

THE
Madras Forest College Journal.

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

Ourselves.

One year has passed since starting the publication of the Journal. We are glad to be able to issue the second volume. Financial conditions are so far satisfactory for successfully getting through the second year. The balance sheet of the Journal accounts for 1916—17 is published elsewhere. It should be gratifying to all interested in the journal that we are able to make the statement.

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We tender our thanks to the subscribers of last year for having encouraged us. We are confident that they will continue to subscribe for the current year's issue and look forward to them in getting us more subscribers. There are still several in the Forest Department alone who might become subscribers but have not done so owing perhaps to not knowing of the journal yet. It is needless to point out that with greater encouragement, further improvements will be easily possible.

We eagerly await contributions of articles and notes on interesting subjects of a professional nature to our Journal

from outside. We make our appeal to all interested, as they can help us a good deal in this direction. It is quite possible to think of various subjects, especially at the present time, when there is scope for rapid development in all directions. Information of interest, though it may seem trivial may be of value. This Journal will be a suitable medium for publishing valuable facts and will serve, it is hoped, as a bureau of information.

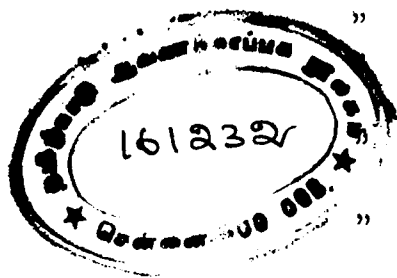
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June has been a busy month in the College. It is the month of final examinations for the out-going students who have had their full course of training and annual examination for the Juniors. The anxious time spent by the Seniors at the end will only be apparent to those who have appeared for examinations and await results.

Prizes and certificates were distributed to the successful students on the 29th of June. Hon. Mr. M. E. Couchman, Commissioner of Forests, presided on the occasion. Mrs. C. D. McCarthy gave away the medals and certificates.

The following were the prize winners :—

1. S. Ramachandra Iyer, 1. Government prize for the best Senior Student.
2. " 2. " for the best Student in Forestry.
3. " 3. " Survey.
4. " 4. " Range Administration.
5. Lodge prize for the best Student in Engineering.
6. Principal's prize for the best Student in Botany.
7. Campbell Walker's prize for the best all round Ranger.



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2. N. Thiruvikraman Thampi, Brazier prize for the best out-door Ranger.
3. C. Srinivasa Rau, Board of Visitors' prize for the best Junior Student.
4. C. Karunakara Menon, Indian Forester prize for the best essay on Village Forests.
5. C. S. Nanjappa, Pentland Shield for the best all-round Athlete for the year.

The following is the order of merit of the Students who have obtained Certificates.

1. S. Ramachandra Aiyer, Honours.

Higher Standard Certificate.

- | | |
|-------------------------------|----------------------------------|
| 2. K. Jayaraman. | 12. C. Karunakara Menon. |
| 3. C. S. Ramanathan. | 13. P. Karunakara Menon. |
| 4. N. T. Thampi. | 14. A. Subramania Aiyer. |
| 5. M. R. Doraiswami Aiyer. | 15. T. Paramasivam Pillai. |
| 6. A. Manikka Mudaliar. | 16. L. A. Krishna Aiyer. |
| 7. S. M. Srinivasagam Pillai. | 17. K. V. Krishnaswami Aiyengar. |
| 8. D. E. Lewin. | 18. M. Rama Rao Kini. |
| 9. P. Dhananjaya Rao. | 19. P. M. Mathew. |
| 10. K. Venkataramanan. | 20. J. Ramalingam. |
| 11. K. S. Raghavachar. | |

Lower Standard Certificate.

- | | |
|----------------------------|------------------------|
| 21. V. Mahadeva Aiyer. | 25. B. Gulam Dastagir. |
| 22. N. Kesava Pillai. | 26. C. S. Nanjappa. |
| 23. K. Thiruvankata Chari. | 27. S. A. Dawson. |
| 24. T. Balaramaswami. | 28. P. V. Ramana Rao. |

One Student failed to obtain any Certificate.

The Principal has in his report fully acknowledged the able management, in all directions, of Mr. C. E. C. Fischer who was Principal before him. "I say I think we can assure the Board that we are now in for a non-stop run without fear of accident and still less of a break-down." He has pointed out the urgent necessity for a Research Institute,

for the establishment of which the Madras Forest College affords full scope and facilities.

Turning to the students the Principal said, "Half of you are going out into the world to start your career in life. Never forget that the College is looking at you. The name of the College is in your hands, not in ours. That you may all attain success is the heartfelt wish of everyone of us here to-day. But some of you may not and what I want to impress upon you is that professional success is not everything; what is infinitely more important is the reflection. If you can honestly say towards the close of your career, that you have done your duty without fear and without favour, seeking no end but to do your work and to play the game and if you can lay your hands upon your heart can honestly make that avowal, then will you have gained for yourself the finest gift that this world has to offer, your own self-respect and the respect of those competent to judge you."

The Principal also referred to the College Journal started by Mr. Fischer which "if wisely conducted, should be of great benefit in encouraging past and present students to record briefly and succinctly the results of their powers of observation. I appeal to you, students, and to your fore-runners to help us by sending in articles of professional nature. They will always receive full and sympathetic consideration. The College has done so much for you students and I ask you all—past and present—to make this little return to your *alma mater*."

The Forest Commissioner in his address expressed his appreciation of the work done by the Madras Rangers, at least as not behind hand of Dohra Dun Rangers. He hoped that "when the really excellent prospects which the Forest Department offers to young men become better

known to the student class, we may expect even more competition for seats in the College."

He gave the amusing comparison of the ryots in classifying the Forest Department as the bad type of "biting snakes." He wished the students to try and see if they cannot improve matters.

"The Government have for sometime past been seriously considering how they can best improve the relations between the Forest Department and the ryots. Villagers are being made to take interest in the forest protection by the institution of the Forest Panchayat system and the Village Forest Scheme. All measures instituted will be ineffective unless the subordinate staff of the department are imbued with the same spirit. I want you when you become Range Officers to bear this in mind and to try and diminish friction between the ryots and the department. Government is far away and it is by your actions that the ryots must judge the intentions of Government. It is your daily conduct which will make or mar all the schemes for enlisting the co-operation of the ryots."

"It may seem extravagant anticipation to look forward to the day when a Forest subordinate will be looked upon by the villagers as their friend, but we can at all events make a beginning by ceasing to be a nuisance when we go to the villages, and one way of doing this is to see that our visits do not put them to any expense or trouble."

"Another point is the attitude of the Forest Officials to the ryots who are always responsive to good treatment." Penal clauses of the Forest Act should only be resorted to as the last resort when remonstrance and warning prove of no avail. Much of the forest fires would not occur if the relations between the forest subordinate and the ryot had been cordial. If these remarks are borne in mind "when

you become Range Officers, not only will you find your own relations with the villagers more pleasant, but you will be more efficient Officers and will have more chance of rising to some of the high positions which are open to all of you who do your work honestly and well and in accordance with the wishes of Government without causing unnecessary annoyance to the ryots. I wish you all successful careers."

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The Forest College affords full facilities to the Students of this Province and the neighbouring States to undergo a beneficial course of training in Forestry and allied subjects. The advantages which private students could derive by a course of training have been fully explained in an article (P. 124 No. 3 Vol. I) of this Journal. The prospects in the Forest Department have been referred to by the Commissioner of Forests. It is not correct to think that the scope in the department is limited. With the development of forest resources and schemes for more concentrated operations and more effectual protection, there will always be an unceasing demand for trained men. Besides, trained men are in great demand from outside the Madras Forest Department.

For information we publish below a list of private students who underwent training in the College and the appointments they have secured after leaving the College.

Private Students.

1913—15 Division.

K. C. Joseph,	M. R. H. Range Officer, The Nilgiris.
Y. S. Chennagiraya,	M. R. H. „ Mysore State.
I. John,	M. R. H. „ Travancore.
T. V. Oommen,	M. R. H. „ „
K. S. Ramiah,	M. R. H. „ South Coimbatore.
T. N. Kochunni	M. R. H. with Honours, (did not seek Thirumalpad, employment).

1914—16 Division.

M. N. Raman Pillai,	M. R. H. „ Working Plans duty South Coimbatore.
B. Sambamurthi,	M. R. H. „ North Coimbatore.
T. S. Narayanaswamy	Chetty, M. R. L.

1915—17 Division.

V. Mahadeva Iyer,	M. R. L. Ranger under the Tem- porary Assistant to the Forest Commissioner.
C. S. Nanjappa,	M. R. L. Deputy Ranger, 1st grade, Coorg.
K. S. Raghava Char,	M. R. H. Offered appointment in C. C.
P. V. Ramana Rao,	M. R. L.

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The 1916-18 batch of students rejoined the College on the 1st August after the vacation. The new batch of students joined the College on the 29th of July. This year there has been no admission of private students owing to lack of seats.

In addressing the students on the reopening of the College, the Principal exhorted them to maintain the traditions of the College. He also told them that they should develop "a Forest eye." Discipline was the key note of success. Self-discipline and self-control are of prime importance before trying to enforce implicit obedience from others. In keeping with the motto of the college "*Mens sana in corpore sano*," great importance is attached to games, athletics, drill and gymnasium. Nothing develops and strengthens character so well as these out door pursuits.

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The college is able to put up good teams for cricket and hockey from the students at present in the college. The following are the games and the results of the matches played after the reopening of the college.

Game.	Played against.	Result.
14-8-17 Hockey	vs., Police Recruit School,	Lost 1 against 2.
21-8-17 "	vs., Agricultural College,	Won 5 " 1.
28-8-17 "	vs., Police Reserve,	Draw 2 " 2.
19-8-17 Cricket	vs., Agricultural College,	Won 138 " 115.
		runs.
25-8-17 "	vs., Stanes High School,	Won 202 " 18.
		runs.

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We learn that the Mysore State has opened a Forest School for training Foresters and Forest Guards. We congratulate the State on its undertaking. It is understood that Sylviculture, Utilization, Botany, Elementary Engineering, Survey, Forest Law and Forest accounts are taught and the training is mainly practical. Sylviculture is taught in Canarese. Trained men would be a great advantage, as such men will take real interest in their work instead of mechanically carrying out orders. Mysore has been attempting to work its forests on a systematic basis for the past few decades and trained men are a necessity.

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We regret to have to announce that none of the four tickets in the Bombay War Fund Lottery purchased by the Madras Forest College Syndicate drew a prize.

The Resources of Madras Forests.

Looking from a commercial point of view one cannot fail to realise about the variety of produce which our forests yield and the scope of work our forests afford in the economic field. The attention of the public has often been drawn to the above and enterprising capitalists have been called upon to take up some scheme of working in developing one or other of the forest industries. The paucity of enterprise

may be due to lack of facilities, to want of knowledge, and also perhaps to want of sufficient enterprising spirit. The industries dependent on the raw forest products are infinitesimal compared with the yield. Such being the case, the Government has to take up the spade work in arranging all preliminaries, and working up definite schemes in regular order, eventually to make over the concern to sure and reliable private enterprise. In a way, it is perhaps but right that Government should start such enterprises at the outset and bring them up to regular working order.

The possible industrial pursuits which are possible are too numerous to mention. Many of the soft-wooded species which have been considered useless, because little is known of their properties at present, are now found fit for making pencils, matches and for the manufacture of paper pulp. The bark of such trees which are felled for timber may on investigation be found suitable to yield good fibre or tannin or dyeing materials. If such industries are started side by side with timber operations, in localities satisfying all conditions, the entire produce could be utilised without waste and could be worked at good profit.

It is proposed in this article to describe in some detail the scope afforded by the present war in working our forests for the supply of timber for the European countries. We thank Mr. A. W. Lushington C. I. E., Economic Assistant to the Commissioner of Forests for having very kindly permitted us to extract information from his records.

The wilful damages caused by the enemy in cities, towns and villages are too well known. Even forests have not been spared. The enemy has so very maliciously and deliberately denuded entire forest areas of all growth that at present there is not even the soil to grow trees upon. The demand for timber during the war has become very great

and the supply to meet the demand has become a serious question. It is learnt that England (Great Britain is notoriously a poorly wooded country) had to cut over 15,000,000 cubic feet of standing trees to send upwards 9,000,000 cubic feet of sawn timber for strategic purposes. Again, timber would be required in millions of cubic feet to rebuild habitations, to rebuild towns, factories, machinery and for various other purposes. It can therefore be conceived that the demand for timber in Europe, after the war will be huge while the supply will be totally inadequate.

The woodwork in the houses of the less wealthy in France and Belgium is almost invariably of "Deal" (either "white deal" or Silver fir or spruce, or less commonly "red deal" or pine). These Deals are used for a multitude of other purposes. It is wrong to suppose that the European deal is superior to the same class of woods in India. The prejudice in favour of one species more than another in any place is really due to its being common in that locality. Deals are universally used in Europe because they are the *common* and *cheapest* timber available, not because they are *really good* timbers. The quality of "Deals" vary depending on the conditions under which they grow. The rapidity with which they grow in low situations makes them inferior in quality. The quality of "Red Deal" (Pine or Scotch fir) varies for similar reasons. The pine growing beyond 60° latitude owing to slow and even growth is very homogeneous, little lignified and little resinous, is very easy to work and has no equal in joinery work. The pines growing at some distance from the polar regions have no rival as a mast-wood. These variations in quality also occur in oak, the most important of all European species. It combines in it all the qualities of weight, hardness, elasticity and fibrous nature, it has such durability when employed in air or in water, it can acquire such large dimensions, that it

undoubtedly is the most precious of the European Forest species. It is the timber *par excellence* for all purposes according to its quality. Because of its scarcity and high cost, other species are used for the same purposes, after injecting them with preservative materials.

The number of species in France capable of being used in any way can easily be counted. Some of them are exotic, while others do not attain more than one foot in diameter. Thus the indigenous forest species in France useful for timber is very limited. In the Madras Forests, on the other hand, the number of species is very large. There are hundreds of common species attaining one foot or more in diameter or less than one foot diameter. Great variations referred to in a single species in France do not occur among Madras species. Such are the 3 species of Shoreas and 4 species of Hopea). From a commercial aspect a series of Indian species little known in European markets can be clubbed under one commercial name. Owing to the scarcity of oak and larch, French and other continental nations have reduced to an art the utilization of every species for its most suitable purpose, not because the wood is best suited for the special purpose, but because it happens to be the best wood for the purpose *on the spot*. A large number of Madras species are every whit as good or nearly as good as oak, while several others of the second and third class types are as good as the next best of French species. Again there are about 100 soft woods in Madras, the majority of which, if properly treated would be quite as good as deals and better than birch, aspen and others, all of which have got their modes of utilization. Our soft woods have been hitherto declared as worthless (1) because there are so many better, that there has been no attempt to use them (2) because there has been no attempt to get the best out of them and (3) because there has been no systematic and

Utilization.—In India the standard of utility of timber has been gauged almost entirely by its capacity to furnish material for building. A timber not useful for building (or perhaps for fuel, a vicious waste of good material) has been considered useless. Timber yielding building materials have quite distinct properties. But other properties in timber are ignored though they render it eminently suited for a hundred and one uses to which timber can be put, just as useful as that of building. We see that, in France and other Continental nations, every one of their woods, hard or soft, good or indifferent are utilised. This we do not see in this country. Possibly this may be said to be due to multiplicity of Indian species and the paucity of the European woods. This means that really we have been wasting our wealth in this direction. The difference may be partly due to our not developing wood industries as we should have done. There has been complete apathy in both starting and encouraging small industries. It is found simpler and cheaper to import small wooden articles, such as used in mills in this country for instance, because at present it does not pay to make them here, as the demand for them here is not a tithe of what it is in Europe. But this does not hold good in a large number of cases. In Madras, the utility of wood except as a building material is practically entirely ignored. It is therefore full time that we should find out for what good all our timbers really are. As already suggested, there is now a vast opening before us as a result of war. France and Belgium will not only be devoid of wood (a very sad case) but also of wood in every single one of their wood industries and of all the small woody parts that are required for the machinery of their mills and factories. Now then is the time to exploit our forests for all timber yielding species and send samples of those species, for which we

at present find no use, to those countries after the war, to find out to what uses they could be put to.

With a view to find out their uses, a collection of different soft woods that would be a substitute for "Deals" was started by Government. One tree of each of the different soft woods was felled, seasoned in water as described above and sent to the Kallayi Mills to be sawn into small scantlings and boards to be sent to France as samples, to see whether they would accept any or all of them and at what rates. Though large "advertisement squares" should be sent by preference, the scantlings had to be made small owing to the high rates of the freights ruling. (Compare present freight at 350 shillings a ton with the pre-war charter rates of 20 shillings a ton). It is expected to obtain from 70 to 80 out of the 100 soft-wooded species.

After as many of the soft-wooded species as could be obtained in the South-West part of the Presidency had been collected, a scheme is being considered (1) for sending these soft woods to Europe (a) to assist France and Belgium in their rebuilding (b) to ascertain the proper uses to which each wood could be put and (2) so as to make it a profitable concern all round. It has been ascertained, on enquiries made, that a consignment of soft-woods alone would not pay and that an admixture of better species also in the consignment could be better handled. The cost of extraction of both kinds of woods would almost be the same, whereas the average value of the consignment would be appreciably greater and make the whole transaction pay. It was therefore suggested that, instead of selecting soft wooded species in the forest, the principle of "clear-felling" the areas to be worked should be adopted.

The experts are of opinion that a project could be evolved which would prove a paying proposition only

provided (1) that both cheap and expensive timber are brought under the scheme (2) that not less than 100,000 cubic feet are available monthly for the saw-mills (3) that timber could be transported by water and can be supplied for a period of at least ten years. (This would mean 6,000 acres in all to be "clear-felled," working 600 acres per year estimating the yield at 40 tons per acre) (4) that the saw-mills be created on the coast at the mouth of the river selected.

It is estimated that 100,000 cubic feet of timber felled would produce only 60,000 cubic feet of sawn timber suitable for the European markets. At least 100 tons per mensem should be available for sale if the scheme should be recognised as a fact in the European markets. It is necessary to provide a full or nearly full load to charter a vessel for carrying the timber.

Floating timber is the cheapest means of transport and a suitable site for the sawmills is important for the same reason.

Items of preliminary work to be undertaken, such as for obtaining a sustained yield, arranging for water transport, choice of site for a mill and so forth are very many to detail here. It would be at least two years before the scheme could be brought into full working order. Large capital expenditure would be necessary during that period, the greatest part of it being for the mill buildings and machinery.

According to expert opinion, none of the soft wooded species should be called or considered "useless". The present first consignment proposed should be considered purely as advertisement samples.

