasidhi Range, Vizagapatam district on relief by Y. Pedalakshamayya Naidu Ranger VI grade transferred from the I to II Circle

27—8—21.

4. In supercession of this office S. O. No. 59 of 21 dated 26—8—1921, M. R. Ry. N. L. Narasimham, Ranger IV grade is posted to the Narasapatam Range of the Vizagapatam District on relief in the Second Circle.

28—8—21.

5. Under Article 260 of the C. S. R. M. R. Ry. Y. Venkataswami Naidu Ranger VII grade, Vizagapatam District, is granted privilege leave for three months with effect from date of relief.

29—9—21.

6. (1) M. R. Ry. I. Ramamurti, Acting Ranger VII grade is transferred from the Vizagapatam to Ganjam district for the charge of the Bontha Range.

(2) M R. Ry. C. T Tiruvengadam Ranger V grade, Ganjam, is granted privilege leave for three months with effect from date of relief by No. 1 under article 260 of the C. S. R.

8—10—21.

7. (1) [Mr. C. R. F. Williams, Assistant Conservator of Forests Lower Godavari is posted to the Rajahmundry Range.]

(2) M. R. Ry. G. Appa Rao, Ranger V grade on relief by Mr. Williams is posted to Ellore Range, Kistna District.

8—10—21.

8. M. R. Ry. P. V Subbaramayya, Ranger IV grade, Kistna District, is granted privilege leave for 4 months and 11 days and furlough on half average salary for one year four months and sixteen days in continuation thereof with effect from date of relief by Ranger G. Appa Rao Naidu.

15—10—21.

9. The privilege leave for one month granted to M. R. Ry. B. S. Sankara Iyer Ranger V grade in this office S. O. No. 53 of 21 dated 15-5-20 is extended by 15 days.

20—10—21.

10. (1) M R. Ry. B. S. Sankara Iyer, Range officer, Marrigudem Range, Godavari Upper, is transferred to Ellore Range, Kistna District to join on expiry of his privilege leave.

(2) The transfer of Ranger M. R. Ry. Appa Rao to Ellore Range, Kistna District ordered in this office S. O. No. 66 of 21 dated 8—10—21 is cancelled.

31—10—21.

11. The transfer of M. R. Ry. B. S. Sankara Iyer, Range officer to Ellore Range, ordered in this office S. O. No. 68 of 21 dated 20-10-21 is cancelled. He should assume charge of Marrigudem Range, Godavari Upper Division.

24—10—21.

12. Under articles 260 and 322-327 of the C. S. R. M. R. Ry. T. E. Varadachari, Ranger IV grade is granted privilege leave for three months and eight days and furlough on full average salary for 22 days in continuation thereof with effect from 24th August.

Second Circle.

3—9—21.

1. The following transfers of Rangers are ordered.

(1) M. R. Ry. N. L. Narasimham Pantulu, Ranger VI grade. Gudem Range, to charge of Narsapatam Range, Vizagapatam District. I Circle.

(2) Ranger Y. Peddalakshmryya Naidu of I Circle to take charge of Gudem Range, Kurnool East Division

8—9—21.

2. (1) Reference:—Chief Conservator's Proceedings Mis. No. 388 dated 1—9—21 reducing on appeal the punishment of removal from service awarded to M. R. Ry. T. Sreenivasa Rao, V Grade, Kurnool West to one of reduction to the bottom of the V. Grade.

(2) M. R. Ry. T. Sreenivasa Chari, Ranger V Grade who has been reinstated on appeal by Chief Conservator is posted to Guntur District To work under the orders of the District Forest Officer Guntur.

8—9—21.

3. Mr. Abdul Hussain Kirmani Sahib, Ranger 4th Grade in charge of Madakasira Range, Anantapur District is reduced to V Grade with effect from 7—9—21.

27—9—21.

4. (1) M. R. Ry. C. Ramasawmi Naidu, Ranger II Grade in charge of Palnad Range of Guntur District is granted privelege leave for 2 months from date of relief.

(2) M. R. Ry T. Sreenivasachari, Ranger V grade now working in Palnad Range is posted to the charge of Palnad Range in relief of No. 1 granted leave or until further orders.

19—10—21.

5. The following postings of Rangers and grant of leave are ordered.

(I) Ranger C. G. Ganapathy on return from leave (21—11—21) is posted to Bookapatnam Range Anantapur District.

(2) Ranger T. K. Ramaswamy Aiyar on relief by No. 1. is posted to Sirvel Range, Kurnool South Division.

(3) Ranger H. Rama Rao on relief by No. 2 is granted privilege leave for two months.

Third Circle.

3—9—21.

1. (1) M. R. Ry. L. R. Narayana Ayyar Ranger III Grade in charge of Odugathur Range, North Vellore District is granted sick leave on Medical certificate for 3 months with effect from 16th August the date of his absence from duty.

(2) M. R. Ry N. Swaminatha Ayyar Ranger I grade in charge of Arcot Range North Vellore District to be in additional charge of Odugathur Range of the same District as a temporary measure.

(3) M R. Ry. S. Vasudeva Reddy Ranger I grade on special duty under the orders of the District Forest Officer, Nellore is posted to the charge of Odugathur Range North Vellore District, in relief of No. 2 to join expeditiously, after relief.

4—9—21.

(1) M. R. Ry. K. Raghuraman probationary Ranger on special duty under the orders of the District Forest Officer South Cudappah District is posted to the charge of Sriperumbubur Range Chingleput District in relief of Mr. H. Mac Bride posted to Chittoor Disdriet.

4—9—21.

(1) M. R. Ry. T. S. Narayanaswami Chetty Ranger VII Grade is granted a further extension of leave without allowances for 2 months in continuation of the leave already granted in this office S. O. No. 61/21 dated 3rd June 1921 and 74/21 dated 1st July 1921.

21—9—21.

4. (1) Mr. J. M. Abraham Ranger IV grade in charge of Vempally Range west Cuddapah District and posted to the additional charge of Sanipaya Range of the same District in this office service order No. 83/21 dated 15—7—21 is permanently transferred to hold charge of the latter Range.

(2) M. R. Ry. C. R. Rajagopalan Ranger VI grade in charge of Sanipaya Range west Cudappah on return from leave granted in this office S. O. No. 83/21 dated 15—7—21 and 94/12—8—21 is posted to the charge of Vempally Range of the same District.

21—9—21.

5. The following transfers are ordered:—

(1) M. R. Ry. D. Krishnaswamiah Probationary Ranger on special Sandal wood duty in Chittoor District, is transferred to West Cuddapah District for a period of two months and posted to the special duty of verification of certain Reserve Boundaries in Kondapuram Range under the orders of the District Forest Officer West Cuddapah District.

24—9—21.

6. The privilege leave for 15 days granted to M. R. Ry. L. Govindaswamy Pillai Ranger VI grade under orders of transfer to the charge of Sriperumbudur Range Chingleput District in this office S. No. 63 dated 6th June 1921 is extended by one month.

27—9—21.

7. M. R. Ry. C R. Rajagopalan Ranger VI grade West Cuddapah District is granted a further extension of privilege leave for 25 days in continuation of the leave already granted to him.

3—10—21.

8. M. R. Ry. T. Paramasivam Pillai Ranger V grade on return from the three months privilege leave granted to him in this office service Order No. 54 of 1921 dated 15—5—21 is posted to the charge of Vempalle Range West Cuddapah District in relief of Mr. J. M. Abraham Ranger IV grade now in additional charge of Saniyappa Range of the same district.

8—10—21.

9. Ref:—Chief Conservator's Proceedings Mis. 435 of 1921 dated 4—10—21.

The following promotions of Rangers are ordered with effect from the 1st of September 1921:—

(1) M. R. Ry. L. R. Narayana Ayyar Ranger North Vellore District from III grade permanent to II grade Sub-protem.

(2) M. R. Ry. K. R Krishna Ayyar Ranger Nellore District from IV grade parmanent to III grade Sub-protem.

(3) M. R Ry. L. Govindaswamy Pillai Ranger Chittoor District from VI grade to V grade Sub-protem.

10—10—21.

10. M. R. Ry. C. R. Rajagopalan Ranger VI grade West Cuddapah District is granted a further extension of Privilege leave for 15 days in continuation of the leave already granted to him.

10—10—21.

11. M R. Ry. T. S. Narayanaswami Chetty Ranger VII on return from extension of privelege leave (on 20th October 21 granted to him in this office S. O. No 103 of 21, is posted for special duty under the orders of the District Forest Officer South Cuddapah District, Cuddapah.

28 10—21.

12. M. R. Ry., L. Govindaswamy Pillai Ranger V grade (Sub—protem) on return from the 1 month and 15 days Privilege Leave granted in this office Service Order Nos. 63 dated 6th June 1921 and 106/21 dated 28th September 1921 is posted to the charge of Vellore Range North Vellore District. This cancels his posting to the charge of Sreeperumbudur Range, Chingelput District ordered in this office Service Order No. 81/21 dated 12th July 1921.

2. M. R. Ry., N. Swaminatha Ayyar Ranger I Grade (Sub—protem on relief by No. 1 is posted to the charge of Sreeperumbudur Range, Chingleput District.

1—11—21.

13. In modification of this office Service Order No. 84/21 dated 21st July 1921, Mr. E. W. Fernandez, Ranger V grade, Chittoor District, is granted Privilege Leave for three months with effect from date of relief (31st July 1921 afternoon).
15—11—21.

14 The 3 months leave on Medical Certificate granted to Ranger M. R. Ry. L. R Narayana Ayyar in this office Service Order No. 101/21 dated 3rd September 1921 is commuted into furlough for 3 months on full average salary under article 322 Civil Service Regulations.

10—11—21.

15 M. R. Ry. T. S. Narayanaswami Chetty Ranger VII grade is granted a further extension of leave without allowances for 2 months with effect from 21st October 1921 in continuation of the leave granted in this office Service Order Nos. 61 of 21 dated 3rd June 1921, 74 of 21 dated 1st July 1921 and 103/21 dated 4th September 1921.

10—11—21.

16. Mr. E. W. Fernandez, Ranger, Chittoor District, will be considered to have been under suspension for 1 month from the date of expiry of his leave and will be reduced from the 5th to the 6th grade for a period of 6 months or until such time as he shows himself fit to be restored.

The period of reduction will begin from the date on which he returns to duty.

10—11—21.

17. Razvi Sahib Ranger IV grade is granted an extension of furlough as follows:—

Furlough on full pay 1 month and 5 days.
,, on half pay 1 month and 25 days in continuation of the leave already granted to him in this office Service Order No. 89 21 dated 7th August 1921

11—11—21.

18 M. R. Ry. K. Raghuraman Probationary Ranger in charge of Sreeperumbudur Range, Chingleput District on relief by M. R. Ry. N. Swaminatha Ayyar is posted for special duty to work under the orders of the District Forest Officer North Vellore District

Fourth Circle.

3—8—21.

1. M. R. Ry. D. Sreenivasa Achar, Ranger IV grade is granted privilege leave from date of relief till 14th October 21 inclusive preparatory to retirement. He has to retire on 15th October 21 under the age-rule.

7—9—21.

2. M. R. Ry S. Nagalingam Pillai Supernumerary Ranger, South Salem Division, is posted to the charge of Vaiyampatti Range of the same Division. vice Ranger D. Srinivasachari granted leave or until further orders.

3 The 6 months combined leave (Privilege leave 4 months and 2 months furlough on medical certificate) from 12—2—1921, granted to M. R. Ry. S. Ramanujam Sesha, Ranger IV in this office Service order Nos. 84-21, dated 22—5—1921 and 124, dated 26—7—1921 is further extended by one month.

11—9—21.

4. (1) M. R. Ry. S. V. Nagalingam Pillai, Supernumerary Ranger, is is posted to the charge of Nammakkal Range, to take charge at once from No 2.

(2) M. R. Ry. S. G. Venkataramana Ayyar Range officer, Namakkal on relief by No. 1 is transferred to Vaiyampatti Range. To proceed soon after relief.

(3) M. R. Ry. D. Srinivasachari, Range officer, Vaiyampatti, relief by No. 2, is to avail leave preparatory to retirement which was sanctioned in Conservator's S. O. No. 137 of 1921, dated 30-8-21.

20—9—21.

5. M. R. Ry. T. V. Govinda Rao, Ranger V grade, on return from leave is posted to east Salem Division on special duty in connection with the verification of boundaries of certain reserves in Harur and Atur Ranges.

30—9—21.

6. M. R. Ry. K. Jayarama ayyar, Ranger VI grade, South Vellore Division is transferred to West Vellore for the charge of Chengam Range vice M. R. Ry. M. Packyanatham Ranger, granted laave.

30—9—21.

7. M. R. Ry. M. Pakyanatham, Ranger II grade in charge of Chengam Range is granted privilege leave on Medical certificate for 6 months from date of relief.

17—10—21.

8. (1) M. R. Ry. P. A. Krishnaswami Mudaliar, Ranger V grade, on Spike duty, North Salem Division, is posted to the charge of Denkanikota Range.

(2) M. R. Ry. S. Nageswara Ayyar, Supernumerary Ranger on Sandalwood operations, North Salem Division, is posted to Spike duty, Vice No. 1.

(3) M. R. Ry. S. Ramalingam, Supernumerary Ranger, East Salem Division, is transferred to North Salem Division for special duty, Vide No. 2.

10—10—21.

9. M. R Ry, R. Thangavelu Pillai, Supernumerary Ranger, is granted privilege leave for 20 days from 24—9—1921. The casual leave already granted, is cancelled.

20 -10—21.

10. Ranger S. Doraiswami Ayyar will be reduced from the 5th grade to the 6th grade for a period of 6 months with effect from 1—11—1921 and will then return to the 22nd place in the 5th grade.

23—10—21.

11. The period of 1 day on 14—10—1921 overstayed by M. R. Ry. R. Thangavelu Pillai, Supernumerary Ranger, is treated as privilege leave in continuation of the leave already granted to him.

6—11—21.

12. M. R. Ry., S. Shanmugakumaru Pillai, Ranger II grade, Central Salem Division, now in Fifth Circle, Coimbatore, will be reduced temporarily by one grade for 6 months and will then return to the place on the list No. 11 in the second grade which he now occupies.

Fifth Circle.

12—9—21.

1. M. R. Ry., S. M. Krishnaswamy Aiyar, Ranger IV grade, Tinnevelly is granted furlough on full average salary for 1 month, from 13—8—1921, in continuation of the 3 months' Privilege leave granted to him in this office S. O. No. 58 and 85 of 1921.

30—9—21.

2. M. R. Ry. P. Ramaswamy Ayyar, Ranger VI grade, is granted privilege leave from 15th July 1921 to 25th September 1921 (both days inclusive.)

30—9—21.

3. Probationary Ranger, P Sankunni Nayar, on special duty in Madura District, is transferred to VI Circle and should proceed at once and report himself for duty before the District Forest Officer, North Manglore.

14—10—21

4. Reference:— Madura District Forest Officer's No. 1632—C, 1921 dated 1st October 1921 submitting for approval s.o. granting extension of Privilege leave for 1 month, from 1—10—1921, to M. R. Ry, P. Sankunni Nayar, Probationery Ranger.

Approved.

14—10—21.

5. Mr. K. Chaikku, Ranger VII grade, is granted furlough on half pay for 1 month, from 27—9—1921, in continuation of the Privilege leave for 3 weeks, already granted to him, from 6th September 1921.

23—10—21.

6. The privilege leave from 15th July 1921 to 25th September '21 granted to M. R. Ry. P. Ramaswamy Aiyar, Ranger, VI grade, Madura District in this office S. O. No. 101 of 1921, dated 30th September '21 is extended by one day.

2—11—21.

7. M. R. Ry. T. V. Thayumman Mudaliar, Ranger, VII grade, is granted combined leave for 4 months and 3 days, from 12th June 1921 (Privilege leave for 4 months and 1 day and furlough on full pay for 2 days).

The furlough on half pay granted to Mr. K. Chakku, Ranger, VII grade, South Coimbatore Division in this office S. O. 105 of 1921, dated 14th October 1921, is extended by 5 days.

Sixth Circle. *Leave.*

8—8—21.

1. Mr J. A. Aranha Ranger I Grade is granted Combined leave from 19—11—21, privilege leave for 3 months and furlough on average salary for one month and 18 days.

2. M. R. Ry. K. L Govindakrishna Ayyar, Ranger VI grade is granted privilege leave for 2 months with effect from 1st July 1921.

25—8—21.

3. The furlough on medical certificate for 1 month from 9—5—21 granted to Ranger, Karunakaram Nambiar by the District Forest officer, S. Mangalore in this office S. O. No. 49,21 dated 7—6—21 is extended by 5 days ordinary furlough.

27—8—21.

4. M. R. Ry. K. Appiah, Ranger VII grade and sub protem VI Grade is granted, under article 260. C. S. R. privilege leave for 2 months from 1st September 1921.

1—9—21.

5. (1) Mr. B Coates, Ranger, VI Grade is considerd to have been on privilege leave for 1 month and 2 days under article 260. C. S. R. with effect from 13 th June 1921.
(2.) Wynaad District Forest officer's S. O. No. 82 dated 27—5—21 granting him 1 month's leave is cancelled.

3—9—21.

6. The 3 month's privilege leave from 29—11—20 granted to M. R. Ry N. Gopalan Nair, Ranger VII grade in the V Circle Conservator's S. O. No 10,21 dated 12—1—21 is extended by 17 days.

13—9—21.

7. Ranger K. R Krishnan Nair will be considered as having been on speciel duty at Nilambur from 27th to 29th July 1920.

27—9—21.

8 In modification of S. O No. 42,21 dated 8—8—21 M. R. Ry. K. L. Govindakrishna Ayyar, Ranger VI grade is granted Combined leave for 8 months from 1—7—1921, ie privilege leave for 2 months and 13 days & furlongh on average salary for 5 months and 17 days.

3—11—21.

9. The privilege leave for two months granted to M R. Ry. S. V. Dorai. swami Ayyar Supernumerary Ranger in this office S. O. No. 23,21 dated 6—5—21is extended by 15 days.

8—11—21.

10. The privilege leave for 2 months from 16—9—21 granted to M. R. Ry, K. Appiah, Ranger, VI Grade Sub protem in this office S. O. No.46,21 dated 27—8—21 is extended by 1 month and 9 days with permission toaffix the Christmas holidays.

Postings and transfers of Rangers.

12—8—21.

11. M. R. Ry. M. N. Raman Pillai, Ranger, V grade, Palghat division is posted to Nilambur division as assistant Ranger in one of the Ranges To join on relief.

30—8—21.

12. Probationary Ranger Doraiswami Ayyar is posted to Ootacamund Range, as a temporary measure *Vice* K. Appiah granted leave to Join at once.

30—9—21

13. M. R Ry. A. P. Sreenivasa Ayyangar, Ranger IV grade N. Mangalore is transferred to the V Circle, Madura District, to report himself to the District Forest officer for orders.

2. Probationary Ranger, P. Sankunni Nair, is posted to N. Mangalore He will Join duty on expire of a months privilege leave which he has avayiled himself of from 1—9—1921.

6—11—21.

14. The following transfers of Rangers are ordered,

(1) Mr. B Coates, Ranger VI grade, from Begur Range to Uppinangadi Range. To work under the Range officer To Join on relief.

(2) M R. Ry. M. N. Raman Pillai, Ranger IV Grade sub protem to charge of Begur Range. To Join at once.

(3) Mr. J. S. Rowland, Ranger, IV grade from Nilambur Range to charge of Kannoth Range. To Join at once.

(4) M. R. Ry. P. Kannan, supernumerary Ranger, to on special duty in Begur Range. To Join on relief.

12—11—21

15. The following transfers of Rangers or ordered.

(1) M. R. Ry. K Karunakaran Nambiar, Ranger IV grade on Research duty Nilambur to special duty in Palghat division.

M. R. Ry. A. G. Jesudasan Pillai, Ranger, V Grade to Mangalore Range on return from leave.

12—11—21.

16. M. R. Ry. C. Vasu, Ranger, VI Grade, on special duty, Nilambur Range to charge of Mangalore Range. To Join at once.

Promotions of Rangers.

17. Chief Conservator's proceedings Mis No. 435 dated 4—10—21.

The following appointments and promotions of Rangers are ordered with effect from 1st Sept 1921 in existing vacancies.

To II Grade sub protem

M. R. Ry. A. Swamikutht, Ranger III grade.

To III Grade sub protem.

M. R. Ry. K. R. Krishna Nair Ranger IV Grade.

To IV Grade sub protem.

Messrs. H. Myers, & M. N. Raman Pillai, Rangers V Grade.

Advertisements.

The following is a list of timber species required for the Gass Museum. Such of them as are procurable may be sent to the Principal ***together with botanical specimens pertaining to each species and a sample of bark about 8" square.***

The long panels should be as broad as available, 6 ft long and 3" thick. The short panels 2 ft long and 1" thick (breadth, maximum available.)

Aglaia Roxburghiana	Gluta travancorica
Albizzia procera	Grewia asiatica
Albizzia stipulata	Hardwickia binata
Acacia dealbata	Hydnocarpus Wightiana
Acrocarpus fraxinifolius	Hereteria papilio
Chickrassia tabularis	Litsaea zeylanica
Carallia integerrima	Machilus macrantha
Dillenia indica	Michelia Champaca
Diospyros tomentosa	Premna tomentosa
Diospyros paniculata	Sterculia fœtida
Diospyros ebenum	Sterculia villosa
Dalbergia sissoo	Sterculia guttata
Erythroxylon monogynum	Stereospermum chelonoides
Gmelina arborea	Tetrameles nudiflora

* * *

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 1878 - 78
2. Volume 6 for 1880 - 81.
3. Volume 14 for 1888 - January, February, March, April September, October, and December numbers.
4. Volume 15, 16, for 1889 and 1890.
5. Volume 18 for 1892 August, September, October, November
6. Volume 19 for 1893 February number.
7. Volume 20 for 1894 July and August numbers.
8. Volume 21 for 1895.
9. Volume 24 for 1898 March and April numbers.
10. Volume 25 for 1899 April, May, June and August, September, October and December numbers.
11. Volume 26 for 1900 August number.
12. Volume 39 for year 1913 - January, April, September and October Nos.
13. Volume 44 for the year 1918 - March number.

* * *

Wanted :

No. 228, Volume XII of the Standard History of the War and eight copies Gamble's "Manual of Indian Timber" Apply stating Edition, Price, Condition etc. to :

PRINCIPAL, MADRAS FOREST COLLEGE,
Lawley Road P. O. Coimbatore.

The Principal will be glad to receive trophies for the Gass Museum either as a permanent gift, or, on loan for not less than 18 months ; also any old records, maps, etc. of historical interest to the Department, for the College Library.

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The Madras Forest College Magazine.

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THE

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The Teak Tree.

TECTONA GRANDIS, LINN. (VERBENACEAE.)

(Third essay for the Indian Forester Prize for students of 1919-1921 Division.)—K. Venkatesan.

***Distribution*:—**

THERE are two areas (1) Peninsular area and (2) Burma area. In peninsular area it extends north as far as the Narbada and Mahanadi and occurs scarcely in Orissa and Northern circars. It is seen abundant in the Chanda district of Central provinces, North Canara, Bombay, Wynad forests in Benni and Mudumalia, North malabar division, Anamala hills and Travancore. It also occurs in the Godavary district near Badrachalam and agency tracts. It is also seen in the Nallamalais of Kurnool and Cuddapah but the growth is not

good as in other places It is also found in Mysore. In Burma it is found in Siam and Java

Vertical distribution :— In western India it is found about 200 ft. elevation, for instance at Nilambur. In the Anamalais up to 2500 ft In Wynad and Burma it ascends up to 3000 ft, but at this latter height the trees are stunted.

Localities : —

(*a*) *Climate:* – Teak does not stand frost but it thrives at temperatures ranging from 60° to 87° with a mean temperature of between 72° and 81° F. H. It requires about 50 inches rainfall in the year and grows well with a considerably heavier rainfall.

(*b*) *Soil*:— The soils best suited to Teak are a rich, red, sandy clay mixed with stones or a dark alluvial sand. Teak will not grow well if the drainage is bad as on stiff laterite. If flooded for many days at a time the trees will sicken and die. Teak is a light demander and can not grow in close proximity with other trees nor can it bear to be over topped or crowded by them and the over drip. Hence its absence from ever green forests.

The best soil for Teak plantation is a sandy clay on the banks of a stream, the ground should slope gently towards the stream. If too steep the soil on the top of the Hill is apt to be different There are other soils, such as a brown surface soil with rather a retentive sub soil of yellow clay. In such a place Teak grows well.

When inexperienced people see Teak that has been cut over and throwing up large shoots with large leaves, they imagine once that the soil and climate are suitable for teak and that some primeval forest of teak once existed and had been utterly

destroyed. The truth being that both soil and climate were incapable of producing good teak and at the best stunted specimens grew there which never contained 5 cubic feet of marketable Timber.

A notable example may be found near Musna gudi, at the foot of the Segoor Ghat, many teak trees are seen bordering the road with leaves as large as finest trees have never produced and never will produce 5 cubic feet of good Timber Yet 10 miles west as the crow flies fine teak will be found, so great an alternation of climate does 10 miles produce in this locality, whereas 10 miles further in other places may not produce any change whatsoever.

At Nilambur it is remarkable to see how enormous is the growth of the trees on the river bank and how the size gradually receded to one third on the top of the low hills especially where laterite cropped out on the surface showing of what vital importance is good soil to a teak plantation.

The usual soil in Wynad is a very dark brown surface soil with rather a dark yellow sub soil. In this teak grows well.

Teak can not be grown in amongst bamboos nor indeed in any other forest trees. It is a fallacy to suppose otherwise and whenever the contrary has been observed, it is due to the fact that the trees were established there before the bamboos appeared.