Clearfelling versus Selection. Following the habitual methods of permit-holders and later on the contractors who

selected only one or two species of timber trees suitable for their requirements, the Government have been limiting themselves in the past to the extraction of only the marketable species by selection, thereby rendering themselves petty shop-keepers in contradistinction to wholesale dealers which by rights should have been their proper function. This selection has been termed as "picking out the plums" and is a most deleterious policy. The results are apparent. By so doing, better species are gradually exterminated and forests of inferior description are left. This is diametrically opposed to the maxim "Leave to your successors a forest *better* than what you have received from your predecessors" Felling becomes very difficult under the selection method. In a high forest with tall trees, as many trees are ruined as are felled for use. Viewed in this aspect, value realised per cubic foot sold is not the true value of the cubic contents removed. On the other hand, the concentrated operations in smaller areas under supervision, less expert establishment, facilities of transport, facility to re-stock the area by artificial means if natural regeneration is inadequate and improvement of the composition of crops by tending are very apparent when a forest is worked under the clear-felling method. Even if need be, a few isolated mother trees can be left, here and there, *solely* as seed-bearers neither with the idea of keeping them as timber, nor in such a way as would interfere with the main purpose of clear felling.

Turning to the question of finding forests in the Presidency suitable to give a sustained yield, it appears that two areas, inspected so far, seem to be well suited and very nearly satisfy the conditions proposed to be requisite for working. One is on the West Coast. A river is available which will render floating possible throughout the year if improvements are made. From the best species down to the species in the fourth class equivalents to

"Deals" were found in the area inspected so far. The net profits that are likely to be realised by successfully working these forests would seem to justify to permanently improve the river, after closer examination.

The second area is in the South of the Presidency. There is enormous demand for fuel in Tinnevely. These forests up to the verge of the semi-evergreen sholas are at present worked for fuel. Owing to the rocky bed of the river and the falls, water transport would not be feasible, but a successful transport by road through mechanical appliances is possible. Valuable species such as *Hopea*, *Pterospermum*, *Aglaia*, *Hardwickia pinnata*, *Balanocarpus utilis* and *Gluta* are abundant in the sholas. The possibility in these areas, as ascertained from the average sample plot chosen, worked out to 60 tons per acre of log wood alone over 18" in diameter. Areas also occur, with greater number of varieties of valuable species yielding at the same time a larger tonnage per acre. From the inspection of these forests, it leads to the opinion that much lesser area of forests would suffice to meet the demand as specified above or a sustained quantity could be supplied for a considerably longer period than 10 years. This opinion goes to justify investment of a far larger capital in permanently improving means of transport, though water transport is impracticable, owing to the unsuitable river and absence of bamboos in these areas for rafting.

All the above calculations have been based taking into consideration the utilization of log-wood only. A considerable amount of revenue could accrue from the poles and branch wood that would be cut at the same time as log-wood. In Tinnevely, the demand for fire wood and charcoal is very great and every stick of branch-wood would be used for the purpose. It will be possible to start minor industries. For instance, branch wood can be used

for pencils, for matches or for parts of weaving looms and other small pieces of wood-work in machinery or for small packing cases. Charcoal might be made on a scientific basis, whereby not only is charcoal made, but also its by-products—Methyl spirit, Acetone, Acetic acid &c. Then again there is the question of wood paper pulp. A portable boiler to prepare crude material would make the product into a far more portable form. Besides branch wood, many bamboos, canes, reeds, palm leaves, screw pines &c., which abound everywhere could at the same time be prepared into boiled semi-pulp. Still there is the bark amounting to about 17% of the trees removed. Fibre and ropes could be made out of suitable species or tannin could be extracted from such barks as would yield them. All these minor industrials should go a considerable way towards improving the revenue from the scheme. Further it would give excellent scope to start such new industries.

Editor.

Wood Pulp for Paper.

Raw Materials and Manufacture.

Paper is an indispensable article in every day modern life. No transaction is possible without it. It is not only used for writing, for books, daily journals and periodicals, it is in very great demand for a large variety of purposes. It is used in wrapping articles, thin paper ribbons and cardboard boxes for packing, it is corrugated and converted into an elastic and protective medium, handles are made of it for instruments, tools and utensils, it is used as an insulator in electrical industries. Further, important industries are springing up for making twine and yarn as well as cloth and other textile fabrics out of it. Its importance is increasing daily which makes the safeguarding

of cheap and adequate supplies of raw material a very pressing matter.

Supplies of Raw Material.

The raw material for paper at first consisted of linen rags, hemp and jute fibre, waste paper and similar materials; but later came straw, various grasses and finally pulp from wood. Recent experiments made leave no doubt that there are great possibilities of important developments in making paper from certain grasses and bamboo.

Of wood pulp which to-day forms the bulk of the raw material for paper, there are three main groupes—mechanical, sulphite and sulphate—to which may be added pulp similar to the last prepared by the so-called “soda process,” which is especially applicable to grasses, bamboo cane and kindred fibres. For the production of mechanical pulp on a competitive basis, abundant and cheap water power is necessary, whereas the other kinds are obtained by processes which require chemicals as well as fuel. The war has seriously affected the supply of the raw material and the prices have gone up very high beyond comprehension.

Imperial Resources.

Raw materials as well as other basic products are available within the British Empire.

In India the possibilities are tremendous, especially when bamboo and certain grasses are taken into account as raw material. Bamboo cane gives quite good pulp when treated properly and as it grows very fast (only three to four years are required for cane to grow to full, suitable size) the supply of raw material from certain area is really much simpler than in the case of wood, the re-growth of which is comparatively slow. The bamboo pulp is very soft and when mixed with wood pulp gives a paper which is almost ideal for printing purposes. India including Burma can supply

bamboo cane in quantities which would ensure raw material for ever and in unlimited quantities.

Efforts to obtain data about the sources of raw material for paper have hitherto been confined within local limits. The importance of the matter is so great that investigations should be instituted on an Imperial basis with the object of concentrating and consolidating all the necessary knowledge and experience, so that authentic and complete data may be available for those interested in developing these new industries.

Manufacture.

The raw material for pulp cannot be used directly in its raw state. The bark will have to be carefully removed from the wood, in a plant properly designed, as it does not contain useful fibre. Further, unless eliminated, it will discolour the pulp and render it less valuable.

The dust produced in cutting wood into chips for chemical fibre should also be removed, as it would otherwise prove detrimental. The same is the case with all grasses. Bamboo again requires different treatment. The cane has to be split and crushed before it enters into the chopper which cuts it into suitable sizes for further treatment and the dust, of which bamboo contains much more than wood, must be carefully removed.

Mechanical pulp.

The mechanical pulp process is used only for wood and is based on the principle of pressing slabs of wood with great force against a sharp grindstone, whereby individual wood fibres are torn away and liberated. When it is feasible, the most economical way is, as a rule, to instal a mechanical wood pulp mill at a waterfall and the plant so arranged that the shafts of the water turbines are directly connected to the grinders. But the question of transport cost has to be

studied with minute care in producing the low priced and half-finished product of this kind. It is sometimes more advantageous to instal the wood pulp mill at a site some distance away from the waterfall. In this case the water power is converted into electricity and transmitted to the mill, where the grinders and other machines are driven by electric motors.

The fine pulp which is produced after a series of processes is collected as thin sheets, cut to size, pressed under hydraulic power to get rid of excessive water and then packed ready for shipment.

The mechanical pulp mill is the simplest factory imaginable and requires no skilled workmen for successful running. The important factors to which attention must be paid are proper transport facilities outside and inside the mill and very strong and reliable machinery.

Sulphite plup.

Sulphite pulp which is made exclusively from wood, gives a strong, easy-bleaching, white pulp suitable for printing paper. This is a chemical process and consists in boiling wood cut into chips of certain length by passing steam under high pressure in very large boilers containig a mixture of lime and weak sulphuric acid. The chemicals required are easily obtainable and the acid is manufactured in separate apparatus at the mill itself.

The wood coming out is a white pulpy mass. It is passed into large storage bins and washed. The pulp then undergoes a series of operations till at last it is made into sheets which are packed in bales for shipment.

The raw materials needed for sulphite pulp are wood, coal, sulphur or pyrites and limestone. Of these, wood and coal are the most important and facilities for transport are dominant factors in the location of a chemical mill.

Sulphate pulp.

The method of producing the sulphate pulp closely resembles the sulphite pulp process, but the boiling liquor used consists mainly of caustic-soda, with various mixtures with sulphur and sulphur salts. These have the quality of dissolving the resin from the wood. In the sulphate method, therefore, various kinds of wood can be used which are unsuitable for making sulphite pulp. Three main qualities produced according to the method of treating the wood are the ordinary soda pulp, easy bleach soda pulp and extra strong soda pulp or "Kraft pulp." It has been found possible to produce paper of extraordinary strength and toughness from the pulp of the last quality and is also used in the fast-growing textile industry.

In this process, the value of products such as acetates, turpentine oil and resin oil are recovered, through a recovery plant attached to the mill, by passing the black residual liquid coming off from the diffusers of the pulp mill. The soda is also recovered from the refuse liquid in a separate apparatus and prepared as a new boiling liquor. Very little fresh raw material is required and consequently the sulphate process is a very cheap one.

Pulp from Bamboo and Grasses.

Fibres from bamboo and grasses are treated with a boiling liquor made up of caustic soda only without sulphur salts. Mr. Rait of the Indian Forestry Department carried out investigations in treating these fibres and established methods whereby these articles may be treated and pulp produced on a commercial scale. By introducing improved methods, the non-fibrous matter contained in them, which originally rendered the pulp inferior, is removed. The plant differs from the wood pulp mills in having two boilers, in the first of which the non-fibrous portion is removed by treating with a weak-solution under low pressure. The

proper treatment of the fibre is done in the second boiler. The spent liquor in the second boiler is used in the first. Waste is thus avoided and the process rendered quite successful commercially.

The pulp finally produced is very much the same as the chemical pulp, with the difference that the bamboo and grass fibres have to be treated rather more gently in special beaters to separate the fibres properly.

General Consideration.

As already stated, proper facilities for transport are of the greatest importance for a successful pulp industry. This point cannot be too strongly emphasised. Pulp is comparatively low-priced article and very bulky, as also is the raw material used for its production. It is therefore necessary, when planning a new pulp mill, to consider all the questions of transport of raw material and finished product most minutely and carefully, even before the technical side is investigated. If the conditions for transport are not favourable, no scheme should be undertaken even though the technical conditions may be very tempting. On the other hand, if the conditions for transport of the wood and other raw material are good and if proper return freights can be obtained for shipping the pulp, enterprises of this kind are attractive, also from a shipping point of view, as they represent a steady and certain freight market which can be arranged for over a number of years.

The scheme should also be investigated from an engineering point of view and the designing and construction of mills should be entrusted to responsible men, so that, the system of working may be thorough, economical and successful.

Editor.

Protection of Sandal.

North Arcot—*versus*—Salem.

The most valuable forest produce, yet known in the Madras Presidency, is sandalwood. Its value is on the increase, and there is every likelihood of its fetching far higher prices year after year, for the fact that the possibilities of Mysore forest have to gradually fall short on account of 'Spike.'

It will be to the interest of our forest revenue that we increase the out-put of sandal. The possibilities of our forests are so great that, with sufficient establishment and intensive working, the sandal revenue would multiply itself ten-fold in a short time. Within the last 5 years, the revenue on sandal alone has increased from a few thousands a year to many a lakh of rupees; and yet the amount spent for the protection and working is far disproportionate to the revenue realized.

The sandal is well protected on the Javadis of North Arcot, especially the Polur and Santhavasal Ranges, but it is disgraceful in Tiruppattur (old Salem District) and Attur-Kalroyans, Pachamalais and Kollimalais. It is because the very reservation has been taken up in wrong lines in Salem or at least in the case of the hill ranges I have mentioned above.

The dry hill slopes have been reserved in the latter, but the rich sandal plateau have been allowed to be ponakaded and left entirely to the mercy of the Malayalees. On the other hand, the North Arcot Javadis was notified as a whole a reserve, including village site, cultivation, etc., so that ponakad or the barbarous shifting cultivation stopped at once. Then a line was cut round the village excluding the cultivation from the reserve and this bit was

disafforested. Further, the malayalees have been bound over to protect every sandal that is growing in the patta land.

Thus the protection of sandal was ensured beyond any possibility of theft or wilful destruction.

The object of reservation in Salem appears to have been purely climatic, so that the rich sandal forests on the plateau have not been taken into any account. Now we realize the value of sandal and regret the action of our predecessors; I am afraid it is too late to repent. The malayalee has mutilated the rich forest area for raising field crops and the karnam for a small consideration has been instrumental in securing patta. The only forest area that remains untouched is the top of hills sacred to some Deity and there is seen rich remnants of sandal coveted by the forester.

Burnt stumps of sandal are to be seen in large number in the area ponakaded. The malayalee never knew that he was destroying thousands of worth of sandal to raise 1/100 of the value of field crop. The extermination of sandal is being brought to completion even now, and still the Forest Officer sits impotent watching the destruction. Fertile forest areas are given for cultivation on durkhast to the hillmen who pay a nominal value for the tree growth. It is even doubtful if the full amount collected reached the treasury or stops in the karnam's pockets.

The karnam is an honoured annual visitor to these hills where his stay does not extend more than 3 or 4 days.

It may be imagined what amount of work he could turn out in such a short time. The Revenue Inspector naturally never goes up the hill, unless the Collector is on tour there—a very occasional contingency. The Tahsildar

is too high a personage even to follow the Collector up the hills. Hence the plateau forests are entirely managed by the malayalees.

It is high time that such an unsatisfactory state of affairs should cease.

With the Kalroyans it is different; as characteristic of Salem District, only the outer slopes of this hill are reserved; nor could they do better in this case, considering that all the plateau portion are jaghir forests, or rather jaghir land because the destruction of forest has long been completed and the malayalee jaghirdars have little or no forest left. A belt of sandal of all girth classes from 3 feet and below is found along the moist upper slopes bordering the jaghir. They have been subject to the ruthless hacking of scheming Chetties of South Arcot with the aid of malayalees under the cover of jaghir permits. Here again the forest subordinates are handicapped and are unable to do much towards preventing theft.

The jaghirdar sells the right of extracting sandal from his land to the Chetties for a nominal sum and they in turn issue permits to malayalees, who do not mind where they cut so long as they are paid well; thus the engine of destruction is set to work with impunity.

If the forest subordinates are to detect any case, it must be within the reserve. When once it is taken out of the reserve, the offenders can escape law under shelter of jaghir permits. The hill beats are so hopelessly undermanned, that efficient protection is not to be thought of. Spasmodic patrolling by special parties are instituted but with disappointing results; they are unable to identify the offenders and naturally the case falls through.

To crown all, our forest law is so deplorably slack that we are unable to bring to book the originators of this

systematic theft. They are in South Arcot District where Sandal Transit Rules are not in force. It goes without saying that this sandal theft cannot be put down till the market ceases to exist and that could be effected only when the Sandalwood Transit Rules are brought to force over this area. Organised theft of this type cannot be eradicated by punishing few malayalees who are only paid agents of wealthy Chetties, the prime originators of this nefarious scheme.

Vigorous steps are now being taken to stop the frightful depredation once and for all. Radical change for the better may therefore ere long, be expected.

E. W. Dawson,
Range Officer, Attur.

Root parasitism in Sandal.

Of late, there has been a passing change in the angle of vision of Forest officers regarding the degree of parasitism of Sandal. While the general consensus of opinion goes to confirm its obligatory parasitism, there has been a growing conviction, if it is not an optional parasite. An earnest endeavour is here made to solve this perplexing problem in the light of our observations and other well-considered opinions on the subject.

We had the opportunity of studying sandal first hand at Komittuyur and our observation goes to shew that in a seedling about 2 months old, we find the marked development of root hairs, through which it takes up its nourishment from the soil. It was observed in the case of another seedling about 6 months old, that its root had thrown a haustorium on the root of its host, and the development of root hairs not so marked. It thus exchanges its free life

for a parasitic life deriving water and mineral substances from the host plant through the haustoria. As Mr. Barber calls it, it turns out to be, at a very early stage 'a constant and greedy parasite.'

The problem now narrows itself to this—if Sandal, if trained to a state of isolation, could acclimatise itself to its new environment and could have a free existence independent of its hosts. It will now do well to follow the life history of Sandal in the light of well considered opinions of experienced Forest officers.

In his 'Host plants of Sandal,' Mr. Rama Rao points out the inability of pure grown sandal seedlings to grow and develop after the reserve materials stored up in the seed are exhausted. This was found to be the case in 4 separate experiments made in Kurnool by raising seedlings in nursery beds, pottiles, and bamboo tubes. Seedlings unassociated with other species died out when they were about a year old, while those grown with host plants continued to grow vigorously. Further, the failure to raise "Sandal wood plantations as a pure crop in Mysore shews it is not within the bounds of practical silviculture to raise pure sandal wood plantations. It is out of recognition of this cardinal idea of its root parasitism that we have carried out dibbling of sandal in cleared strips about 6 feet broad alternating with jungle growth 20' broad from which the sandal seedlings could piece up hosts after the seeds germinate.

Next, it was the experience of Mr. Pigot, once Conservator of Forests, Mysore that in plantations of Casuarina and Sandal, casuarina trees died off after 25 years and fears were entertained for Sandal after the loss of its companion. Further, we have the testimony of general Rhodes Morgan who says that in the case of the Byalur Sandal plantation

started in 1870 in North Coimbatore weeding and pruning continued till 1889, when the thorny bushes were removed and burnt, and consequent on this injudicious operation, the plantation began to go back.

These facts give incontrovertible proof to the absolute parasitism of sandal, and Mr. Whitehead's illuminating article on 'spike in sandal' throws further light on the subject. According to him, if sandal overtakes one or more of its hosts or foster plants, and finally kills them, the haustoria die off. It is the severance of its connection with the host plants that causes spike in sandal. He goes on to say that the reproduction of sandal, when once established, is prolific, and the area eventually becomes overstocked. Once this is so, the appearance of spike, as he says, is inevitable, as the strength of the foster plants is then insufficient to support the sandal.

In spite of Dr. Coleman's researches in the field of spike in sandal, Mr. Whitehead's theory is very convincing; and if it finds acceptance, I would suggest one line of experiments by leaving one or more foster plants with sandal, and digging a trench round them 2' deep, and cut off the roots of sandal going beyond the trench. This would enable us to find out how many hosts a sandal requires for its growth. Any results obtained in this direction might be of incalculable help in raising sandal wood plantations.

One important experiment is being carried on in Komittiyur to test the degree of parasitism of sandal. It consists in digging a trench around a sandal tree at a radius of 10 feet. It is 3 feet deep and one foot broad, and all the sandal roots going beyond the trench have been cut off. The sandal tree was thus isolated from its hosts in February, 1916, and weeding was also carried out in isolated

areas. No change in the appearance and vigour of the tree was noticed by us in September, 1916.

It is premature to hazard any opinion on the subject. Suffice it to say, that, if it is conclusively demonstrated that sandal is an optional parasite, capable of managing itself in the matter of nutrition, it would indeed be a startling revelation, and would revolutionise all current ideas about the habits of sandal. There are possibilities by which the roots of host plants might go beyond the trench, and sandal enabled its throw fresh haustoria. We may, however await results.

The root parasitism of sandal is one of some antiquity, and experiments analagous to this were made by John Scott in 1871. Among dicotyledons, he examined the root connection of *Haptapleurum* with sandal. When the sandal roots were cut out, it was destitute of leaves and in an unhealthy condition. After the 4th year, it is said to have acquired fresh vigour, perhaps due to fresh root attachments.