Shape and developement:— The teak has little tendency to branch low down. It usually has a fairly clean, straight bole surmounted by a large crown. The young sapling has a very strong terminal shoot, enabling it to pierce over-head cover to obtain light. It grows very fast when young. The mode of growth of the teak tree depends very much on its situation, such as at Nilambur, for

instance, where the climate is exceedingly forcing, the trees are drawn up to a very great height. At forty years of age, being something like 106 ft. high, after which age their vertical growth is slow and the boles begin to fill out. In Wynad owing to the difference of climate the growth is much slower, probably not quite two-thirds of the above rate. In the Anamallais the growth is between that of Nilambur and Wynad and at the same time the trees attain a gigantic height. In 1914 one teak tree felled, about 22 ft. 7 inches in girth at breast height with an age of 601 years and its yeild was estimated about 1200 c. ft of Timber.

Reproduction:— Teak flowers during rains and the fruit ripens in the following cold wether and falls on the ground on the following hot wether when the tree is leafless. The fruit is a hard nut covered with a papery cover with hairs. It contains two or three fertile ovaries. The early showers of rain are very essential for germination an account of alternating wetting and heating. The seeds keep vitality for a long time, sometimes 3 years. Germination succeeds well if the seed gets sufficient warmth and moisture to rot the corkey outer covering and enable to open the hard-nut. The seed splits in at two or three places and through these cracks the radicle comes out and after the radicle grows deep into the ground the walls fall off and the centre hard part remains in the ground; when the seedlings are come up in the forest they must be weeded throughout the rains and following year in succession. Unless direct light is given over head the seedlings can not develop and die off or remain stunted.

Teak coppices vigorously up to a considerable age.

Character and Composition:—In the natural state teak rarely shows any tendency to grow in a pure crop. It forms only a small

percentage of the stock of the deciduous forests in which it is most commonly found. It is generally found in company with Rose-wood, Pterocarpus marsupium, Schleichera Trijuga, Xylia, Terminalia tomentosa and belerica, Gmelina arborea, Bridilea retusa, Adina cordifolia, Styphegyne parvifolia and Bamboos.

In one of our tours this year I measured the sample plot laid out by the Madras Forest College students at Waliyar and found the perecentage of teak to be 68, per acre comparing only with the two species (1) Rose-wood and (2) Pterocarpus Marsupium.

Methods of Treatement:—Teak when grown pure like the plantations of Nilambur offers little difficulty to be worked over The best method suited for such plantations is clear felling and restocking the area artificially by transplantings. When it is mixed with other species and where the greater part of the crop is unsaleable the only method that can be practicably worked is Selection method combined with concentrated regeneration fellings.

Girdling:— Girdling is the real cause of teak being brittle and devoid of oil, for if the sap descends by the capillary tubes so does the oil. That if a tree is felled and lies horizontally for years the oil does not escape but the sap is evaporated out. It has been a well known fact that Malabar teak is superior to Burma. The chief reasons being that Malabar teak has retained its oil, whereas Burma teak had lost it.

Sowings and Plantings:— The seeds should be collected from trees with a clear stem free from decay and of vigorous growth. February is the best month to collect in.

(*a*) *Preparation of Nursery beds*:— Select good free soil and dig 12 inches deep, removing weeds, roots, and stones The

soil should be reduced to a fine powder and the nursery levelled Then prepare beds 2½ ft × 12 ft with one foot space between each bed and its fellows. Sowing must be done from 10th to 15th April. Before sowing steep the seed for 48 hours in water. After sowing the beds must be watered daily copiously. Then the seeds will germinate in from 10 to 15 days or 20 days or more according to the freeness of the soil. Watering may be lessened as the plant strengthens but sufficient moisture must be maintained till the monsoon sets in; when the plants will be from 4 to 8 inches high they will be ready for planting The site for planting should be selected and all the tree growth thereon should be clear felled After removing the timber if any all the debris must be burnt off. After the soil is softened by rains, line and mark off the pits. The required distance apart from 6 to 7 feet answers well and the pits dug 10 to 12 inches Cube and filled in as dug with earth slightly raised around tops.

(*b*) *Planting*:— The seedling should be put well down in the pit taking care the tap root is not twisted and turned up. Planting should be done after the soil is well saturated with rain First week of July is the best season; plantations at Nilambur are the instance of how plantations of this species may be raised successfully.

Injuries to which it is liable:— Teak has some enemies in addition to fire. Sometimes mealy bug attacks the tap root when the seedlings are in the nursery bed. The cure is plenty of ashes in the beds. Elephants sometimes destroy the trees by walking through a plantation. Sambar also, rubbing the horns against the young trees do considerable damage. Monkeys jumping from tree to tree break the tops. Much loss is caused by wind-storms which snap off the finest trees especially just

after the thinnings of a plantation. Teaks suffers very badly from defoliation by two kinds of defoliators called:

(1) Hybloea peura (2) Pyrausta Macharalis. The first one eats all the lamina and leaves only the mid-rib The second one skeletonizes the whole leaf. Teak saplings and poles suffer from borers. The caterpillar of a Moth, Cassus cadamboe, bores a hole into the stem generally within a foot of the ground and then tunnels downwards. I was shown one of this sort at Kargudi last year while on excursion with my Imperial Instructor. The only remedy is to cut back the pole down and let it throw up a new shoot.

Part II Utilisation.

Indentification of tree:— Teak is a large deciduous tree often fluted near the base Bark thin fibrous, light brown or grey, peeling off in long thin strips Branchlets quadrangular and deeply channelled with a large white pith Leaves opposite decussate, simple, ovate-elliptic or obovate, entire, thickly coriaceous and rough above. Inflorescence a large di-or tri-chotomously branched cyme bearing bractiate terminal panicles 2-3 ft. long. Flowers regular and sweet scented.

Identification of timber:— Heart wood is strongly scented when freshly cut and dark golden yellow, turning dark brown afterwards Annual rings distinct Medullary rays moderately broad and fairly numerous.

Utility of timber:—Weight 45 lbs. and P. 600. The uses of teak are innumerable, for there is hardly any purpose for which timber is employed to which it can not be put. One of the most valuable qualities of the wood is that once seasoned it does not split, crack,

shrink warp or alter its shape. It works easily and takes a good polish and is of handsome appearance. But its principal value is its great durability which is due to the essential oil it contains which prevents white ants from attacking it. For house building purposes it is unsurpassed. It is more largely used than any other wood, for ship-building as the oil does not allow the iron bolts to take rust.

"AN ATTEMPT."

Forest Life in India *(continued)*

IV Elephant Capturing.

(Reprinted from 'The Varsity' May 27, 1913.)

The most humane and at the same time least expensive method of catching elephants is by digging pits for them. This is the method we always adopt. The pits are arranged in groups, round the junctions of the big elephant paths These are fairly numerous in elephant jungle and are very well marked. The usual method is to arrange them in triangles round each path a little way from the junction. At the apex of the triangle one pit is placed, and this is close to the path, but not on it, as to disturb the growth actually on the path would indubitably arouse the elephants' suspicions. At each end of the base of the triangle and about 5 yards to 10 yards on each side of the path another pit is placed The pit is 12 ft. to 15 ft. deep, and about 12 ft. square, and is filled up with brushwood to a height of 6 ft. from the bottom so as to break the fall of the elephant. It is covered over with thin bamboo laths and a light sprinkling of earth and then grass or bamboo leaves or whatever material is present on the ground in the vicinity.

This covering has to be renewed daily, as it dies and turns a different colour to the rest of the ground covering, or gets blown away. If the pits don't look natural the elephants become suspicious at once and they are very cautious. When they think there is any need for care—as for instance when going down a steep hill or when walking over a bridge or crossing a river full of loose boulders—they never take their next foot off the ground till the one already raised has found a firm foothold, and they never have less than three feet on the ground at once. In fact, their one pace is a walk, though when they want to they can walk faster than an average man can run. So it is necessary to have the pit covering very fresh and carefully laid, and for this purpose, to every twenty pits or so, a forest guard is told off, and under him one or two 'pit watchers' work. It is the duty of this 'pit' guard and his watchers to go round his pits every morning and every evening to see if there has been a fall, and if so to report it at once so that the capture may be taken without loss of time—and also to arrange and renew the covering of the pit.

The District Forest Officer inspects the pit when he is touring in the neighbourhood, and only last year one of the more senior of the 'D. F. O's' in the province had rather an amusing experience while on this work. He was inspecting his pits and was dissatisfied with the condition of the covering and was explaining that it would not do at all; that elephants were by no means fools; and that even if they were they couldn't be expected to fall into such ill concealed traps. Then he moved off to see some more, and...fell straight into one of the pits he had just been cursing! However, the brushwood bed was in its place and he broke no bones.

When an elephant "falls" it immediately sets up a trumpeting and squealing that can be heard for a mile or more, and often the whole herd joins in. If any one is near enough to hear this, word is immediately sent for the tame elephants, and five or six of the best are marched off to the scene of action at once But even if no one hears the noise they make after the fall, the pit guard will report it at latest within twelve hours after it has taken place, so that no unfortunate animal can be left for long in what must be rather a terrifying position. Directly the fall is reported, then the tame elephants with their mahouts and cavadies are marched off by the Deputy Ranger who is in charge of them to the pits where the "fall" has occurred. They take with them the necessary ropes—which are made of twisted fibre and are specially prepared by the elephant men and kept in readiness—and chains, as well as axes, spades etc. Some twenty or thirty coolies are also taken, and directly the scene of action is reached these latter fall to work felling trees and cutting them up into billets about 2 ft to 3 ft in length; these are thrown into the pit until it is nearly full, thus gradually raising the elephant, who climbs up on to the pile as it grows and tramples it down to one level When he can get his forefeet well on the edge of the pit he can scramble out, so a little before this state has been reached the filling up of the pit is stayed until the elephant is properly 'roped' All this time the roping has been going on, and other coolies have been carrying water in large bamboos and pouring it on the captive, as it is continually fighting to get out of the horrible trap intowhich it has fallen, and to, kil, the billets which are thrown in, and it gets very hot and tired, Pouring

water on its head and back is very refreshing to it, and sometimes soothes it and keeps it quiet for some minutes.

The 'roping' is the difficult part, and with a troublesome elephant this process may take three or four hours. Frist the neck-rope has to be fixed. For this purpose the height of the capture in the pit is measured as this is approximately the size of its neck, and a peg is spliced in to the rope at this point and a slip-knot tied above the peg. This slip-knot is then held horizontally over the pit on four bamboo hooks, and the elephant is enticed into putting up his trunk through it by dangling a handkerchief or bit of white cloth over it to attract its attention; it invariably reaches up its trunk to seize and destroy the bit of cloth, and the slip-knot is then run down its trunk and over its head and pulled tight. The peg which has been spliced into the rope prevents it from slipping too far and strangling the elephant, to fix it firmly and prevent its slipping back again it has now to be tied in place with string, and this is the dangerous part of the business, The most senior mahout usually does the work, and to him the biggest reward is given afterwards. He has to be down and lean over the edge of the pit to tie the slip-knot firmly with string, while the elephant is naturally fighting, like a devil gone mad, to get rid of the horrible strangling thing that has twined itself round its neck. It seizes the rope in its trunk and pulls part of it into the pit and tramples on it; it gets it against the side of the pit and charges it like a living batterping-ram; and occasionally it manages to pull it off when the whole process has to be gone through again, If, however it does not get rid of the rope after some five or ten minutes' strenuous

fighting and stands still, then water is poured on its head from above, the rope is gradually pulled up taut again, and the mahout leans down and with deft fingers ties the strings to keep the knot in place, while his relations—mere friends are not sufficiently trustworthy—hold him by his loincloth, ready to pull him back with a jerk if the elephant sees him and tries to catch hold of him, and others stand with sharpened bamboos ready to prod its trunk if it makes such an attempt. When at last this knot has been firmly tied another rope has to be fixed to one of its hind legs. This is usually not so difficult, as the elephant has by now got tired and sulky—as well it might. The leg rope is a tapering one, and it is tied to a bit of cord, and this to a bit of string. This is passed round the elephant's leg in the following way: it has a loop tied at the end of it, and it is fixed in a thin cleft bamboo by which it is pushed down into the pit and passed behind the elephant's leg while he is standing sulking in a corner of the pit—but, if possible without touching him. Another bamboo with a hook in it is then used to look the loop in the string, and it is pulled up rapidly, pulling the cord and then the rope up through the elephant's legs. Then a slip-knot is tied and pulled tight, and this is worked down the elephant's leg, by pushing it with sticks, till it reaches the ankle; its foot is then lifted up as high as possible, and, while the elephant is held still by the rope round its neck the mahout again leans over the edge of the pit and ties the knot in place with string. The roping is now complete. The two biggest tame elephants are brought forward and one of the ropes is passed round the body of each and fastened, and the pit is finally filled up with billets. The captured animal scrambles out at the first opportunity and

makes a rush for the jungle, only to be pulled up with a jerk when it reaches the end of the rope; it makes a dash, in the opposite direction, but is again stopped by the other rope. Then two more tame elephants are marched up, one on each side of the capture, and they reason with him and prod him and push him on, and so they more off in procession in the direction of the nearest Kraal. This is an enclosure about 20ft by 20ft built very strongly of good stout young trees, and well floored and drained, and here the newly-captured elephant has to remain until it is tame. It is well fed and supplied with plenty of water, and its mahout, who is appointed at once, is always with it. Tame elephants are continually wandering about near it, working, feeding, and bringing in new supplies of fodder for their captured friend; and it is not long before the prisoner is sufficiently tame to feed from its mohout's hand, then for him to go inside the Kraal with it, and finally to have chains-for hobbling-attached to its ankles, and to be brought out under the escort of one or two tame elephants for exercise and for grazing. The length of time during which an elephant has to be kept in durance vile varies greatly. It is usually not more than five or six weeks, but may be as much as three months The older elephants or the very young ones are the easiest to tame, the half grown ones usually the most difficult. When they are brought out they are taught first to come when called; then to follow their mahout, to pick up a stick, a leaf or anything they are told to; then to kneel down, which is usually a difficult matter, and finally they are broken to harness and are taught to pull and lift logs and to perform their various other duties.

Great care is taken with the elephants of the Forest Department to see that they are taught by kindness and not by fear. Punishment is occassionally necessary-as is also the case with children and school - boys—but it is very rarely allowed; and ill-treatment, if discovered is visited with direst punishment. If an elephant s savage it is, as likely as not due to cruelty when it was first captured or afterwards when in working I have known a savage animal whose mahout used to beat it, become quiet and friendly within a few months of being under a good man who treated it well. When they have once been tamed they have a very happy life, provided the District Forest Officer takes the trouble to see that they are well treated ; they have plenty to eat and not very much work, and I have never known a case of one of them permanently rejoining a wil herd.

CHOKRA,

Lumbering in the Madras Presidency,

By O. S. Martin, Consulting Forest Engineer to Indian Government

(SPECIAL CORRESPONDENCE TO THE *Timberman*)

The timbered area in Madras under forest Department control amounts to 19,615 square miles. Besides this, there are many thou-

sand square miles of forest privately owned which are either deteriorating rapidly under working for immediate profits only, or cannot be worked at all, due to lack of any organised transport system

The Madras forests are in many cases very fine bodies of timber, often extending for many thousand acres of unbroken forest. One such tract, known as the Agency Tract, consists of over 400,000 acres of solid forest.

The stand varies from about 10 tons of merchantable timber to the acre to over 200 tons to the acre, making in many instances the finest sort of logging chance

The more important timbers at present are teak, sal, Mesua or ironwood, Hopea, poon, Bombax, and many others less well known. Among less known species is one which will eventually be recognised as one of the world's finest timbers. This is Gluta, which grows to a large size and is found in very considerable quantities in the Tinnevelly district. This wood is of a much richer colour than mahogany, works easily and has the lasting qualities of cedar—truly a beautiful wood which will be in great demand when a steady and dependable supply is arranged for, and when it becomes known in continental markets There are also rosewood, ebony and sandalwood, for which there is a great demand, but which occur in relatively small quantities and sizes and are not classed as a rule, among the timber trees. Sandalwood sold last year in some of the public auctions at over $ 500 per ton of 310 feet B. M.

Profits Deemed Incidental.

In the past the energies of the Government have been exerted in the conservation and organisation of this large timber resource. While the profits received from the management of these forests have returned

a large profit to Government after all the expenses of administration and management have been met, this profit has been to a large extent incidental rather than fundamental The supply of firewood to the surrounding country has been of greater economic importance than have the strictly lumbering operations.

This stage is passing however, and the sudden and imperative demands which grew out of the war have awakened thinking men to the pressing need of developing these natural resources to a point where the state can realise on the potential value of these holdings while constantly improving and enlarging on their productivity

While treated sleepers, box shook and Swedish pine are now imported in considerable quantities at competitive rates, there are large reserves of even better woods for the same uses lying within 30 to 50 miles of existing railways All that is needed is organisation and organised transportation to make these large supplies available. India is now severely crippled in a business way by the large perponderance of imports over exports As far as timber and timber products are concerned, she can well tip the balance the otherway. It all depends on the far-sightedness and ability for clear thinking shown by the members of the new legislative Assemblies. The future of the country lies in their hands. They have the opportunity to prove to the world their capability of directing the destinies of a great country, as no policy of development can succeed without their hearty and intelligent support

Logging Operations at Dhoni.

Aside from the out-turn of logs from the Nilambur teak plantations and the product of the new Government-owned saw mill at Russelkonda, the only logging operation of any size is that at Dhoni, near Coimbatore. Here a purely logging operation has been started, using

current methods of exploitation, and due to the energy and ability of the men in charge of the work has proved successful. By the end of the second year it will have paid back to the Government all the invested capital with interest. Were the methods employed suitable for continuing the work beyond local areas, there would not be so much interest displayed in more modern appliances and organisation As its proposed to carry on this production over an area 70,000 acres, in extent, much of which lies in what has always been regarded as absolutely inaccessible country, the Government has asked for a plan by which the entire area may be profitably worked. We will take up later, however, and explain current methods of logging, which may be of interest to readers of *The Timberman*.

The trees are felled with native axes, the fallers hacking around the trees at any convenient point until it toppies over. No effort is made to direct the fall and as much of the timber is very large, with crowns, the resulting breakage and damage to smaller trees is very large.

Next the trees are chopped into logs with axes, a slow and wasteful paocess, which is further enhanced by cutting back the end of each log about 18 feet in a sort of egg shape to facilitate dragging. Drag notches are also cut into the log in which to attach a chain for hauling. This wastes at least a foot of the log.

Dragging Logs by man power.

We next have from 10 to 20 nearly naked coolies who appear armed with sticks to use as levers, and a manila rope which is inserted in the drag hole. The log is now supposed to move to the drag path through a process of chanting, and shouting, the leader giving the verse, the gang coming in strong for the chorus Thus translate

freely it would go something like this "She is hung on a root" Gang: "Heave, ho" "Try it again." "Heave, ho." "Pull hard you beggars." "Heave ho," etc, Meanwhile should the log be pretty firmly held up, the process continues, no one worrying much whether it is moving or not. Why worry? Every one is working hard and quite happily. I suppose that the average speed of this process is about one foot advance every five minutes. But please note that eventually the log reaches the drag path and all is well

Then comes the elephant or the patient buffaloes, which drag the log to the top of the nearest slide or chute, down which it goes to another drag path

Eventually by this process it reaches the lower log depot, where it is slang on two-wheeled bullock carts which take it to the railway depot, five miles away. Here it is loaded on railway wagons by the use of a hand crane, and proceeds to the Kolar Gold Fields, which contract for the entire log out-turn of the operation.

The annual possibility of this logging unit is about 10,000 tons per annum or 3250 M feet per year.

Machinery to be employed.

In order to increase out-turn and cheapen production it is proposed to use one or more yarders, eventually one road donkey, Holt caterpillars for dragging, and a heavy-duty road tractor for the longer hauls. In course of time it is hoped to have a meter guage railway to the foot of the hills, which will further cheapen transportation charges

The prospects for a long-time operation with constantly increasing out-turn and with desirable profits, are very bright, and it is hoped to get the project under way as soon as an organisation can be developed to handle it.

This same story could be repeated all over the province, and when the total possibilities are summed up we get some almost incredible figures as to the future value of these forests to the presidency.

Minor Species to find market.

I can see the finer timbers sold in world markets as Madras products, the teak, sal and Mesua now relied upon by the railways for sleepers. supplemented by many other species of which we know little at present but which under treatment will serve equally well, releasing the teak and sal for other uses The other species now known as jungle woods, will be made into three-ply boxes, pulp and other minor products Water power will be developed and a large number of new wood working industries will spring up. The whole prosperity of the country will be enhanced and a new example given the world as to what is possible under forest management which is resolved to develop its utilisation possibilities to their fullest scope

To accomplish this we will need modern saw-mills equipped with kilns and treating plants; an organisation developed for the handling of the timber, with Indians trained for this special line of work as they are now trained in sylviculture; a development of markets by advertising our woods and insuring a regular and dispendable supply; an experiment station where the seasoning and treating of Madras woods can be taken up and commercial problems worked out in co-operation with the business community; and last but not least, a widespread educational campaign to make the people familar with what we are doing what we expect to accomplish, and with the steadily increasing benefits occuring to the ordinary citizen through these activities.

And I must say that taking into full account all discouragements and disappointments, I believe that all these things will come to pass and that Madras will take her place as among the progressive, enlightened peoples of modern times.— —*The Timberman.*

Forest Utilization in North India.

(a) Wood Working Institute, Bareilly

1. In Bareilly is an experimental wood-working Institute which was originally purely educational, but has now greatly developed, and combines education with what is really neither more nor less than research work.

It consists of a small saw-mill, the outturn of which feeds the other concerns; a factory for solid turnery, for the manufacture of parts of furniture, tool handles, brush backs, boot lasts, etc., for which there is a big demand; another factory for the manufacture of bobbins suitable for the cotton and jute mills of Bombay and Calcutta; and two Tieman Kilns, for the artificial seasoning of timber, which have recently been installed, and of which one is already working.

2. The value of the Institute is very great, and its objects are threefold:—

In the first place, it is a training ground, where expert cabinet makers, carpenters, and machanists are educated Some 200 are continually employed and a considerable number of these complete their training every year, and get excellent positions on good pay varying from about Rs. 90 up to Rs. 250 or more per mensem As the great majority of the students come from the poorer classes the social and industrial benefit to the Province generally is obviously considerable.

In the second place, the fact of training such a large number of men in wood working industries, who all learn, and greatly appreciate the value of the local timbers, in itself creates an ever-widening demand for those timbers, and so contributes to the prosperity of the country as a whole.

And thirdly, experimental work done on various timbers is of the greatest and most far reaching importance – an importance that is, at present, little realised even in the Province itself To mention but two of the valuable results obtained:—The timbers, *Adina cordifolia* and *Anogeissus latifolia* have been shown by the experimental work done at the Institute, and at Clutterbuckganj to be especially suitable for the manufacture of bobbins and tool handles respectively. A big demand for both the timbers has arisen and the prices now paid for these woods is far higher than it was before. As regards *Anogeissus latifolia* the tool handles manufactured have been sent far afield, to Australia, England, and other countries, and the timber has been tested by experts, and certified to be considerably stronger than English Ash

3. Such experiments are continually in progress at the Institute, and suitable uses are being found for various little known or little valued timbers These experiments include the testing and trying of such woods for dry and wet cask making, for the making of cotton reels, tool handles, toys and various types of timbers to varying degrees of humidity, which is now being taken up for the first time.

4. Apart from these indirect benefits, the value of which, however great, cannot be expressed in figures, certain branches of the Institute are actually run at a financial profit. For instance the profits on the Turnery, even on the small uncommercial scale which is possible in an experimental establishment of this sort, have, this year, amounted to 31% on the capital expenditure.

(b) Clutterbuckganj.

5 At Clutterbuckganj, 5 miles outside Bareilly are established the big saw mills, bobbin, and solid turnery factory, which form part of the United Provinces Utilization Circle.

6 The rosin and Turpentine factory has been established for some years, and has only comparatively recently been transferred to its present position. It produces a very handsome annual net revenue for Government, which is now well over two lakhs, and appears to be increasing with fair regularity.

While on this subject it will not be out of place to quote the figures for the Punjab Rosin Factory at Jallo. In 1919-20 a net revenue of Rs. 398, 350/ was made, equivalent to a rate of interest of *396%*. In 1920-21, owing to the general trade depression, it showed profits amounting to only 164.9 %!

7. To return to Clutterbuckganj, the saw mill was erected under great difficulties, largely as a war-measure, at a time when expert supervision was of course unobtainable. The machinery is, therefore, not of the latest type, and the lay-out might be, – and probably very shortly will be, – improved.

Moreover, the demand to meet which it was erected, namely, that of box planking, to be sawn largely from Chir Pine Sleepers for the Munitions Board, is now no longer existant, and the general demand for this material is not yet fully developed. Had war conditions continued for a short time longer than they did the whole capital cost of the mill would have been paid off. As it is, it requires bringing up to date and altering in one or two details so as to meet existing conditions when it will with little doubt become a very paying concern.

At present, though it is actually run at a loss it serves the purpose of feeding the bobbin, and solid turnery factory. This latter has been only recently fully staffed with the necessary expert supervision and is showing marked progress. If required the papers regarding the engagement of these experts, *on commercial terms*, can be obtained

from the Inspector General of Forests or the Government of India. Owing to initial mistakes, hardly altogether avoidable at the commencement of a big enterprise of this kind, material was put on the market which was not up to standard, and not exactly what was required.

8. These mistakes have now been rectified and the outturn is of the very highest class obtainable, and ready markets are opening up in Calcutta and Bombay which will easily absorb the whole outturn of the factory, and still remain unsatisfied. The mill Manager informed me that the present working justifies the expectation that within two years from now, the saw mill will be showing no deficit and the Turnery and bobbin factory, which it feeds, will be showing a profit of not less than 25 % net. This can hardly be considered as otherwise than very satisfactory.

As soon as the financial position of Government allows of their making certain proposed alterations in the lay out and equipment of the saw mill that too will without doubt be run at a considerable profit.

9. However, apart from the purely financial aspect, the works at Clutterbuckganj have a far greater value *in that they serve as a demonstration of the possibilities of industrial enterprise in India, in connection with the forests.* Very large quantities of timber, both in the manufactured and the raw state, are annually imported into India, largely because the value of the indigenous timbers for the various purposes in view is unknown. Moreover when the value is known funds have not hitherto been forth coming to embark upon schemes of exploitation and manufacture. This seems to be essentially a matter in which the State should make the first move, provided that, after careful examination the schemes seem likely to pay.

10. Our vast timber resources, and the great wealth that lies in our forests are at present realised only by Forest Officers, and no

indeed by all of them. So far from being an importing country India ought to be exporting many crores worth of timber per annum, and it is only due to the fact that our timbers are little known, not only throughout the world, but even in India itself, that this is not now the case There are markets crying to be supplied in Mesopotamia, Palestine, South Africa, Egypt, which would absorb readily all our inferior timbers; and for our very excellent hard woods there is an enormous and ever increasing market in Europe and America.

A very eminent American gentleman, who is now touring in India in connection with the timber trade, by name Mr Mc Giffort, assured me that 80 % of America's hardwood forests had of comparatively recent years been destroyed, and that the demand for hardwood timbers was growing annually. Yet the yield of our Indian forests at present amounts to not more than 3. 1 cubic feet per acre per annum, and of our Madras Forests to not more than 1. 7 cubic foot per acre per annum which is clearly far less than the annual increment This state of affairs is solely due to lack of the funds necessary for exploitation. Indeed the potential value of our forests is so great that, were they exploited to their full extent, India would be one of the richest countries, and the Indians one of the most prosperous peoples in the world. Such works as those at Clutterbuckganj are for this reason of enormous value as they serve to demonstrate on a small scale what can and should be done on a really big scale by private commercial enterprise. One of the most eloquent testimonies to the world wide importance of the work that has been, and is now being done at Clutterbuckganj and Bareilly is the fact that what is, I believe, the biggest bobbin-making firm in the world recently realised that their supremacy was threatened by the competition they were likely to meet with in India as exemplified by the factory, small though it is, at Clutterbuckganj, and attempted, needless to say, without success, to get state protection for their industry Copies of the interview between representatives of this firm and the

Secretary of State for India, have been already sent to the Government of Madras)

11. Now representatives of this firm are in India looking for sites to erect factories where the supplies of timber are suitable and sufficient, and transport facilities good.

The demand for bobbins by the jute and cotton mills in India is so great as to absorb some 60,000 tons of timber per year. At present nearly the whole of this supply is *imported* in the form of the manufactured article.

(c) *The Madras Evergreens.*

12. To turn now to the application of these observations and facts to Madras. The present scheme for the exploitation of the Evergreen Forests in Malabar provides for the extraction of some 20,000 tons of timber per annum. Of this perhaps 20 to 30 % is well known timber for which a ready sale can be found The remainder consists of timbers which are at present largely unknown and untried, and unless we can find a sale for all of them, or at least 90 %, their extraction is unlikely to be a financial success. There is however very little doubt that there is a use for every cubic foot of the yield if we can find it.

13. In the first place if Messrs Wilson and Company, the bobbin manufacturers referred to above, could be interested in the scheme, it is probable that they would find many of these untried timbers of ours to be suitable for bobbin making, in which case they would no doubt consider the advisability of erecting a saw mill and turnery on the west coast in some convenient site, as for instance at Olavakkot or Calicut. Similarly the timbers of the Tinnevelly Forests from which the annual yield will probably amount to nearer 10,000 tons, may be found to be suitable for bobbin making.

14. Should Messrs. Wilson and Company, who, owing to their large experience, are the most likely people for the purpose, not be prepared to go into the business, some Indian firm might be sufficiently interested to do so. As regards the sale of the timbers to any such firm we are in the strong position of having the Bareilly wood working Institute to apply to for information as to the correct market value of woods suitable for making bobbins, so that it should be unnecessary for us to sell at concession rates, nearly always an unwise plan.

Samples of these timbers were shown to the experts at Dehra Dun and the general opinion was that *Dichopsis elliptica*, and *Hemicyclia clata* and also possibly *Callicia excelsa* and *Strombosia Ceylanica*, which form the greater part of the crop, would probably be suitable for making various kinds and parts of bobbins.

15. If however, as may be the case, these timbers are unsuitable for this particular purpose there can be no doubt that they are eminently suitable for either three-ply wood or sleepers. Of the samples shown to Mr. Pearson at the Research Institute he gave it as his opinion that *Dichopsis elliptica*, certainly, and *Callicia* and *Strombosia*, probably, would be easily impregnated and would be suitable for sleepers. He suggested that sample sleepers for testing should be sent to him as soon as the new apparatus at Dehra Dun is ready for use. Such samples should be carefully stacked and air-seasoned for about six months before being sent to Dehra Dun. The Railways have, it is understood, at the recent Railway Conference at Simla, agreed to accept the opinion of the Research Institute as to the suitability of various timbers for sleepers.

16. Again as regards the manufacture of three-ply wood all the samples produced of the evergreen timbers of Malabar were stated by Mr. Pearson to be suitable. The question of glues suitable for use in this country has already been thoroughly investigated at the Research

Institute at Bareilly and has been satisfactorily settled, and no difficulty need be anticipated on this score.

As, at present, three-ply boxes to a value of 5 lakhs of Rupees are annually imported into the Port of Madras, largely for use on tea and rubber Estates, it is obvious that the demand is present, and there seems to be no reason why it should not be met by Indian firms making use of Indian timber, instead of allowing the large resultant profits to leave the country as they at present do.

17. Even should none of these three propos is be feasible, as there is a very big demand for general purpose timber throughout the country, as well as overseas, as pointed out in para 10 above, we could certainly find a market for our outturn were we to saw to convenient sizes *and season* the converted material.

18. Artificial seasoning is expensive but would probably be advisable in the case of our more valuable species. For the others air seasoning, of the *converted material*, under roofed sheds, giving protection from sun and rain, would be all that is required. To get the best results from such air seasoning the timber should be converted *green*, and then carefully stacked in the drying sheds. If green conversion is not possible the logs must be kept under water, in some form of log pond, till they can be sawn.

19. For any of these schemes a considerable initial outlay is essential. Should Government be unable or unwilling to sanction the necessary expenditure the question arises as to how the capital is to be raised. The most desirable solution of the difficulty is obviously that some private firm should erect the plant and purchase the timber from Government.

20. Private enterprise appears however to be shy of such ventures except on terms which Government should not, in the interests

brought none with them, and had expected, the master' to make all arrangements for them. This unfortunately, the young coffee planter had not realised, and he had made no provision whatever for feeding the coolies. My boy had fortunately brought an oil lamp with him, as he had not trusted the appearance of the unknown acetylene lights, and so we were not condemned to eat our first dinner in darkness. Three of the coolies were told off and ordered to set out early next morning to go and fetch food for themselves and the rest of our retinue, while we would push on forward slowly in search of our lost tribe, which had not yet turned up. And so we turned into our tent, and our boys shut themselves up closely in theirs, while the coolies sat huddled up under the shelter of a sort of one-walled hut they are in the habit of making for themselves, consisting of a large hurdle made of bamboos, and broad leaves laid one on the top of the other, like the feathers of a duck's back, so as to render it watertight, and propped up as a shelter from wind and rain on two props. And there they sat late into the night murmuring away to each other and searching diligently on each others' heads and bodies for little biting insects, for all the world like a cage full of monkeys.

Next morning we were up early and pushing on with the striking and packing up of the tents, and then after break-fast we marched on again. Our path led us now through a jungle which consisted almost solely of a species of close growing bamboo, and we walked in what was to all intents and purposes a tunnel through

this, which had been made by elephants, bison, and various other animals. We kept on hoping we might meet a shootable animal of some sort, as our unfortunate coolies were clamouring for food and we had at last to decide that we would kill the very first edible animal we saw. Luckily we met a sambur soon after, and though it was absolutely useless as a trophy with much regret we killed it as food for our followers. The path we were on seemed to be a main thorough-fare in the animal world, as other smaller ones kept on joining it, and eventually it came out at the largest and best specimen of a salt lick that I have ever seen. A flat place ten square yards or more had been eaten out into the side of the hill with a perpendicular bank at the back of it of from six to ten feet in height. In this we could see at various hights the marks where the different animals had been to eat the salt mud they like so much at certain times of the year, the higher part being worn quite smooth by the elephants. A little further on we found fresh marks of elephants, and then an open space of about an acre in extent quite clear of vegetation and with the bare earth trampled hard and flat. We at once both of us exclaimed that this must be one of the elephants' dancing places described by Rudyard Kipling in the ***Toomai of the Elepants***. We asked our shikaris what was the meaning of the open space, and they replied at once 'oh, this is where the elephants play.'

Shortly after this we got out of the tunnels through which we had been marching into more jungles, and here we

25. Down here in Madras we have far better timbers, a far greater variety of timbers, and a far larger quantity of timber than they have in North India, yet we cannot develop; the reason is, once again, solely lack of funds.

If the money is forthcoming from Government,—if not from private enterprise,—and a bold forward policy is adopted there is little doubt that an immense increase in Forest Revenue will materialise in the course of a few years, and the whole country will benefiit correspond ingly.

C. C. WILSON.

The Marathon race run on 30--11--21.

The race was run during the joint camp of the two Divsions at Sethumadai. The course was only a distance of 7 miles of which the major part lay on a hard metalled road. Most of the students ran with bare feet, and felt the after effects of their running rather badly. Out of 68 students only 63 faced the starter, and of these one student was disabled on the way, so that only 62 completed the course.

The first place was keenly contested for from the beginning by two Coorg students of the Senior Division, viz, N. S. Poonacha, the winner of the race last year, and M B. Aiyanna, the winner of many athletic honours during this year. To the very end they were seen running abreast, and almost marking time together. Nearing the winning post, however, Ayyanna made a timely dash forward and came out first by about 4 paces. The third man got his place uncontested, but his follower had to exert all his energy to beat his closely following countryman. Of these four places, three were taken by the Senior Division and one by the Junior Division.

The inter divisional challenge-cup went to the Senior Division.

The prizes were distributed by Mrs. Wilson, who afterwards kindly entertained the students to light refreshments and cool-drinks.

The prize winners in order were:

(1) M. B. Ayyanna (Senior Division) who finished the course of 7 miles in 48 minutes.

(2) N. S Poonacha (Senior Division) — Time: 48 minutes and 1 second.

(3) P Madhavan Nair Junior Division.

and (4) G. R. Kelkar Senior Division.

P. SITHAPATHI AYYAR.

Capture of Gopalan.

In the Anamalais of South Coimbatore Division, elephant capturing operations are extensively carried out during a certain part of the year commonly known as "elephant capturing season" This season occurs during the rainy months, during which period the herds of wild elephants in this locality usually wander from place to place

When the Madras Forest College, Junior Division was camping at Topslip, two miles from Mount Steart, there was a fall of a calf at the Seechalipallam pits. Early morning of the 20th November 1921, the news of the "pit-fall" was brought to the camp. The students were quite excited at the tidings and immediately hastened to the spot.

Seechalipallam is a valley situated about two miles from Mount Stuart, and is an ideal place for elephant capturing operations The pit, wherein our capture had fallen, adjoined a streamlet and this with the growth of bamboo all round, entices the herds to visit the locality year after year. The number of pits dug, vary according to the locality. Here the pits are arranged in threes, each of the three pits forming the side of a triangle. When a herd of elephants passes over the area, perhaps one elephant falls into one of the pits; panic seizes the rest of the herd and they rush wildly in all directions, some more perchance, falling into the remaining pits.

The earth excavated from the pits, is thrown far away from the vicinity of the pits, which are left open until the eve of the capturing operation (that is at the commencement of the rainy season), when they are closed. During the elephant capturing season, the pits are inspected twice a day once in the morning and once in the evening by a man specially deputed for the purpose. Sometimes other animals such as bisons, sambur and deer fall, but these are released. Tigers and panthers falling are shot dead, and the carcasses are removed and the pits are recovered, as before

When there is a pit-fall, the information is conveyed to the Range Officer immediately, and the Jamadar arranges forthwith for the rescue of the capture and its removal to the kraal.

We, the students, arrived at the pits and a finer sight of its kind could hardly be imagined. A magnificent young male, about 4½ years old, gazed at us, pawed the ground madly, tossed his huge head and snorted in wild fury. His whole body was besmeared with earth thrown up with his trunk. He tossed about, sometimes swaying one leg and sometimes another in a restless manner. Suddenly he would grow

restive, throw his whole weight on to his haunches and abruptly dash to the top extending his trunk as if to catch hold of some one standing and wreak his vengeance on him Fortunately there was no accident of the kind, owing to the alertness of the lookerson. In a fit of despondency, he would try to hurt himself by endeavouring to drive his trunk against his tusks. When he had tired himself out, he kept perfectly still for a while, when water stored in bamboo pieces, was poured copiously over his body, especially over the massive head. It was a deplorable spectacle to see so magnificent a beast of massive proportions come to such a pass.

The normal dimensions of the pits are 12 feet square at the top, 8 feet square at the bottom and 10 feet deep. Sometimes they are 12 feet deep, but 10 feet is adopted to secure the fall of younger elephants, which are preferred as they are more easily trained than the older ones. The latter even after having been trained, often prove treacherous. Last year there was a big capture and the elephant, "Unni," after being trained, killed a mahout The middle aged ones are easily trained and are quite fit to work in about a year after the date of capture. Calves are generally auctioned as they are unfit for work until eight or nine years of age and their maintenance during this period is an unprofitable business. When a solitary tusker falls into a pit, he either effects his escape or the department releases him, as he is exceedingly difficult to train and even when trained is very liable to return to his former wild ways and prove useless; cases have also occured in which solitary tuskers, while beeing taken out of the pit, have caused grevious injury to the decoy elephants This perhaps is another reason why the department liberates tuskers.

The floor of the pit is packed with brushwood and leaves of a sufficient depth, to break the fall of the elephant. The mouth of the

pit is covered with mats made of split bamboos and brushwood and presents an appearance exactly similar to the surrounding ground. The unwary elephant, little suspecting pitfalls, walks over the snare and is precipitated into the pit, to its great annoyance.

Rope made of the fibre of Sterculia villosa, is used for tying round the neck of the animal after he has fallen Twenty head loads of fibre are required for making one such rope Ropes of the kind are always available at the Range office, in case of emergency The rope is 40 feet long and tapering towards one end; the diameter of the butt end is 5½ inches. A cross bamboo piece was tied to a bamboo pole at a height approximately equal to that of the animal A white handkerchief was held up before the trunk to divert the animal's attention; meanwhile the bamboo with the cross piece, was lowered down into the pit by the side of the animal and the height was noted to be 5 feet. Sometimes the cross piece tied to the bamboo has to be adjusted three or four times before the exact height of the animal is obtained, but so experienced a man was the Jamadar in question, that the exact height was obtained at the first try. Three fourths of the height of the animal measured to its withers, gives the circumference of the neck. (This was found to be 3 feet 9 inches) In this connection it will be interesting to know that the height of any elephant is nearly (that is within a couple of inches) twice the circumference of one of the front legs.

To return to the work of rescue; a small loop was made at the thick end of the rope. From the base of the loop 3 feet 9 inches (the circumference of the animal's neck was marked on the rope and a short wooden rod of about 1½ feet in length, was inserted at the mark, and at this point a small fibre rope was attached which was subsequently used to make fast the noose described below. The running end of the main rope was then passed through the loop and a noose was thus formed, its circumference being equal to the animal's neck measurement

This contrivance eliminates the possibility of the animal being strangulated by the subsequent strain placed on the noose. The noose was hoisted up before the trunk by means of bamboo hooks and a white flag was waved about the centre of the ring to attract the attention of the elephant, and thus entice him to raise his trunk and enable the Jamadar to noose the beast. The animal attempted to catch the flag and at this opportune moment the noose was thrown over the uplifted trunk and around the animal's neck After three futile attempts the noose was correctly worked into position, and then hightened by "mulsars" pulling the rope tightly and beating the knot with the butt ends of bamboos. The animal dashing his head to and fro with a view to extricate himself, facilitated considerably the tightening of the noose. The loose rope was lashed round and across the cross piece of wood connecting the main rope, thus finally making fast the noose.

Small billets and leaves were thrown into the pit alternately till "jumbo" was just able to scramble out The students did yoemen service in throwing billets into the pits. No sooner had the elephant reached the top than he rolled down on the ground thoroughly exhausted. He lay thus for sometime; meanwhile a fibre rope was tied round one of the hind legs Four "Kumkis" or decoy elephants are generally used for the rescue of a big capture. But in the case in question, only two (namely "Akbar" and "Lalamiah" were employed as the capture was only a young beast. The neck rope was tethered round the body of "Akbar" and the leg rope round "Lalamiah," both being tuskers of reputation Water was poured over the capture who suddenly arose and made a frantic attempt to escape. He grew incenced at his cramped position and attacked Lalamiah but the latter was quite unmindfull of the franks of the stripling. The capture, then placed his trunk against that of a cow elephant ("Phyllis," employed usually for riding), as if he was pouring out to her the illtreatment he had received at the hands of his fellow creatures. Between the two decoys, the

capture, despite all his resistence, was convoyed three miles to the Krall, a secluded spot in Anapudy Sometimes a short 'pujah" consisting of breaking cocoanuts and burning incense, is done by the "mulsars" before the elephant is conducted to the Kraal. This "pujah" is surmised to tranquilise wrath of "The Goddess of the Wood" for the loss of an elephant, and is also presumed to confer a long life to the capture.

The Principal and the District Forest Officer with their ladies and our instructors graced the occasion with their presence andtook a lively interest in the affairs of the day Many photographs weretaken.

The Kraal is a wooden structure 16 feet by 20 feet by 15 feet and is raised on concrete masonry with cross drains suitably placed. The floor is paved with planks. The corner pillars are of wood, 1½ feet spuare in section and take the cross bars running horizontally and giving the Kraal a cage like appearence The Kraal is thatched to protect the elephants from sun and rain Some of the cross-barl were drawn out to admit of the entrance of the capture and the animal was coerced inside by Lakamiah while Akbar directed him into the door. The neck rope and the leg rope were cut free. The elephant fretted and fumed in his new place of confinement and one could hardly help thinking that on the previous evening he was roaming in all mirth and enjoyment in the west forests of Anamalais utterly regardless of his impending fate.

During the first night of confinement, the mother called at the Kraal to realease her progeny, but after a vain attempt, was scareed away. The visiting by the mother is usual in the case of a sucking calf and rare in the case of an older elephant (as was the capture in question) This unprecedented event prompted the range staff to prepare a snare for the capture of the mother if she again paid her noctur-

nal visit, but unfortunately she had bid her last good-bye to her son the first night and never visited the Kraal again.

A week later, the capture, while in the act of being trained by a mulsar, broke the cross beam separating the animal from the trainer and was about to charge him Fortunately he climbed the cross-bars of the Kraal and jumped out before the animal was on him.

Last year a new capture called "Gopalan" died of Anthrax, near the place where the beast in question, was captured; so the hunters called "Gopalan" after the deceased animal. From the agile movement and the general build of the new capture, it is hoped that he will be the pride of the timber yard, and prove himself extremly useful in Forest work.

S. DORARAJA,

M. F. C. 1921—23 Division

Miscellanea.

(a) At the Forest Conference held at Dehra Dun in January last, a very interesting and instructive series of logging operations that are in vogue in America was exhibited in the local cinema by Messrs. Mc. Giffert of the Clyde Engineering Works, Duluth, U. S A., and C. S. Martin Consulting Engineer to the Goverment of India. A large number of Forest Officers and others interested in the subject were present. Among the items of special interest were the exhibits of modern methods of timber extraction; felling, loading, transport by wire-rope ways etc, but the most interesting instrument shown was the Clyde Catterpillar tractor which was demonstrated to be not only more economical and easily manipulated in logging operations

than other and old fashioned methods of transport, such as horses and oxen – which unfortunately were still in use (though to a limited extent) even in America – but can be used with advantage for the various operations in connection with road making, clearing of paths in jungles etc, "No road is too steep and no snow too deep" for the Clyde catterpillar. As Mr Martin observed, it is neither possible nor profitable at present, to adopt at once all the modern American methods of extraction in Indian Forests, but some select features of the same are worth copying in India at present, to be followed eventually and gradually by such other modern methods as Indian conditions and finance will permit A beginning has already been made in the Dhoni evergreen forests.

G. V.

* * * * *

(b) The True Mahoganies. KOLLE, K. H., in *Royal Botanic Gardens, Kew Bulletin of Miscellaneous Information*, No. 4, pp. 201-207. London, 1919.

Of late years extensive planting of Mahogany trees has taken place in Trinidad and some other British colonies, and numerous specimens and fruits have been received at Kew with the enquiry as to whether they represent the true plant. Mahogany has long been known as the timber of a tree called botanically *Swietenia Mahagoni* Jacq., usually said to be a native of the West Indies and the adjacent coasts of Central America, but the term has also been extended to other red-brown timbers possessing somewhat similar properties, some of them belonging to other genera of Meliaceae and some to quite different families. The term, however, was originally applied to the West Indian tree, the timber of which has been known for upwards of 300 years, and under the name of Spanish mahogany, early became famous for the construction of articles of furniture.

At a somewhat later date British Honduras became famous as source of mahogany, which until 1886 was generally regarded as the timber of *Swietenia Mahagoni* In that year, however, Sir George KING described and figured a new species under the name of *Swietenia macrophylla*, this having been grown in the Royal Botanic Gardens, Calcutta, from seeds collected in Honduras. Since then it has been generally recognised that Honduras mahogany is specifically different from the West Indian tree There is also a third species, *S. humilis*, Tucc., a native of Western Mexico, which was thought to be in cultivation at Calcutta. Specimens of the Calcutta tree, however including fruits have recently been received at Kew, and prove to be a form of *S. Mahagoni*, Jacq. Further species formerly referred to *Swietenia* have now been transferred to other genera.

* * * * *

(c) Mechanical Timber-Felling.—GERDIL,, H. (Inspecteur des Eaux et Forets,) in the *Bulletin officiel de la Direcion des Recherches scientifiques et Industriciles et des Incentions* reproduced in *Le Bois*, Year 39, Nos. 28 and 29. Paris, Dec, 9 and 16, 1920.

Timber-felling by hand is now a very costly and slow process, owing to the high cost of manual labour. This article supplies the latest information regarding the mechanical felling of timber in France, a problem which assumed great importance during the war.

Each successive operation, clearing, cutting both small and large wood, trimming, and logging, requires, according to the author, a special machine,

Trials of felling with red-hot wires have been discontinued in practice, not only becase this method of carboninsation is too slow but there is too great a risk of killing the stumps and so ruining the coppices. The patent process of H. GANTKE, whereby a moving

red-hot steel wire is employed was also tried, but the anthor thinks that the best way is to use a cutting tool.

The author briefly dscribes the instruments which were tested and found satisfactory ; these were the alternating saw, endless band-saw, mechanical axe or chisel, the wire or chain friction saw, the multiboring machine

The problem of clearing has been solved by small locomobile saws several types of which are described by the author.

Credit must be given to the Americans who have produced a single machine which will carry out the whole work: with the help of a single workman.

Extracted from International Review of the Science and practice of Agriculture, February 1921.

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(d) **Experiments in Sowing Seeds of** Cassia auriculata **in India.** — BENNETT H. C., in *The Indian Forester*. Vol. XLVII. No. 1, pp. 25-29, Allahabad, Jan. 1921.

An account of the experiments carried out at Golla, Anantapur, to determine the cheapest successful method of raising *Cassi auriculata* ("Tangedu,") a shrub which yields the most valuable tanning bark in India.

Six different methods of sowing, each on an area of not less than 5 acres, were tried namely:

(1) Broadcast sowing on untouched soil.

(2) Sowing in furrows about 2½ ft. apart and 4" to 6" deep.

(3) Broadcast sowing followed by close ploughing in one direction.

(4) Broadcast sowing followed by close ploughing first in one direction and then at right angles

(5) Close ploughing in one direction followed by hoeing with a 3-pronged fork (or "goru,") seeds sown in the furrowsmade by the prongs which are about 6 in and finally the whole gone over by a "guntakah" or iron plate drawn by 4 oxen in the same direction as the original ploughing was done to root out grass, turn up the soil, and cover the seeds.

(6) Dibbling seeds under trees in soil turned up to a depth of about 6 in. by a spike or crow-bar.

Result.—The cheapest successful method was found to be No. 2. which cost 14 annas, per acre, and by it sufficient seedlings were obtained to stock any area with about 4 800 plants per acre. By method 3 at double the cost, about 27 times as many seedlings were obtained as by method 2, and were somewhat more advanced in growth at the end of a year. By method 5, about twice as many seedlings were got than by employing methods 3 and 4 and they were still more advanced in growth than those obtained by those two methods. The cost was 2-7 rupees per acre more than with method 3 and 8 annas 6 pies more than with method 4 Sowings under bushes and late sowings were failures.

The author suggests a further experiment, employing method 2. but making the furrows 10 ft. instead of 2½ ft. apart and thus tending to ensure sufficient regeneration and considerably less expense

It is possible to grow "Tangedu" on land which can be ploughed, but which is too poor to yield profitable field crops.

Extracted from International Review of the Science and practice of Agriculture April 1921,

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Contributions to the Gass Forest Museum.