The foregoing arguments prove, beyond doubt, the obligatory parasitism of sandal.

L. A. Krishna Iyer,
Student, M. F. C.

Editorial Note :—We do not agree that the obligatory parasitism of sandal is proved beyond doubt. It is too early yet to come to a final conclusion. It seems pretty certain, however, that to be really thriving the sandal must have a host or hosts.

It would also seem that as Dr. Coleman has succeeded in inducing "spike" by contact the disease is *not* due to severance of root attachments, want of moisture etc. Moreover a disease which appears to be identical with

"spike" in sandal attack a number of other plants which are not parasitic in their habits and this under very varying conditions of soil and climate.

Spike in Sandal.

To

The Editor, M. F. C. Journal.

Sir,

Many of your readers might have gone through this the article by professor Somerville on "effects of grass and certain other plants on the growth of young ash trees" in the Quarterly Journal of Forestry reproduced in the Indian Forester for February 1917. There the professor establishes that the effect of grass on fruit and *other* trees is often so deleterious that the terminal bud often failed to mature and the foliage was stunted and prematurely shed. This deleterious effect was found to be due to a substance produced by the grass roots which acts as poison to the roots of fruit and *most other* trees.

I think this discovery goes in a way to solve the question of 'spike in sandal.' It is now admitted on all sides that sandal is a root parasite in the latter stages at least, though not in its infancy. Therefore, possibly, some of its rootlets suck up this poisonous substance produced by grass roots with the result that they die. When once the rootlets die, much water with mineral salts from the soil is not pumped into the tree and therefore the elaborated carbohydrate or starch manufactured by the leaves, is accumulated without being converted into plastic materials required by the growing tissues, thus resulting in the marked effect on the size of the foliage. This, however, cannot continue for long and in course of time as the poison spreads to the other rootlets the tree ultimately dies.

In the light of the above theory will it not be worth while to carry some experiment in connection with sandal? Hoeing to a radius of 10 feet and to a depth of 1 to 1½ feet around a healthy sandal tree in an affected area may throw some light as to how far that tree is immune from the attack.

Note :—Italics are mine.

A Junior.

Sacred value of the resin of *Ailanthus excelsa*.

The resin of the *Ailanthus excelsa* is believed to possess very rare properties to be sought for by holy men such as recluses and others who spend their time far away from the haunts of men—in jungles. The properties are attributed to the resin exuding from the tree on the New moon day in the Tamil month of Audi preferably the second new moon day if two such days occur in the same month. The recluses are said to collect the resin and eat it on the same day. It will be interesting to know what peculiar properties the product possesses to make it valuable even to those who have renounced the world.

The resin is similar to that exuded by the allied species *Ailanthus malabarica*. The latter is much used as a frankincense. The bazaar stuff is much adulterated with the former among other gummy substances. So far as is known, the resin of *Ailanthus excelsa* is not useful for any purpose.

T. K. Parthasarathi,
Senior Division,
Madras Forest College.

**Key for the identification of plants met with
around the Madras Forest College camp
at Nedungayam.**

The following list is the outcome of two short visits and is, therefore, far from complete, whether taken as a list or regarding dates of flowering and fruiting and the vernacular names.

The figures in brackets indicate the first number falling within the converse class. Measurements are of length.

The following abbreviations are used :

ab.	=above.	Nov.	=November.
ac.	=acute.	num.	=numerous.
acm.	=acuminate.	ob.	=obtuse.
alt.	=alternate.	obl.	=oblong.
Ap.	=apex.	obv.	=obovate.
ba.	=base.	opp.	=opposite.
bel.	=below.	orb.	=orbicular.
com.	=compound.	ov.	=ovate.
cor.	=coriaceous.	par.	=parallel.
cord.	=cordate.	pel.	=pellucid.
cre.	=crenate.	Pet.	=petiole-s-d.
dist.	=distinctly.	Pin.	=pinna-e.
Ent.	=entire.	pint.	=pinnate.
Fl.	=flower-s.	pr.	=pair-s.
fol.	=foliate.	prom.	=prominent.
Fr.	=fruit-s.	pub.	=pubescent.
Gl.	=gland-s.	rou.	=round-ed.
gla.	=glabrous.	Sc.	=scale-s.
gld.	=gland-dotted.	sca.	=scabrous.
glr.	=glandular.	ser.	=serrate.
L.	=leaf, leaves.	ses.	=sessile.
lat.	=lateral.	sim.	=simple.
lo.	=lobe-d.	St.	=stipule-s.
Lt.	=leaflet-s.	stel.	=stellate.
Mar.	=margin.	str.	=stipular.
mem.	=membranous.	Ten.	=tendrils.
Ner.	=nerves.	tom.	=tomentum ; ose.

A. Trees (56).

I. L. sim (41).

i. L. alt (31).

(i) juice milky (7).

§ L. sca., hispid or strigose.

(a) L. 3-8 Ner at ba.

1. *Ficus hispida*, Linn. (Urticaceæ).

(aa) L. 1 ner. at ba.

(b) L. under 4", strigose

2. *Streblus asper*, Lour. (Urticaceæ).

(bb) L. over 4", strigose, mar. cut

3. *Artocarpus hirsuta*, Lam. (Urticaceæ).

§§ L. not sca, hispid or strigose.

(a) aerial roots present, often epiphytic

4. *Ficus bengalensis*, Linn. (Urticaceæ).

(aa) no aerial roots.

b. L. glossy ab, Ner 7-8 pr, Fl. & Fr. Nov.

5. *Artocarpus integrifolia* Linn. (Urticaceæ).

bb. L. not-glossy, Ner 10-14 pr.

6. *Bassia latifolia*, Roxb. (Sapotaceæ).

(ii) juice watery.

§ L. peltate.

(a) L. gld-bel.

7. *Macaranga Roxburghii* Wight, (Euphorbiaceæ).

(aa) L. not gld.

8. *Pterospermum Heyneanum* Wall. (Sterculiaceæ).

§§ L. not peltate.

(a) L. lo.

9. *Bauhinia malabarica* Dc. (Leguminosæ).

(aa) L. not lo.

b. L. with pel. gl. Fl. Nov.

10. *Casearia tomentosa*, Roxb. (Samydaceæ).

- (bb) No pel. gl.
- (c) l. cre. or ser (18).
- (d) L. gla.
- (e) L. over 12"
- 11. *Dillenia pentagyna*, *Roxb.* (Dilleniaceæ).
- (ee) L. under 12"
- (f) L. obv. ses or subses.
- 12. *Careya arborea*, *Roxb.* (Myrtaceæ).
- (ff) L. not obv; dist. pet.
- (g) L. under 4", ba. obl.
- 13. *Putranjiva Roxburghii*, *Wall.* (Euphorbiaceæ).
- (gg) L. over, 4" ba equal Fr. Nov.
- 14. *Hydnocarpus Wightiana*, *Bl.* (Bixineæ).
- (dd) L. not gla.
- (e) L. white or fulvous tom. bel.
- 15. *Cordia Wallichii*, *G. Don.* (Boraginaceæ).
- (ee) L. not white or fulvous bel.
- (f) Ba of l. very obl.
- 16. *Grewia tiliæfolia*, *Vahl.* (Tiliaceæ).
- (ff) Ba of l. equal.
- 17. *Tetrameles nudiflora*, *Roxb.* (vern Chini) (Datiscaceæ).
- (cc) L. Ent. (11).
- (d) L. with scarlet Sc. bel.
- 18. *Mallotus philippinensis*, *Muell-Arg.* (Euphorbiaceæ).
- (dd) L. without scarlet Sc.
- (e) L. under 1", close set. F. Nov.
- 19. *Phyllanthus Emblica*, *Linn.* (Euphorbiaceæ).
- (ee) L. over 1", not close set.
- (f) Bark deeply cracked, resembling crocodile hide. Fr. Nov.
- 20. *Terminalia tomentosa*, *Bedd.* (Combretaceæ).

- (ff) Bark not resembling crocodile hide.
- (g) L. 3-5. Ner. at ba.
- (h) L. stel-scurfy bel. Fl. Fr. Nov.
- 21. *Aleurites moluccana*, *Willd.* (katubadam-vern) (Euphorbiaceæ).
- (hh) L. not stel-scurfy.
- 22. *Trewia nudiflora*, *Linn.* (Euphorbiaceæ).
- (gg) L. 1. Ner at ba.
- (h) L. sca. ob., stel-pub. bel. Fl. and Fr. Nov.
- 23. *Sterculia guttata*, *Roxb.* (Sterculiaceæ).
- (hh) L. gla. or nearly so.
- (j) Mar. of L. pel.
- 24. *Terminalia belerica*, *Roxb.* (Combretaceæ).
- (jj) Mar of L. not pel.
- (k) Ner. num. stong, par.
- (m) pet with two tubercles at Ap. Fr. Nov.
- 25. *Holigarna Arnottiana*, *Hook.* (Anacardiaceæ).
- (mm) Pet without tubercles Fr. Nov.
- 26. *Bridelia retusa*, *Spreng.* (Euphorbiaceæ).
- (kk) Ner. few, not conspicuous and par.
- (m) Pet. with 1-2 gl. at Ap. Fl. and Fr. Nov.
- 27. *Terminalia paniculata* *Roth* (Combretaceæ).
- (mn) pet. without gl.
- (n) L. rou, ob.
- 28. *Cleistanthus collinus*, *Benth.* (Euphorbiaceæ).

- (nn) L. not rou, ac.
- (o) axils of nerves
usually glr.
- 29. *Hopea parviflora*, *Bedd.* (Dipterocarpaceæ).
- (oo) axils of ner. not gl.
- (p) Ap. of L. long-acm.
- Hydnocarpus Wightiana* *Bl.* (14).
- (pp) Ap. of L. not long-acm.
- 30. *Mangifera indica*, *Linn.* (Anacardiaceæ).
- 2. L. opp. or whorled (1)
- (i) Juice milky.
- § L. Hispid.
- Ficus hispida* (1).
- §§ L. not hispid unripe Fr. Nov.
- 31. *Wrightia tinctoria*, *Br.* (Apocynaceæ).
- (ii) Juice Watery.
- § St. interpetiolar.
- (a) Thorny.
- 32. *Randia ulginosa*, *Dc.* (Rubiaceæ).
- Fr. Nov.
- (aa) Not Thorny.
- (b) L. cord. pub. bel.
- 33. *Adina cordifolia*, *Hook f.* (Rubiaceæ).
- (bb) L. not cord. glab. bel.
- 34. *Stephegyne parvifolia*, *Korth.* (Rubiaceæ).
- §§ St. not interpetiolar.
- (a) L. 3-5 ner at ba.
- 35. *Strychnos Nux-Vomica*, *Linn.* (Loganiaceæ).
- (aa) L. 1-Ner at ba.
- (b) L. gla.
- (c) Ner. very num, par.
- 36. *Calophyllum Wightianum*. *Wall* (Guttiferæ).

- (cc) Ner. few, not par.
- (d) Bark white or pinkish, peeling in.
long strips.
- 37. *Lagerstroemia lanceolata*, *Wall.* (Lythraceæ).
- (dd) Bark brown, not peeling in strips.
Fr. Nov.
- 38. *Lagerstroemia Flos. Reginae*, *Ret.* (Lythraceæ).
- (bb) L. not gla.
- (c) L. very large, hispid. Fr Nov.
- 39. *Tectona grandis*, *Linn.*
- (cc) L. not very large, densely woolly.
Flo Nov.
- 40. *Callicarpa lanata*, *Linn.* (Verbenaceæ).
- II. L. com. (1)
- 1. L. alt (53)
- (i) L. digitate.
- 41. *Bombax malabaricum*, *Dc.* (Malvaceæ).
- (ii) L. not digitate.
- § L. 3-5 fol.
- (a) Thorny.
- 42. *Erythrina stricta*, *Roxb* (Leguminosæ).
- (aa) Not Thorny.
- 43. *Bischofia javanica*, *Bl.* (Euphorbiaceæ).
- §§ L. pint.
- (a) L. 1. pint.
- (b) L. gld.
- 44. *Limonia acidissima*, *Linn.* (Rutaceæ).
- (bb) L. not gld.
- (c) L. paripint.
- (d) Lt. 4-8 par-ac (green fruit Nov.)
- 45. *Cassia Fistula*, *Linn.* (Leguminosæ).

- (dd) Lt.—3 pr. ob.
46. *Schleichera trijuga*, *Willd.* (Sapindaceæ).
- (c) L. imparipint.
- (d) Main ners. num. prom.
47. *Pterocarpus Marsupium*, *Roxb.* (Leguminosæ).
- (dd) Main ner. few, not prom.
- (e) Lat. Lt. opp.
48. *Pongamia glabra*, *Linn.* (Loguminosæ).
- (ce) Lat. Lt. alt.
49. *Dalbergia latifolia*, *Roxb.* (Leguminosæ).
- (aa) L. 2. pint.
- (b) L. over 5'.
50. *Caryota urens*, *Linn.* (Palmeæ).
- (bb) L. under 2'.
- (c) Lt. under 2".
51. *Albizzia Lebbeck*, *Benth.* (Leguminosæ).
- (cc) Lt. over 3".
92. *Xylia dolabriformis*, *Benth.* (Leguminosæ).
2. L. opp. (41).
- (i) L. 3-5 fol.
53. *Vitex leucoxydon*, *Linn. f.* (Verbenaceæ).
- (ii) L. pint.
- § L. 1 pint (Fr. Nov).
54. *Stereospermum Chelonoides*, *Dc.* (Bignoniaceæ).
- §§ L. 2-3 pint.
55. *S. xylocarpum*, *Wight.* (Bignoniaceæ).
- B. Bamboos** ($\frac{1}{3}$).
56. *Bambusa arundinacea*, *Willd.* (Gramineæ).

C. Shrubs or under-shrubs (§§).

- I. L. sim. or 1 fol. (75).
- i. L. alt (69).
- (i) L. with silvery Sc-bel.
57. *Elæagnus latifolia*, *Linn.* (Elaeagnaceæ).
- (ii) L. without silvery Sc.
- § L. gld.
- (a) L. mem.
58. *Embelia robusta*, *Roxb.* (Myrsinaceæ).
- (aa) L. cor.
59. *Ardisia humilis*, *Vahl.* (Myrsinaceæ).
- §§ L. not gld.
- (a) juice milky.
- (b) L. mem. gla. Fr. Nov.
60. *Holarrhœna antidysenterica*, *wall.* (Apocynaceæ).
- (bb) L. fleshy, white cottony (Fl. & Fr. Nov).
61. *Calotropis gigantea*, *Br.* (Asclepiadaceæ).
- (aa) Juice watery.
- (b) L. ent.
- (c) L. under 2" (Fl. & Fr. Nov).
62. *Phyllanthus reticulatus*, *Poin.* (Euphorbiaceæ).
- (cc) L. over 3"
- (d) Stem and L. fleshy (Fr. Nov).
63. *Costus speciosus*, *Linn.* (Scitamineæ).
- (dd) Not at all fleshy.
- (e) Branchlets triquetrous (Fl. & Fr. Nov).
64. *Desmodium triquetrum*, *Dc.* (Leguminosæ).
- (ee) Branchlets terete (Fl. Nov).
65. *Desmodium gangeticum*, *Dc.* (Leguminosæ).

- (bb) L. not entire.
- (c) L. 3-5 Ner. at ba.
- (d) L. with 2 Gl. at. ba. (Fl. Nov).
- 66. *Baliospermum axillare*, *Bl.* (Euphorbiaceæ).
- (dd) L. without gl. (Fl. & Fr. Nov).
- 67. *Helicteres Isora*, *Linn.* (Sterculiaceæ).
- (cc) L. 1-Ner. at ba. (Fr. Nov).
- 68. *Leea macrophylla*, *Roxb.* (Vitaceæ).
- 2. L. opp. or whorled (57).
- i. Thorny.
- § St. interpetiolar, stem terete (Fr. Nov).
- 69. *Randia dumetorum*, *Linn.* (Rubiaceæ).
- §§ St. absent, stem square (Fl. Nov).
- 70. *Lantana Camara*, *Linn.* (Verbenaceæ).
- ii. Not thorny.
- § St. interpetiolar or connate.
- (a) L. mem. Pub. (Fl. Nov).
- 71. *Mussaenda frondosa*, *Linn.* (Rubiaceæ).
- (aa). L. cor. gla. (Fl. & Fr. Nov).
- 72. *Ixora coccinea*, *Linn.* (Rubiaceæ).
- §§ St. not interpetiolar or connate.
- (a) L. gla. (Fl. Nov).
- 73. *Clerodendron serratum*, *Spreng.* (Verbenaceæ).
- (aa) L. densely woolly (Fl. Nov).
- 74. *Gomphostemma strobilinum*, *Wall.* (Labiatae).
- II. L. comp (157).
- 1. L. 3-fol (81).
- i. Branches triquetrous (Fl. & Fr. Nov).
- 75. *Desmodium cephalotes*, *Willd.* (Leguminosæ).

- ii. Branches terete.
- § Lat. Lt. under 1" (Fl. & Fr. Nov).
- 76. *Desmodium gyrans*, *Dc.* (Leguminosæ).
- §§ Lat. Lt. over 1."
- (a) Lt. gla. bel.
- (b) Pet. 1" or more, narrowly winged (Fl. Nov).
- 77. *Flemingia semialata*, *Roxb.* (Leguminosæ).
- (bb) Pet. 1½" or less, not at all winged (Fl. & Fr. Nov).
- 78. *F. involucrata*, *Benth.* (Leguminosæ).
- (aa) Lt. not gld.
- (b) Pet. under ½"; bracts concealing the Fl. (Fl. Nov).
- 79. *Desmodium pulchellum*, *Benth.* (Leguminosæ).
- (bb) Pet. over ½"; bracts sim. not concealing the Fl. (Fl. & Fr. Nov).
- 80. *D. polycarpum*, *Dc.* (Leguminosæ).
- 2. L. pint. (75).
- i. L. 1-pint.
- § L. gld. Rarely 1-2 or 3 fol. (Fl. Nov).
- 81. *Glycosmis pentaphylla*, *Corr.* (Rutaceæ).
- ii. L. 2-pint.
- § Prickly; L. very sensitive (Fl. Nov).
- 82. *Mimosa pudica*, *Linn.* (Leguminosæ).
- §§ Thornless; L. not sensitive (Fl. Nov).
- 84. *Leea sambucina*, *Willd.* (Vitaceæ).
- D. Climbers and straggling shrubs (57).**
- I. L. Sim. (102).
- 1. L. alt. (97).
- i. Ten. present.