Serial No	Contribution.	Contributor.
1	(i) Samples of Soapstone, Manganese ore, Red oxide, and Black oxide (ii) Eleven articles made of Soapstone	L. S. Janes Esq I. F. S D. F. O. Bellary.
2	(i) Two hammer handles of *Terminalia tomentosa and Anogeissus latifolia* (ii) One chisel handle of *Dalbergia sissoo*. (iii) One Police man's baton of *Terminalia tomentosa*.	The Bareilly Woodworking Institute.
3	(i) 202 Botanical specimens for the herbarium (88 of which are new to it, and the rest duplicates). (ii) Specimen showing hypertrophy in *Vitis quadrangularis*	C. E C. Fisher Esq. I. F. S. Conservator of Forests
4	Specimens of branches of *Trema Orientalis* with larvae of *Phassus malabaricus*? badly boring in them.	M. H. Krishnasamy Student M. F. C 1920 —22 Division.

Contributions to the General Library of the Madras Forest College

1. Burma Forest Bulletin No. 1. Preparation of Teak seed for Early Germination, by H. R. Blanford Esq., O B E I. F. S

2. Burma Forest Bulletin No. 2. Early Burning in young Regeneration areas by, C. G. E. Dawkins Esq, I. F S.

3. Western Australia Report of the Forests Department for the year ended 30th June 1921.

4 Progress Report of Forest Administration in the Province of Assam for the year 1919—20

5. Report on Forest Administration in the Andamans for the year 1919 – 20.

6. Progress Report of Forest Administration in Baluchistan 1919—1220.

7. Progress Report of Forest Administration in Coorg for 1919—1920 by E M Crothers Esq,

8 Schedule of proposed Delegation of powers to the Chief Conservator and Conservators

9 Ceylon Administration Reports for 1920 (Forest Conservancy).

10. Malaria and the mischief done by the Mosquito, (A lecture).

11. Burma Forest Bulletin No 3. Silvicultural series No 3. Published in April 1921. Planting of one year old teak stumps

12. Forest Bulletin No. 42 (1921). Note on Haldu—Adina Cordifolia; by C E. C. Cox I. F. S.

13 Forest Bulletin No. 43. (1921). Note on Odina Wodier Roxle by C. E. C. Cox I F. S.

14. Forest Bulletin No 44. (1921) Note on Semul or Cotton wood by C. E. C Cox I. F. S.

15 Forest Bulletin No. 45. (1921) Note on the Miscellaneous Forests of the Kurnaom Bhabar by E A. Smythies I. F. S.

16. Forest Bulletin No. 46 (1921). Rate of growth of Bengal sal. (shorea robusta) l. quality by S. H. Howard B. A.

17. Administration report of the Forest Department of he Madras Presidency for the year ending 31st March 1921. 1920–1921.

18. The Game birds of India Burma and Ceylon. Vols I & II by E. C. Stuart Baker O. B E.

19. The Silviculture of Indian trees. by R. S. Troup M. A. C. I. E. Vols. I, II, III.

20. The Indian Forest records Vol. VII Part III. Note on Hopea Canarensis Hole by R. S. Hole C. I. E.

21. Administration report of the Forest Department of His Exalted Highness, the Nizam's Dominions (7—10—19 to 5—10—20).

22. Administration report of the Travancore Forest Department for the year 1095 M. E.

23. Working Plan for the Reserved Forests of the Porahat DivisionBehar and Orissa by F. K. Makins, B. A. Deputy Conservator ofForests.

24. Flora of the Presidency of Madras by J. S. Gamble Part IV.

Students' Club Fund.

Statement showing amounts promised and still due by old students, towards the Students' club :—

Mr. C. S Ramanathan	...	...	10	14	0
,, M. R. Doraiswami	...	...	3	0	0
,, Kerala Varma	...	....	10	0	0
,, Gulam Dustagir	...	...	9	0	0
,, S. A. Dawson	...	...	11	0	0
,, N. T Tambi	...	...	4	0	0
, P. Karnakara Menon	...	...	9	0	0
,, Dhananjeya Rao	...	...	13	0	0
,, Kesava Pillai	...	...	12	0	0
,, I. Ramalingam	...	...	8	0	0
,, L A. Krishna Ayyar	....	...	7	0	0
,, S. Krishna Ayyangar	...	...	15	0	0
,, T. K. Parameswaram Pillai		....	15	0	0
,, P. Krishnan	...	...	10	0	0
,, T. E. Varadachari	...	...	15	0	0
,, K. G Sundararaja Rao	...	...	10	0	0
,, M. Krishna Ayyar	...	...	10	0	0
,, S. V. Sigbhatullahi	...	...	10	0	0
,, Gulam Rasool	...	...	10	0	0
,, T. R. Naganatham	...	...	10	0	0
,, W. Balakrishna Mudaliar	...	...	10	0	0
,, Aiyappa Asari		...	15	0	0
,, D Patel	....	...	18	0	0
,, K. Jayaraman	...	...	12	0	0
,, P. V. Ramanna Rao	...	...	12	0	0
,, R. E. Lemos	...	...	50	0	0

Gazette Notifications.

22—11—1921.

1. Mr B. F. Rigold, Dy. Conservator of Forests, has been granted by the Secretary of state an extension of furlough on medical certificate for seven days.

2. Mr. H.C. Bennett, Deputy Conservator of Forests, now doing duty as Chief Forest Officer Coorg, on reversion, to this Presidency, to act as Conservator of Forests I circle.

3. Mr. D. T. Barry, Acting Conservator of Forests, I circle on relief by Mr. H.C. Bennett to be D F O Lower Godaveri

29—11—21

Mr. F J Marshall, Forest Engineer granted extension of leave by 2 months and permitted to return to duty at the end of it.

6—12—21

M R Ry. A Raju Naicker avl. E. A. C. of Forests is granted extension of privilege leave for ten days.

13—12—21

Mr Roland Mitchell, D. F. O. Lower Godaveri Division is granted privilege leave for 3 months from the date of relief.

20—12—21

Mr A. B. Jackson, Conservator of Forests, is granted extension of furlough on average salary for 4 days from 30-12-20 up to 2—1—1921.

3—1—22

Mr. D. L Sathe, Deputy Conservator of Forests, is granted extension of privilege leave for 18 days

2 Saiyid Abdul Qadir sahib Bahadur will be Confirmed as E. A C of forests with effect from 30th June 1912.

3 Mr. D. L Sathe, Deputy Conservator of Forests, on return from leave, to be D. F. O West Vellore Division.

4. M. R. Ry. V Narayana Ayyar avl. E. A. C of Forests on relief, to be D. F. O. North Cudappah Division.

5. Mr. C. Mahony E. A. C. of Forests, on relief, to be D. F. O, West Cuddapah Division.

10—1—22.

1 Saiyid Abdul Qadir Sahib Bahadur D. F. O. South Vellore, is granted, subject to certificate of eligibility by the Accountant general an extension of privilege leave for 2 months in continuation of the leave for one month already granted to him.

2. M. R. Ry. T. V. Venkateswara Ayyar E. A. C. of Forests will continue to be in charge of the D. F. O's duties during the absence of Saiyid Abdul Qadir Sahib Bahadur on leave.

24—1—22

(1) Mr. A F. Minchin Deputy Couservator of Forests is granted an extension of leave up to 4th March 1922.

(2) Captain W. G. Dyson D. F. O. South Coimbatore,

is granted privelege leave for 3 weeks with effect from or after 2nd February 1922 subject to A. G's certificate of eligibility. He may spend his leave in Ceylon.

The D. F. O, North Coimbatare will be in charge of the current duties of the South Coimbatore office, in addition to his own during the period of absence of Captain Dyson on leave.

3. M. R. Ry. Govinda Menon E. A. C, of Forests is granted combined leave with effect from date of relief for 5 months and 5 days and furlough on half average salary for four months.

(4) Mr. J. A. Master D. F. O. South Cuddappah, is granted 3 month's privelege leave from date of relief after 1st April 1922.

31—1—22.

(1) Mr. D. L Sathe is given a further extension of privilege leave by 12 days in Continuation of the leave alreedy granted.

(2) M. R. Ry. A. Hanumantha Rao Avl E. A. C. of Forests, is granted furlough on half average salary for 6 months in continuation of the privilege leave already granted to him.

(3) The following officers appointed to the Indian Forest service by the Secretary of state reported their arrival at Bombay on the dates noted against them:—

(i) Mr. H. R. M. Law 14—11—21

(ii) ,, M. F. Bridge 11—12—21

(iii) ,, J. S. Connolly do.

(iv) ,, D. M. Currie do.

(v) ,, T. W. K.Wernham do.

(iv) ,, H. P. Ward do.

(vii) ,, V. G. Darrington 12—12—21

7—2—22

(1) M. R. Ry. Rao Sahib K. R. Venkataramana Iyer avl. Forest Research offier, is granted with effect from date of relief Combined leave for 2 years (privilege leave to the extent due, and furlough on half average salary for the remaining period).

(2) Mr. J. M. Sweet Assistant Conservator of Forests, is to act as Forest Research officer until further orders.

(3) Mr. Roland Mitchell will be Confirmed as E. A. C of forests with effect from 10—7—1918.

(4) Mr. A. R. Brand E. A. C of Forests Salem, is appointed to act as Junior Instructor in the Madrass Forest College Coimbatore, vice M. R. Ry. M. R. Sundaram Ayyer reported sick.

Notifications relating to range officers:—

First Circle.

22—11—21.

1. Y. Venkataswami Naidu, Ranger VII grrde, Vizagapatam is transferred to Kurnool South, II Circle. He will join Kurnool South at the end of his privilege leave which terminates on 23—12—1921.

27—11—21.

2. (I) M. R. Ry. A. R. Pingale, Supernumerary Ranger, II Circle is posted to Palakonda Range, Vizagapatam District to join as early as possible after 10—12—21.

(2) Mr. W. S. Fernandez, Ranger III grade on relief by No. (1) is transferred to Ganjam District.

2—12—21.

3. D. E. Lewin, Ranger V grade, transferred from III Circle, is posted to Ganjam District to join on 24—12—1921.

T M. Varadachari, subprotem Ranger IV grade, Ganjam, is transferred to III Circle to join on expiry of his privilege leave.

27—12—21.

4 M. R. Ry. A. V. Sundram Ayyar, Probationary Extra Assistant Conservator of Forests, Godaveri Lower is posted to the charge of Gokavaram Range.

24—12—21

5 M. R. Ry. I. Ramamurti, Probationary Ranger is appointed as temporary Ranger VII grade from date of taking over charge of the duties of Junior Instructor of the Vernacular Training School.

3—2—22.

6. M. R. Ry. T, Balaramaswami Nayudu, Ranger VII grade, on reversion from Nodgole Estate service, is posted to charge of Nugur Range, Upper Godaveri Division, to relieve M. R. Ry. A. Subramaya Ayyarproceeding on leave.

2—3—22.

7. M. R. Ry. P. Durasswami Ayyar Ranger 4th Grade Godaveri Lower is granted privilege leave for 3 months with effect from date of relief. (2) The posting of Ranger N. K Sarma to the charge of Polavaram Range vice Duraiswami Ayyar is approved.

2—3—22

8. The posting of Ranger G. Apparow to the charge of Rajahmundry Range, Godavari Lower, vice Mr. Williams transferred to the Vizagapatam District as District Forest Officer, is approved.

7—3—22.

9. M. R. Ry. P. Ramunni Menon Ranger 2nd grade Ganjam District is granted privilege leave for three months with effect from 15 April 1922 or date of relief. He should have completed the building works and submitted completion reports for them before he goes on leave.

11—3—22

10 This Office Service Order No. 7 of 22 dated 2—5—22 granting privilege leave to Ranger S. Duraiswami Ayyar for three weeks and posting Ranger N. K. Sarma to the Polavaram Range, Godavai Lower Division is cancelled.

11—3—22.

11. M. R. Ry, P V. Subbaramayya Ranger 4th grade is granted privilege leave for four months and furlough on half pay for 17 months in

continuation thereof with effect from 1st June 1922, preparatory to retirement.

20—3—22.

12. The promotion of M. R. Ry, I. Ramamurty, Probationary Ranger to Temporary Ranger VII grade ordered in this office S. O. No 77 of 21 dated 14—12—21 is cancelled with effect from 1st March 1922 without prejudice to his appointment as Junion Instructor, Vernacular Training School until the close of the current session.

16—11—21.

Second Circle.

13. Ranger C. G. Ganapathy is granted an extention of furlough for 4 months and twenty days from 21—11—21 in continuation of the 6 months leave granted.

(2) Ranger Abdul Kalak Sheriff on Special duty in Kurnool South is transferred to Bukkapatnam Range, Anantapur District, to relieve Ranger T. K. Ramaswamiayer, forthwith.

12—11—21.

14. In virtue of the consent given by the Chief Conservator for the mutual transfer of M. R. Ry, Y. Venkataswamy Naidu Ranger, 7th Grade, of I Circle, and M. R Ry, A. R Pingale, Supernumerary Ranger, II Circle, the following transfers of Rangers are ordered.

1. M. R. Ry, N. R. pingale, special duty ranger, posted to the charge of Chelama Range for one month from 10—11—21 during the absence of Ranger B. Punniah, Granted Previlege leave for one month from 10—11—21, is transferred to the Ist Circle after the expiry of his Range Charge.

2. M. R. Ry, Y. Venkataswamy Naidu, Ranger 7th Grade, of I, Circle, is posted to Kurnool South to work under the orders of the District Forest Officer, Kurnool South.

24—11—21.

15. The following transfers of Rangers are ordered:—

(1) Supernumerary Riger P. V. Krisha Rao Naidu from Cumbum Range to Rachakonda Range Kurnool East Division.

(2) Probationary Ranger C S. Ganapathy from Special duty to the charge of Cumbum Range.

(3) Ranger R Gulam Dastagir from Rachakonda Runge to special duty in Kurnool East Division.

26—11—21.

16 (1) M. R. Ry, Y. Venkataswamy Naidu, Ranger VIIth grade of Ist Circle transfered to this circle and posted to Kurnool South Division to work under the orders of the District Forest Officer is posted to Sivapuram Range of Kurnool West Division. The order posting him to Kurnool South is therefore cancelled by this order.

(2) M. R Ry, T. Sreeramulu Naidu, Ranger, Sivapuram Range on relief by No. I, is transferred to Kurnool South Division to work under the orders of the District Forest Officer Kurnool South. His transfer to Kurnool South is in place of A. R. Pingale transferred to Ist Circle.

5—12—21.

17. In continuation of one month Privilege leave granted by the District Forest Officer to Ranger, B. Puniah from 10—11—21 an extension of Privilege Leave for 11 days from 11—12—21 and permission to avail the ensuing Xmas & New year holidays in continution is granted subject to his eligibility for the leave which should have been reported by the District Forest Officer.

6—12—21.

18. (1) M. R. Ry, A. Vyasulu, Ranger, VII Grade is transferred from Kudligi Range Bellary District to Kurnool East Division to take charge of Morricherruvu Range.

(2) M. R. Ry, M. Krishna Rao Ranger, IV Grade on relief by No (1) is transferred to Bellary District to take charge of Kudligi Range.

8—12—21.

19. The following postings are ordered to take effect from 10th January 22.

(1) Mr. Sreenivasaraghavan, Pro. Extra Asst. Conservator of Forestst, attached to Kurnool West to be in charge of Dhone Range unti further orders.

(2) M. R. Ry, M. Umapathi Mudaliar, Range Officer, Dhone Range Kurnool West Division., to be on Special Duty under the orders of the District Forest Officer, Kurnool West, until further orders.

12—12—21.

20. In modification of this Office S. O. No. 90/21, dated 6—12—21, the following transfers of Rangers are ordered :—

1. Mr. I. John, Ranger 7th Grade, attached to Bellary Range is transferred to Kurnool East District, to charge of Morricheruvu Range. This cancels the posting of A. Vyasulu to Morricheruvu Ranger Kurnool East Division.

2. M. R. Ry, M. Krishna Rao, Ranger 4rth grade, attached to Morricheruvu Range, Kurnool East, on relief by No. 1. is transferred to Bellary Range.

22—12—21,

21. M. R. Ry, C. Ramaswamy Naidu, Ranger, II Grade Guntur District is granted an extension of leave for 1 month (1 day privelege leave and 29 days forlough on half salary) in continuation of the leave granted him in this Office S. O. No. 61/21 dated 27—9—21.

(2) The existing arrangements will continue.

3—1—22.

22. M. R. Ry, T. Sreeramulu Naidu, Supernumerary Ranger posted to Karnool South Division to work under the orders of the District Forest, Officer is granted privilege leave for 3 months subject to his elegibility therefor.

23—1—22.

23. M. R. Ry, C. Ramaswami Naidu, Ranger, IInd Grade Guntur District is granted an extension of leave for one month (furlough on full average salary) in continuation of the leave granted to him in this Office Service Order No. 4 of 22 dated 14—1—22.

2. The existing arrangements will continue.

1—2—22.

24. Ranger H. Ramarow is considered to be on special duty in Karnool south from date of relief of Range charge (Sirval Range) till his final relief from special duty i. e. from the forenoon of 30—12—21 to the forenoon of 26—1—22 .

26—2—22

25 M. R. Ry N. E. Kanakiah, Ranger IV grade Kurnool West Division is granted 4 months privilege leave from the date of relief; he should be ordered to appear before the District Medical Sanitary Officer for medical examination.

12—2—22

26 (1) Ranger Mr. Syed Ibrahim Albiz Sahib IV grade transferred from V Circle (Kollegal District) is posted to work under the orders of District Forest Officer Kurnool West Division

(2) Ranger M R. Ry. A. M. Sreenivasalu Naidu VI grade transferred from V Circle (Tinnevelly District) is posted to work under the orders of District Forest Officer Kurnool South Division.

6—3—22

27 (1) Abdul Khalak Sheriff, Acting Ranger in charge of Bukkapatnam Range is reverted to his permanent post as Forestor I grade persuance of Chief Conservator's Proceedings 340 27—2—22. To take effect atonce.

(2) M. R. Ry. H. Rama Row Ranger II grade is posted to Bukkapatam Range; Anantapur District on return from leave which expires on 25—3—22

15—2—22

28 Ranger Syed Ibrahim Albiz Sahib is posted to Gundlabrahmeswaram Range to take charge immidiately.

Third Circle.

17—11—21

29. M. R. Ry. C. R. Rajagopalan Ranger VI grade is granted furlough on full pay from 11th to 13th October 1921 in continuation of the leave already argnted to him in this office Service Order No. 115/21 dated 10th October 1921.

19—11—21

30. In modification of this offiice Service Order No. 2/21 dated 4th

January 1921, M. R. Ry. C. Balaya Nayudu, Ranger V grade, is granted combined leave for 2 years with effect from 5th April 1921 as follows:—

	Years	Months	Days
Privilege leave	0	1	18
Furlough on full pay	0	6	12
do on half pay	1	4	0
	2	0	0

24—11—21

31. Mr. D. E. Lewin Ranger V grade in charge of Kondapuram Range West Cudappah District is transferred to I Circle vice Ranger T. E Varadachari. This cancels the privilege leave granted to Mr. D. E. Lewin in this office Service Order No. 122/21 dated 5th November 1921 and he should join the I Circle on 24th December 1921.

(2) M. R. Ry. B. V. Vaideeswara Ayyar Ranger V grade on relief of Sathiavedu Range charge in Chingleput District is posted to do special duty under the orders of the District Forest Officer West Cuddapah eventually to relieve Ranger D. E. Lewin on 15th December 1921. This cancels his immediate posting to Kondapuram Range ordered in Service Order No. 128/21 dated 11th November 1921.

1—12—21

32. M. R. Ry. C. R. Rajagopalan Ranger VI grade is granted furlough on full pay from 14th to 22nd October 1921 (both days inclusive) in continuation of the leave already granted to him in this office Service Order No. 131/21 dated 17th November 1921.

3—12—21

M. R. Ry. V. P. Narayana Menon Ranger IV grade on return from the privilege leave granted to him in this office Service Order No. 64 of. 1921 dated 8th June 1921 is posted for special duty under the orders of the District Forest Officer, Chittoor.

11—12—21

34 M. R. Ry. T. E. Varadachari Ranger IV grade (Sub protem) transferred to the III Circle Conservator's Service Order No. 75 of 21 dated 2nd December 1921, is, on the expiry of his leave on *24th December 1921* posted for special duty under the orders of the District Forest Officer North Cuddapah District, Cuddapah.

16—12—21

35 M. R. Ry D. Krishnaswamiah Probationary Ranger posted to West Cuddapah District in this office Service Order No. 105/21 dated 21st September 1921 for a period of 2 months is permanently transferred for special duty under the orders of the District Forest Officer West Cuddapah District.

21—12—21

36 M. R. Ry. D. Krishnaswamiah Probationary Ranger on special duty West Cuddapah District is posted to the charge of Sanipaya Range of the same District.

Mr. J. M. Abraham, Ranger IV grade on relief by No. 1 is posted for special duty under the orders of the District Officer, West Cuddapah.

22—12—21

37 M. R. Ry. T. E. Varadachari, Ranger IV grade Sub-protem is granted an extension of leave for 3 months with effect from 23rd Decembe 1921.

2—12—21

38 Ranger M. R. Ry. A. Ranganayakulu Nayudu on return from leave is reposted to the charge of Rajampet Range, South Cuddappah Division On relief by Ranger A. Ranganayakulu Nayudu Ranger T. T. Ansep to be on special duty in the South Cuddapah Division.

Ranger T. T. Ansep is appointed to be the Senior Instructor of the Vernacular Training School in the North Cuddappah Division to report himself for that duty at Cuddappah on 20th January 1922.

Forester M. Krishna Ayyar is appointed to be Junior Instructor at the Vernacular Training School to report himself for duty at Cuddappah on 20th January 1922.

26—12—21

39 Mr. B. K. Roy I. F. S. is posted to the charge of the Madanapalli Range and will take over on the 16th January.

31—12—21

40 M. R. Ry. V. P. Narayana Menon, Ranger IV Grade North Cuddappah District is granted on extension of privilege leave by 1 month in continuation of the 4 months' privilege leave granted to him in this office Service Order No. 64/21 dated 8th June 1921.

2—1—22

41 On relief by Mr. B. K. Roy, Ranger K. R. Viswanatha ayyar to be on special duty under orders of the District Forest Officer, Chittur with head quarters at Madanapalli.

6—1—22.

42. M. R. Ry. T. S. Narayanaswami Chetty, Ranger. VII grade is granted a further extension of leave without allowances for 1 month with effect from 21st December 1921 in continuation of the leave

granted to him in this office Service Order No. 126/21 dated 10th November 1921.

21—1—22.

43. M Krishna Iyer. Forester 1st grade appointed to be Junior Instructor, Vernacular Training School 1922 session is promoted to act as Ranger VII grade (Temporary) with effect from the date of taking up the duties.

21—1—22.

44. Mr. J. M. Abraham, Ranger, IV grade is granted Privilege leave for 4 months with effect from 10th December 1921.

31—1—22.

45. The three months extension of leave granted to M R Ry, T. E. Varadachari, Ranger, IV grade in this Office Service Order No 143 of 1921 dated 22nd December 1921 will be treated as leave on full average salary.

2—2—22.

46. In continuation of the one month's suspension ordered in this office Service Oader No. 125/21 dated 9th November 1921 Mr. E. W. Fernandez, Ranger, V grade is granted furlough on full pay for 8 months with effect from 1st December 1921.

2—22—22.

47. The following posting and transfer of Rangers are ordered :—

1. M. R. Ry, T. E. Varadachari, Ranger IV grade North Cuddapah District on expiry of his leave on 23rd March 1922 is posted to the charge of Balapalle Range, South Cuddapah District.

This cancels this office service order No. 139/21 dated 11th December 1921.

2. M. R. Ry, L. R. Narayana Aiyer, Ranger, II grade Sub-protem in charge of Balapalle Range, South Chuddapah District on relief by No. 1 is permanently transferred to the VI Circle.

3. Mr. J M. Abraham, Ranger, IV grade West Cuddapah District on expiry of the 4 months Paivilege Leave granted to him with effect from 10th December 1921 is permanently transferred to the IV Circle.

5—2—22.

48. Ranger S. Sankara Alwa is reduced to the 7th grade until further orders from 1st February 1922 and on relief of the Gangapalli Range will be transfered to South Cuddapahand placed on special duty under the orders of the District Forest Officer.

5—2—22.

49 Probationary Ranger A. Sitharamiah, on special duty Nellore District is transferred to West Cuddappah for charge of the Gangapalli Range in relief of S. Sankara Alwa.

10—2—22.

50. M. R. Ry, T. S. Narayanaswami Chetty, Ranger VII grade is granted a further extension of leave without allowances for 2 months with effect from 21st January 1922 in continuation of the leave granted to him in this office Service Order No. 2/22 dated 6th January 1922.

20—2—22.

51. 1, Ranger K. R. Viswanatha Ayyar IV grade on special duty Chittoor District is transferred to the North Vellore District on special duty under the orders of the District Forest Officer.

2. K. Raghuraman Probationary Ranger on special duty North-Vellore is posted as Junior Instructor Vernacular Training School North Cuddapah District to join at once.

3. On relief as Junior Instructor Vernacular Training School Forester M. Krishna Ayyar is posted to the Nellore District to act as Drafts-man.

6—8—22.

52. M. R. Ry V. P. Narayana Menon, Ranger IV grade on special duty under the orders of the District Forest Officer, Chittoor is posted to the charge of Mamandur Range of the same District in relief of Probationary Extra Assistant Conservactor Mr. Mohamed Amir Padsha Sahib transferred to South Cuddapah District.

Fourth Circle.

8—9—21.

53. Ranger M. R. Ry., V D. Ramalingam, is granted paivilege leave for 9 days from 17—7—1921 to 25—7—1921 both days inclusive a recommended by the District Medical and Sanitary officer.

10—12—21.

54. The privilege leave granted to M. R. Ry.. D. Srinivasachari, Ranger IV Grade, in this office Service Order No. 137 of 1921, dated 30—8—1921, till 14—10—1921 inclusive, is extended by one day.