- § L. ending in a Ten. (Fl. Nov).
85. *Gloriosa superba*, *Linn.* (Liliaceæ).
- §§ L. not ending in a Ten.
- (a) Branches 5-6 angled (Fl. & Fr. Nov).
86. *Vitis discolor*, *Dalz.* (Vitaceæ).
- (aa) Branches not angled.
- (b) L. deeply 5-7 lo. (Fl. & Fr. Nov).
87. *Momordica Charantia*, *Linn.* (Cucurbitaceæ).
- (bb) L. not or shallowly lobed (Fl. Nov).
88. *Gymnopetalum Wightii*, *Arn.* (Cucurbitaceæ).
- ii. Ten. absent.
- § L. with silvery Sc. bel. (57).
- Elæagnus latifolia*, *Linn.* (Elæagnaceæ).
- §§ L. without silvery Sc.
- (a) Thorny.
- (b) L. minute with axillary cladodes.
89. *Asparagus racemosus*, *Willd.* (Liliaceæ).
- (bb) L. over 1", no cladodes.
- (c) L. lo. (Fl. Nov).
90. *Hibiscus furcatus*, *Roxb.* (Malvaceæ).
- (cc) L. not lo. (Fl. Nov).
91. *Zizyphus ænopia*, *Thunb.* (Rhamnaceæ).
- (aa) Not thorny.
- (b) L. gla.
- (c) L. 7-Ner. at ba. (Fl. Nov).
92. *Piper longum*, *Linn.* (Piperaceæ).
- (cc) L. 5-Ner. at ba.
- (d) L. orb., ob.
93. *Cocculus macrocarpus*, *W. & A.* (Menispermaceæ).

- (dd) L. ov., acm. (Fl. Nov).
94. *Tiliacora racemosa*, *Coleb.* (Menispermaceæ).
- (bb) L. not gla.
- (c) L. ent or 3-lo. (Fl. & Fr. Nov.; a stinging nettle).
95. *Tragia involucrata*, *Linn.* (Euphorbiaceæ).
- (cc) L. 5-10.
96. *Ipomœa vitifolia*, *Sm.* (Convolvulaceæ).
2. L. opp. (85).
- i. Juice milky.
- § Str. Gl. present (Fl. Nov).
97. *Hemidesmus indica*, *R. Br.* (Asclepiadaceæ).
- §§ No. Str. Gl. (Fl. Nov).
98. *Ichnocarpus frutescens*, *Ait.* (Apocynaceæ).
- ii. Juice watery.
- § St. interpetiolar (71).
- Mussaenda frondosa*, *Linn.* (Rubiaceæ).
- §§ St. not interpetiolar.
- (a) L. tom.
99. *Calycopteris floribunda*, *Lam.*
- (aa) L. gla.
- (b) L. ac. at ba. (Fl. and green Fr. Nov).
100. *Hippocratea Grahami*, *Wight.* (Celastrineæ).
- (dd) L. cord. at ba. (Fl. Nov).
101. *Dioscorea bulbifera*, *Linn.* (Dioscoreaceæ).
- II. L. com. (85).
1. L. 3-fol. (Fl. Nov).
102. *Naravelia zeylanica*, *Dc.* (Ranunculaceæ).
2. L. pint.
- i. L. 1-pint.

- § Lt. cor., fewer than 15.
103. *Dalbergia volubilis*, *Roxb.* (Leguminosæ).
- §§ Lt. mem. 20 or more.
- (a) Lt. under $\frac{3}{4}$ " (Fl. Nov).
104. *Abrus precatorius*, *Linn.* (Leguminosæ).
- (aa) Lt. over $\frac{3}{4}$ " (Fl. & Fr. Nov).
105. *A. pulchellus*, *Wall.* (Leguminosæ).
- ii. L. 2-pint.
- § Pet. without Gl.
- (a) Pin. 12-16. (Fl. & Fr. Nov).
106. *Cæsalpinia Bonduc*, *Roxb.* (Leguminosæ).
- (aa) Pin. 4-10.
107. *Mezoneuron cucullatum*, *W. & A.* (Leguminosæ).
- §§ Pet. with a large Gl.
108. *Acacia concinna*, *Dc.* (Leguminosæ).

C. Fischer.

Raison d'être of the students' Recreation Room.

What the students require is a common recreation room close to the Hostels (the Library is at a considerable distance away) where the students can sit and talk, play draughts etc., read the papers, and generally cultivate the communal spirit so desirable in a College. The Recreation Room would contain the Students library of light literature. It would also be used for students' meetings, theatricals etc. In other words it would be the Students' Club.

It is understood that Government is ready to grant a site on College Land for the purpose and to sanction a grant in aid of subscriptions raised for the purpose of

constructing a club room on a modest scale, if the amount of private contributions is sufficient to justify such assistance.

Situated as far as we are from Coimbatore, a Recreation Room would be a great boon to the students and would help greatly in fostering a healthy spirit (social and intellectual) in the College.

About Rs. 1007 have so far been subscribed. Contributions may be sent to the Principal who will acknowledge the amounts in the columns of the Journal.

The Cowley-Brown Memorial Fund.

From the above article, it will be seen that Rs. 1007 have been so far subscribed for the Cowley-Brown Memorial Fund.

A call has not been made hitherto for the payment of the subscriptions kindly promised. The subscribers are requested to remit their subscriptions to the Principal.

Rs. 237—6—0 have been received and Rs. 162—5—0 have been spent therefrom to make a bromide enlargement of Mr. F. L. C. Cowley Brown. This was one of the aims when the Fund was started. The first object has been achieved and the enlargement is now put up in the Principal's lecture room in the College.

All subscriptions received hereafter and the balance left will be utilised for the construction of the Recreation Room.

We appeal to the past students and to all gentlemen interested in the scheme to be so good as to subscribe for the laudable object and send in their subscriptions at their early convenience.

We are sanguine that our request will appeal to everyone interested and that we will have a good and encouraging response.

C. SRINIVASA RAU,
Secretary,
The Cowley Brown Memorial Fund,
The Madras Forest College,
Coimbatore.

Occasional Notes.

The Committee of Management has decided that Donors of Rupees Fifty will be placed on the free list of the Journal whether the issue is monthly or quarterly.

Mr. R. D. Richmond, The Indian Forester and Mr. F. L. C. Cowley Brown are accordingly placed on the free list.

The following gentlemen have lately visited the College and the Museum.

Hon'ble Mr. Buckley, Mr. Stoney, C. I. E., Mr. Morrison with a party of Zamindars.

New roads and gravelled paths are being laid out on the College Estate.

The Senior division is undergoing a gymnastics course of two hours a week.

The following members of the Junior Division have been elected to the House Committee.

1. Krishnan Nair.
2. Narayana Rao.
3. Thayuman.
4. Peddalakshmayya Naidu.
5. D'Sylva.

In future, the House Committee will be distinguished by a special Puggri or Turban.

The College proceeds on its cold weather Tour on the 2nd of October—the Senior division to Komattiyur and the Junior division to Mount Stuart. The divisions will return to Head Quarters on the 4th of November to undergo the Periodical Examination from 5th to 10th November before proceeding to their next camp.

The Principal is now in residence at the College, his bungalow having been practically completed.

Planting on the Estate and in the arboretum is being taken up. The North side of the Gass Museum has been faced with Trellis for creepers. The nursery is being restored. A special allowance has been sanctioned to the Curator for the supervision of planting operations.

The Vice-President of the Athletic Club has prepared four plots to test the best method of forming an athletic ground. It is hoped that before long the preparation of the Athletic ground and three Tennis Courts will be undertaken.

The pavilion has been completed.

The following have been awarded colours since our last issue.

<i>Hockey.</i>	<i>Foot-ball.</i>
G. M. Bartholomeusz.	A. B. Fenn.
C. B. Chengappa.	J. S. Rowland.
Abdul Hameed Khan.	U. K. Thimmayya.
	J. Venugopal Naidu.

On the 6th September, student Narasinga Rao was presented with a bat by the Athletic Committee in

commemoration of his having scored a century--the first yet scored in a College Match.

At the Grigg Memorial sports on the September 1st the following students distinguished themselves.

C. B. Chengappa—Second in $\frac{1}{4}$ mile and third in 100 yards flat races.

P. K. Parameswaran Pillai—First in the one mile race.

A carpenter's shop has been started. The carpenter's services will be available for private work.

The Book-Stall run by some members of the Staff and the Students at the War Fete on the 18th of August realised Rs. 300.

The Editor will be glad to receive old copies of No. 1 and No. 2 of the Journal.

Quarters for the Engine Driver and the cleaner have been completed and fitted with pipes.

Two sections of the strata on the College Estate. Sixty feet and 120 feet respectively have been framed and hung up in the Principal's room, in the Museum and in the Library.

It is proposed to start a Photographic Club shortly.

It is proposed to form Demonstration forests on the College Estate.

List of contributions to the Gass Forest Museum since July 1917.

Serial No.	Contributions.	Contributor.
1.	Botanical specimen of <i>Vateria indica</i> .	M. R. Ry., Sadasiva Iyer. Avl., D. F. O. Manga- lore North.

- | | | |
|----|--|--|
| 2. | 8 specimens of haustoria of <i>Anacolosa densiflora</i> . | } P. M. Lushington Esq. |
| 3. | 2 specimens of Coral. | |
| 4. | Specimens showing spike in <i>Zizyphus ænoplea</i> , <i>Dodonca viscosa</i> , and lemon grass. | } Mr. S. Krishnaswamy Ayyangar, M. F. C. |
| 5. | Botanical specimens of <i>Viburnum punctatum</i> , | |
| | | } Mr. R. E. Lemos
R. O. Ambasamudram. |
| | | } E. M. Crothers Esq. |

We beg to acknowledge receipt of the following journals.

1. Then and Now.
2. Fettesian.
3. The Mysore Social Review.

Business Columns.

Intending subscribers are requested to note that subscriptions will be accepted from the commencement of a fresh volume. It is impossible to ensure back numbers for those who join our list when a couple of issues of a volume have been published.

We are issuing the No. 1 of volume II of the journal to all our subscribers and request that the annual subscription of Re. 1 be sent to the Manager to save inconvenience. If subscriptions are not received in time the 2nd number will be sent per Value Payable Post.

Subscribers are particularly requested to send in their correct addresses and also any change of addresses to the Editor. We wish to point out that several complaints received that the journals have not been received is entirely due to want of correct addresses.

We assure our subscribers that the journals are promptly despatched at every issue. In several cases we have to refer to the classified list of Forest Officers for addresses in the absence of definite information.

Manager.

**Balance Sheet of Accounts of the Madras
Receipts.**

Items.	Particulars.	Amounts.		
		Rs.	AS.	P.
1	Subsidy from the Indian Forester ...	50	0	0
2	Donation from Mr. R. D. Richmond ...	64	0	0
3	Donation from Mr. F. L. C. Cowley Brown. ...	50	0	0
4	Entrance fees from :—			
	i. 24 Imperial Officers and Extra Deputy Conservators at Rs. 10 each. ...	240	0	0
	ii. 23 Provincial Officers at Rs. 5 each. ...	115	0	0
	iii. 148 Subordinate Officers at Rs. 2 each ...	296	0	0
5	Annual subscription from 195 members at Rs. 1 each. ...	195	0	0
6	Receipts towards advertisement charges. ...	98	5	0
7	Interest accrued on the deposit in the Savings Bank. ...	8	13	3
8	Sundry receipts. ...	1	2	6
	Total Rs. ...	1118	4	9

G. VISWANATHAM,
Treasurer.

C. SRINIVASA RAU,
Editor.

**Forest College Journal for the year 1916—1917.
Expenditure.**

Items.	Particulars.	Amounts.		
		Rs.	AS.	P.
1	Printing charges including cost of paper :—			
	i. Stationery. ...	4	15	0
	ii. Cost of printing circulars. ...	1	12	0
	iii. „ wrappers. ...	12	8	0
	iv. „ four issues of Journals. ...	386	13	9
		406	0	9
2	Cost of making printing blocks. ...	2	10	0
3	Postal charges :—			
	i. Incurred by the press in despatching Journals ...	33	3	6
	ii. Incurred by the Editor in despatching Journals and Correspondence. ...	22	11	6
		55	15	0
4	Charges incurred in packing Journals for despatch	5	2	9
5	Conveyance charges :—			
	i. Jutka charges incurred by the Editor to the press ...	1	10	0
	ii. Trainage incurred by the Editor to proceed to Coimbatore from Camp on Journal work ...	2	4	0
		3	14	0
6	Advance made to the press for purchasing stock of paper. ...	75	0	0
	Total Rs. ...	548	10	6
	Add amount deposited in the Savings Bank including the interest accrued on the deposit. ...	508	4	3
	Add cash balance with the Treasurer on 11-9-17.	61	6	0
	Total Rs. ...	1118	4	9

F. COWLEY BROWN,
President.

E. M. CROTHERS,
Manager.

Forecast of probable Receipts and Expenditure during 1917—1918.

Probable Receipts

Items	Particulars.	Amount. Rs. A. P.	Items	Particulars.	Amount. Rs. A. P.
1	Annual subscriptions from 195 members.	195 0 0	1	Printing four issues of Vol. II. of the Journal and all charges connected therewith	550 0 0
2	Advertisement charges.	100 0 0			
3	Entrance fees from 30 additional members at Rs. 2 each.	60 0 0			
4	Annual subscriptions from 30 additional members.	30 0 0			
	Total Rs.	385 0 0		Total Rs.	550 0 0
				Expected receipts during the year	385 0 0
				Annual deficit Rs.	165 0 0

Note:—Forecast of expenditure based on the actuals of 1916—1917.

THE Madras Forest College Journal.

Published Quarterly.

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December, 1917.

No. 2.

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

Ourselfes.

The last quarter of the past year was mostly spent by the College in touring except for a week at head-quarters in November, when periodical examinations were held for both divisions. The two months term at head-quarters and the break in the touring season, afforded by the return to Head quarters for the examinations, decidedly make for comfort. The Senior Division visited Komittiyur to study the sandal and Mt. Stuart to study teak. The Junior Division visited Mt. Stuart, Nilambur and Nedungayam to study teak and the natural forests in all their aspects.

The Annual Athletic Sports of the College were held on the 29th September 1917. Almost all the students competed for the events and those who stood for the finals did credit to the College motto "*Mens sana in corpore sano.*"

The Students are much gratified by the generous sanction made by the Government for the formation of the

Athletic Ground on the College Estate. The work has been taken on hand. The grounds will be ready in March. A great deficiency has thus been supplied.

* * * *

It is gratifying to learn that the Secretary of State has sanctioned the creation of the Post of Chief Conservator of Forests for Madras as also an addition of nine other posts to the Imperial and ten to the Provincial cadres. This increase is doubtless in recognition of the fact that the Forest Department is undermanned and cannot cope even with the present system of working.

It is also understood that the Government of Madras propose to depute an experienced Forest Officer to Canada to study modern methods of timber extraction and transport, with a view to their application to the problems of this Presidency.

When concentrated working becomes the rule, as it must ere long, improved and up to date methods will be requisite. Extraction and transport by mechanical means, among several other methods of working will follow. The development of economic forestry is no longer a matter of the remote future.

The augmentation of the Subordinate staff is the logical sequence of the addition to the Controlling Staff.

Now is the opportunity for equipping ourselves with adequate knowledge to adapt ourselves to any branch of forest work. A Forest Ranger is said to be a "Jack of all trades." We should prove ourselves fully deserving of the epithet. An efficient man is one who knows everything of something and something of everything.

People are at last beginning to realise that the Forest Department is managing the Forest Administration for the

benefit of the community at large. We must lose no opportunity of fostering and developing that idea. Regular propaganda work must in future form part of the Ranger's duties; the present Senior Division at the College is being afforded special opportunities for this purpose.

There is thus a vast field before an aspiring and energetic Range Officer in the several branches of forest work. We should bestir ourselves and make ourselves fit for the situation.

Forest Panchayats.

The efforts of the Forest Committee of 1912, headed by the Hon'ble Mr. W. O. Horne, are now bearing fruit and everyone will be glad to hear that on 30th June 1917 there were 290 panchayats as against 147 in the previous year. This increase of 143 panchayats within the space of a year is a clear indication of the ready response of the ryots to the call of the Forest Officer to co-operate with him in his efforts to protect the forests. An aggregate area of 689 square miles of which 479 was covered by Reserved Forests and the rest by Reserved Lands was thus under the direct management of villagers during 1916-17. It is indeed a matter for congratulation that in the last forest year only 3 panchayats had to be dissolved and the management of the forests concerned taken back in the hands of the department. The very useful work of clearing prickly pear, repairing cart-tracks and paths, ploughing up the forest and sowing seeds of the required grass and such other works executed by certain panchayats in the forests entrusted to them in the Coimbatore district show what the ryots are capable of, provided they are coached and instructed by responsible forest officers. My chief aim in writing this, therefore, is to bring out the additional responsibility of

future Range Officers in the matter. A policy of strict "keep aloof" on the part of the Range Officer in his relations with the ryots is by no means beneficial to the department. The ryot has to be taught; the responsibility of the Range Officer is even more serious and greater with regard to the Forest Village System. It is all the more important for the budding Range Officers to shake off their reservedness and to talk to the ryots and to meet their several sensible querries and thus do justice to the costly training given in the Madras Forest College. The Indian ryot, though antiquated in his habits and bereft of the modern English education or for that matter education of any sort, has almost intuitive powers of understanding to his credit and the Range Officer who considers it beneath him to have a free talk with the villagers is the least fitted for the responsible post he holds. The ryot's attitude towards the Revenue and the Agricultural Departments which is not one of hatred or antipathy can be easily accounted for. The officers of these departments, whenever they camp in the villages, always summon the ryots to their offices and hold informal discourses. Till recently, Forest Officers had no opportunity to carry on the propaganda work in the villages and the splendid results now achieved by the new policy fully warrant its continuation. It is the Range Officer in close touch with the people who should do a good deal to enlist the sympathy of the ryots on the side of the Forest Department and not the District Forest Officer who has most opportunities for visiting the rural parts close to the forests.

2. The position of the Range Officer is a very important one in so far as the District Forest Officer and the Conservator cannot have the same intimate local knowledge of any given forest. Suggestions should be made to the District Forest Officer based on the Range Officer's local

knowledge and constant inspections of these forests. It is not the Range Officer's look out to see whether all his suggestions are carried out or not. Much depends on the initiative of the Range Officer, as it is not possible for the District Forest Officer to look into or get information about the minute details of every scheme in operation in a range.

3. We have often heard of instances of forests deliberately burnt wholesale by villagers as a result of their unfriendly relationship with the forest subordinates. A Range Officer who can claim only this kind of relationship with the ryots cannot command labour for work in his forests and his position in the range is simply miserable. Whereas, a Range Officer who has always the good will of the villagers and for whom he provides labour in the forests is doing good not only to himself and to the department, but also to the public at large. Formerly, in several cases panchayats had to be forced on unwilling villagers. But now villagers are becoming alive to their responsibilities in protecting the forests and the Range Officer's part in training the ryots on the aims of Forest Conservancy is an important one. By handling the ryots properly and dealing with them leniently, within limits of course, we ought to be able to entrust to their management all our "Class V grazing reserves" leaving us more time and better facilities, than now exist, for the working of our important I, II and IV class reserves.

4. No doubt the ryots indulge to some extent in goat browsing in the panchayat forests; but, the Range Officer should face this question squarely and tell the ryots that such suicidal folly will not be tolerated, that contravention of this rule will result in the panchayat being dissolved and the management of the reserve resumed by the department which in turn will entail the closure of the reserve to any kind of grazing. This drastic step will be taken only when

repeated warnings to the defaulting panchayat are found to be of no avail. The ryot cannot get on without his agricultural cattle and between the goats kept by him as a luxury and the cattle so vitally necessary for his agricultural works he will choose the latter. Have we not a standing example in the Javadis where under the Forest Village Scheme, the ryots in all the hill-villages have been induced to get rid of their goats? This is an example of how much a Forest Officer can do by means of his intimate movements with the ryots. Will every Range Officer attempt to do where facilities exist what has so excellently been done on the Javadis where the most valuable forest produce, sandal, is left to be successfully protected by the Malayalis?

S. G. Venkatraman, *Senior Dn. Student.*

Forest Principles and Indian Forestry.

Experience appears to be the foundation on which we begin to work up any subject. It is so with our Forestry development in India. The ideas of formation, the demarcation, protection, working, exploitation have all more or less, for their basis the experience of forest working in Europe. It is evidently so with fire protection and grazing. The writer of this had the opportunity of seeing the coniferous forests of Himalayas which enjoy a temperate climate. The conditions of forest growth in Temperate and Tropical climates are quite dissimilar in some important respects. European climate has four distinct seasons winter, spring, summer and autumn. The winter is a period of unbearable cold and complete inactivity in all aspects of life, vegetable and animal. It is specially so with vegetation which is exposed to the terrible cold. The forest growth is at a stand-still. The insect life is dormant.

The spring comes and releases life from this stupor. The vegetation begins to put on a blooming appearance, sprouts, and grows actively. Insects are seen everywhere moving about briskly in numbers. Regeneration is markedly plentiful all over the forest. This is chiefly the period of growth and is marked in the whorls of coniferous trees. The annual rings of growth are also clear. This is succeeded by the summer. Now the growth which has come up so quickly begins to mature. The autumn succeeds. Some species shed their leaves wholesale. The fruit ripens. Except winter, the other seasons are more or less agreeable and are not characterized by extremes of climate.

In these forests favoured by the mildness of climate the fallen leaf accumulates year after year. The water of the melting snow and occasional showers sinks down to the lower layers of old leaf, converts it into humus and keeps it moist. Every year new leaves are added to the old humus. It is pleasant and happy to walk over the porous strata of this soft and very valuable moist manure covered with leaf. No elements of value are lost and this manure is always ready in the condition in which it is most suitable for assimilation by plants with all nutritive materials. The formation and existence of this humus is a distinguishing feature of temperate climates. Even the cultivator should be interested in protecting and preserving this humus and favour forestry in this respect.

The vegetation here having only a limited period of actual growth, the plants are very susceptible to injury either by fire or by any other agency. If fire starts anywhere in these coniferous forests, it burns the humus on the ground and the tree growth above. Ready chances of immediate recuperative healing by natural process do not seem to be always at the disposal of the trees. The burning of the

resinous leaf is intense. The humus exposed to this burning, loses much of its productive capacity and has to actually become useless as manure. The fires occur only during the short summer and do not appear to be as far and extensive as in the tropics, being mostly ground fires. If the heavy cattle tread on the porous strata of soft moist soil it is sure to become hard and would not be of much use.

Any injury to trees or seedlings is to be most carefully guarded, in transplanting the seedlings; these have to be very carefully pricked out from nurseries without the least injury to the tap or the side root. This is so serious that the transplant may not survive the crisis. This must have been surely the basis for the comparatively costly basket planting even in forest operations which should be as cheap as possible. The conifers have their needle like leaves of special structure and even the broad leaved species have their protective arrangements against the killing cold. This limits the number of species of plants to a few hundreds here.

The Sivaliks and similar hills are special tracts of peculiar local interest. They are of recent formation where the sand-stone strata has not become cohesive and hard yet, to withstand crushing and weight. There have been huge land slips, erosion and washing down of unfertile sand debris. This caused the denudation of hill slopes above and made the fields below barren. Such localities seem to be the basis for the well known principle of protection of hill slopes and the anxiety for keeping them always covered. It is with these considerations and ideals of forest experience, the foundations of general protection seem to have been laid in India.

We have forests and forest management in India under similar conditions of utility. The forester in tropical forests has a different story to tell.

There are no distinct seasons. Only summer is more pronounced and the forests become leafless for about 2 to 3 months. The heat in this season is very severe and extremes of short intervals prevail. Even this summer is seasoned by occasional showers in some years. The vegetative activity goes on almost all round the year putting on fresh growth every time of the year. Annual rings are absent in several species. The limited forests of moist and evergreen zone are not much affected even by this summer. But the combustibility of the dead grass and fallen dry leaf and the uncontrollable fires of summer are features peculiar to the tropics. The inflammability is so much that all the forest dry material which would accumulate as moist humus in temperate climates acts like fuse here. The mere rolling of a stone on a stony surface may create conflagration. There is no snow to melt. As we sit under a tree in such a summer, the hot unbearable winds blow over the face and sun-strokes are not uncommon. As we walk in the forests, the completely dry leaves rustle rolling about, the grass is dry like tinder, thick and high, differing according to locality. There are places like Nallamalai hills in the Madras Presidency with grass so high as 6' and thick. When once fire starts here, it is difficult even to approach its broad and high flames and it sweeps fast like a cyclone in the hot summer days. Many villages which contain thatched houses burn at times wholesale, in spite of the greatest care exercised by the inhabitants to keep their property safe. And it is no wonder that many of our rigidly protected extensive forests are unable to escape these fires in spite of 60' and 100' fire lines. The leaf that is shed by trees in summer is either burnt to ashes, or eaten away by white ants immediately after the first showers. No humus worth the name as is found in the temperate climates is found any where. The conditions of inflammability are reached in a few sunny days and burning

also is similarly finished. The vegetative activity is not much affected. Neither is it too vigorous in one season like temperate spring nor is it markedly absent as in European long winter. The growth is so rapid and plentiful that a deep blaze made on a tree in one season will be almost completely occluded and covered by next year. The injury to the roots of seedlings, tap roots or side roots, in transplanting is not of much importance under favourable conditions. On a rainy day in rainy season, I once asked a man to bring a bundle of small seedlings from a teak plantation without giving instructions not to injure the tap or side roots purposely. The man pulled them out and brought a bundle. The stem of each of these was as stout as a drumstick and tap root of every one of them was broken. I had these planted on the same day in shady forest and left them alone without further care. After a fortnight I found most of them survived and were putting on fresh leaves, the old leaves having been shed. This was in a locality with 60" rainfall. If this be possible the costly basket planting of plants may be avoided in the tropics in such an environment. If the shoot of a seedling dies during one summer by burning fire or summer heat, the root is able to send a more vigorous one during next rains. The root, while the shoot continues to die like this year after year, not only does not suffer but continues to store materials to send a vigorous sapling at a distant year. Thus it would appear there is no necessity for the continual living of the shoot of a seedling as in temperate climates. This being so, it seems to be an irony of nature that the burning heat of the summer or of fire seems to be rather a help for the appearance of a good shoot instead of being a death blow to the seedling. This does not mean that annual burning down of plants is a necessity. If there is a way to protect this shoot from fire up to pole stage that appears sufficient. After attaining the pole stage, almost

every species in the tropics appears to have the power of withstanding the scorching of the forest fire. As the skin of the inhabitant of the tropics is better able to withstand the scorching and sun stroke than that of an inhabitant of temperate climates, it appears reasonable to deduce that it should be nature's scheme to provide in the tree bark, cell arrangement to withstand scorching by the sun. Nature here pleases herself to increase the number of species to a perplexing figure of thousands in the tropics. As for grazing in tropics, there are not such soft strata of porous moist humus of any thickness to fear its being stiffened on account of grazing by heavy animals. Even for the soil, unlike the more or less uniformly manured soft soil of temperate climates, the land in tropics gets heated to complete hardness in summer and reduced to clayey conditions in rains. The hardness is so complete by January that it is difficult to drive a sharp edged crow-bar a few inches deep without a strong thrust. Thus the land gets hard and soft more efficiently naturally by other agencies than by grazing.

As for denudation of soil the granite and other rocks of old ages are so hard that they disintegrate only by inches under the influence of natural agencies. Tracts like Sivaliks are rare. All shades of forests exist in all climates. But generally the above principles are prominent and since they differ they are dealt with.

When we look to forest questions and principles here from this point of view, it is hoped that we can have more room for providing larger areas for grazing, and restricting our attention, energy and funds in connection with fire protection to the specially recognised young regeneration areas like plantations, coppice and other regeneration coupes of marked, sure, and definite interest.

B. V. Jogeswara Rao,
Ranger.

We do not profess to agree with or even to follow the writer in all his views and expressions. But we present the article as we wish to emphasise the fact that we particularly welcome contributions from all classes and grades of Forest Officers.

Editor.

Killing trees with Arsenic. (*Continued*).

In the December 1916 issue of the journal the following note has been made:—"At the Forest College, attempts were made to poison several *Acacia arabica*, and one *Thespesia populnea*. No signs of any kind of result were visible after two months, but the same can be said of the trees that were deeply girdled at the same time.... The failure at the College may perhaps be due to the season, and to heavy rain falling within a few hours of the operation."

The said operation was carried out in October 1916, and cannot altogether be called a 'failure.' Even about three months after its application the effect of the poison was evident. By the month of September of the current year, two Babul (marked 1, and 5,) were found to have completely died, and the other three were dying. The girdled controls were likewise found to suffer, but to a less degree. Again, all the treated trees (poisoned and girdled) coppiced freely below the cuts, and it is interesting to note that the coppice shoots from poisoned trees were, and, are, either less copious, or less healthy,—sometimes both—than those from the girdled. In one case (poisoned tree No. 3) the effect of the poison was most marked: with regard to this tree there has been till now, no growth of shoots whatever from the cut ring in which the poison was applied; in effect the tree has been poisoned to the extent of preventing the growth of shoots.

Taking into consideration, the dilution or dissipation of the poison caused by "heavy rain falling within a few hours of the operation" the *period of eleven months required by some of the poisoned trees to die, is perhaps not excessive.

Better results were anticipated if the operation was conducted during the hot weather. Accordingly, the experiments were repeated during the month of April of the current year with a different set of (Babul) trees, with more success.

About ten were girdled and poisoned, and as many girdled alone. Each poisoned tree was compared with the corresponding girdled one, and these two with a control tree hard by. So early as the beginning of October (that is, six months after the operation) two poisoned trees were quite dead (marked P₈ and P₁₀ respectively), some three were nearly so, and the rest are gradually dying. The girdled trees too have suffered, though to a less degree.

A striking feature is that (except in one case, tree No. 5) neither girdling nor even poisoning was found to be able to totally prevent coppice shoots. This is in keeping with the fact that Babul in South India coppices more readily than in the North.

The two sets of trees are still under observation and anything more of interest noticeable will be reported in the future issues of the Journal.

9-11-1917

G. V.

*The poisoned *Thespesia* has however shown no discomfort whatever until now, that is, even after about a year. The mucilage in which the last of this tree (as also of most other *Malvaceæ*) abounds may perhaps have a counteracting or retarding effect on the poison.

An Elephant Capture on the Anamalai.

To provide some excitement to the junior students during their camp at Anapadi, a wild elephant fell in one of the pits at Karianshola, about three miles from camp, on the 11th October; on our way to the Konapalam bridge, which we were constructing, we were informed of the "pitfall".

Then about we promptly turned and wended our way in double file to see what others called the "tamasha", but which to us of course was useful and practical instruction. To the more corpulent of the students—those possessed with a superfluity of adipose tissue—the brisk march of three miles up hill seemed a trying one; nevertheless, the end was reached with no casualties.

The "capture" was a young tusker, height 5 feet 3 inches, age about 6 years, condition excellent. Judging from the amount of damage he had done to the pit, it is presumed he fell in the night before.

Four Government elephants were on the spot in good time, to perform the dignified duties of escort. The students did yeoman service in cutting the required billets of fuel. The Jemadar set to work at 8 A. M., but in spite of a considerable amount of fuss, poonja, vacillation, bluster and blunder, the animal was not out of the pit till past 2 in the afternoon. During this interval of 6 hours, trying both for us and jumbo, the latter had punctured his trunk in three places with his own tusks, and was thoroughly—"winded". I think these Anamalai folk have something yet to learn from their brethren the Kurumbars at Teppakadu in the Mudumallai Range, who have enkraaled as many as four elephants in one day.

Well, to return to the capture, he was enkraaled safely by 4-15 P. M. The distance from the pit to the kraal is

about three miles, which was covered in an hour and a half—a very good time.

Once in the kraal and released from his bonds, he shook hands—rather trunks—with a brother in affliction in the next kraal, captured about a fortnight previously. They seemed to recognize each other—evidently old friends!

A new capture generally will not eat anything till he has had a good night's rest in his changed abode, but our friend devoured sugarcane greedily within 5 minutes of being caged, and smiled beamingly. The sugarcane must have brought back pleasant reminiscences of periodical raids on the "Gounda's" sugarcane crop near Sethumadai.

As is the custom here, the Students were asked to suggest a name for the elephant, which (the name, not the elephant) would be sent up to the District Forest Officer for approval. The name Sundram was decided on, after Mr. Sundram Iyer, the E. A. C. in charge of the range.

Camp Anapadi.

W. C. Hart.
11-10-17.

An attack by a wild Elephant.

We went on an excursion on the morning of the 1st of November 1917 to mark standards in coupe XXIV of the Ayaranga Working Circle of the Pollachi Range in the South Coimbatore Division. Having forgotten to take tar with us I had to go and fetch it from the reserve boundary about three furlongs from the work spot. In my anxiety to get back quickly I started running, but missed my way. This I realised after going about three furlongs. As I was retracing my steps I heard some loud cracking noise a few yards ahead of me. Suddenly a small herd of a cow

elephant and two calves emerged. The cow began to charge me, perhaps fancying that I would do harm to her young ones. This was strange, as I heard that elephants in groups rarely attack men. However I quickly realised my danger and began to run for life little heeding which way I went. The cow kept up the chase close at my heels the young ones following it. To my good luck, I suddenly came upon a steep slope and the younger of the two calves began to lag behind. I started down the slope and my pursuer stopped chasing, as elephants do not get down the slopes quickly. Evidently then she began to think of the calves more than me and this gave me a chance for escape. When I reached the bottom of the slope I was thoroughly exhausted and was out of my wits. I was in an unknown jungle. Having seen fresh dung all over the ground, I was afraid of further attacks. I got up a small tree and rested for a while. Being in the midst of a thicket of bamboo forest without having the least idea of knowing my way out of it, I realised the futility of my remaining there any longer. The longer I stayed there the more would be the danger of any attack by wild elephants and later on perhaps by other wild beasts. The small tree I perched on was not a safe hiding place. Though I was still scared I made bold to go down the tree and find my way out. For a long time I wandered aimlessly and began to curse my stars. However I chanced to be on right path all along, which I realised subsequently to my good luck. I heard the sound of cow-bells and following the direction of the sound met cattle and graziers. One of them led me to the reserve boundary. Then I began to breathe freely and was assured of my safety. I felt I escaped from the jaws of death. I reached camp at about 3 P. M. and found some students making ready to go in search of me.

It must have been five to six miles from the camp at Sethumadai when I met the graziers.

P. Ramaswami,
Junior Division Student,
Madras Forest College.

The Madras Forest College Athletic Sports. 1917.

The Police Recruits School grounds at Coimbatore attracted a large number of European and Indian ladies and gentlemen in addition to a large gathering of school children on Saturday the 29th September 1917, the occasion being the Madras Forest College Athletic Sports. The display was as good as it was in the previous year, better performances being made by the Winners of the 100 yards' flat race, Long Jump, Throwing the Cricket ball and High Jump. The new events of the year were, Servants' race 200 yards, which was open to all the menials of the College and the Sack Scrimage which afforded unceasing amusement to the lookers on. The College, and Students were at home to the Indian ladies and gentlemen of Coimbatore who were invited and to the Students of selected local institutions, while the Principal and Staff entertained the European ladies and gentlemen. The proceedings commenced punctually at 3-30 p. m. St Michael's Orphanage band was throughout in attendance and gave great satisfaction. Towards the close of the programme, rain visited us but proved no obstacle to the Obstacle race. The following old students of the College who attended the sports took part in the 100 yards flat race for Past Students:—1. S. Chidambara Iyer, M. R. H., 2. D. E. Lewin, M. R. H., 3. P. M. Mathew, M. R. H., 4 C. S. Nanjappa, M, R. L., and 5. A. J. M. Suaize.

The prizes were given away by Mrs. McCarthy, wife of the Conservator of Forests, Western Circle. Mr. Cowley Brown then thanked Mrs. McCarthy and pointed out how doubly fitted she was for the duty of giving away the prizes that evening, firstly because she was the wife of one of the most Senior Forest Officers in India and secondly because her son in England was Captain of the Rugby School XI distinguished in all Athletics and one of the finest school Cricketers in England, has also passed high into the R. M.A. Woolwich at the last open competition. The Students were exhorted to aspire to a similar realisation of the College motto. Mr. F. A. Hamilton, District Superintendent of Police who kindly granted the use of his ground and men was thanked. The Principal, after referring in suitable terms to the indefatigable work of Mr. H. C. Bennett, Vice President, Athletic Club both in getting up the Sports and in training the competitors, thanked the ladies and gentlemen present for the honour of their company and concluded by expressing the hope that next year he might be able to welcome them on our own grounds which are now in active preparation.

3. Junior division student C. B. Chengappa, who won Mr. Richmond's Championship cup with 21 marks, and Senior Student P. K. Parameswaram Pillay with 15 marks gained colours for "Athletics."

4. The results of the various events are appended :—

100 yards flat race:—

1. C. B. Chengappa, Winner's time $11\frac{1}{2}$ seconds.
„ in 1916 $12\frac{1}{2}$ „
2. Abdul Hameed Khan.

Long jump:—

1. P. K. Parameswaram Pillay, Winner's Jump $17'4\frac{1}{2}''$.
„ in 1916. $16'3''$.
2. Y. Peddalakshmiah Naidu.

Throwing the cricket ball:—

1. C. B. Chengappa, Winner's throw 94 yds. 2 ft.
„ in 1916. 82 yds.
2. T. V. Thayuman.

Winner lost at least 6' by throwing before reaching the mark.

High Jump:—

1. J. A. Stephen, Winner's Jump $4'9''$.
„ in 1916 $4'5\frac{1}{2}''$.
2. A. Muthukrishnan.

Servants' Race 200 yards:—

1. Anthony, Peon of the Senior Imperial Instructor
M. F. C.
2. Palaniswami. do.

120 yards Hurdle Race:—

1. P. K. Parameswaram Pillay, Winner's time
 $20\frac{3}{4}$ seconds.
„ in 1916 $19\frac{1}{4}$ „
2. J. Venugopal Naidu.

Thayuman and Hamid Khan who were dead level and leading at the last obstacle fell victims to a fault in the design of the hurdles. Magnificent finish was thereby spoilt.

100 yards race for past students:—

1. C. S. Nanjappa, Winner's time $12\frac{3}{4}$ seconds.
2. A. J. M. Snaize.

Quarter mile race:—

1. C. B. Chengappa, Winner's time 1 min. $4\frac{1}{2}$ seconds.
„ in 1916 58 seconds.
2. C. L. Narayana Rao.

Half mile Invitation race :—

1. Krishnan, (Reserve Police) Winner's time 2 min. 39½ seconds.
„ in 1916 2 min. 15½ seconds.
2. Ratnavelu (Coimbatore College).