2—1—22.

55. M. R. Ry., S. G. Venkataramanan, Ranger, VI grade. in charge of Vaiyampatti Range, South Salem Division, is appointed as Instructor, Vernacular Training School, to be held in the North Salem Division, during the Session 1922.

He should report in Salem.

(2) M. R. Ry., T. Kesavalu Nayudu, Forester I grade, Central Salem Division, is appointed as Assistant Instructor, Vernacular Training School, to be held in North Salem Division. during the Session 1922.

(3) M. R. Ry., C. D, Parthasarathi Chetti, Ranger, IV grade, on special duty, East Salem Division, is posted to the charge of Vaiyampatti Range, South Salem Division.

2—1—22

56. M. R. Ry., S. Ramanujam Sesha, Ranger VI grade, on special duty, Central Salem Division, is granted leave for one year (privilege leave for 10 days and the rest furlough on half salary) from 3—1—1922 or date of relief.

3—1—22.

57. M. R. Ry. S. Nageswara Ayyar, Supernumerary Ranger, on spike duty, North Salem Division, is granted privilege leave fron 14th to 28th December 1921 inclusive

10—1—22.

58 This office Service Order No. 179—21, dated 4—12—1921 granting privilege leave to Saiyid Yahia Sahib, Ranger VI grade, Chitteri Range, East Salem Division, is cancelled.

10—1—22.

59. The following transfers of Rangers in East Salem Division, are ordered :—

Name	Grade.	From	To
R. Manikkam Pillai.	III	Kallakurichi Range.	Chitteri Range
Syed Yahia Sahib.	VI	Chitteri Range.	Kallakurchi Range.

10—1—22

60. Para 3 of this office Service Order No. 1 of 1922, dated 2—1—1222 posting Ranger C. B. Parthasarathi Chetti to the charge of Vaiyampatti Range, South Salem Division, is cancelled.

(2) M. R. Ry. T. V. Govinda Rao, Ranger V grade, on special duty, East Salem Division, is posted to the charge of Vaiyampatti Range, South Salem Division.

15—1—22.

61. M. R. Ry., K. L. Munisami Ayyar, Ranger I grade, *Sub-protem* in charge of Salem Range, Central Salem Division, is granted 6 months leave from date of relief.

(2) M. R. Ry., T. P. Palanikumaran Pillai, Supernumerary Ranger on special duty, West Vellore Division, is transferred to Central Salem Division to the chargo of Salem Range and will relive No. 1 at once.

25—1—22.

62. R. Ry., P. A. Krishnaswami Mudaliar, Ranger V. grade, North Salem Division, is granted furlough on average salary from 18—12—1921 to 30—1—1922, both days inclusive.

22—1—22.

68. This office Service Order No. 9 of 1922, dated 10—1—1922 ordering transfer of Rangers Saiyid Yahia and Manikkam Pillai, is cancelled.

(2) Saiyid Yahia Sahib, Ranger VI grade, in charge of Chitteri Range, East Salem Division, is transferred to Central Salem Division for charge of Salem Range, on relief by No. 4.

(3) M. R. Ry., T. P. Palanikumaran Pillai, Supernumerary Ranger in charge of Salem Range, will on relief by No. 2 return to West Vellore Division, for special duty.

(4) M. R. Ry., P. A, Krishnaswami Mudaliar, Ranger V grade, on return form leave on 31—1—1922, is posted to the charge of Chitteri Range, East Salem Division.

(5) M. R. Ry., R. Manikkam, Ranger III grade, on relief by No. 7 to North Salem for charge of Dharmapuri Range.

(6) M. R. Ry., Saiyid Munavar, Ranger V grade to proceed to Krishnagiri Range, West Vellore Division, to relieve No. 7.

(7) M. R. Ry., K. P. Krishna Ayyar, on relief by No. 6, is transferred to East Salem for charge of the Kallakurichi Range.

7—2—22.

64. M. R. Ry., S. M. Srinivasagam Pillai, Ranger V grade *subprotem*, North Salem Divison, is reduced to VI grade for a period of six months, with effect from 7th February 1922.

7—2—22.

65. S. Ramalingam Ayyar, Supernumerary Ranger was in charge of Denkanikota Range from 1—2—1922 to 7—1—1922 both days inclusive.

5—2—22.

66. M. R. Ry., C. D. Parthasarathi Chetti, Ranger IV Grade, on special duty, East Salem Division, is granted privilege leave on urgent private affairs for one month from date of relief.

11—2—22.

67. M. R. Ry., T. P. Palanikumaran Pillai, Supernumerary Ranger, on relief of Salem Range, is posted to the charge of Shevaroys West Range, Vice Mr. A. R. Braud, Extra Assistant Conservator of Forests, appointed as Junior Instructor in the Madras Forest College or until further orders.

(2) This cancels para 3 of this office Service Order 24 of 1922 dated 29—1—1222 transferring No. 1 to West Vellore.

18—2—22.

68. Kesavalu Nayudu, Forester I grade, Central Salem Division, and Junior instructor, Vernacular Training School, North Salem Division, is reverted to his pormanent appointment of Forester from date of relief.

(2) S. Ramalingam Ayyar, Supernumerary Ranger, North Salem Division is appointed as Junior Instructor, Vernacular Training School and relieve No. 1 forthwith.

20—2—22.

69. M. R. Ry., V. D. Ramalingam, Ranger VI grade, on return from suspension, is posted to the charge of the Namakkal Range, South Salem Division.

(2) M. R. Ry., S. Nagalingam Pillai, Ranger VI grade, *subprotem*, on relief by No. 1, is posted for special duty in the South Salem Division.

Fifth Circle.

16—11—21.

70 M. R. Ry. K. S. Ramiah, Ranger, IV Grade, is granted privilege leave for 7 weeks from 3rd September 1921, in continuation of the extension granted in this office S O. No. 88 of 1921 dated 14th August 1221.

17—11—21.

71. The leave for 15 days from 18th August 1921 granted to M. R. Ry, M. Gulab Singh, Ranger, VI grade, Kollegal in this office No. 2221, dated 2nd September 1921, is treated as furlough on full average salary.

20—11—21.

72. Ranger M. R. Ry, N. S. Eswara Ayyar, VI grade, is transferred from North Coimbatore to do duty under Mr. Lemos (Temporary Extra Assistant Conservator) in the Tinnevally District.

1—12—21.

73. On relief by Ranger Mr. Syed Ibrahim Albiz. Ranger, M. R. Ry, Gulab Singh is transferred to North Coimbatore, to work as the District Forest Officer directs.

9—12—21.

74. Ranger, M. R. Ry, Jaganatham Pillai, is transferred (from South Coimbatore) to North Coimbatore district on the expiry of his leave.

9—12—21.

75. Ranger, M. R. Ry, S. M. Krishnasawmy Ayyar is reduced one grade, from 1st December 1921, for six months.

13—12—21.

76. Mr. Syed Ibrahim Albiz Saheb Forest Ranger is granted privilege leave for a month and a day from the 6th November last.

20—12—21.

77. M. R. Ry, S. Chinnadurai Pillai, Ranger, II grade is granted combined leave for 3 months and 15 days from 16 October 1921 (Privilege leave for 1 month and 1 day and furlough on full average salary for remaining period.)

22—12—21.

78. In supersession of North Coimbatore District Forest Officer's S. O Nos. 223 of 21, dated 11th July 1921, this Office S. O. Nos. 88 of 21, dated 14th August 1921, and 114 of 21, dated 16th Novemberr 1921, M. R. Ry, K. S. Ramiah Ranger, IV grade is granted combined leave for four months and 2 days (from 5th July to 6th November 1921 inclusive) privilige leave for 3 months and 19 days and furlough on half average salary for the remaining period.

23—12—21.

79. Mr. S. Chinnaswami Pillay, B. A., Ranger, II grade, is on the expiry of his leave (3 months and 15 days leave from 16—10—1921) transferred from Tinnevelly to North Coimbatore Division to be put in charge of one of the Ranges by the District Forest Officer.

23—12—21.

80. The following promotions are ordered in the 'Foresters' class with effect from 1st September 1921 :—

Name	Permanent Grade.	Grade to which promoted	Remarks.
K. O. Anandan,	III	II (permanent.	—

25—12—21.

81. Mr. M. P. Philips, Probationary Ranger, Tinnevelly Division, is granted privilege leave for 2 months, with effect from 24th October last, with permission to affix the Christmas holidays.

4—1—22.

82. M. R. Ry. Chidambara Ayyar, Ranger, IV grade, Mettupalayam Range is transferred, on relief by Ranger. Mr. S. Chinnadurai, from North Coimbatore District to Madura District to charge of Kodaikanal Range.

2. M. R. Ry, K. Kunhiraman Menon, Ranger, VII grade, on relief by No. 1, is transferred to Tinnevelly District, to work under the District Forest Officer.

12—1—22.

83. Reference:— Tinnevelly District Forest Officer's R. O. C. No. 1857-21 dated 2nd January 1922, requesting to grant combined leave for

1 month and 17 days, from 18—11—1921 i. e. privilege leave for 6 days and commuted furlough on full salary for the remaining period to M. R. Ry, S. M. Krishnaswamy, Ayyar, Ranger. Approved.

27—1—22.

84. In continuation of the leave granted in this Office S. O. No. 125 of 1921, dated 20th December 1921, M. R. Ry, S. Chinnadurai Pillai, Ranger, II grade, is granted furlough on full average salary for 3 months,

30—1—22.

85. Ranger M. R. Ry, M. Sankaran Nair of Kollegal District is transferred to Tinnevelly District to work under Mr. Lemos until further orders. He should proceed to Ambasamudram and report himself to Mr. Lemos.

31—1—22.

86. Owing to the Chief Conservator's order to transfer 6 posts of Rangers in excess of the cadre in this Circle, the following transfers are ordered:

(1) M. R. Ry, S. Chinnadurai Pillai, Ranger II grade, is transferred on the expiry of his leave, to the 2nd Circle.

(2) Ranger, M. Syed Ibrahim Albiz Sahib, IV grade, Kollegal, is transferred, on the expiry of his leave, to the II Circle.

(3) Ranger, M. R. Ry, A. M. Srinivasulu Naidu, VI grade is transferred to the II Circle.

(4) Ranger M. R. Ry, N. S. Eswaram, VI grade, on the expiry of his leave, is transferred to the I Circle.

(5) Ranger, Mr. J. D. Theodore, VI S P. T. (Tinnevelly District,) is transferred to the I Circle. (on the expiry of his leave.)

(6) Ranger M. R. Ry. S. M Krishnaswamy Ayyar, IV grade (Tinnevrlly District) (reduced to V for 6 months from 1—12—1921) is transferred to the I Circle.

31—1—22.

87. Syed Ibrahim Albiz Saheb, Ranger, IV grade, Kollegal, is granted furlough on average salary for 2 months in continuation of the Privilege leave granted to him in this Office S. O. No. 124 of 1921.

5—3—22.

88. The following promotions and confirmations are ordered in the Foresters class with effect from 1st January 1922:—

Name.	Present Grade.	Grade to Which Promoted	Remarks.
1. P Sankunni Nayar (North Mangalore, VI Circle)	III	II grade permanent.	Without prejudice to his appointment as a supernumerary Ranger.
2. P. A. Venkataraman (Forest College.)	Do	Do	

Sixth Circle.

24—11—21

89. M. R. Ry, C. Vasu, Ranger VI grade is posted to Palghat Division for special duty under Ranger Sankunni Menon.

4—12—21

90 M. R. Ry. A. G. Jesudasan Pillai Ranger VI grade is granted furlough on average salary for 3 months from 3rd October 1921 in continuation of the privilege leave for one month granted to him by the District Forest Officer, South Mangalore.

8—12—21

91 The following postings of Rangers are ordered:—

(1) Supernumerary Ranger, P. Sankunni Nair to the charge of Mangalore Range.

(2) M. R. Ry. M. P. Subbiah, Ranger VI grade on special duty, Dhoni, to the charge of Pathur Range.

The posting of Ranger, A. J. Jesudasan Pillai to Mangalore Range ordered in this office S. O. No. 61 dated 12th November 1921 is cancelled.

14—12—21

92 (1) Under article 260 of the C S. R. M. R. Ry. B. Sambamoorthy Iyer, Ranger V grade in charge of Sigur Range is granted privilege leave for two months from date of relief.

(2) M. R. Ry. S. V. Doraiswami aiyer, supernumerary Ranger is posted to the charge of Sigur Range:

To join immedediately on relief of, by Ranger Appiah.

24—12—21

93 A. G. Jesudasan Pillai, Ranger V grade on leave, is posted to the charge of Sigur Range, in relief of Ranger, B. Sambamoorthy Ayyar to join on or before 1st January 1922.

This cancels the posting of supernumerary Ranger. S. V. Doraiswami aiyer to the charge of Sigur Range ordered in this office S. O. No. 68 dated 14--12—21.

28—12--21

94 M. R. Ry. C. S. Jesudasan Pillai Ranger VII grade is granted privilege leave for 4 months from 15th January 1922 and furlough on half pay from 15th May 1922 to 7th October 1922 inclusive, preparatory to retirement.

28—12—21

95 Mr. J. S. Rowland, Ranger IV grade, is granted privilege leave for two months from date of relief.

24—12—21

96 The following transfers and postings are ordered:—

(1) M. R. Ry. C. Karunakara Menon, Ranger V grade is transferred from Palghat to Wynad and posted to the charge of Chedleth range. To join on the 15th January 1922.

(2) Supernumerary Ranger, K. Raghavan is transferred from Nilambur to Wynad to the charge of Kanoth Range, to join atonce.

(3) Supernumerary Ranger, S. V. Doraiswamy ayyar is transferred from the Nilgiris to Wynad for special duty in Chedleth Range, to join atonce.

22—1—22

97 The following promotions of Foresters are ordered with effect from 1st October 1921:—

1. K. Raghavan, from II grade to I grade permanent.

2. S. V. Doraiswami Ayyar, from III grade to I grade permanent.

3. P. Kannan, from III grade to I grade permanent.

without prejudice to their appointments as Supernumerary Rangers.

9--2--22

98 Mr. J. S. Rowland, Ranger IV grade, who was granted privilege leave for 2 months from 11—1—922 in this office S. O. No. 71/21 dated 28—12—21 is transferred from the Wynaad to the Nilambur division and permited to join duty.

(2.) The unexpired portion of his leave (from 31—1—1922 to 12—3—1922) is cancelled.

12—2—22

99 M. R. Ry. B. Sambamurthi Ayyar, Ranger V grade on return from leave is posted to the charge of Palghat range.

15—2—22

100 Mr. S. F. Lobo, Ranger VII grade, working under the Forest Research Officer, Coimbatore, is granted privilege leave for 4 months from date of relief by Ranger, K. C. Joseph.

17—2—22

101 M. R. Ry. C. Vasu, Ranger VI grade on special duty in Palghat division is granted privilege leave for 3 months from date of relief.

M. R. Ry. K. G. Monappa, Ranger VI grade is granted privilege leave for 2½ months from date of relief.

M. R. Ry. N. Gopalan Nair, Ranger VII grade in charge of Olavakkode depot (Palghat division) is transferred to Mudumalai Range as Assistant Range Officer. To join on relief.

102 The following promotions are made in the Ranger class with effect from 1st December 1921 in the vacancies due to the confirmation of Mr. C. Mohony, Ranger II grade, as Extra Assistent Conservator and to the retirment of M. R. Ry. D. Srinivasachariar, Ranger IV grade.

1. Mr. Hussain Khan Sahib, Ranger II grade S P. T. to be Ranger II grade.

2. M. R. Ry A. Krishnamacharya, Ranger III grade S. P. T. to be Ranger III grade.

3 M. R. Ry T. E. Varadacharya, Ranger IV grade S. P. T. to be Ranger IV grade.

4. M. R. Ry. K. Tatacharya, Ranger IV grade S. P. T. to be Ranger IV grade.

5. M. R. Ry. C. S. Ramanathan, Ranger V grade to be Ranger IV grade S. P. T.

6. M. R. Ry. P. Dhananjaya Rao, Ranger V grade to be Ranger IV grade Subprotem Vice M. R. Ry S. Duraisami Ayyar reverted to V grade.

7. M. R. Ry M. Rama Rao Kini, Ranger V grade S. P. T. to be Ranger V grade.

8. Mr. P. M. Mathew, Ranger VI grade to be Ranger V grade S. P. T.

9 M. R. Ry K. Appayya, Ranger VI grade S. P. T. to be Ranger VI grade.

10 M. Sankaran Nair, Ranger VI grade S. P. T. to be Ranger VII grade permanent and to continue as Ranger VI grade S. P. T.

11 M R. Ry A. Ramanirtha Pingale, Ranger VII grade S. P. T. to be Ranger VI S. P. T.

12. M. R. Ry S. V. Duraiswamy, Supernumerary Ranger to be Ranger VII grade S. P. T.

13. M. R. Ry K. R. Subraimanyam, Supernumerary Ranger to be Ranger VII grade S. P. T.

Advertisements.

The following is a list of timber species required for the Gass Museum, Such of them as are procurable may be sent to the Principal *together with botanical specimens pertaining to each species and a sample of bark about 8" square.*

The long panels should be as broad as available, 6 ft. long and 3" thick. The short panels 2 ft. long and 1" thick (breadth maximum available).

Aglaia Roxburghiana	Gmelina arborea
Aquilaria Agallocha	Gluta travancorica
Adina cordifolia	Grewia asiatica
Artocarpus integrifolia	Hardwickia pinnata
Albizza procera	Hardwickia binata
Acacia dealbata	Holoptelea integrifolia
Acrocarpus fraxinifolius	Hydnocarpus Wightiana
Chickrassia tabularis	Hereteria papilio
Dillenia indica	Litsaea zeylanica
Dillenia pentagyna	Machilus macrantha
Dysoxylon malabaricum	Premna tomentosa
Diospyros tomentosa	Sterculia fœtida
Diospyros paniculata	Srerculia villosa
Diospyros ebenum	Sterulia guttata
Dalbergia sissoo	Stereospyrmum chelonoides
Erythroxylon monognnum	Stephegyne parvifolia
	Tetrameles nudiflora

brought none with them, and had expected, the master' to make all arrangements for them. This unfortunately, the young coffee planter had not realised, and he had made no provision whatever for feeding the coolies. My boy had fortunately brought an oil lamp with him, as he had not trusted the appearance of the unknown acetylene lights, and so we were not condemned to eat our first dinner in darkness. Three of the coolies were told off and ordered to set out early next morning to go and fetch food for themselves and the rest of our retinue, while we would push on forward slowly in search of our lost tribe, which had not yet turned up. And so we turned into our tent, and our boys shut themselves up closely in theirs, while the coolies sat huddled up under the shelter of a sort of one-walled hut they are in the habit of making for themselves, consisting of a large hurdle made of bamboos, and broad leaves laid one on the top of the other, like the feathers of a duck's back, so as to render it watertight, and propped up as a shelter from wind and rain on two props. And there they sat late into the night murmuring away to each other and searching diligently on each others' heads and bodies for little biting insects, for all the world like a cage full of monkeys.

Next morning we were up early and pushing on with the striking and packing up of the tents, and then after break-fast we marched on again. Our path led us now through a jungle which consisted almost solely of a species of close growing bamboo, and we walked in what was to all intents and purposes a tunnel through

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Forest Life in India.

V. EXPLORATION.

(Reprinted from 'The Varsity' June 3. 1913)

ONE of the advantages of being a District Forest Officer is that you can arrange your tours and expeditions to suit your own convenience. Once when I was up in the hills staying with some coffee planters who leased their land from the Forest Department, and attending to the measuring up and surveying of the areas they had cleared, they spoke of a tribe of white natives of whom they had heard. I had also heard a report of the existence of such a tribe, from quite a different source, but had given no credence to it. This confirmation of the rumour

I had heard, however aroused my interest, and a young planter who was present and who had not been long in the country offered to accompany me in a search for this tribe. We hardly expected to find them, as they were said to be particularly retiring in their habits, but we came to the conclusion that it would do no harm to try. The tribe was supposed to live along the banks of a river just where it flowed through the corners of two native states and a bit of British India as well, and not more than 15 or 20 miles from the coffee estate where we were. The young planter with whom I was going said he would make all arrangements about feeding, and would take one tent, as he was on the spot, while my headquarters was a long way off; I was only to bring a small tent I had with me, and my camp cot and bedding without which one does not move about at all in India. My tent was to shelter us, and the other was for the use of our boy and cook. And so we started, with about 30 coolies carrying our baggage on our march through damp evergreen jungle, in search of the white natives. The jungle through which we were marching swarmed with leeches, and as there were no regular paths but only game tracks to move along we left our dogs behind under the care of the servants in the planter's bungalow.

We halted, after doing about 12 miles through this sort of country, for lunch and had hardly settled down to it when up rolled two of our dogs ecstatically pleased with themselves, very tired, and covered with blood and leeches, having broken loose some hours after we left and come straight after us. They had

needless to say, never been through that particular jungle before, there were no beaten paths for them to follow, but they had come straight through by scent, past the line of coolies who were behind us, past our boys—who had always fed them on to where their masters sat, and once arrived there they settled down with beaming faces and grinning mouths perfectly satisfied with themselves and their exploit. Of course it was out of the question to send them back then, and so they finished the trip with up. After lunch we moved on again, but not very far as there was said to be a possibility of finding some of the tribe we were in search of where we were. So we pitched our tent by the river and went out to fish and bathe, taking our rifles with us in case there was a chance of a shot. The bathing however, did not come to much, as before we had actually stepped down into the water we noticed what appeared to be half sunken log floating in the water and which on investigation turned out be a small crocodile, some six to eight feet in length. So we contented ourselves with a wash near the bank, and didn't feel inclined to do much swimming, though as a matter of fact the crocodile would most probably have left us severely alone if we had ventured out into deeper water.

Our fishing also was not very successful, and we got back to camp when it was just about dark, to find that the lamps which the planter had brought, and which were patent acetylene ones, would not work, and that the coolies were all asking for rice, as they had

brought none with them, and had expected, the master' to make all arrangements for them. This unfortunately, the young coffee planter had not realised, and he had made no provision whatever for feeding the coolies. My boy had fortunately brought an oil lamp with him, as he had not trusted the appearance of the unknown acetylene lights, and so we were not condemned to eat our first dinner in darkness. Three of the coolies were told off and ordered to set out early next morning to go and fetch food for themselves and the rest of our retinue, while we would push on forward slowly in search of our lost tribe, which had not yet turned up. And so we turned into our tent, and our boys shut themselves up closely in theirs, while the coolies sat huddled up under the shelter of a sort of one-walled hut they are in the habit of making for themselves, consisting of a large hurdle made of bamboos, and broad leaves laid one on the top of the other, like the feathers of a duck's back, so as to render it watertight, and propped up as a shelter from wind and rain on two props. And there they sat late into the night murmuring away to each other and searching diligently on each others' heads and bodies for little biting insects, for all the world like a cage full of monkeys.

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this, which had been made by elephants, bison, and various other animals. We kept on hoping we might meet a shootable animal of some sort, as our unfortunate coolies were clamouring for food and we had at last to decide that we would kill the very first edible animal we saw. Luckily we met a sambur soon after, and though it was absolutely useless as a trophy with much regret we killed it as food for our followers. The path we were on seemed to be a main thorough-fare in the animal world, as other smaller ones kept on joining it, and eventually it came out at the largest and best specimen of a salt lick that I have ever seen. A flat place ten square yards or more had been eaten out into the side of the hill with a perpendicular bank at the back of it of from six to ten feet in height. In this we could see at various hights the marks where the different animals had been to eat the salt mud they like so much at certain times of the year, the higher part being worn quite smooth by the elephants. A little further on we found fresh marks of elephants, and then an open space of about an acre in extent quite clear of vegetation and with the bare earth trampled hard and flat. We at once both of us exclaimed that this must be one of the elephants' dancing places described by Rudyard Kipling in the ***Toomai of the Elepants***. We asked our shikaris what was the meaning of the open space, and they replied at once 'oh, this is where the elephants play.'

Shortly after this we got out of the tunnels through which we had been marching into more jungles, and here we

decided to pitch our camp. That night we were rather troubled with elephants moving about, and we had to keep fires going all night to keep them away as they are very inquistive, and like to enquire in anything new they find in their forests, and we had no desire to have our tents investigated at mid-night by playful elephants.

The coolies we had with us, who were tribesmen of that vicinity, at this point began to be rather doubtful as to whether we should see the white people we were in search of, not because they weren't there, but beause they were very shy and retiring. I have little doubt that they had found some of them and these men had refused to come and be inspected by the 'masters,' It was of course no use our trying to find them if they did not want to be found, as they would be able to disappear in the jungle and hide from our sight even more easily and completely than wild animals. However, we stayed on a day or two wandering about and changing camp, hoping that might get used to us, and be persuaded to show themselves. However. they did not do so; and we had to get back to our work, and so reluctantly we retraced our footsteps, leaving the problem of the white tribe unsolved. I have no doubt that they do exist, as two different tribes of hillmen have separatly spoken to me of them, and indicated the same locality in each case as their habitat; and I think also that if a white man who was trusted by the hillmen were to spend a month or six weeks

in those jungles that it is quite likely that the white natives would show themselves, and it would probably be of great scientific interest if they did. I do not think they are just light coloured natives for I questioned my informants on this point and they always said, no, no, that these people were quite white and looked like sahibs

"CHOKRA."

Breaking of rocks by means of Fire

(and its advantages over Blasting with Explosives)

That blasting by fire is one of the simplest, most effective and very commonly practised method of stone removal, is a fact well known to most Forest Officers and others, who are intimately connected with Road and Building construction in forest areas. As such I do not profess to be the revealer of an unknown phenomenon, but my object is to impress on my readers, through the medium of this valuable journal, that this method can advantageously be used whenever opportunity arises, as it is highly economical and almost sure of success.

Whenever we have to encounter huge rocks, such as Granite and Sand stone in sheet or massive formation on the road surface, impeding the progress of the road work, the best and cheapest plan

is to adopt this method of removing the rocks, instead of blasting by means of costly explosives, such as dynamite, gun cotton etc., involving danger and skilled labour, and often having discouraging results. By this, I do not speak against the advantages of the latter method (provided skilled labour and funds are available) but, considering the simplicity and cheapness of the former method, one, especially a Forest Officer would prefer it, for it involves only some fire wood (which is a forest produce) and unskilled labour.

Now, dealing with the subject itself, I have to say, that first of all, if the blasting is to be done in or near a forest area, the chief precaution to be taken is to clear all cumbustible material, lying scattered in the vicinity of the rocks which are to be removed, so as to prevent the fire from spreading into the forests

Secondly sufficient quantity of fire wood required for the operation should be collected and stacked near the rocks to be removed. The quantity of fuel to be used for a unit of 100 cft. of rock varies according to the density of the rocks to be blasted and the species of fire wood available No data on the subject is available as no special experiments have been conducted. However those engaged in this sort of blasting soon get to know exactly how much fuel is required for any special kind of rock.

It is important that the clearing of brushwood and collection of fuel should be carried out on the day previous to that fixed for the burning, in order that the burning may be started very early on

the morning of the following day. The full length of the day may thus be utilized in burning, proper supervision exercised and the subordinate in charge of the work enabled to extinguish the fire before he leaves the work spot. Any danger of the fire spreading into the neighbouring forests is thus reduced to a minimum, if not altogether eliminated.

On the day fixed for the burning, supposing the object of the operation is to merely remove rocks, arrange the required amount of fuel on the top and sides of the rock to be blasted and set the heap of fuel alight. Go on adding fire wood until you think the rock is sufficiently heated, (Here again this is a matter of experience). Then stop adding fire wood and see that all wood already put on is completely burnt to ashes. If there are any remaining particles of fire on the rock put them out by throwing a few baskets full of moist earth on the particles of fire and mix them both so that the latter is entirely extinguished Leave the burnt rocks as they are; and on your return next morning, you will, to your surprise, observe that the uppermost surface of rock comes off in flakes You will also see that many deep cracks have occurred during cooling These cracks are then utilized and the different masses of rock are separated and levered apart by means of iron jumpers assisted by sledge hammers if necessary. No water need be poured on the heated rock as cooling is best effected by the action of dew.

If rocks of a specified size are required for building or other purposes, the fuel is so arranged that a surface of rock having the same

dimensions of the rock required, is left exposed, and is surrounded by fuel which is then set alight. The rock on cooling cracks along the line or lines which were occupied by the inner margin of the lighted fuel and can conveniently be removed by means of jumpers, or wedges driven in by heavy hammers

By this method as many blocks as are required can be removed with a little time and patience.

In some Districts, as a means of time saving, the burning part of the operation detailed above is carried out during the night This is open to objection for the following reasons.

(*a*) The benefit of the intense heat of the day for burning, and the lowest temperature obtainable during the night for cooling is lost.

(*b*) The results obtained are not nearly so successful.

(*c*) There being no supervision during the night time, the fire may spread into adjoining forest areas and extend without control.

In conclusion I should like to impress upon my readers that this method of breaking rocks by burning, although a crude one is, generally speaking, very effective and economical, is easily adoptable for all works

met with in our department, and needs only a few unskilled workmen.

The above facts are based on my personal experience gained while laying out a forest road in Ganjam, where the rssults were very satisfactory.

V. SUNDARESAN,
M. F. C. 1921-23 Division.

Working of Bamboos in Changarh Reserve of Nimar Forests.

(*Central Provinces*).

This Reserve is situated on the north bank of the Nurbadda and forms part of the northern limit of Nimar Division of the Central Provinces. It is about 99 square miles in extent, having a good growth of bamboos To facilitate the working the whole area has been divided into 3 bamboo felling series called :—(1) *Kaneri felling series*, (2) *Sirkia felling series* and (3) *Mathai felling series*. Each of these felling series is again sub-divided into 3 coupes. One coupe of each

felling series is worked every year. Thus the whole area is worked once in three years (i e. these areas are worked on a rotation of three years).

Rules for fellings are as follows :—

(1) Bamboo felling is prohibited between 1st of July and 1st of September of each year, because this is the rainy season. But now efforts are being made to cancel this rule, as it seems superfluous, for the extraction of bamboos during rains does not injure the clumps, nor does it in any way hinder their proper regeneration.

(2) No culm of the current year is allowed to be cut, as it is essential to retain a certain number of culms at least a year old in order to provide food for the underground expansion of rhizome, which sends up new culms The leaves of culms left in a clump manufacture sufficient food material, which is transported to the rhizomes which expand and send up new shoots It is thus that new culms are produced every year in a clump.

(3) All culms are cut within one foot of the ground : because the very high stumps left in a clump, besides increasing the danger from fire, make the subsequent exploitation difficult

(4) As far as possible bamboos are removed partly from the interior and partly from the circumference of a clump Congestion is thus avoided and the culms remaining in a clump are evenly distributed.

Work is not carried on departmentally, but bamboos are sold standing at the following rates:—Re. 1/9 per hundred bamboos extracted from *Mathni* and *Kaneri* F. S ; and Re. 1 per hundred from *Sirkia* F. S. This reduction in the latter case is due to the Forests being distantly situated from Khirighat, which is the only large market near the Reserves.

Purchasers desirous of extracting a small number of bamboos only buy licenses from the license vendors, employed by the Forest Department and posted at convenient places. Every license-vendor is given a copy of the above mentioned rules, and a list of the rates for different felling series. Before issuing a license he explains the rules to the purchasers. If the purchaser is willing to take the license on the specified conditions he is charged the due fee and is given a duplicate license The following particulars are contained in every licence issued :—(a) the name and resident of license holder, (b) name of the felling series for which the license is issued (c) Produce with the quantity for which the license is issued, (d) the time (which is generally 24 hours in the case of petty purchasers) after which the licence expires-

Purchasers who wish to extract a large number of bamboos purchase permits from the Range Officer. These permits give the purchasers a definite period for cutting and transporting the bamboos to the "Paras" (*Timber station*), where the Range Officer, or his assistant checks the produce removed with the permit. If the quantity removed corresponds with the quantity stated in the permit, the purchaser is,

made to buy a second permit, paying the total fee for the bamboos removed. In case the purchaser removes a few bamboos in excess of the number noted in the permit, he is made to pay the fee for the total number he has removed ; but if he has removed less than the quantity noted in the permit, he has to pay the fee for the greater quantity.

Thus annually about 3 lakhs of bamboos are extracted from this Reserve.

PRITHI CHAND,
1921-23 Division.

Boswellia Serrata.

(*Turpentine Tree*).

This species belongs to the Natural Order Burseraceae, and is generally found in dry deciduous forests. It grows to a moderately large size, with stooping branches and a light spreading crown. The bark is yellowish-red in colour, fairly thick, smooth and exfoliating in thin papery flakes. It is resinous inside.

On suitable localities the tree grows to a height of 30 to 50 feet and attains a girth of 4 to 6 feet. The wood is moderately hard, whitish and with very little heart-wood, which has a brown colour. It weighs 25 to 30 lbs. per cft. when dry. It is used for rough planking, box making and match manufacture. The green wood is used as fuel for lime burning in some parts of khandesh. A fragrant gum—oleo -resin exudes from wounds in the bark and is used as incense and also in medicines. It also promises to yield, on distilation, rosin and turpentine which are of considerable economic importance. In the Satapura forests of the Bombay Presidency it is found growing gregariously, and in abundance on the southern slopes of those hills, where experiments are at present being conducted to ascertain the percentage of turpentine and rosin which can be obtained from the gum—oleo—resin which is collected locally.

The gum is collected in the following manner:—In the evenings the bark is scraped to a depth of ¼ inch all round the tree and to a width of 4 inches, and the gum is then collected after three days. So that the collection of gum is done twice a week. The gum is insoluble in water.

Distribution and Habitat.

It is common on dry hills throughout India (except Assam and Burma). It is found growing gregariously on the Satapura hills of the Bombay forests, Nimar, and in Central India. It is also

brought none with them, and had expected, the master' to make all arrangements for them. This unfortunately, the young coffee planter had not realised, and he had made no provision whatever for feeding the coolies. My boy had fortunately brought an oil lamp with him, as he had not trusted the appearance of the unknown acetylene lights, and so we were not condemned to eat our first dinner in darkness. Three of the coolies were told off and ordered to set out early next morning to go and fetch food for themselves and the rest of our retinue, while we would push on forward slowly in search of our lost tribe, which had not yet turned up. And so we turned into our tent, and our boys shut themselves up closely in theirs, while the coolies sat huddled up under the shelter of a sort of one-walled hut they are in the habit of making for themselves, consisting of a large hurdle made of bamboos, and broad leaves laid one on the top of the other, like the feathers of a duck's back, so as to render it watertight, and propped up as a shelter from wind and rain on two props. And there they sat late into the night murmuring away to each other and searching diligently on each others' heads and bodies for little biting insects, for all the world like a cage full of monkeys.

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variable In Bhandara Division where it grows most commonly on gneiss, it is said to coppice well, if cut in dry whether, Natural reproduction by seed is also common.

Artificial regeneration :—

The tree can easily be propagated by large cuttings, which are best planted in the rainy season when the soil is moist. These cuttings once established can stand severe drought There have been examples of such cuttings sprouting and producing flourishing shoots when well established seedlings of other species have died owing to severe drought.

At present the trees are not felled in the Satapuras as the Government intends starting a distillery for turpentine and rosin. They are awaiting the results of the experiments that are now in progress, It is hoped that the distillery will very shortly be started, with which the species which it is at present of little importance and so well represented will acquire a greater economic value.

G. V. MOGHE,
M. F. C. 20-23
Division.

Notes on Hopea Parviflora.

(1) *Shape and Development :—*

Hopea Parviflora is a tall evergreen tree growing to a maximum height of about 120 feet with a diameter of 4 to 5 feet. The bole is usually long and straight. The tree has a very handsome and majestic appearance which can be easily recognized from a distance. The branches are crowded towards the top and the crown has a charactristic conical appearance which is aesthetically magnificient.

(2) *Leaves, flowers and fruits :—*

The leaves of Hopea are bright green, ovate or ovate lanceolate, 2 to 4 inches × 1½ to 2 inches, petiole ⅓″, coriaceous, lateral nerves 8 to 12 pairs with their axils often glandular. Flowers cream coloured, sweet scented, ⅛″ across on numerous pedicels borne on terminal or axillary panicles. The fruit is an ovoid nutlet ½ to ¾″ long with an acuminate apex and has generally two straw coloured wings (persistent sepals transformed into wings) one on either side These wings are also coriaceous, oblong and 6 to 8″ long, and aid the wide dispersal of the fruit

(3) *Distribution and Locality :—*

The tree is found in the evergreen forests of the Western

Ghats from South Kanara downwards It grows gregariouly especially along river banks and in coastal forests right down to Tinnevelly.

(4) ***Climate***:—

In its natural habitat the absolute maximum shade temperature varies from 95 to 100°F and the absolute minimum from 60 to 65°F.

(5) ***Rain fall and altitude***:—

A mean annual rain fall of 35 to 150 inches appears to satisfy the requirements of the species. which is formed growing at a max. elevation of 3500 feet above mean sea level, but the species is said to be less gregarious below 1000 feet.

Associates:- ***Vitex altissima***, ***Artocarpus hirsuta***, ***Pterocarpus marsupium***, and ***Calophyllum spp*** are someof its favorite associates,

(6) *Soil*:—

Hopea grows on almost any soil but thrives best on a deep sandy loam. It requires a fair amount of moisture but it grows well even in comparatively dry situtation as it has a long and deep tap root (with few lateal roots) which penetrats into the moister strata below. The soft alluvial soil of river banks and nallas forms an ideal habitat for a gregarious crop of Hopea.

It cannot thrive in water logged localities and requires a moderately well drained soil.

(7) ***Character and Composition of Hopea Forests***:—

Hopea has a tendency to form a pure crop. A single tree in the midst of a forest is capable of bringing about natural regeneration within a radius of one furlong all round. It is an ever-green tree but is not averse to deciduous forests provided it gets sufficient shade until it is established. After its pole stage it is no longer a shade bearer and requires a good deal of over head light, where its crown becomes less conical and expands. The canopy in a Hopea ferest is always dense and the soil is in consequence, well protected.

(8) ***Method of treatment***:—

Coppice, simple or with standards, is out of the question for a crop of Hopea, as it is seldom, if ever, grown, except for timber. Further it does not coppice well. The selection method seems therefore to be best suited to this species and is simple and elastic; but a treatment of "Regular High Forest" with periodical thinnings should prove satisfactory expecially, if the Hopea was grown side by side with an equally valuable species, (as Artocarpus hirsuta in the Pilarkan Reserve of the North Mangalore District,) while other trees of the less important species are gradually removed preferably by girdling. I am afraid it will take so long

a time to achieve this ideal, that one is almost inclined to look upon it as impracticable and is therefore reluctant to attempt it. Hopea seedlings are immune from grazing but fire is its worst enemy froom which it must be "rigidly" protected until regeneration is well established after which a system of "partial" protection may be adopted

(9) *Reproductive Power*:—

As already stated, Hopea does not reproduce itself by coppice shoot. It bears seed when quite young. The flowering is biennial and gregarious, being confined to definite localities at one flowering It seeds profusely. The fruit, in some trees ripen in may while in others they ripen in August The first flush which falls just before the break of the South west Monsoon germinates successfully and produces strong and healthy seedlings. The attachment of the fruit to the tree is very weak, and it falls with the first rains preceeding the Monsoon. The seed germinates in a week to a fortnights time and extensive patches of regeneration are to be seen under almost every seed bearing tree.

(10) *Artificial regeneration*:—

The seeds do not retain their power of germination for a long time, and should be sown in about 3 or 4 days after collection; A slight drizzle every day for about a week after sowing will do an immense amount of good and will bring

about speedy germination, after which frequent showers for the subsequent development, of the young seedlings are necessary.

(a) *Preservation of seeds*:—

If there is not sufficient rain fall for sowing, the seeds should be preserved by evenly spreading them ina shady locality. They should be kept away from moisture as the radicle quickly finds its way through the fruit and if not sown immediately the radicle dries up and the seed becomes sterile.

(b) *Sowing*:—

Broad Cast sowing yields good result but systematic sowing with proper care is naturally to be preferred. (providing funds permit). The following points should always be borne in mind (i) the seed should be laid flat in their natural position (that is with their wings horizontal and both touching the ground.

(2) The wings should not be cut off or otherwise damaged.

(3) The seeds must not be buried under earth, but should only be lightly covered. The reason for this is obvious. In germination, the radicle emerges from near the appex of the fruit and curving downwards rapidly forms, a tap root This radicle has a pointed and sticky surface, which if it does not strike the earth, immediately will, on account of exposure, dry

up and consequently lose its vitality. In the meantime, the elongation of the hypocotyl withdraws from the fruit the fleshy cotyledons which expand and are carried above ground, the young shoot appearing from between them. In broad cast sowing and when the seeds fall natuarlly from the parent tree, they lie flat on the ground and the wings help them to take up a position most convenient and advantageous for their germination.

(c) *Trans Planting:* -

Hopea has a long tap root, which should not be injured intrans-planting, which is invariably successful For transplanting, seedlings which are one year old (even older) are preferable to younger ones. There should be no delay between the removal from the nursery and the planting out into the root The day selected for the operation should be a rainy day if possible as the seedlings are unable to withstand the heat of the sun even for 24 hours. With a sufficient amount of shade and moisture the young transplants establish themselves in one or two week's time.

(d) *Artificial regeneration in South Kanara* :—

(1) Mr. D T Barry has successfully restocked with Hopea several fuel felled coupes (coppice with standards), and along foot paths, roads and lines of various Reserves The seedlings are healthy and have grown up to an average height of 20 to 25′ in the course of ten years. Sowings were mostly broad cast.

(2) Under orders of Mr. Tireman, conservator of forests VI circle, 1000 acres of forest in the Udipi Range of North Mangalore Dt. have been stocked with Hopea in the years 1920 and 1921. The seedlings are 12 to 18 inches high and have six leaves The method adopted was this:- Lines were cut (to serve as inspection paths) 3′ wide and at distance of 12 feet from each other. On one side of every line at a distance of 2 feet from one edge of it small patches of ground 2′ × 2′ were cleared and the soil loosened slightly. These patches were 12′ apart and were sown with 8 to 12 seeds. The object of having these patches in the heart of the forest and away from the lines was to avoid the seedlings being trampled down by men or cattle. The percentage of germination was very high. The blanks were filled up with seedlings one and two years old. It is new reported that there is scarcely a blank in the whole of 1000 acres.

(11) *Tending:* —

Hopea seedlings must be weeded twice or thrice a year for the first three years as tiny little creepers entwine the young seedlings and smother them. During the next few years this operation may be repeated once a year and should then be accompanied by cleanings and the admission of overhead light. Light thinning, getting rid of the suppressed and crooked stems, may be undertaken after this and repeated every fourth year until the

sapling stage is past. In the pole stage and thereafter Hopea does not tolerate shade. All inferior species may be girdled or felled and the Hopea stems kept evenly distributed and further apart This operation may be carried out once in every ten or twelve years. Under this method of tending the crop grows splendidly and reaches the age of exploitability (6 feet girth) in 60 to 80 years.

(12) Utility:—

The bark of Hopea is rusty brown in colour, somewhat rough, fissured and often exfoliating in rectangular flakes. Its inner bark is yellow or yellowish brown, $\frac{1}{8}$ to $\frac{1}{2}$" thick The heartwood is light brown which turns dark on exposure, close and even grained, uniform, very handsome and heavy (weighing from 60 to 65lb.) The pores are rather small, but numerors and uniformly distributed. The Annual rings are not very distinct but the medullary rays are fine and numerous The wood seasons well (especially under water) and takes a good polish. It is largely used for building purposes and railway sleepers. For rafters and beams it is often considered to be superior to teak and is durable. The branches and top pieces yield good fuel and charcoal. Its extra heaviness combined with its oily nature renders it immune from attack by white ants. It is thus of great value in underground construction of any sort. It is unfortunately rather too heavy for

furniture; However in spite of this, so great is the economic value of Hopea that we would not be surprised if it replaces teak in the near furture, for many purposes.

K. SANKARANARAINA RAO,
M. F. C. 1921–23.

The Permit System in the Ceylon Forest Department.

The Ceylon Forest Department has not yet commenced working its forests in rotation as is done in this Presidency, so the permit system—the primitive method—is still in vogue. Any person who pays the royalty for the required quantity and kind of produce is given a permit The permits are of different kinds and are issued in quadruplicate. The "original" is kept in the issuing office, the "duplicate" is handed over to the purchaser, the "triplicate" is sent to the Forest Guard of the beat and the "quadruplicate" is sent to the police "headman" of the locality

where the forest is situated. All three copies of the permit are returned to the issuing office within three days, after the realisation of the produce

A "felling permit" is first issued for major produce; and later, after felling has been done, a "removal permit" is necessary for the removal of the produce from the forest; for minor produce only one permit is issued, and covers both collection and removal. Inspection (after felling) before removal is not necessary as in the latter case.

For the removal of timber form private lands, a separate permit known as a "Private permit," which has been printed espically for the purpose, is issued.

In the past, fees were levied for all classes of permit forms, these fees being primarily intended to cover the cost of paper and printing. At the present time, however, such fees are not collected, and permits are issued free after the royalty has been collected.

Permit books are given in charge of the District Forest Officers ("Divisional Forest Officers" in Ceylon) and Range Officers Divisional Forest Officers are authorised to issue permits to any person to cover a maximum of twenty five trees, and for minor produce to the value of Rs 500/- Above these limits the sanction of the conservator of Forests has to be obtained. Range

Officers are empowered to issue permits to any person for not more than five trees, and in the case of minor produce to the value of Rs. 50 In both the above cases the maximum laid down is irrespective of the actual value of the trees.

A permit for minor Produce is issued on the payment of royalty for the required kind and quantity of produce But in the case of major produce or timber included in the twelve royalty classes of scheduled Timber, the Range Officer has to inspect the locality before a permit is issued. When any person desires to purchase a certain tree he informs the Range Officer of its species, girth and the locality where it stands. The Range Officer, accompanied by the applicant, proceeds to the spot, on an appointed day and measures the girth of the tree at 4′ 6″ from ground and estimates its probable height. If on inspection, the Range Officer finds that that tree should be felled on sylvicultural grounds and is over 4′ 6″ in girth (at breast height) then only can the tree be sold and the value recovered according to the number of cubic feet it contains (i. e. volume of workable bole) No part of tree, or a few cubic feet are sold, but the whole tree must be purchased. The only exception to trees of less than 4′ 6″ being sold is in the case of dead ones. If a purchaser buys a tree of any of the first three royalty classes (fixed in regard to species) then he has also to pay for the branch-wood over three feet in girth.

When a ' felling permit" is issued, the tree or trees in question are stamped with the beat hammer. Immediately the trees are felled the Forest Guard sends in a report to his Range Officer giving the measurements of each tree. Then the Range Officer goes to the spot and checks the girth at the butt end of the felled tree and also the actual height. If any error has been made by him in the original measurements, it is adjusted and a further recovery, if necessary, made from the purchaser Under no condition is refund of money made, unless the difference by an original over estimation is appreciable.

After issuing the removal permit the Range Officer stamps the felled tree with an "S" or "F" hammer: *i. e.* to show that the tree has either been sold (stamped "S") or given free (stamped "F") The removal of any such tree before marking constitutes an offence under the "Ceylon Forest Ordinance."

In the case of trees on private land so many inspections (as detailed above) are not necessary. The tree is felled and left lying near its stump. On application the Range Officer inspects the locality and satisfies himself as to its boundries and the correctness of the stump of the felled tree. If he has no doubt or suspicion, the tree (or trees) is stamped with the beat and "P" hammers (the latter to show that the tree has been felled on private land) and a permit is issued. A careful check is always exercised in the removal of produce from private lands as well

as from Government Forests, and to facilitate this check all produce has to be transported along prescribed routes given on the permits. If the removal is not completed within the allowed time, the produce or transit is liable to be stopped and on extension fee of 10% on the total value of the permit is recovered and an extension granted; similarly, when the produce is not felled within the period stated on the felling permit an extension fee is collected and an extension of time granted. A removal permit is issued only after the felling permit is returned after the completion of felling.

The permit system helps the poor people to obtain their requirements at a cheaper rate than that which would be demanded by timber dealers, whose prices are often exhorbitant. The felling of trees on this system is conducted in a manner similar to selection fellings as the trees sold on permits are either mature or passed maturity.

H. WIJESINGHE,

M. F. C. 1920–22, Dn.

Preparation of charcoal in the octagonal kilns in Newman Block in Coonoor Range.

Coonoor Forest Range is composed of nemerous plantations of which Newman Block is one. In Newman Block, *Eucalyptus Globulus* trees were planted in 1870 & 1871 and the trees are now 51 years old The whole area is divided into a number of compartments, each compartment being from 3 to 4 acres in extent Every year one compartment is thinned Those trees among the dominent or other classes that are interfering (or likely to interfere) with the more promising ones, which will eventually form the future crop, are marked for thinning and are subsequently felled Since Newman Block is inaccessibly situated, being consideratly higher than Coonoor and about 7 miles distant, there is no demand for the fuel removed from this block in thinnings: the felled trees are billeted, stacked and converted into charcoal for which there is considerable demand. It is found that the Produce obtained in thinning (only those interfering with those of the future being removed,) is sufficient to satisfy the requirements for the manufacture of charcoal required to meet the local demand.

The trees are felled with a saw and sawn into 3 feet billets. Each billet is split so that the maximum diameter of any billet

is not more than 6". Thes billets are then stacked 8′ × 5′ × 3′, each stack of green fuel thus having a volume of 120 cubic feet which when dried, is reduced to too cubic feet.

The billets are converted into charcoal in three permanent octagonal kilns constructed in the block. The kilns are censtructed in a sheltered place in the proximites of water. The soil is sandy loam which is just the soil required for the even carbonisation of wood, as the type of soil is not 100 porous and the admission of air is uniform and not excessive. Further this soil is a suitable absorbent of the liquid exudations resulting from the distillation of wood.

The kilns are constructed on level ground and the floor of the kiln is natural soil well-rammed. The foundation is constructed of boulders in mud-mortar to a height of 18" with an equal bdearth On this foundation, a basement of bricks, laid on edge in mud mortar, with same breath and 6" high is constructed. The top of basement is level with the ground surface. On the basement walls of burnt brick in mud have been constructed 1½ bricks thick and 7′ high. The breadth of the wall when measured outside is 4′ 6", while inside it is 3′ 6". There is a rectangular draught hole at the botton and centre of each side for the inlet of air requirsd for carbonisation.

The roofing is a corrugated galvanized iron sheet supported on 4 iron rods, each, 1" square in section. There are five square holes in the roofing, the central one being 7" × 7" and the other four smaller ones being 3" × 3" at right angles to the central hole.

A doorway (5' × 2¾') is provided in each kiln and after the kiln is packed, the door-way is closed with a corrugated gavanized iron sheet which fits into a groove at the top of the door way.