Relay race :—

Juniors won.

Half mile race :—

1. C. B. Chengappa, Winner's time 2 min. 34 seconds.
„ in 1916 2 „ 29 „
2. C. L. Narayana Rao.

Slow Bicycle race :—

1. G. M. Bartholomeusz.
2. J. Venugopala Naidu.

One mile race :—

1. C. B. Chengappa, Winner's time 6 minutes.
„ in 1916 5 „ 37½ seconds.
2. C. L. Narayana Rao.

Sack scrimmage race :—

Successful team {
 1. Krishnan Nair.
 2. B. S. Chengappa.
 3. A. Seshagiri Rao.
 4. C. L. Narayana Rao.

A mirth provoking competition—which would perhaps be improved by substituting for sides the principle of all against all. The Circle also might be enlarged.

Obstacle race :—

1. Y. Peddalakshmiah Naidu.
2. P. K. Parameswaram Pillay.

Tug of War :—

Seniors won.

The date of the sports (last week of the month) prevented the attendance of several old students chained to the desk of their Range Offices by "monthly accounts." The College was also during this week in the throes of packing for camp. Next year in fixing the date these disabilities will be borne in mind.

Madras Forest College, } S. G. Venkataraman,
 Coimbatore. } Assistant Secretary and Treasurer,
 Athletic Club.

**Athletics at the Madras Forest College from
 1st September '17 to 18th December 1917.**

September was a busy month for athletics in the College; months of October, November and December were spent in camps but for a short stay of about a week at head quarters from 5th to 10th November for the periodical examinations.

2. The Senior division students had regular practice at hockey and occasionally played cricket in the Komattiyur camp where an extensive maidan was kindly procured to us for the purpose by the District Forest Officer. The facilities for playing matches on this excellent ground were greatly enhanced by the generous contribution made by our Senior Imperial Instructor, Mr. C. B. Dawson for a gala evening. The team captained by Student Thimmayya won, scoring the best of nine games. We also had practice in running for the Marathon at Mt. Stuart. We run a race of 5 miles from Sethumadai to foot of the ghats and back. There was much keenness among the students due not a little to the untiring zeal of our Officer in charge of the camp who emphasises to us ever and anon on the importance of physical culture.

3. The Junior division students, had practice at foot ball in Nilambur Camp.

4. The following are the details of matches played by the College in September 1917.

Cricket. On 9th September 1917 we played the "Coimbatore Vakils United Eleven" on the Coronation Park ground, and easily won the match, the scores being 226 runs for 5 wickets against 141 runs. Senior division student Narasinga Rao (Cricket Captain) the top scorer (not out) with 126 runs, scored a century for the second time in a College match. He has scored a century and more in each of the last two matches.

The following are the full scores.

The Coimbatore Vakils' United Eleven.

G. Sundram Iyer	b. Narasinga Rao	....	5
P. S. Sitaram	b. Narasinga Rao	....	4
Singara Iyengar	c. Sankara Alwa b. Narasinga Rao	....	5
C. R. Parthasarathy Iyengar	b. Sankara Alwa		51
Puniakoti Mudaliar	b. Sankara Alwa	....	12
C. S. Sundram	b. Seshagiri Rao	....	31
Kandaswami Chettiar	c. & b. Sankara Alwa		6
K. Ramaswamy	b. Seshagiri Rao	....	2
N. A. Subramaniam	b. Narasinga Rao	....	20
Raja Pillay	b. Chengappa	...	2
Subbaya Gounder	Not out	....	0
	Extras		3
			141

Bowling analysis.

	O.	M.	R.	W.
Sankara Alwa	13	4	37	3
Narasinga Rao	13½	1	54	4

Seshagiri Rao	8	1	34	2
D'Silva	2	"	13	"
C. B. Chengappa	2	2	"	1

Madras Forest College.

Muthukrishnan	b. Parthasarathy Iyengar		5
Venugopala Naidu	b. Puniakoty Mudaliar		0
Narasinga Rao	Not out	....	126
Sankara Alwa	b. Parthasarathy Iyengar	....	3
D'Silva	c. Sundram b. Singaram Iyengar		17
Chengappa	c. Sitaram b. Sundram	....	7
Seshagiri Rao	Not out	....	60
	Extras		8
			226

Bowling analysis.

	O.	M.	R.	W.
Parthasarathy Iyengar	10	0	39	2
Puniakoty Mudaliar	7	0	44	1
Singara Iyengar	9	0	38	1
C. S. Sundaram	6	0	30	1
Sitaram	3	0	21	0
Ramaswamy	2	0	12	0

Hockey. On 15th September 1917 we met the "Coimbatore Young Men's Club" on the Coronation Park. Both sides were well-balanced and a very good game was played which ended in a draw of 2 goals all. One goal was scored by Thimmayya (Hockey captain) and the other by Junior student C. B. Chengappa.

On 20th September 1917 we played our second match with the Reserve Police on the Coronation Park. In August last, we played a drawn game with the Reserve Police, 2 goals all, a good performance on our part considering the regular training which the Reserve had undergone in the

hockey field. This time also we played well but almost at the close of the game, two short corners against us resulted in two goals to the credit of our opponents. Added to this, our captain Thimmayya, a strong centre forward, meeting with an accident in his leg, the game ended in our defeat to the tune of 3 goals to nil.

5. On 22nd September 1917, the interdivision hockey match for the "Cowley-Brown Cup" was played at the coronation park. Both teams proved equally strong and the game ended in a draw, one goal all, student Muthukrishnan scoring the point for the Seniors and Student Narayana Rao for the Juniors. The annual sports and preliminary heats in connection therewith coming off during the week succeeding, it was decided to replay the hockey interdivision match in November on the return of the students from the first period of the cold weather tour. It was accordingly replayed on the 9th November and the game had not proceeded for more than a few minutes when an accident happened to two Senior division students Thimmayya and Ratnavelu Mudaliar both of whom had to be taken to the hospital. The former had only a slight wound and reappeared in the field the next day. On the 10th November after half an hour of starting the game heavy rains prevented us from playing any longer that evening. On the morning of the 11th idem, the match was finally decided. The senior division team was defeated by 3 goals to nil. Junior student Abdul Hameed Khan (vice captain for hockey) as half back is an acquisition to the College in hockey matches. Junior student C. B. Chengappa is a good forward in the right out. The "Cowley-Brown Cup" was presented by Mr. H. C. Bennett to Abdul Hameed Khan, Captain of the Junior Division team. Mr. Bennett, in doing so, made a short speech. "A hard game, a good game and a clean game had been played and no one could wish for more.

That similar keenness had been shown in all the year matches testified more than anything else could how much the students appreciated Mr. Cowley-Brown's kindness in presenting the cup. The Juniors had not only earned a well merited success but by beating the team that *won* last year had achieved unusual distinction."

Mr. Cowley-Brown then warmly eulogised the work of Mr. Bennett, Vice President, Athletic Club, who was responsible in no small measure for developing the interest for games in the students of this College for the past over three years. He briefly alluded to the object with which the cup was instituted as being the establishment of better co-operation among the students of the two divisions in the College. He referred in gratifying terms to the right idea prevalent amongst the Madras Forest College Students in watching and judging the game with a spirit of fairness on the part of those who were not playing.

The morning's proceedings were brought to a close with three cheers to Mr. Cowley-Brown, to Mr. Bennett and to Mr. C. B. Dawson who was also present.

Captains and Vice-Captains. Senior students Narasinga Rao and Thimmayya becoming Captains for cricket and hockey respectively, Junior students D'Silva and Abdul Hameed Khan were appointed vice captains for cricket and hockey.

Colours. During the term colours were awarded to the following students for Cricket:—A. Muthukrishnan, D'Silva and Seshagiri Rao.

Madras Forest College, } S. G. Venkataraman,
Coimbatore. } *Assistant Secretary & Treasurer,*
Athletic Club.

Correspondence.
College Athletics.

Dear Sir,

Will you be good enough to find space for a plea on behalf of the obstacle race in the college sports being kept as a purely physical test. The obstacle race is a good event, and a good physical test, as it calls into play many muscles besides the running muscles. The race can be made as amusing as possible without bringing in pure luck to spoil the best man's chances, as is seen in the tarpaulin item. To get through the highly pegged down tarpaulin at racing speed is a very strenuous business, and after having successfully negotiated this, and afforded much amusement, by going in one colour and coming out many, it is hard to see the prize go to a man then a long way behind, because he was lucky enough to find quickly his name written on a piece of paper hidden in a sand heap. There can be no merit in winning by such luck, I plead that the race is worth winning as a purely physical test, and a student who wins it ought to be able to look back as the winner of it in the same way as the one who wins other events. College Athletic sports are one thing and a skittle gymkana is another. It ought to be the aim of all students to keep themselves as fit as possible and do well in their sports, but, it must be somewhat trying to a probable winner to see fitness, and skill set at nought by the introduction of pure luck; the sack melee was most amusing yet that was a purely physical contest, in which there was nothing to prevent the best team winning. After seeing all the otherwise excellent programme, so well carried out, my sympathies were with the leader who reached the sand heap first and stopped there till the race was won by some one else,

H. F. A. Wood.

Our correspondent's appropriate suggestions will be referred to the athletic authorities.

Editor.

2. Kanaka Prahasanam (a play in Telugu).

Dear Sir,

At the close of the Vernacular Training School Session in the Nellore District, early in 1917, the students acted a small play in Telugu composed by the Senior Instructor M. R. Ry. V. N. Seshagiri Rao.

The late Mr. Arbuthnot, who had taken a very keen interest in the V. T. S., was impressed with the play, which is devised to explain the aims of Forest Conservancy, and caused it to be printed under the title of Kanana Prahasanam advancing the cost of printing the 1st Edition, with a view to devoting any profit to some War Fund. Copies were sold at the modest price of 2 annas each. There was a large demand and the first edition of 500 copies was soon exhausted and by the kindness of the Manager, the Vani Press of Bezvada, struck off a 2nd Edition of 500 copies at special terms in view of the good object.

The 2nd edition has now been sold off; as the whole enterprise is a "Forest" concern, I think it may interest your readers to read of it and its practical result.

The total revenue derived was Rs. 121—15—0 and the expenditure amounted to Rs. 57—5—0, leaving a net balance of Rs. 64—10—0.

Mr. Arbuthnot was consulted as to the disposal of this amount and as a result £ 4—5—0 has been sent to the Overseas Club in London to be devoted to the provision of cigarettes, and tobacco, to soldiers at the 'Front', a fund

which the late Mr. Arbuthnot was much interested in and was in the habit of contributing to. The Secretary of the fund has been requested to see that at least one half of this contribution should go to Indian Soldiers.

I send a copy of the play, which I believe was also performed by the students of the 2nd session of the V. T. S. in the Chittoor District.

C. Fischer.

Occasional Notes.

The management greatly regrets that by reason of the temporary breakdown of the printing arrangements it has not been possible to issue the September number of the journal until February.

The article on a Memorial Fund that appeared on page 47 of the last issue was not intended for publication in the Journal, and was inserted through a misunderstanding.

A considerable number of contributions were selected from the Gass Forest Museum show-cases by Mr. A. W. Lushington, C. I. E.

A Diploma of Excellence has been awarded by his Excellency the Governor, to the Forest Department for its exhibit of forest products in the Madras Exhibition of Indian Arts and Industries, 1917—18.

Owing to the Mysore Durbar having decided to start a Rangers' College, State Students from Mysore will not in future be sent to the Madras Forest College.

A Forest College for the Bombay Presidency is under contemplation. At the College, which will be situated at

Dharwar, Rangers, Foresters and Forest Guards will probably be educated.

K. S. Raghavachar, M. R. H. (1917) has been appointed as Ranger in the Working Plans Branch in the Mysore State.

The catalogues for the college and the students' Libraries are being printed.

The following contributions to the Students' Library between 1-8-17 and 31-12-17 are acknowledged with thanks.

For General Library.

C. B. Dawson Esqr.	1 book.
C. E. C. Fischer Esqr.	7 books.
F. L. C. Cowley Brown, Esqr.	1 book.

For Students' Library.

C. B. Dawson Esqr.	20 books.
F. L. C. Cowley-Brown, Esqr.	23 books.
Mr. S. Doraisami Aiyar.	1 book.
C. E. C. Fischer, Esqr.	2 books.

Steps have now been added to the South Eastern corner of the College, thereby giving direct access to the East Lecture Room from the Hostel path.

An Overseer, to be in charge of sanitation also, has been sanctioned for the College Estate.

Improvements to the Engine house and compound have been sanctioned.

The preparation of the Athletic Ground has been sanctioned; the work will be undertaken at once. The Tennis courts are nearing completion. A badminton set is being procured for each division.

* * * *

Student Narasinga Rao scored his second century of the season (126 runs, not out) in the cricket match versus the "Coimbatore Vakils united eleven" on 9-9-1917.

* * * *

Student M. Umapati Mudaliar of the 1917-19 division has been appointed Assistant Editor vice C. Srinivasa Rao student 1916-18 division appointed Editor.

* * * *

The following additional members have been appointed to the House Committee.

B. S. Chengappa, Junior Division.

P. Sankunni Menon, Do.

* * * *

"The trees and flowers shall now be my friend;
The trees and flowers that never pretend.
They keep to their nature as quite and true
They grow to their stature and bloom in their hue."

Mary F. Robinson.

* * * *

"Who does his duty is a question too complex to be solved by me,
But, he, I venture the suggestion, does part of his,
that plants a tree."

T. R. Lowell.

"The holes were already dug and they set to work. Winterborne's fingers were endowed with a gentle conjurer's touch in spreading the roots of each little tree, resulting in a sort of caress under which the delicate fibres all laid themselves out in the proper direction for growth. He put most

of these roots towards the South-West; for, he said, in forty years time, when some great gale is blowing from that quarter, the trees will require the strongest hold fast on that side to stand against it and not fall."

* * * *

"How they sigh directly we put'em upright, though while they are lying down they don't sigh at all", said Marty.

"Do they?" said Giles, "I've never noticed it!"

She erected one of the young pines into its hole, and held up her finger; the soft musical breathing instantly set in, which was not to cease night or day till the grown tree should be felled—probably long after the two planters should be felled themselves."

Thomas Hardy,
(The Wood landers).

Obituary.

We regret to learn of the death of Rao Sahib K. Gundu Rao, Forest Assistant, Revenue Board, on the 13th September 1917.

Mr. Gundu Rao was Manager of the Office of the Conservator of Forests Central Circle till March 1915 when he was promoted to the post of Forest Assistant to the Board of Revenue. The latter appointment he held until his decease.

Mr. Gundu Rao was an able and devoted servant of the Government. Two of his sons were at one time members of the College.

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Gazette Notifications.

September 4, 1917.

Under article 260 of the Civil Service Regulations.

Mr. F. R. Madam, District Forest Officer East Kurnool, is granted privilege leave for two months with effect from or after 1st September 1917.

Mr. J. A. Master, Assistant Conservator of forests, attached to the Central circle is granted privilege leave for one month with effect from 11th August 1917.

Mr. A. A. F. Minchin, District Forest Officer, Ganjam is granted privilege leave for one month from date of relief.

M. R. Ry., P. Venkataramanan Avergal, Extra Assistant Conservator of Forests will be in charge of the district during Mr. Minchin's absence on leave.

(1) M. R. Ry., V. N. Seshagiri Rao, Ranger, 1st grade sub-protom, on return from privilege leave is posted to the charge of Chinglepet Range, Chingleput district. (This cancels this office order No. 111 dated 22nd July 1917).

(2) M. R. Ry., R. Sama Rao, Ranger, 3rd grade, on relief by No. 1 is posted to the charge of Palmaner range, Chittoor district.

(3) M. R. Ry., C. Balayya Nayudu, Ranger 5th grade, on relief by No. 2 is posted to the charge of Chendragiri range, Chittoor district.

(4) M. R. Ry., B. Chenchurama Nayudu, Ranger, fourth grade, on relief by No. 3, to continue in charge of Chemala range, Chittoor district.

The confirmation of L. Govindaswami Pillai, Deputy Ranger, second grade and M. Krishna Ayyar Deputy Ranger, 1st grade as Ranger, sixth grade ordered in this office Service Order No. 72, dated 1st June 1917, is hereby cancelled under the orders of the Board of Revenue.

P. A. Krishnaswami Mudaliar, acting Ranger, 6th grade, is granted privilege leave for one month from date of relief.

THE
Madras Forest College Magazine.

Published Quarterly.

Vol. II. March, 1918. No. 3.

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

Ourselves.

After the christmas holidays both the divisions of the College rejoined their respective camps at Walayar and Mundanthorai. The Seniors spent January at Walayar studying the transition forests and the Pterocarpus Marsupium plantation. The plantation can be regarded as a forerunner of several that will in future be started, for a steady supply of timber. Its value as a suitable wood for gunstocks is now realised and there is little doubt that there is a great future before it.

Instructive engineering works such as the construction of portable bridges and bamboo shoots for sending fuel down steep hill sides were taken up by the students. The shoot was left as it was built, to serve as an example for the contractors who work the fuel coupes.

The Junior Division studied the forests worked under "Coppice with Standards" method. This system has advanced considerably in the Tinnevely District more than any where else. An excellent system of roads at

Mundanthorai affords convenient means of extraction of uel. The contractor is encouraged and given facilities for forming wide cart tracks of suitable gradient in his coupe which are eventually made into regular roads. The contractor is able to make good profit on his work even after transporting fuel from the Mundanthorai forests as far as Tinnevely Town by road and rail.

The study of teak, growing under local conditions, formed a valuable object of the tour.

Vengai (*Pterocarpas Marsupium*) regeneration is prolific in suitable places. It is a soil fertiliser and a valuable timber tree. Seedlings have been further freed in a sample plot chosen in 1917. The species is a light lover and there has been very good response to the tending operations.

The semi-evergreen species, *Hopea parviflora*, *Balanocarpus utilis*, *Gluta travancorica* and others were studied in the evergreen forests of Kodumadi. Improvement operations were conducted by girdling accessory species, to gradually let in more light, to help the regeneration of *Hopea* and *Balanocarpus*.

At the edge of the evergreen forest, where the soil is deep and drainage good, teak seeds are being dibbled. The teak plantation at Kariar started in 1907 has become established and thinnings are being carried out.

The combined camp of both the divisions at Sadivayal during February was of interest from all points of view. The growth of trees in these forests warrant the conversion into High Forest and schemes to render this possible were considered.

The Senior Division prepared a Working Plan for these forests for a practical investigation of the subject.

Two trestle bridges were constructed across the Noyal river. Timber and bamboos being available in abundance in these forests this work was more to demonstrate how temporary bridges could be made across streams even for cart traffic with the materials and fibre close at hand.

The Junior Division made charcoal in an overground paraboloid kiln.

The divisions returned to headquarters early in March and have their lectures at headquarters till the 13th of April, when they proceed on the hill tour.

* * * *

The compartments of the Demonstration Forest have been laid out on the College Estate with an approximate area of sixty acres. The system of working has been fixed upon. The area is being surveyed and demarcated in order to start actual working of the Forest in the near future.