Each kiln is capable of holding 300 cubic feet of fuel. The fuel is stacked inside, the first two tiers being vertical and closely packed and the upper most tier being laid horizontally. The biggest billets are placed in the centre and the smaller ones near the walls. Close packing is necessary to exclude as much air as possible. Near one of the bottom holes on the inside near the door way, unburnt chips wood are stacked to enable the fire, to catch readily when the kiln is set aligt. Having packed the kiln, the doorway is closed by the corrugated galvanized iron sheet fitting into a groove at the top of the door way, the edges of the door pressing tightly againt the sides of the walls. All joints are then plastered with mud and rendered air tight

To set the kiln alight, a few burning embers are thrust into the bottom hole on the inside of which unburnt fuel is stacked. All the holes at the bottom are kept open, but the holes in the sides of the roof are closed, leaving the central one open. If all

the holes at the bottom are completely closed, there can be no access of air into the kiln for carbonisation. First bluish, grey, vapour escapes through the hole which is a sign that the kiln is beginning to burn. A few hours latter, a thick yellowish brown smoke escapes showing that carbonisation is well in progress. Finally a clear blue smoke emerges and is an indication that carbonisation is complete. As blue smoke appear at each hole, the hole is closed; and this is repeated until all the seven holes are closed. Lastly the central hole in the roof is closed and the kiln allowed to cool.

The number of days occupied in the process of carbonisation and subsequent cooling depends on the size of the kiln, but usually two days are required for each lot of 100 cubic feet. Thus in these kilns 6 days are taken for conversion and cooling, and on the 7th day, the kiln is opened and charcoal removed.

In unpacking the kiln care has to be taken to remove the carbonised billets cautiously as the fire may not have been completely extinguished. The unburnt fuel may be stacked on one side and the volume of it noted. This unburnt stuff may be utilized for a subsequent burning. The charcoal is weighed in bags and stored, each bag containing 56lb.

Now regarding the yield of charcoal:—

For 300 cubic feet of stacked split fuel (i. e. 10050lb. at, 33·5lb per 1 cubic foot of fuel), outturn of charcoal is usually

45 bags of 56 lb each, i. e. 2520 lb. The percentage of yield in thus *25%*.

Usually a fourth of the volume of fuel remains unburnt. The fuel stacked near the walls will not be well burnt as the intensity of heat is greatest at the centre gradually diminishing towards the sides. If the volume of the unburnt fuel is deducted from that of fuel originally stacked in the kiln, the percentage of yield rises to about 29%.

In calculating the comparative percentage of profit in selling fuel and charcoal respectively, we find that in the former case it is 60%, and slightly over double this in the latter

Details for charcoal are given below:—

I. Expenditure.

(a)	The charges for felling, stacking and billeting 300 cubic feet of fuel at Rs 2—8—0 per lot of 100 cubic feet ...	... Rs 7—8—0
(b)	The charges paid for labour on contract employed in converting it into charcoal at Re. 0—3—6 per bag, the average outturn being 45 bags ...	Rs 9—13—6
(c)	The charges for transport by carts from Newman Block to coonoor at Rs 4/- per cart, for two carts ...	... Rs 8—0—0
	Total expenditure	... Rs 25—5—6

II. Revenue.

(a)	Each bag of charcoal is sold at coonoor for	... Rs 1—4—0
(b)	Gross revenue for 45 bags	... Rs 56—4—0
(c)	Net profit Rs 30—14—6, i. e. 128·9%.	

In the above calculation, however, no allowance has been made for establishment charges, supervision, depot charges at Coonoor cost of annual repairs of the road and kilns, etc. Including all these, a net profit of Re 0—4—0 per bag is obtained or 25% clear profit is obtained.

The charcoal prepared in these octagonal kilns is of very good quality being superior to that manufactured by other methods. The percentage of conversion is also greater, and since there is always a demand for charcoal, it is continuously prepared in these kilns at Newman plantation.

S. SANKARAN,
1921–23 course,
M. F. C.

Note or Casuarnia. Planting in Coat Range Nellore District.

Casuarina equisitifolia is an evergreen tree in appearance and resembles closely the conifers of the Temperate Zone. The wood is used chiefly for fuel, poles, and small timber for temporary sheds etc. The species is cultivated on sandy soils having an under stratum of moisture-laden clay generally met within the coastal tracts of the Nellore District

(1) *Collection and preservation of seeds.*

The fruit ripens in June and July. The unopened mature fruits, conical in appearance, are collected from middle aged, well grown, flourishing trees, and laid on a mat spread on the ground, or on a prepared plot of ground, similar to a thrashing floor and enclosed by a low fence of dry branches to prevent the fruits being blown away by heavy wind. The fruit should be protected from ants and fowls, which feed greedily on the seeds. In about a week after collection the fruits open and the seeds are collected mixed with ashes of cow dung and stored in pots or tin cases. 56 seers of fruit yield 5 lbs of seeds.

(2) *Formation of Nursery & Sowing of seeds.*

The nursery beds should be prepared to a depth of 2 feet and the soil turned over two or three times, being simultaneously mixed with ashes of dead leaves and cattle dung. The beds

should be 3 feet wide and of required length. In the following January one seer or 1 lb of seed is sown per square yard of nursery bed and the seed covered with a very thin layer of sand in such a way that they are but slightly covered. Then a light layer of elephant grass (locally known as "Vidavali") is laid over the beds to prevent the seeds from being blown away by wind or eaten away by insects and birds and also to prevent the seeds from being disturbed when the beds are watered. Watering the beds should be done with tin cans both in the morning and evenings. In about 9 days the seeds germinate when the cover of "Vidavali" grass should be removed. The young seedlings have a reddish colour. Watering should be done for about a month by which time the seedlings will be between 4 to 6 inches in height. These seedlings are "picked out" and transplanted 6" apart in fresh beds in order to make them stronger and healthier before they are finally planted out in August or September. By September the young seedlings attain a height of 18 to 24 inches and the roots also develop to an equal length. Watering should be done 4 times a day during this period.

(3) *Method of Planting.*

At the end of September or in the begining of October pits are dug deep enough to allow the roots of the seedlings to remain intact and unhurt in the transplanting operation. The following are the different methods of planting:—

brought none with them, and had expected, the master' to make all arrangements for them. This unfortunately, the young coffee planter had not realised, and he had made no provision whatever for feeding the coolies. My boy had fortunately brought an oil lamp with him, as he had not trusted the appearance of the unknown acetylene lights, and so we were not condemned to eat our first dinner in darkness. Three of the coolies were told off and ordered to set out early next morning to go and fetch food for themselves and the rest of our retinue, while we would push on forward slowly in search of our lost tribe, which had not yet turned up. And so we turned into our tent, and our boys shut themselves up closely in theirs, while the coolies sat huddled up under the shelter of a sort of one-walled hut they are in the habit of making for themselves, consisting of a large hurdle made of bamboos, and broad leaves laid one on the top of the other, like the feathers of a duck's back, so as to render it watertight, and propped up as a shelter from wind and rain on two props. And there they sat late into the night murmuring away to each other and searching diligently on each others' heads and bodies for little biting insects, for all the world like a cage full of monkeys.

Next morning we were up early and pushing on with the striking and packing up of the tents, and then after break-fast we marched on again. Our path led us now through a jungle which consisted almost solely of a species of close growing bamboo, and we walked in what was to all intents and purposes a tunnel through

this, which had been made by elephants, bison, and various other animals. We kept on hoping we might meet a shootable animal of some sort, as our unfortunate coolies were clamouring for food and we had at last to decide that we would kill the very first edible animal we saw. Luckily we met a sambur soon after, and though it was absolutely useless as a trophy with much regret we killed it as food for our followers. The path we were on seemed to be a main thorough-fare in the animal world, as other smaller ones kept on joining it, and eventually it came out at the largest and best specimen of a salt lick that I have ever seen. A flat place ten square yards or more had been eaten out into the side of the hill with a perpendicular bank at the back of it of from six to ten feet in height. In this we could see at various hights the marks where the different animals had been to eat the salt mud they like so much at certain times of the year, the higher part being worn quite smooth by the elephants. A little further on we found fresh marks of elephants, and then an open space of about an acre in extent quite clear of vegetation and with the bare earth trampled hard and flat. We at once both of us exclaimed that this must be one of the elephants' dancing places described by Rudyard Kipling in the ***Toomai of the Elepants***. We asked our shikaris what was the meaning of the open space, and they replied at once 'oh, this is where the elephants play.'

Shortly after this we got out of the tunnels through which we had been marching into more jungles, and here we

Serial No.	Distance between each plant.	No. of plants per acre	Remarks.
1	2	3	4
1	12′ × 12′	302	
2	9′ × 9′	537	
3	8′ × 8′	680	Planting 8′ × 8′ has proved the most satisfactory.
4	7½′ × 7½	777	
5	6′ × 6′	1210	
6	4½′ × 4½′	2150	

Watering should be continued for about 15 days or even later until the seedlings establish themselves; casualities, if any, should be replaced immediately. One cooly can dig 200 pits of 1½′ depth in the forenoon, while another cooly is able to plant out 200 plants in the afternoon A third cooly can water these two hundred plants immediately they are transplanted. After the transplanting operation has been completed, one cooly can water 300 plants thrice daily When the young transplants are established watering should be be done twice a day for the next 15 days. At this rate one cooly is able to water 500 plants per day; subsequently one cooly can water 1000 plants once a day and each

plant will then get ½ a pot of water (equivalent to 1 gallon) During the North East Monsoon no watering is required. In the 2nd. and 3rd year of planting watering should be done during the hot weather, generally from about the begining of March until September. Watering may be dispensed within the 3rd year if the plants have well established themselves This can easily be decided by the vigorous and healthy appearance of the young plants.

(4) *Source of water supply.*

Shallow wells locally known as "Doruvus" are dug of 10 × 10 feet and 5 feet deep, at which depth fresh water is available. Water can be carried in pots by coolies. The cost of digging three wells is Re 1—0—0 each, and usually only one well per acre is required.

(5) *Expenditure.*

The following items of expenditure in planting, 8′ × 8′ are given.

	Rate per acre. Rs. AS. PS.
1st. year.	
(1) Planting 8′ × 8′ and preliminary watering ...	3 4 0
(2) Watering during January for continuous quarter watering (calculated @ 0—3—0 a day per acre)	1 7 3

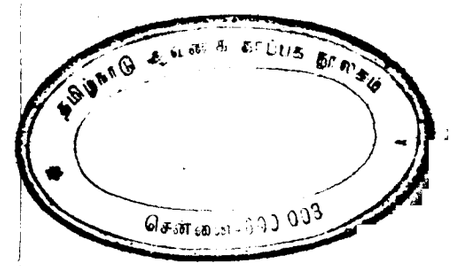
		Rate per acre. Rs.	AS	PS.
1st. year				
(3)	January to June for continuous ½ watering ...	14	1	0
(4)	July to September for actual watering for 2 months	5	10	0
(5)	Well excavation	1	0	0 per well.
(6)	Miscellaneous	0	8	0
2nd. year.				
(1)	During February and March for continuous ¼ watering	2	13	0
(2)	April and May for continuous ⅓ watering ...	3	13	0
(3)	June and July ⅛ watering	2	13	9
3rd. year.				
	Same as second year ...	9	7	9
	Preliminary charges for formation of Nursery and pricking out &c, ...	3	4	0
		48	1	9

These rates refer to the year 1910 when planting operations were in progress. The present rates vary a great deal. Planting operations were stopped in 1912.

(6) *Rate of growth.*

In favourable localities and under normal conditions the average rate of growth of the plants is as noted below:—

Year (End of.)	Girth.	Height.
1st. year	Seedlings	1½'
2nd. year	3″	3'
3rd. year	5″	8'
4th. year	12″	12'
5th. year	16″	18'
6th. year	18″	25'
7th year	22″	30'
8th. year	26″	35'
9th. year	30″	38'
10th. year	34 or 36″	40' & above



(7) *Thinnings & Cleanings.*

These cultural operations are not necessary in a plantation of 8′×8′ which is the most suitable method of obtaining the

largest yield of fuel. If the soil in the locality is covered with dense undergrowth of weeds and if the object is to put down this rank growth closer planting at $6' \times 6'$ or $4\frac{1}{2}' \times 4\frac{1}{2}'$ may be adopted. This spacing is usually adopted by private owners as by it a greater height growth, and long clean boles, free of side branches, are obtained.

(8) *Yield.*

The yield per acre varies from 20 to 60 tons according to the fertility of the soil and the attention paid to the crop The average may however be taken at 40 tons per acre provided the locality is normally suitable, and a sufficient degree of tending exercised.

(Sd) T. N. SESHAGIRI RAO,
Range Office, Nellore.
Dated 15th Novr 1920.

Miscellanea.

1. *Note on some methods of preparing botanical specimens, communicating Memoranda by* MESSRS C. MARIES, F.L.S., *and* R. PANTLING *By* D. PRAIN, M.B.

[Read June 5th.]

Usually the preparation of botanical specimens is easy; some natural families, however, give a good deal of trouble. Those

who have private herbaria are as interested to hear of improved methods of treating such families, as are those who look after public collections. The writer, therefore, would call general attention to modes of dealing with three troublesome families – *Magnoliaceæ*, *Coniferæ* and *Orchidaceæ*.

I. MAGNOLIACEÆ. The *Champak* family is not troublesome to preserve as to the leaves, but the flowers are apt to go to pieces. If, however, pieces of blotting-paper are carefully insinuated between the petals before the pecimen is laid in drying-paper, and if the specimen is then rapidly, fire dried, even adult flowers may be preserved entire Nothing, however, prevents the shrinkage of the large leathery petals. In this order shrinkage is so excessive and so unequal, that in the case of herbarium specimens the estimation of the size of the flowers becomes to some extent guess-work.

Those who know Rangoon may recollect the practice of selling bottles of flowers on the stirs of the Shwe-Dagon Pagoda Unless, however, their stay has been long enough, or their interest sufficiently great, to have led them to notice that the flowers in these bottles are not fresh but preserved, they may have supposed, as the writer did, that the medium in which the flowers are kept is water.

Everyone, however, has not been so void of curiosity. When Assistant Surgeon C. L. Bose, was in Rangoon in 1885, he was

struck by the length of time the flowers were kept, and brought some with him to Calcutta for examination. Dr. Warden, then chemical examiner, and Mr, Bose found on examining the fluid that it was a solution of Alum The solution is of no special strength : the Burman, being a happy-go lucky individual puts some Alum into the water along with the flowers and is not particular as to the amount.

Mr. Bose brought only *Champak* petals; some of these are in shape, size, colour and consistence much as they were when taken from the tree eight years ago. Here then we seem to have the means of overcoming the difficulty, hitherto insoluble, of preserving the natural size in specimens of *Magnoliaccous* flowers.

Though only *Champak* was brought by Mr. Bose, the writer recollects seeing *Plumieria* and *Nymphaea* flowers as well, and a bottle in which Dr. Warden placed some green leaves with a 1% Alum solution at the time he examined the Rangoon bottle has its contents very much as they were when he put them in. There is, therefore, no reason why the use of Alum solution should be confined to *Magnolia* flowers.

It should be understood that the use of Alum solution is only suggested as an auxiliary to the usual means of preserving specimens. Wet preparations are to be avoided; they are difficult to handle, difficult to keep, difficult to house, and still more

difficult to carry about But occasions arise when wet specimens are of the greatest moment as supplements to dried ones, and the Burmese preservative has the advantages over spirit of not discolouring the specimen or rendering it brittle. Most important of all, one can carry Alum about as a solid and make a solution when required.

If the bottles are not carefully sealed the specimens do not keep The flowers immersed in the fluid do not suffer, but as the water evaporates the flowers at the top get exposed to the air, decay, and fall in a flocculent mass to the bottom. This flocculent matter keeps pushing up others to undergo the same decomposition. But from a well-stoppered bottle—a glass stopper with wax is best—the fluid does not evaporate; the flowers, therefore, do not reach the air and seem to keep indefinitely.

II. CONIFERÆ The P*ine*, *Fir* and *spruce* family is usually very troublesome to preserve both in the field and afterwards in the Herbarium, from the readiness with which the cones fall to pieces and the leaves (needles) drop off. In the Calcutta Herbarium there are a number of beautiful specimens of Japanese *Conifers* presented by Mr C. Maries, F. L. S., who collected them. The writer anxious to learn the secret of the success with which so troublesome a family had been treated asked Mr. Maries if he would kindly explain his method. Mr Maries' reply, which he has courteously permitted the writer to communicate to the Society, is as follows:—

"*Conifer* specimens of the *Abies* or *Picea* section are "generally rather difficult to dry. When I was in the island "of Yesso, in the North Pacific, I was very much troubled "with them. One night I arrived very wet at my rooms and "and stacked my branches of *Abies*, with the cones attached, "round a big charcoal fire. I fell asleep and woke up next "morning to find my specimens dried beautifully. After this "I always dried them slowly over a charcoal fire, first wiring "or wrapping up the cones All fir-cones, except Pine, or Spruce, "or cedar, should be tied up either with cotton or wire immediately "they are gathered The Spruce section is the most difficult "to dry, even roasting is not always a success."

Mr. Maries goes on to say:—"The way I dry ferns and "leaves of trees for fitting up my birds-cases" (in the Gwalior "state Musuem) to preserve their natural shape, is to take some "very *clean*, washed sand, arrange the leaves in a *clean* box "and fill in with hot sand, and keep at a temperature of 100° "to 120° Fh. or even more They soon dry (I imagine Spruce "would dry like this if very hot) and flowers dry beautifully 'in this way, some keeping their natural colours in a most "remarkable manner. When I was young and living in London, "an old gardener taught me this; he used it for ferns and "roses for winter decorations when fresh ferns and flowers "were scarce All the dried flowers one sees in florists' shops "in London are dried in hot sand. C. MARIES."

III. ORCHIDACEÆ. The *Orchid* family is perhaps the most troublesome of all natural families to represent in Herbaria. In all the epiphytic kinds the leaves and, in most of them, the flowers also are apt to drop off when the specimens are dried in the ordinary way, while even in ground Orchids the pressure that has to be applied during drying usually so distorts the flower that a true conception of the relative position of its parts becomes impossible. This is very unfortunate, because there is no natural order where a proper understanding of the position of parts, particularly of the lip and the culumn, is so necessary. Spirit preparations are most unsatisfactory. If the spirit is sufficiently strong to preserve the flowers the parts become so brittle that when handled they go to pieces; if weak enough to prevent this hardening and consequent friability the spirit does not adequately preserve the specimens. The jars and bottles in which the specimens are placed, moreover, are very apt to get broken, and any one who has tried it will testify to the worry that is caused by the necessity of having to carry about a stock of alcohol Dr. Schweinfurth when travelling in Africa, made use of a most excellent modification of the method of preservation in spirit. He laid his specimens between sheets of drying paper, laid these in tin-boxes and soldered them up after soaking the paper thoroughly with spirit. He was thus able greatly to reduce the initial stock of alcohol and was freed from the subsequent anxiety of possible break-

ages. But the objections to spirit as a preserving medium for flowers are not obviated by this mode of applying it, and it remains to be seen whether the Alum solution will answer as a subtitute if used in this way.

In the meantime Mr. R. Pantling, who for many years has made a special study of Orchids, has perfected a method of drying them so far in advance of anything hitherto accomplished that it is highly desirable, that the details of his process should be made known. At the writer's request Mr. Pantling has supplied these details and like Mr. Maries, has courteously given him permission to communicate the account to the Society. This memorandum is given below; it will be noticed that it consists of a happy combination, suitably modified, of the ordinary method of fire-drying recommended for all ordinary plants with the hot-sand process mentioned by Mr Maries as that practised by florists in Europe.

"*To dry Orchid Specimens.*— In order to preserve *Orchids* "so that the leaves and flowers remain intact and do not fall away in "fragments as invariably happens to epiphytal spiecies when "pressed in the ordinary way between drying paper, the procedure "to be adopted should be as follows. Procure a light metal "box – 14 inches, by 12 inches, by 6 inches deep is a convenient "size—and place over the bottom half-an-inch of sand. Arrange "a specimen between two sheets of thin paper inside the box

"and cover over with a layer of sand taking care, as far as "possible, that the interstices between leaves, etc, are filled up. "Repeat this until the box is full, then place it on a stove "or above a fire and dry with a brisk heat. No weights for "pressing are necessary. As a general rule, the sand at the "commencement of drying should not be allowed to attain a "greater heat than can be borne by the hand, and this should "be lessened as drying proceeds or the flowers may become "scorched and rendered useless for purposes of dissection.

"Occasionally species (*Dendrobium Pierardi* Roxb., and "*Phajus alba* Lindl.) are met with whose perianths will adhere "to the paper; the removal of the perianth cannot then be effected "without mutilation. This may be obviated by using porous "drying-paper instead of the thin kind recommended above

"The advantages of drying in hot sand as compared with "the universally adopted method in paper are:—*First*, the rapidity "in preparing specimens; plants belonging to such genera as "*Saccolabium*, *Vanda*, *Cleisostoma*, etc, being ready within a week "against a period of three to four months by the old method. "*Secondly*; when finished the specimens will be found preserved "in their entirety and will not fall to pieces. The column and "lip will be found to have suffered little, as the pressure of "the sand is not sufficient to cause any material damage to "these organs".—R. PANTING.

The boxes that Mr. Pantling has found handiest for his purpose are old kerosine tins cut through lengthways; one is placed within the other to give more strength to be the tin and a rivet or two hammered through the seams as the solder runs when the boxes are over the fire The only thing to guarded against in the process is the adhesion of the flowers of certain species to the paper, and Mr Pantling shows how this is easily overcome

The possibilities of this method either as recommended by Mr. Pantling or with slight modifications for the drying of succulent species generally, such as the *Cactus* family and fleshy members of the *Spurge* family, as well as for families like *Scitamineae*—the ginger family—and for water plants, where the flowers are very delicate and therefore very difficult to dry seem considerable and the plan is well worth trying for them as well as for orchids.

Extracted from "The Journal, Asiatic Society of Bengal, Vol. LXII, Part II, No 3, 1893."

RATE OF GROWTH OF TEAK FOR TRINIDAD.

Sir,—The following extract from the Kew Bulletin for 1916 should be of interest to Foresters in India. Surely the rate of growth

of teak given for Trinidad is as good as anything recorded in its natural home:—

"East Indian Teak, *Tectona grandis*, was first introduced into the plantations in the forest reserves in Trinidad in 1913.

The seeds were obtained from the Tharrawaddy Divison, Burma, through the courtesy of the Conservator of Forests, Pegu Circle.

In 1913 about 14½ acres were planted So far the best results have been obtained in the Central Range Reserve Plantation where 5 acres were planted (*sic*) 10 ft. by 10 ft . . . 2,143 pickets were sown with Teak seeds in July. The sowing was rather late owing to the impracticability of getting the area ready at an earlier date. In the following January (1914) 1,339 pickets, at which seeds had not yet germinated, were resown.

At the end of March 1914, 1,758 teak seedlings had resulted, and some of them were 6 to 10 feet high. In the following wet season the blank pickets were again resown At the end of March 1915, when stock was taken, it was found that there were only 12 blanks.

Some of the plants had attained a height of 23 ft. and leaves were measured up to 36 in. in length by 25 in. in width, the Teak

being then between 20 to 21 months old from the date of sowing the seeds.

In October 1915, a tree was measured and found to be 32 ft. high with a girth of 2 ft at ground level, and 16½ in. at 3 ft., and 14½ in. at 5 ft. from the ground. Its age was 2 years and ½ months from date of sowing.

The soil is sandy loam of Tertiary origin. The elevation does not exceed 1,000 ft.

The normal rainfall for the district is about 115 in., but during the last two years it has been 20 per cent. below the average."

It would be interesting to have the measurements at this date.

C. E. C. FISCHER, I. F. S.

Extract from the "Indian Forester" for April 1922.

Miscellanea—(*continued*).

The importance of maintaining forest growth.
(Some explorers' theories).

"Sir Harry Johnston, artist, naturalist, African administrator, explorer, ethnologist, and writer of sequels to Dicken's novels was able to throw significant light on our present water difficulties.

"The wholesale cutting of timber which drives away rain—though it may be necessary in Assam and some parts of West Africa, where the rainfall is too heavy, is no doubt partly responsible for the water scarcity we are now experiencing. Taking the world all over, the present rainfall is insufficient for the needs of the civilised populations of this earth. For, although a large majority of the surface of our planet is composed of water, it is, what the French call 'non-potable'; it is not fit to drink. However, during the last 30 years man has discovered how to distil fresh from salt sea water. In view of that discovery, there is no risk, of the world experiencing a water-famine. The worst that could happen is that there might be scarcity for some months while the water supplies of thickly populated areas were being arranged.

"We certainly seem now to be entering a period of desiccation and increase of temperature. In this connection, it is interesting to

note the results of the latest ascent of Mt Kilimanjaro and the reports of the extent and lowest altitude of its snow cap.

When I was there in 1884, the lowest snow seemed to me to lie at an altitude of 1000 feet higher than it had been seen by the Rev. Charles New, who had ascended the peak to the region above the Forest level, 11 years before

" However, Dr. Hans Meyer three or four years later, ascended Kilimanjaro to its summit, and his statistics recording the snow line then have been shown, by the climbing of the peak, by Englishmen in 1921, to fix the limits of the snow in 1887 something like 1000 ft. lower than the snow now reaches.

World's smallest Rainfall—

When I lived for 3 years (1885—88) within sight of the greae cameroon's peak, " the mouth of the Gods," (13,746 ft.) I used to set it tipped with snow in the winter months of the dry season. I believe snow is hardly ever seen now.

The world is undoubtedly getting drier—and it seems as if it were tending to a period of diminished rainfalls. Except along the west coast, between the Gambi and the Congo, and in spots on the East Coast, the one absorbing topic in Africa is the diminishing rainfall.

I am afraid that some small part of this effect has been brought about by the more extensive cutting down of forest.

The wide spread circulation of all kinds of news papers and periodicals with the consequent increasing demand for paper, and for tree trunks to provide the necessary pulp, has caused paper makers to turn their attention to the forests of New Foundland and British Columbia. A thousand interests are concentrating on the Pine forests of Sweden for paper pulp, and many other substances now become necessary to civilisation. Similar destruction was extending over Siberia and parts of Russia before the war.

The destruction of forests in Spain was a comparatively ancient affair.

Under the Turkish regime in Cyprus, Asia minor, and Syria, the diminishing of the trees is held to have altered the climate and greatly diminished the rainfall. The Turk, indeed, has laid this blight of drought and sterility on cultivated lands throughout vast tracts of Asia.

On the other hand, the planting of trees in Egypt has brought about showers of rain in hitherto rainless regions and afforestation is held to have increased the rainfall in the desert regions of North America and Australia.

We ean draw from all this one safe deduction—to plant trees! Though, of course, this is sure to be denied by some men of science anxious to express an original opinion.

Trees help rainfall —

In Great Britain the parts of the country threatened with decreased rainfall are the South Eastern Counties lying roughly between the Humber and the Solent.

It is an English man's first duty to think of England. It distresses me very much, as a lover of natural beauty, to see the destruction of English wood land. All recent taxation has told very heavily against wood land in England.

"Take the Duke of Norfolk Estate"—on which Sir Henry Johnstone is a tenant —"which from the late sixties to 1917 was under the direction of the young Duke's father. The finances of that estate have been so crippled by death duties that it is with the utmost difficulty those now directing its affairs can continue to allow a large portion of the land to remain under forest and to form part of the striking beauty of West Sussex.

And here is the interesting deduction: In maintaining or recreating the ancient woodland the directors of that estate have been unconsiously helping to maintain the rainy climate necessary for local agriculture and the proper reserve of water supply for the surrounding area.

In view of the period of diminishing rainfall and increased desiccation which seems ahead of us one urgent duty of civilised

man towards his own furture seems crystal clear, and that is to increase the potential rain-fall by systematic afforestation of areas now denuded of wood land.

Extracted from the "Daily Express"

Contribution to the Gass Forest Museum.

Serial No.	Contribution.	Contributor.
1	Three samples of granitic rock containing a deposit of graphite (collected from Gunavaram range	M. R Ry. A. V. Sundaram Ayyar Avl. E A. C.
2	One long panel of *Artocarpus hirsuta*	W. H. Woodhouse Adolphus Esq.
3.	Forty seven articles of Rangers' and Forester' accourtrements.	C E. C. Fischer Esq. I. F. S.
4.	Ten specimens of Combs made of *Canthium didymum.*	Mr. N. Rajagopalachetty M. F. C. 1920–22 Dn.
5.	Two slabs of the wood of a tea-shrub (36 years old)	R. D. Anstead Esq. Dy. Director of Agriculture.

6.	One spotted deer head	M. R Ry D. Venkateswarulu R.O. Chandragiri
7.	One panther skin.	M R. Ry T. Sadasiva Ayyar Avl B. A. D F. O. Kollegal

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A generous donation of Rs. 25 by M. R. Ry. Rao Bahadur, T. Namberumal Chetty Garu to the Madras Forest College Magazine is acknowledged with many thanks. He has been made an Honorary Life Member of the Magazine.

Gazette Notifications.

21—2—22

Mr F. X. Mascarenhas, Inspector of Livestock, Calicut, is granted leave on average pay for one month and fifteen days from date of availing himself of the leave.

28—2—22

(1) Mr. R. D. Richmond, Assistant Inspector-General of Forests, is granted leave on average salary for 10 months with effect from the forenoon of the 16th February 1922. From the same date his services are replaced at the disposal of the Madras Government.

(2) M. R. Ry. Gajaraja Mudaliar Avl., D. F. O. Vizagapatam is granted privilege leave for 2 months from the date of relief.

(3) Mr. C. R. F. Williams, Assistant Conservator, Lower Godavari Division, is posted to act as D. F. O. Vizagapatam during the absence of M. R. Ry. Gajaraja Mudaliar Avl., on leave.

7—3—22

(1) In modification of Chief Conservator's proceedings, dated 21—1—22, Mr. J. A. Master, D.F.O. South Cuddapah, is granted privilege leave for 2 months from 19—4—1922 with permission to prefix the Easter Holidays provided the conditions of Article 220, C. S. R. are fulfilled.

(2) Md. Amir Padsha Sahib, Probationary E. A. C. of Forests, Cuddapah, will hold charge of the Division Office. South Cuddapah, during the absence of Mr. Master on leave.

14—3—22

(1) Mr. H. C. Bennett, Acting Conservator of Forests, I circle, is granted combined privilege leave and furlough on average salary for nine months and twenty-one days with effect from date of relief.

(2) Mr. O. H. C. Shelswell, Assistant Conservator of Forests, is granted leave on average pay for two months and fifteen days and leave on half average pay for three months and fifteen days with effect from date of relief.

(3) Mr. J. C Wrench, who has been appointed to the Indian Forest Service by the Secretary of State reported his arrival at Madras on the forenoon of 7—2—1922

(4) Mr. B. F. Rigold, Deputy Conservator of Forests, and D. F. O. Upper Godavari to act as Conservator of Forests, I Circle, vice Mr. H. C. Bennett, granted leave.

(5) Mr. R. Mitchell, E. A. C of Forests, is granted an extension of leave on average salary for one month in continuation of the 3 months' leave already granted to him provided he elects to come under the Fundamental Rules.

28—3—22

(1) Mr. E. T. C. Vas, Pro. Asst. Conservator of Forests, now employed in the Bombay Presidency, is granted privilege leave for one month and two days with effect from the 20th July 1921.

(2) Mr. H. W. A. Gaudoin, Dy. Conservator of Forests, is granted leave on average pay for 5 months and on half average pay for one month from date of relief.

(3) The services of Mr. A. A. F. Minchin, Dy. Conservator of Forests, on his return from leave, are placed at the disposal of the Govt. of India for employment as Chief Forest Officer, Coorg.

4—4—22

(1) M. R. Ry C. M. Kushalappa Avl., E. A. C. of Forests, Ganjam, is granted privilege leave for 2 months from 19—4—1922, and is permitted to prefix the Easter holidays to his leave.

(2) M. R. Ry. M. R. Sundaram Iyer Avl., E. A. C. of Forests, is garnted leave on average pay for 4 months from 19—1--1922 provided he elects to come under the Fundamental Rules

(3) M. R. Ry. B. S. Kesava Vittal Avl., E. A. C. of Forests is granted an extension of furlough on half average salary from 27—11—1921 to 29—11—1921 in continuation of the combined leave for 3 months and 23 days already granted to him.

11—4—22

Mr. C. M. Hodgson, conservator of Forests, has been granted by the Secretary of State an extension of furlough on medical certificate by 6 months from 10—6—1922.

18—4—22

Mr. D. A. Stracey, E. A. C. of Forests, and D. F O. East Kurnool, is granted leave on average pay for six months from date of relief.

25—4—22

Mr. H. C. Bennett, Acting Conservator of Forests, is given leave on average pay for 9 months and 24 days in lieu of the leave already granted to him.

2—5—22

(1) Mr. A. M. C. Littlewood, D. F. O. Chittoor, is granted privilege leave for 25 days with effect from 28—4—1922 subject to certificate of eligibility by the Accountant-General.

(2) On return from leave, Mr. R. Mitchell, E A. C. of Forests, is posted as D. F. O. Upper Godavari Division. Vice Mr. Rigold reported sick.

He will hold additional charge of Lower Godavari Division pending the reversion of Mr. Van Haften from Andaman Forest Service.

9—5—22

(1) M. R. Ry. A. Appadurai Pillai Avl., Dy. Collector, and Personal Asst. to the Chief Conservator of Forests, is granted leave on average pay 10½ months from the date of relief.

(2) Mr. A. B. Myers, Dy. Conservator of Forests, is granted leave on average pay for 4 months from 22—6—1922 to 21—10—1922 preparatory to his retirement on 22—10—1922.

(3) Messrs. M. H Krishnaswami, Saiyid Riaz-ud-din Sahib, and Mr. Amir Padsha Sahib, are confirmed as E. A. C's. with effect from 29—3—22.

(4) M. R. Ry. Gajaraja Mudaliar Avl., E. A, C. of Forests, on leave, is granted an extension of leave on average salary for a period of 2 months. On the termination of his leave, he will take charge as D. F. O. Bellary. Vice Mr. James, transferred as D. F. O. Anantapur.

(5) On reversion from the Andaman Forest Service, Mr. Van Haften, E. A. C. of Forests, is posted as D. F. O Lower Godavari. He will take over charge from Mr. Mitchell D F. O. Upper Godavari, who holds additional charge of Lower Godavari Division.

(6) On return from leave, M. R. Ry. E. V. Padhmanabha Pillai Avl., E. A. C. of Forests, is posted as D. F. O. South Kurnool. Vice

Mr. H. W. A. Gaudoin, granted leave or until further orders. He should take charge of the Du. from Mr. Crothers, D. F. O. West Kurnool, who is in additional charge at present.

16—5—22.

(1) Mr. D T, Barry, D. F. O., Lower Godavari, to act as Conservator of Forests, First Circle, vice Mr. Bennett granted leave. To take effect from 15—4—22.

(2) Mr. L. S. Janes, D. F. O. Bellary, to be D. F. O., Anantapur, from 22—6—1922. Vice Mr. Myers granted leave.

(3) M. R. Ry. S. Amirtaswami Pillai Avl., Deputy Collector, to be personal Assistant to the Chief Conservator of Forests.

(4) M. R. Ry. M. H. Krishnaswami Iyer Avl, Probationary E. A. C. of Forests, is granted leave on average pay for one month and fifteen days from date of relief.

(5) M. R. Ry. A V. Sundaram Iyer Avl., Probationary E. A. C. of Forests is granted leave on full average salary for 6 weeks from about 8—6—1922.

Notifications relating to Range Officers.

First Circle.

5—4—22.

1. M. R. Ry, N. K. Sarma, Ranger 3rd. Grade, Godavari Lower, is granted leave on full average salary for six weeks with effect from 10—4—1922 or date of relief.

8—4—22

2. Mr. J. D. Theodore, Ranger, VI grade, subprotem, is posted to special duty, Ganjam District. He should report himself to the District Forest Officer at Chatrapur for orders.

9—4—22.

3. Under article 260 of the C. S. R, M. R. Ry, A. Subramanya Ayyar, Ranger Vth. grade, Godavari Upper, is granted privilege leave for four months with effect from date of relief.

11—4—22.

4. Mr. J. D. Theodore, Ranger, VI grade, Sub Protem, will be considered to have been on special duty in theW altair plantation, Waltair, during the period from 21—3—22 to 10—4—22 afternoon.

22—5—22.

5. The leave on full average salary for 6 weeks granted to M. R. Ry, N. K. Sarma, Ranger III grade, Godavari Lower, in this office S. O. No. 15/1922 dated 5—4—22 is extended by 15 days.

Second Circle.

21—3—22.

6. (1) Mr. Syed Ibrahim Albeiz, Ranger IV grade posted to Gundlabrahmeswaram Range, Kurnool West, is granted an extension of leave for two months from 8 th March 22, incontinuation of the leave granted in this office S. O. No. 16/22 dated 2—3—22. (The nature of leave to be granted will be specified on receipt of Service register from District Forest Officer, Kurnool West).

(2) Mr. B. Kristna Row, will continue to hold charge of Gundalabrahmeswaram Range, until future orders.

He is informed that the question of commuting the 3 months leave (one month leave granted in this office S. O. No. 16/22 dated 2-3-22 and 2 months extension now granted into 6 months furlough on average salary will be considered on receipt of his Service Register from the district Forest Officer, Kurnool West. He should inform the District Forest Officer of his desire to come under the Fundamental Rules as per rule 58 of the Fundamental Rules published in the Fort St. George Gazette dated 6—12—1921.

23—3—22

7. Supernumerary Ranger, T. M. Krishnachari on special duty in

Bellary District is transferred to Kurnool South to work under the orders of the District Forest Officer, Kurnool South.

4—4—22.

8. Mr. M. Hussain Khan, Ranger, II grade, and Assistant Special Chenchu Officer is granted 6 months leave from date of relief.

2. Mr. V. T. Staggs, Ranger II grade incharge of Markapur Range is appointed to act as assistant to the Special Chenchu Officer vice No. 1 granted leave.

3. M. R. Ry, C. G. Ganapathy, Ranger IV grade on expiry of his leave is posted to the charge of Markapur Range East Kurnool Division to revieve No. 2.

11—4—22.

9. M. R. Ry, T. Sriramulu Naidu, Supernumerary Range, on expiry of his leave (i. e. on 11—4-22) is posted to Anantapur District to hold charge of Bukkapatnam Range till further orders.

29—4—22

10. M. R. Ry, H. Rama Row, Ranger II grade, is granted extension of leave for 3 months (on Medical certificate) in continuation of the 2 months privilege leave already granted to him in this office S. O. No. 68/21, 19—10—21.

Note. The nature of the leave, granted will be settled on receipt of report from District Forest Officer Kurnool South regarding his election to come under the Fundamental Rules.

2. The order posting him to Bukkapatnam Range, Anantapur District vide this office S. O. No. 17/22 dated 6—3—22 is cancelled.

29—4—22.

11. Supernumerary Ranger, C. S. Ganapathy Kurnool East Division on returne from leave (10—5—1922) is posted to Gundlakamma Range, Kurnool South Division.

(2) Ranger G. Rama Row may avail himself of the privilege leave of 8 months already granted to him from date of relief by No. 1.

29—4—22.

12. The following postings are ordered:—

(1) Ranger Umapathi Mudaliar, on special duty in Dhone Range, to take charge of Dhone Range forthwith.

(2) Mr. M. S. Raghavan Pro. Extra Assistant Conservator in charge of Dhone Range on relief by No. 1 to work as special Assistant to Mr. Crothers, District Forest Officer, Kurnool West & South.

30—4—22.

13. The leave granted to Mr. Hussain Khan, Ranger, III grade, and Assistant Special Chenchu officer in this office S. O No. 23 of 1922 dated 4—4—1922 will be considered as leave on Medical certificate on full average pay for 6 months.

2—5—22.

14. Ranger A. M. Sreenivasulu Naidu, VI grade transferred from V Circle is posted on special duty to work under the orders of District Forest Officer Kurnool East Division.

Note. This cancels S. O. No. 21 dated 21—3—22 posting him to Kurnool South Division.

18—5—22.

15. This office S. O. No. 32 of 22 posting special duty Ranger Umapathi Mudaliar to Dhone Range is cancelled.

2. Mr. M. Sriniwasa Raghavan, probationary Extra Assistant Conservator will continue to hold charge of Dhone Range until further orders.

Third Circle.

2—4—22.

16. Mr. E. W. Fernandez, Ranger, V grade, Chittoor District will be placed under suspension from 1st. March 1922 until further orders.

23—4—22.

17. In the circumstances now reported the order suspending Ranger E. W. Fernandez for a period of one month is cancelled.

* * * *

(2) The leave granted in this Office Service Order No. 11 of 1922 dated 2nd February 1922 is extended by 3 months.

11—5—22.

18. M. R. Ry. Sankara Alwar, Ranger, VII grade, on special duty South Cuddapah District is granted privilege leave for one month with effect from date of relief.

11—5—22.

19. M. R. Ry, R. Alagiriswami Nayudu Ranger IV grade in charge of Sreeharikota Range, Nellor District is granted privilege leave for 6 weeks with effect from date of relief.

11—5—22.

20. M. R. Ry, T. E. Varadachari, Ranger, IV grade, in charge of Balapalle Range South Cuddapah District is granted leave on average salary for 3 months on medical certificate with effect from the date of his relief.

2. M. R. Ry, T. S. Narayanaswamy Chetty, Ranger, VII grade, on special duty South Cuddapah District is posted to the charge of Balapalle Range, vice No. 1 on leave or until further orders.

15—5—22.

21. M. R. Ry, C. N. Narasimhachari, Ranger, VI grade in charge of Cuddapah Range, West Cuddapah District is posted to the charge of Rapur Range Nellore district to join expeditiously *without availing the full joining time* after handing over charge to the Range Officer Ganganapalle Range of the same District.

(2) M. R. Ry A. Seetharamiah Probationary Ranger in charge of Ganganapalle Range, West Cuddapah District to hold additional charge of the Cuddapah Range of the same District as a temporary measure in relief of No. (1).

(3) M. R. Ry, B. Chenchurama Nayudu, Ranger, IV grade in charge of Rapur Range, Nellore District on relief by No. (1) is posted to the charge of Cuddapah Range, West Cuddapah District in relief of No. (2) To Join expeditiously.

Fourth Circle.

26—3—22.

22. M. R Ry, V. Narayanaswami Ayyar, Ranger V grade in charge of Attur Range, East Salem Division, is granted privilege leave for 2 months from date of relief.

2. M. R. Ry, L. R. Narayana Ayyar, Ranger II grade, *sub protem* transferred from III Circle, is posted to Attur Range, Vice No. 1 granted leave.

3—4—22.

23. M. R. Ry, G. N. Subba Rao, is restored to Ranger, VI grade and is posted to West Vellore Division for charge of Alangayam Range.

7—4—22.

24. The following posting made by the District Forest Pfficer, South Salem Division, are approved:—

1. M. R. Ry, S. Nagalingam Pillai, Ranger, VI grade, S. P. T. on special duty is posted to the change of Thammampatti Range. To proceed at once.

2. M. R. Ry, K. R. Subramanian, Ranger, VII grade, S. P. T. on relief by No. 1 of Thammampatti Range charge is posted on special duty to continue the demarcation and survey of the Bailnad block Namakkal range.

11—4—22.

25. M. R. Ry, R. Subramania Ayyar, Ranger III grade. Santhavasal Range, South Vellor Division, is granted leave on averago pay for 3 months from 7—2—1922 under rule 81 (b)-ii of the Fundamental rules.

2. The existing arrangement to continue.

14—4—22.

26. M, R. Ry, K. R. Subramanian, Ranger, VII grade, *sub protem*, Thammampatti Range, South Salem Division, is reduced to Forester I grade, for 4 months from date of relief of Range charge, and posted to special duty.

16—4—22.

27. The period of one day, i. e. 28—2—1922 overstayed by M. R. Ry, V. D. Ramalingam Pillai, Ranger, VI grade, will be treated as leave on loss of pay.

16—4—22.

28. Ranger G. N. Subba Rao is diricted to take over charge of Chengam Range, immediately and remain in charge of it until the return of Ranger, K. Jayarama Ayyar from leave.

25—4—22.

29. The six months leave granted to M. R. Ry, K. L. Munuswami Ayyar, Ranger, I grade, *sub-protem* in this Office Service Order No. 14 of 1922, dated 15—1—1922 is treated as 6 months leave on average pay from 24—1—1922 as per fundemental rules.

5—4—22.

30. M. R. Ry, S. Nageswara Ayyar, Supernumerary Ranger, on Spike Investigation duty, North Salem Division, is granted privilege leave on average salary for one month from 1—5—1922.

28—4—22.

31. In continuation of this Office Service Order No. 20/22, dated 25—1—1922, M. R. Ry, P. A. Krishnaswami Mudaliar, Ranger is granted extension of furlough on average salary for 7 days from 31—1—1922.

29—4—22.

32. In modification of East Salem District Forest Officer's Service Order No. 15 of 1922 M. R. Ry, C. D. Parthasarathi Chetty Ranger IV grade, East Salem Division, is granted combined leave for six

months, i. e., 1 and 14 days privilege leave and rest furlough from 15 2/22.

4—5—22.

33. The following promotions are ordered in the class of Foresters with effect from 1st January 1922 (except in the case of K. R, Subramanian:)

To First Grade-Pemanent.

Thangaswami Talaivar, (South Salem.)

To First Grade-Acting.

K. R. Subramanian - Reduced from Ranger VII Sub-protem from dated of relief from Range charge this office S. O. No. 60-22 dated 14—4—1922.

To Second Grade - Permanent.

J. S. Vedanayagam - Under training in the Madras Forest College (Madras Forest College.)

To second Grade-acting.

M. Rajaram Pillai - Vide J. S. Vedanayagam deputed to the Madras Forest College. (South Salem.)

T. N. Vedantaramanujam- Vice K. R. Subramanian promoted (West Vellore.)

To Third Grade Permanent.

(1) G. D. Solomon- East Salem.
(2) Swaminatha Pillai- West Vellore.

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(3) Chitteri Swaminatha Mudali–South Vellore.
(4) Narayana Mudali– North Salem.
(5) Ahemadulla Sheriff- North Salem.
(6) S. Ramaswami Ayyar- North Salem.
(7) Minussin Sahib- East Salem.
(8) Y. N. Subaramania Mudali- South Vellore.
(9) Ramaswami Nayudu- South Vellore.
(10) Mohideen Sahib- East Salem

18-

To Fourth Grade - Perminent

(1) R. Subramania Ayyar– East Salem.
(2) Sheik Ahmed Sahib— South Salem.

17—5—22.

34. The following postings are ordered:—

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(1) M. R. Ry, M Packyanathan, Ranger II grade, on return from leave is posted to the charge of Denkanikota Range North Salem Division.

(2) Mr. D. F. Stilemen, Deputy Conservator of Forests, on relief by No. 1, is posted to the charge of Thammampatti Range, South

23

Salem Division.

(3) M. R. Ry, S. Nagalingam Pillai, Ranger VI, *sub-protem* is, on relief by No. 2, posted to special duty in the same Division.

(4) M. R. Ry, J. M. Abraham, Ranger IV grade, on return from leave, is posted to the charge of Cauveri Range, Central Salem Division.

(5) M. R. Ry, M. Muthuswami Ayyar, Ranger II grade is on relief by No. 4, posted to the charge of Shevaroys West Range, Central Salem Division.

(6) M. R. Ry, T. P. Palanikumaran Pillai, Supernumerary Ranger, is on relief by No. 5, posted to special duty in the same Division.

11—5—22.

35. M. R. Ry, R. Manikkam, Ranger III grade, North salem Division, is reduced to Fourth grade for one month.

Fifth Circle.

8—4—22.

36. The transfer of Ranger, M. R. Ry, N. S. Eswaran, to the First Circle is cancelled. He is posted to do duty under the District Forest Officer, South Coimbatore.

11—4—22.

37. Ranger J. D. Theodore is granted privilege leave for 3 months from the afternoon of 16th. December, 1921.

14—4—22.

38. M. R. Ry, C. R Ragunathan, Ranger, VI grade, Tinnevelly District, is granted leave on average salary from 4th February to 23rd March 1922 (inclusive.)

12—5—22.

39. Supernumerary Ranger, Mr. Phillips, now stationed in Tinnevelly District is posted temporarily to do duty under the Principal of the Forest College for the erection of huts at Ootacamund. He should report himself to the Principal at the Forest College for orders without delay.

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13—5—22.

40. The leave on average pay sanctioned in this Office S. O. No. 18 22 dated 15—3—1922, to Ranger, K. Chaikku, of south Coimbatore Division, from 10th January to 27th. April 1922, is extended by one day.

16—5—22.

41. The privilege leave granted to Ranger, M. R. Ry, N. S. Eswaran, in this Office S. O. No. 14 of 22, is extended by 2 days.

Sixth Circle.

4—3—22.

42. (1) M. R. Ry, P. Sankunni Nair, Supernumerary Ranger, from Mangalore Range, to the charge of Mannarghat Range, Palghat Division. To join on relief.

(2) Mr. B. Coates, Ranger, VI grade, on special duty, South Mangalore to Mangalore Range. To join at once.

(3) M. R. Ry, K. R. Krishna Nair, Ranger III grade, sub prtoem to Nilambur as soom as he has finished his special tracing duty in Palghat Range. He will work under orders of the Forest Utilization Officer on the duty of rebuilding the Nilambur bungalows.

(4) M. R. Ry, K. G. Monappa, Ranger, VI grade on return from leave to palghat for special duty.

(5) M. R. Ry, K. Karunakaran Nambiar, Ranger, IV grade, to Chedleth Range. To join as soon as his special duty at Ootacamund is finished.

2—4—22.

43. M. R Ry, K. D. Govindakrishna Ayyar, Ranger, VI grade, is granted leave on half average salary for six months from 1st March 1922 in continuation of combined leave for 8 months from 1st July 1921, granted in S. O. No. 54 dated 27th. September 1921.

22—4—22.

44. The privilege leave for 2½ months from 16th February 1922 granted to M. R. Ry, K. G. Monappa, Ranger, VI grade, in S. O. No. 22 dated 15th February 1922 is extended by 15 days.

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Advertisements.

The following is a list of timber species required for the Gass Museum, such of them as are procurable may be sent to the Principal *together with botanical specimens pertaining to each species and a sample of bark about 8″ square.*

The long panels should be as broad as available, 6 feet long and 3″ thick. The short panels 2 feet long and 1″ thick (breadth, maximum available.

Aglaia Roxburghiana	Grewia asiatica
Aquilaria Agallocha	Hardwickia pinnata
Adina cordifolia	Hardwickia binata
Artocarpus integrifolia	Holoptelia integrifolia
Albizzia procera	Hydnocarpus Wightiana
Acacia dealbata	Hereteria papilio
Acrocarpus fraxinifolius	Litsaea zeylanica
Chickrassia tabularis	Machilus macarantha
Dillenia indica	Premna tomentosa
Diospyros tomentosa	Sterculia fœtida
Diospyros paniculata	Sterculia villosa
Diospyros ebenum	Sterculia guttata
Dalbergia sissoo	Stereospermum chelonoides
Erythroxylon monogynum	Stephegyne parvifolia
Gmelina arborea	Tetrameles nudiflora

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2. Volume 6 for 1880–81.
3. Volume 14 for 1888—January, February, March, April, September, October, and December numbers.
4. Volume 15, 16, for 1889 and 1890.
5. Volume 18 for 1892 August, September, October, November.
6. Volume 19 for 1893 February number.
7. Volume 20 for 1894—July and August number.
8. Volume 21 for 1895.
9. Volume 24 for 1898—March and April numbers.
10. Volume 25 for 1899—April, May, June, and August, September, October, and December numbers.
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