* * * *

Physical Culture is not neglected at the College. While on tour every facility is afforded for outdoor exercises.

A bathing pool was provided at Sadivayal by partially bunding the Noyal river, to give opportunity for the non-swimmers to learn swimming. The Marathon race was the chief athletic event of the tour.

Our activities in games are detailed in a separate contribution.

* * * *

We beg to acknowledge with gratitude the very kind present of a Challenge Cup for the Marathon race by Rissaldar Major Bahadur Amir Mahomed Khan (late XX Deccan Horse). The cup is to be held annually by the

Winning Division (the first 10 men in each Division count). The students appreciate the gift which has enhanced the keenness in competition for the race.

* * * *

As "Journal" has a special technical application at the College, the Board of Management has decided to change the name from "Madras Forest College Journal" to "Madras Forest College Magazine."

* * * *

We wish to bring to the notice of our subscribers and to all the Ranger Class (including Deputy Rangers) in general that this Magazine was started for the benefit of the Ranger Class and will have to be conducted by that class almost exclusively.

The Magazine is not being adequately supported in literary contributions by those of us for whose special benefit it was called into being.

The primary object of this Magazine is to provide Rangers (including Deputy Rangers and literate Foresters) with the means of exchanging ideas on the various subjects which interest them and in particular those subjects which come into their everyday life.

To those Rangers who have been trained at the College, the Magazine should have a special value. It was the 1914—16 division that started the idea of a journal. After a good deal of opposition the journal came into being in 1917 and has been carried on up to date principally by the Members of the Staff of the Magazine. Very few contributions have come from the old students of the College, though frequent appeals have been made for suitable articles. It may be mentioned without offence that students while leaving the college after the completion of the course readily promise to contribute to the journal but manage to as quickly forget all about it. There is

such a large variety of subjects one could write on usefully and yet so few seem to be sufficiently interested in the Magazine. Interest in the Magazine and a due appreciation of it to be worth anything must go so far as to contribute to it.

To send ones fees and subscriptions annually and then to think no more about it is exactly the treatment unsympathetic people usually accord to a subscription list for some charitable purpose.

It has now come to this, that unless contributions came in adequately from the Ranger Class of the Presidency (including students at the College) the Magazine will be discontinued. The opportunity of having a paper exclusively for the executive staff to discuss what interests them would thus be lost for all time.

The Magazine was founded *for* the Ranger Class to be conducted *by* the Ranger Class; and we have authority for stating that it will *not* be conducted by the Principal and Staff of the College for the benefit of people too lethargic to show an adequate response to the efforts made to convert them from raw material into a finished Ranger, with an assured position and good prospects.

We can imagine our readers giving an emphatic "No" in reply to the question "Is our Magazine to become defunct"? We settle ourselves down in the office chair with confidence, awaiting arrival of manuscripts for the next issue.

Our subscribers, the past students in particular, can render valuable assistance to the Magazine in another direction. We have a little over two hundred subscribers on our lists, while there are at least twice that number in executive service who can become subscribers. It ought to

be the duty, if it is not expecting too much, for every subscriber to at least get one additional subscriber. Our financial condition has already been published. We are at present issuing copies below cost price. Several interesting illustrations (photographs and drawings) are kept back from publication for want of funds. In this connection we have to note with regret that a few past students have so far forgotten the essentials of their training as to fail to accept the Magazine when it was sent to them after having undertaken to subscribe to it.

Forestry as a Profession for Young Men.

An article under the above heading which appeared in the American "Forestry", November 1917 issue, has induced me to take an extract from it as it applies equally to Madras. My hope is that the readers will not fail to be impressed by it and will make it their business to popularise Forestry as a science in a country where many people still think that forests are no man's land and the busy men of towns have little notion of what Forestry is.

The war must have opened the eyes of all people to the demands of various kinds of forest produce. Very interesting facts regarding the necessity for and the extensive use of wood must have brought home to the minds of our people the importance of the forest and its proper care. We learn that wood is not merely used for house construction, fuel, telegraph poles and pulp for paper, but, even in this age of steel and cement, enormous quantities of wood are required for ships and camps, for railways and also for aeroplanes. Beyond this, wood is now made into clothing, bedding, fibre for shoe-soles where such industries are possible. Further, sugar, alcohol and vinegar are being made out of wood.

Not only to meet the demand, but to provide ourselves with requisite material we must grow the right kind of forest crop and use the soil to its full capacity.

One has to realise that the food, clothing and housing materials are products of the soil; land, labour and time are needed for their production and especially the forest crop needs a long time—a century or more to produce timber for instance, fit for a definite purpose.

The care of one of the largest crops of the land, the planning for produce to be realised a century hence requires better capacities than those of a mere wood cutter and necessitates a policy which has a continuity.

It is said that thirty years ago Forestry was not yet known in the American dictionary and that there were then no trained foresters. To day, millions of acres of natural forest land bear a forest crop under more or less organised management.

In Madras the work of the Forest Department, so far, has been to protect and improve the forests to bring them to the present condition. It is now time to concentrate operations and to apply permanent methods of treatment, to produce, later on, materials to meet demands of all kinds.

What a great field this offers for the young men in choosing a profession. On the Continent and in America tens of thousands of foresters and assistants and labour are required for forest work. Madras will need several hundreds at least in the near future. Private and States forests have also to be taken into consideration.

Schools and Colleges to train foresters are being started in the several provinces and states. A forester will prove himself a public servant of the highest order and value.

A forester's life is one of the finest that any enterprising, hardy man can desire; work and hardships mingle with leisure and freedom, and to this is added variety in work and variety in place, the out-of-doors and a clean and beautiful environment. His work is not of the nature of a clerk. He deals with large things, thousands of acres of land and a large supply of forest produce. The salary of a forester is good. The forester fares well and is even better than the teacher, doctor, lawyer etc. and is able to earn after a few years' experience what a good teacher will earn after long years of drudgery.

The course of study which the forester pursues comprises, in science—mathematics, physics, chemistry, geology and botany—, surveying, including map making and Engineering, besides courses in forestry proper. A student who takes a forestry course is far more certain of a useful, well balanced science course than is the student who trusts his own immature judgment and the enthusiastic pleadings of the various specialist teachers. The course will prove useful for works in other lines besides forestry: e. g., General Estate Management, Planting etc.

The field is immense, interesting and enjoyable in character and appreciative in its pay. We need foresters and we *shall* have systematically managed forests.

Editor.

The French Rangers' College.

At Les Barres near Nogent-sur Vernisson (between Paris and Dijon) is situated the establishment where the French Provincial Forest Officers and Rangers receive their professional training.

As at Dehra the two classes of students are kept entirely apart as regards residence and course of instruction, and are under the control of a single Director who ranks rather above a Conservator.

The staff consists of, besides the Director, a Deputy Director, four outside Professors, one Officer of the Army for military training, a Ranger, and two Havildars.

Eighteen students belong to the Extra Assistant Conservator's class, while the Ranger's class numbers twenty one. The course for the Provincial Service is two years, for the Ranger's class one year. Thus, every year 9 students for the former and 21 for the latter are admitted. Nearly every student for the Extra Assistant Conservator's class has already passed through the Ranger's course and has also served for some years as a Ranger. The Ranger's class is recruited from Forest Guards of approved service. (There is no Forester's or Deputy Ranger's grade in France). In the Provincial Service school, the course is naturally more theoretical and less practical than at the Ranger's school. Colonial and private students are also occasionally admitted.

The two schools are situated on the same Estate—about 150 acres in extent—which is admirably suited for the object in view: i. e., practical training in Sylviculture and Forest Botany. The greater part of the area is covered with compact blocks of conifers and broad leaves (indigenous and exotic), pure and mixed, even and uneven aged, and of all stages of growth. Thanks to the fertility of the rich sandy loam, an exceptional height and girth increment is the rule. Close by, are the arboretum and nurseries, admirably arranged, and of the greatest instructional value. In one of the nurseries each student of the secondary school has his own plot, bearing his name. A keen and healthy competition naturally results. The same plan is about to be adopted in the Madras Forest College.

Each tree in the arboretum is labelled, as are also many of the blocks on the estate. The grounds are common to the two schools and present a sylvicultural charm that, within the writer's knowledge, rivalled only by the surroundings of the Italian Forest College at Vallombrosa.

At both schools the time-table and code of discipline are very similar.

Students are called at 5 A. M. in summer; 5-30 A. M. in winter. Roll-call is taken half an hour later. The sleeping and living-rooms are then thoroughly swept out and cleaned by the students themselves. A few servants are maintained for the menial offices, but the greater part of the domestic duties are borne by the students. The messes are run by a committee of students presided over by an instructor.

The head of each year called the Major has special responsibilities. There is also a house committee of similar constitution and functions to that of the Madras Forest College.

Lectures and practical work commence at 8 A. M. and last, with short breaks and an interval of one and a half hours for dinner, till 6 P. M.

All calls are sounded on a forest horn. The last call (bed-time) is sounded at 8-30 in winter and at 9 in summer. Half an hour later, all lights are extinguished.

The strictest discipline is maintained as regards salutes, standing at attention, silence in the lecture-rooms, and an absence of noise in the passages etc.

All kit is arranged on a definite plan. Questions may not be asked during lectures. The order of a superior may not be discussed at the time of its issue, but must be obeyed instantly.

Combined or collective complaints are forbidden; all such must come through the house committee.

The office is out of bounds.

Students must always be in uniform; civilian dress is forbidden, as are also the presence of the other sex, or the introduction of private arms or of dogs, within the schools.

Married men or widowers with children are allowed to live at their own expense in Nogent-sur-Vernisson, but they have to be present at the first parade like the resident students.

Playing cards is forbidden. Public balls or wine parties may not be attended. A student from the one school may not invite a student from the adjoining institution.

Sunday is a free day from 7-30 A. M. till 9-30 P. M. in winter and 10-30 P. M. in summer.

Education and lodging are entirely free. Messing is paid for by the students, the large majority of whom are drawing Government pay.

Punishments are extremely rare. They are similar to those in force at the Madras Forest College. Money fines are not imposed. Expulsion, which may only be inflicted by the Director General of Forests, is practically unheard of. There is no provision for appeals against the decision of the Director of the schools.

Course of students: Rangers' school:—The course is somewhat more advanced than that of the Madras Forest College, though the subjects are very similar. Entomology, chemistry, geology and mineralogy (formerly subjects at the Madras Forest College) are not taught, but lectures are given on game, preservation and pisciculture, while the Law-course is rather extensive.

During the ten months of the school year the time is divided as follows :—

195 lectures of $1\frac{1}{2}$ hours;
 15 days' touring;
 70 half-days of manual forest work;
 70 half-days of survey (including plates);
 60 periods $1\frac{1}{2}$ hours, devoted to military work.

The following is a rough distribution of the in-door work :—

Forest botany, silviculture and working plans, exploitation, 30 lectures.
 Law, forest rights and procedure, 30 lectures.
 Arithmetic and geometry, 25 lectures.
 Survey, 20 lectures.
 Fixing of unstable soils, 20 lectures.
 Game and its protection, 5 lectures.
 Pisciculture, 5 lectures.

The French language, spelling and composition, 60 lectures.

The students are marked for their work throughout the year, but there are no final examinations. Those who obtain the required minimum, pass out of the school as rangers.

Provincial Service School:—The subjoined table gives the subjects and numbers of lectures in each.

Subject.	First year. <i>Lectures.</i>	Second year. <i>Lectures.</i>
Sylviculture	30	....
Working Plans ....	....	30
Reboisement and dunes ....	....	25
Law and Procedure	30	30
Botany	25	25
Zoology : pisciculture . ....	....	25

Mineralogy : geology	10	....
Geometry	50	....
Algebra	35	....
Trigonometry: solid geometry	20	....
Survey	40	10
Engineering & correction of torrents ....	....	55
Physics ....	....	25
Inorganic chemistry	15	....
Agriculture and cultivation of pasture ....	....	20
French language and literature	30	30
Military science	20	30
Total....	305	305

The comparative value of each subject in the oral, practical and written examinations, is as follows :—

	Marks.
Forest sciences ...	16
Law and procedure	12
Natural science	12.5
Mathematics pure	5.5
„ applied	13
Inorganic chemistry	1
Drawing and Survey	3
Agriculture	2
French language	8
Military science	5
Conduct, discipline	3

The examinations, held once a year, are oral, written and practical. The minima for passing are : totals, 50 per cent; forest sciences, and applied mathematics, 30 per cent; other subjects 20 per cent. A certificate of merit in military service must also be obtained.

A student failing to qualify, or who has been absent from illness for more than one month, is permitted to repeat

one year. In no case may a student stay for more than three years of the school.

On the whole, the course is more advanced than that for the provincial service at Dehra Dun. The relative importance attached to law and mathematics at Les Barres is remarkable.

A senior student remarked to the writer that the school course was too theoretical. This criticism seems justified by the fact that advantage is not taken of the splendid estate to practise the students in cleanings, improvement fellings and thinnings, nor in forest engineering. In fact, the home forest is not subjected to silvicultural operations, and the roads are constructed and maintained by outside agency. Want of time was the curious reason professed for the omission to profit by the excellent opportunity for practical work afforded by the environment.

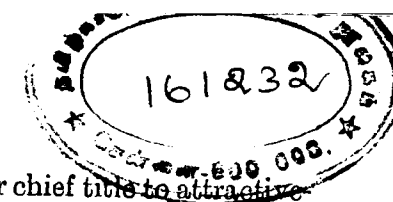
Taken as a whole, the forest schools at Les Barres are admirably organised institutions and as such, are of the greatest service to the French forests and therefore to the French people.

Regular touring is not undertaken, but visits are periodically paid to the State Forests of Montargis and Fontainebleau easily accessible by railway.

No provision is made for Athletics, nor with the very full daily time-table prescribed is there any scope for them. The annual vacation lasts for two months.

In appearance and size the buildings cannot compete with those of the Dehra Research Institute or of the Madras Forest College, but are nevertheless well adapted for the end in view.

All the French Forest Schools are remarkable for an entire absence of external architectural embellishments.



They not undeservedly claim that their chief title to attractiveness is based on the renown of their professional reputation.

On the whole students at Les Barres have longer hours, harder work, less leisure, and less comfort than is the case at the Madras Forest College. On the other hand they enjoy a long vacation and their touring is confined to excursions for the day.

It will perhaps be of interest to add a few notes on the general administration of the French Forest Department.

The service consists of

1 Director-General at Paris under the Minister of Agriculture. In rank he corresponds to a Secretary to Government in India.

2 Inspectors-General also at Paris.

Gazetted officers.

32 Conservators (including two Directors of schools, who have no territorial charge—one for Les Barres, and one for Nancy where the higher officers are trained).

200 Deputy Conservators.

430 Assistant Conservators, Extra Deputy Conservators and Extra Assistant Conservators.

1,050 Rangers and 2,575 Forest Guards (including those of both these classes who are partly in charge of communal forests).

There are no watchers.

The area directly and absolutely under the control of the Forest Department consists of 4,860 square miles of reserved forest. In addition, there are 7,800 square miles of communal forests administered by the Civil authorities. In many cases the subordinates of the communal forests are State forest guards in charge of both classes of forests.

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The Civil authorities controlling communal forests are bound to consult the Conservator in all important matters, such as the felling of coupes, fire protection etc. If the Conservator's advice is not accepted, the Collector as the head of the Civil Administration, must refer the question to his superiors.

All private forests in France (some 23,000 square miles) are also, to a limited degree under the control of the Forest Department. For example, the Conservator can forbid all felling on unstable mountain slopes, and does prohibit all grazing over such areas. He can also insist on the establishment of an adequate system of the fire protection in any private forest.

In cases of serious fires, the Collector can, at the request of the Conservator, call upon the General of the Division to furnish troops to assist in extinguishing the conflagration.

The entry of goats into reserved forests is absolutely prohibited, and the pasturing of other animals is greatly discouraged and restricted.

The reserved forests are, for the most part, normal: the result of 350 years of more or less regular management, dating from the law of Tire et Aire, promulgated by Louis XIV in 1669. Under that regulation, on every acre under coppice, sixteen trees were to be reserved as seed-bearers; on every acre under high forest, eight trees were to be retained for the same purpose. The rotation for coppice was fixed at forty years in all private forests; the revolution for high forests was fixed at one hundred and twenty years. In all State forests, reserved coupes were instituted and the pasturing of goats and sheep prohibited.

France, Corsica and Algeria are, for administrative purposes regarded as one and are divided into 32 circles.

The French colonies proper (e. g. Cochin China have) their own separate personnel.

The two Inspectors-General are mainly concerned with inspection duties. They have no territorial charges but, with the Director-General and the Conservators on the staff at Paris, form the Administrative Council of the Forest Department.

A Conservator's circle roughly consists of 150 square miles of reserved forest; a division (controlled by a Deputy Conservator or an Extra Deputy or Assistant Conservator, assisted by an Extra Assistant Conservator, 20 square miles; a range in charge of an Extra Assistant Conservator or Ranger) about four square miles, and a beat 1.7 square miles. But as already explained, the officers may also have surveillance over the neighbouring communal and even private forests.

Twelve special divisions, with a staff of 30 gazetted officers, are devoted solely to working plans and re-afforestation. The very large number of sedentary posts sanctioned both in Paris and at each Conservator's headquarters afford ample opportunity for the recruitment of shattered health or jaded nerves, a provision that must add materially to the popularity of the service.

The work of the forest officers is entirely professional; all account matters are controlled by a special branch of the State Service, and almost all exploitation is effected by contractors.

The annual revenue of the Department amounts to £1,372,000 the expenditure £638,000. This includes £129,000 spent on the restoration and conservation of mountain tracts (producing practically no revenue) and £44,840 devoted to roads, buildings, fixing of dunes, fire protection, and general improvement of the State forests.

The average annual yield per acre of the reserved forests is calculated at five rupees or forty cubic feet.

Fire Lines.

At the time of year at which this is written the attention of the majority of Forest Officers is very largely devoted to the problem of fire protection, and it must occur to many that the results achieved are ordinarily hardly commensurate with the trouble and expense involved. Fire lines will not prevent the occurrence of fires. With that side of the problem this note will not deal; it is only intended to discuss the utility of the steps now taken, by fire lines, to check the spread of fire and to limit the areas burnt, in the hope that the matter may be subjected to constructive criticism by those who should be best qualified to offer an opinion, i. e., Range Officers who have direct control of the work.

It is not a common thing to see a fire line which could, with confidence, be expected to stop a fire: many, as at present executed, would hardly afford a safe line from which to counterfire, while in very many cases the burning is undertaken so late that the forest is exposed to the gravest danger by the very act which is supposed to afford a means of protection.

What is required is that the fire lines should be cleared and burnt, and put into such a condition that no fire can cross them, before the forest is liable to damage from fire. This is the ideal, and if a fire line is not perfect it is of little use. The date by which the fire lines should be completed naturally varies in different localities and according to the season, but preparation can hardly be commenced too early. It is quite common to find that guide line clearing is not commenced until the fire season is upon us, and that

the actual burning of the fire lines goes on concurrent with, and is often a cause of, the firing of the forest. In the forest which the writer of this note has in mind, guide line cutting is commenced in Novr. 1st. (arguments that so early a commencement results in the cut grass coming up again are met by the fact that the grass that comes up is green and that it attains no height) and was completed in January. The earlier the lines can be burnt the better, but here the difficulty begins—the lines will not burn, the dry material from the guide lines is insufficient to burn the green grass in the central belt and a clean burn seems impossible. The difficulty is further increased in the case of "Closed" lines (i. e. those on which the trees have not been cut) where clearly the line will not burn until the forest will burn. It is not desired to provoke controversy on the subject of "closed" and "open" lines; there are many "closed" lines and it is desirable to consider the problem of how to burn them. The case of "open" lines is more simple, on them the grass will dry more quickly than that under shade in the forest, but even in the case of these lines it is often not possible to burn so early as is desirable. Another point is that the grass on fire lines is ordinarily less flammable than that in the forest (if the latter has escaped fire in the preceeding season) for, if the fire line was burnt previously, the grass on it will not contain the dry stalks and other material which accumulates in the unburnt surroundings. Again grass in which it is difficult to start a fire will burn fast enough when a fire is once started, which fire, travelling perhaps down a strong wind, scorches the grass ahead of it rendering this material inflammable, and burning over the prepared line which was found impossible to burn with the ordinary precautions.

Granted that they have been prepared in time there is very real difficulty in burning fire lines as early as is desirable. Some of the reasons have been indicated, how is the

problem to be solved? A great deal can be done by seeing that all the weeds, woody growth and similar small stuff is cut back in the central belt when the guide line clearing is done, by seeing that all the material cut from the guide and ladder lines is scattered over the central belt, and by beating the grass in the central belt with split (i. e. sharp edged) bamboos, so as to reduce the height of the grass and consequently the danger when burning is undertaken, and to provide inflammable material from the pieces of grass so cut. The last operation is in the nature of a compromise: it would be infinitely better to cut all the grass over the total width of the line, but the cost of so doing would be considerable, whereas the operation suggested is cheap, and should be effective enough.

Further if it is necessary to burn twice or even three times it must be done, though second burnings are difficult and rather costly. The belief that patrols (how often they are appointed for lines which have never been burnt at all) will attend to reburning and to the pruning of unburnt patches is a most dangerous one.

The first criticism which will be levelled against what has been written is that it cannot be done for the amount of money available, and in some cases this will be a very just criticism. If an expenditure of twelve annas will not attain an object it is desired to achieve, we clearly waste precisely twelve annas by spending that sum, and it is probably better to spend a rupee if by so doing the object sought is attained. A fire line to be any use must be perfect.

Other points which occur to one in a consideration of fire protection are that so often more is attempted than can be done effectively; insufficient width of lines; lines run over inaccessible country and there are no made paths by which they can be reached; facilities are not afforded for the labour

to halt where it is engaged, hours and energy are wasted daily in walking to the work; guide line cutting and burning are supervised by irresponsible persons or not at all; other works are in arrears and the Ranger is unable to give his whole time to his most difficult, but largely neglected, problem. If it is decided that fire protection is desirable let us tackle it thoroughly, half measures are of no avail. If this note is successful in producing comment and suggestions from those who are most intimately connected with this very real problem much should be gained.

R. D. R.

Note.—We welcome discussion of this interesting article. Three points stand out in the recollection of probably nearly all of us:

- i. Line cutting is often commenced far too late;
- ii. A large proportion of Forest Fires is due to accidents in burning the fire lines (the burning having been started so late in the season that the operation itself becomes dangerous to the very forest that it is intended to protect):
- iii. Naturally bare lines (e. g. rock) find their way into—and annually retain their place in—estimates for “clearing and burning.”

Editor.

The Madras Exhibition of Indian Arts and Industries (1917—18) with special reference to the Forest Section.

Great as was the number of visitors for the Exhibition held recently, there were many, who, for some reason or other, were unable to pay a visit; to the edification of such people in general, and those interested in Forestry and allied subjects in particular, the following stray notes are published.

Due to the initiative of H. E. Lord Pentland an Exhibition of Indian Arts and Industries was held in Madras in December 1915; this was followed by the recent one of December 1917; perhaps the best yet seen in the Presidency. Though the interval between the two shows was not long, no justification is necessary in a country like India, where industrial literature is practically non-existent, so far as it relates to local manufactures etc., and where "Ocular demonstration and oral explanation" are consequently of decided advantage and even a necessity; furthermore, India under the stimulus of the present war is taking rapid strides in her industrial development and has been, or is, on the look out for the best substitutes for a large variety of her imported articles, which as a result of the war have either become prohibitively costly, or of which the importation is likely to cease. Exhibitions in India cannot, therefore, be called stereotyped, and the late one was not a repetition of its predecessor. No doubt the industries of the Presidency are, for the most part, in their infancy, but from the recent exhibition it may be assumed that the Madras Presidency is striving to efface the stigma implied in Sir Thomas Holland's remarks that 'Madras with its wealth in raw materials has found it easier to buy than to manufacture the articles required for the amenities of life.'

The 1917-18 exhibition was different from the previous one in having been an 'All-India Exhibition' i. e., exhibits were sent from such distant states as Patiala. The opening of it by the Viceroy of India attracted a large number of visitors, especially to the opening ceremony, admission to which was gained by silver passes of Rs. 15.

The building was twice as big as the one of 1915; the grand gateway and the front aspect were after a Pathan fort of Pre-Moghul architecture and really very imposing. The exhibition space was 42,600 sq. ft. with verandahs and

passages, and contained 144 stalls. Of these, points of special interest in the more important stalls will be briefly mentioned.

1. *Salt and Abkari Department, Madras:—*

Chief among the exhibits were Madras table salt, epsom salt, salt-petre etc. Of these, table salt is worthy of special mention. At the present time, Madras table salt can be made for 1 anna and a quarter per pound as against 3 annas per pound, the current price of imported salt. Being much cheaper and the dirt in it only 0.12% more than in the imported salt, Madras table salt, will prove an efficient substitute for its foreign competitor. The manufacture of salt for the masses is still capable of enormous development. The price of table salt has trebled during the last three years, and the department can view with legitimate pride its success in producing table salt nearly as good as, and much cheaper than, the imported article.

2. *Parry and Co., Madras:—*

Messrs. Parry & Co., exhibited products manufactured by the following companies under their management.

The New Malabar Timber Yards and Saw Mills, Ltd., situated at Kallai, exhibited samples of cordite cases, and various casks etc., manufactured by them; but it was a pity that the names of the different timbers used were not noted on the exhibits, nor was the Officer in charge there, able to give them.

The Presidency Manure Works Ltd., exhibited a large number of organic and inorganic fertilizers both imported and made locally at their works at Ranipet.

3. *The Government Pencil Factory Madras:—*

In this stall were exhibited raw materials and samples showing various stages of pencil manufacture in Madras, and

also exhibits of experimental pencils made of Indian woods. All attempts to find a ready satisfactory substitute for the pencil cedar have however failed. Over 80 Indian woods* were experimented and sample of these exhibited. *Tetrameles nudiflora* and *Gyrocarpus Jacquini* were found technically suitable but not attractive enough. Better woods have been discovered, and pencils made of these would probably command a limited sale, but for the present, it would seem necessary to rely mainly on cedar (*Juniperus procera*) imported from East Africa. Pencil factories in Europe depend mainly on imported cedar and imported graphites.

There were also exhibited the several stages in the manufacture of brown paper from bamboo pulp, made at the Punalur paper mills:—Green bamboo chips.

Chopped " "
Bamboo pulp from the breaking engine
" " beating "
" " coloured.

4. *Village and Mission Industries:*

Among the exhibits were metal mirrors manufactured in the Krishna district, which proved that the secret of manufacturing these is no longer confined to a particular family in the Travancore State, as was believed hitherto.

5. *Indian Munitions Board:*

This was one of the most instructive of all the stalls, demonstrating by its exhibits how India is striving to become less and less dependent on imported articles.

* Chief among these were:

Cedrela Toona,	
Melia composita,	Sterculia urens,
Trewia nudiflora,	Ailanthus excelsa,
Holigarna Arnottiana,	Lophopetalum,
	Wightianum,
Gmelina arborea,	
Boswellia serrata,	Phyllanthus Emblica,

The Chemical section showed various chemicals prepared in India. The Indian Institute of Science, Bangalore, has an excellent representation of the work done there. It has shown how some industries can be profitably taken up in India, and some, yet in their infancy, developed further. The extraction of sandalwood oil is a striking case in point. After the out break of War there was a considerable reduction in the export of sandalwood from South India, and distilleries were established in Mysore, which, due to the work of Dr. Sudborough of the Indian Institute of Science, turned out oil as good as any previously produced elsewhere.

Next were exhibited the preparation of thymol from Ajwan seeds (*Carum copticum*) in all its different processes. The crystals were as good as the imported ones.

There were, again, exhibits suggesting new developments in the use of Indian timber for military purposes such as in the construction of aeroplanes and ships. In connection with air-craft efficient Indian substitutes were shown for the commonly used European timbers—spruce, ash, walnut. The substitutes for ash, tried and suggested are: *Grewia tiliaefolia* (found to be twice as strong as ash).

Acrocarpus fraxinifolius,
Holoptelea integrifolia,
Moras laevigata,

Those for walnut are:

Lagerstroemia Flos-Reginae.
Albizzia procera and a few others.

It was also shown how the war and the rise in the price of iron may lead to the revival of the old industry of wooden ship building in India.

There was also displayed, an array of glass articles and apparatus manufactured by the "Scientific Instrument Co."

Allahabad, and the 'Indian Glass Manufacturing Company' of Bombay, most of the apparatus being maiden attempts in India since the outbreak of war.

6. *The Madras Forest Department.*

The Madras Forest department had its share in the exhibition as before, but the exhibits and the arrangement were somewhat different from those previously adopted. The main idea this time was to emphasise the timber resources of the Presidency, and launch a scheme of commercial categorization of Madras timbers, such as would, in a way, virtually increase the abundance of the popular and more costly timber species of the Presidency. The principle of the project which originated from Mr. A. W. Lushington, C. I. E. is briefly as follows :—

Owing to the increasing demand for timber in the country and abroad, it would be desirable to increase the abundance of species in demand, and avoid that 'abuse'—so to speak—of the more costly timber species, such as teak, which prevails in India, where teak is used more commonly and liberally than is advisable and necessary. An easy way would be to find substitutes cheaper than and nearly as good as the species in demand. Clubbing together species which approximate one another in hardness, colour, weight, transverse strength and other such important properties, the whole of our 472 species (capable of attaining 1 ft. or more in diameter) can be aggregated into 64 categories. In that way, the multiplicity of species, and the resulting confusion in nomenclature can, to some extent, be avoided, making it easier for the commercial community to recognise the various species of timbers suited for a particular class of work. Further, this clubbing of a number of similar species into one commercial group is justifiable, when we realise that though the quality of a single species in Europe is often exceedingly variable all the grades of one and the same

species are sold as of one quality. It is also a common practice in introducing a new species, to name it with that of some similar thing already on the market, tacked on to it.

Based on the above principle, the timber specimens were divided into four main categories, ranging from *Cochlospermum gossypium* to *Hardwickia binata* :—

- | | | |
|------|--|--|
| I. | Mostly soft to very soft woods (Consisting of 15 categories) | |
| II. | „ moderately hard woods („ 20 „) | |
| III. | „ hard woods („ 21 „) | |
| IV. | Very or extremely hard woods („ 8 „) | |

It is neither possible nor necessary to describe the 64 categories, as details of these will be found in Mr. A. W. Lushington's book on "Madras Timbers" recently published and sold, in connection with the Madras Exhibition. The scheme was appreciated by many educated people of the commercial class, and pronounced as a move in the proper direction. It was, however, suggested it would be better, from a commercial point of view, to call such groups as "False walnuts" and "False elms," 'Madras walnuts' and 'Madras elms.'

Some interesting points on the timber exhibits may be given here. Under utilization of *Sterculia villosa* and *Givotia rottleriformis* were exhibited cigar boxes made of these woods, which attracted the attention of the commercial public to such a degree that enquiries poured in, about the available quantity per annum, and the habitats of these woods. *Melia composita* drew the attention of some firms who were anxious to know whether it could be obtained in quantity for making packing cases. They were also hankering after such species as *Carallia integerrima*, *Lophopetalum Wightianum*, *Evodia Roxburghiana*, *Gluta travancorica*, *Lansium anamalayanum* for cabinet work. The last is recommended, under the scheme, as an efficient substitute for satin wood. *Vitex altissima* and *Premna tomentosa* can

very well take the place of teak wherever possible. A longitudinal section of *Gnetum scandens* a common liane of the Western Ghats showed how attractive the wood is and could be profitably used for making small fancy articles instead of its being abused as material for fuel.

In addition to timber, there were exhibited other products such as oils, gums, resins, fibres, paper pulp from *Lantana* and *Helicteres* and tanstuffs. The gums were classified into *adhesive gums* such as *Acacia arabica*, *Anogeissus latifolia*, and *hoggums* such as *Odina Wodier*, *Bombax malabaricum*. The resins were likewise separated into *true resins* such as *Shorea robusta*, *Vateria indica* and *gum resins* such as *Eugenia gardneri*. Tanstuffs were exhibited along with very interesting notes on these, prepared by P. M. Lushington Esq., and published in the "Official guide and descriptive Catalogue of the Exhibition."

Last but not least must be mentioned, the charcoal briquettes prepared by Mr. Pearson, Imperial Forest Economist, Dehra Dun. These were prepared from powdered charcoal agglutinated with the gum of *Bauhinia retusa*, and pressed under hydraulic pressure. They are reported to possess a higher calorific power than Indian coal. The particular gum *Bauhinia retusa* is preferable to others yet known, as it has a high adhesive power and burns with a clear flame. It is however not abundant enough, and a satisfactory substitute is, therefore, being tried. The juice of prickly pear along with some other substances have been suggested and are being tried.

Mention must also be made of the 'sale sub-section' of the Forest Department, run by the Forest Assistant. A large variety of minor forest products was sold, the sale proceeds amounting to a good round sum of Rs. 2,000. The profits go to the War Fund. "Naga Canes" as usual found a ready market, selling at Re. 1 each. The demand for this

was mainly based on the belief that it invariably wards off snakes, especially cobras. A pair of elephant tusks weighing 50 lbs sold for Rs. 500. In this connection it may be remarked that a pair weighing 150 lbs was sold at the Travancore stall for Rs. 1500! Walking sticks made of *Chloroxylon Swietenia*, *Hardwickia binata*, *Dalbergia latifolia*, and *Acacia Sundra* were sold in large numbers.

7. *The Agricultural Department.*

An interesting and novel feature of this stall was the display of children's patent foods, prepared, for the first time, by the staff of the Chemistry Section of the Agricultural College and Research Institute, Coimbatore, from indigenous cereals such as cholam and ragi in the place of wheat, barley and other such cereals of the West, from which most of the imported foods are made. These foods prepared locally, were nearly as good as, and much cheaper than, the foreign ones. For this exhibit the section has won a well deserving gold medal.

The department also demonstrated by means of nursery plots with growing paddy crops, that by sowing, so as to furnish plants for transplantation of single seedlings instead of the traditional bunch transplantation, there is a saving of 30 measures for an acre, or 19,200 measures for a square mile of cultivation. Such demonstrations would certainly induce the ryot to do away with the traditional and conventional methods and adopt modern ones.

Daincha (*Sesbania aculeata*) was grown near the paddy plots and advocated as an excellent green manure.

8. *The United Planters' Association :—*

Tea of all sorts, and some spices were on show in this stall. There was, among the trophies exhibited, the skin of what is said to be a record panther.

9. *The Patiala State* exhibited excellent lace, and some Forest Produce; matches made from the woods *Erythrina suberosa* and *Bombax malabaricum*, and pencils of *Holigarna Arnottiana*, *Gmelina arborea*, and other woods were of special interest.

10. *Other Stalls*: There were also very interesting exhibits contributed, among others, by the states of Travancore, Cochin, Pudukottah, Banganapalle. The South Indian Railway Company exhibited a working model of the rolling lift-bridge over the Pamban pass, the viaduct between India and the island of Rameswaram on the Ceylon-Indian Railway line; the Electric Supply Corporation, a model Tram car with 'first class' accommodation fitted with electric lights and fans,—a model which the company hopes to follow in the near future.

As already prefaced, this account does not claim to be exhaustive and therefore can only give a very inadequate idea of the various phases of the Exhibition too numerous to be dealt with here.

G. Viswanatham.

Forest Offences.

Short as my experience as a Range Officer is to warrant an article from me on this subject, I feel justified in writing one because the chief aim of this magazine—conducted by Rangers for Rangers—is the free exchange of ideas and opinions among the Madras Rangers. One cannot shut one's eyes to the fact that, at present, the subordinate magistrates, at any rate, are apt to overlook the prosecuting Range Officer's lack of knowledge of Law and being Government Officers themselves take upon themselves the duty of eliciting the omitted facts from the prosecution witnesses. But when in certain cases the

accused are defended by vakils, among whom there are a few at least who attempt to baffle even the magistrate not to talk of the poor Range Officer, then the Range Officer finds that in every step of his in the course of the trial there is a rebuff from the opposing wakil to combat with. Inexperienced Range Officers, as also others who have not improved their knowledge of Law and Procedure in conducting forest cases, find their position awkward in such circumstances and true cases are lost in the court. A large number of cases under the column "*cases acquitted*" in Form 71 of the Annual Administration Report indicates something rotten in the state of Denmark and seems to reflect on the Range Officers concerned.

The Range Officer has, at first, to be thoroughly conversant with his own departmental orders, the District Forest Officer's, Conservator's and District Magistrate's Standing orders and other circulars. I will quote but two instances of lack of interest in this matter leading to undesirable results. A Range Officer charged a certain villager with possession in his house of a cart load of firewood the origin of which could not be satisfactorily accounted for by the owner. The Ranger argued that the firewood must have been brought from the adjacent reserve in which case it is an offence or from the still nearer unreserve in which case, again, firewood for sale or for other than domestic use (i. e. in head loads only) should not be collected. The case was ushered in court and the accused through his wakil pleaded that he purchased all the firewood from the coolies bringing headloads every evening. The accused was acquitted. The point in this case recorded by the Range Officer himself in his reports to the District Forest Officer but which he failed to make use of in the court was that the firewood consisted of *Chloroxylon Swietenia*—one of the Reserved trees in the District Classified list of trees issued under Section 26 of the

Madras Forest Act the removal of which except under seigniorage permit entails punishment of imprisonment for a term of up to one month or fine which may extend to two hundred rupees or both. The Magistrate also overlooked this important point in this matter, but the Ranger Officer's neglect of this important fact was inexcusable.

The second instance I am quoting betrays even a worse state of affairs in Range Administration. The notice served on the accused in forest offences gives them the option of paying the compounding fees either to the Range officer or in a treasury. In the latter case the treasury includes the amount in the "Taluk chitta" received in the Range office at the end of every month. Unaware of this remittance which is not intimated to him then and there, either by the treasury or by the accused, the Range Officer requests the Magistrate to take up the case against the accused who is unnecessarily dragged to court. The magistrate either refuses to take notice of the remittance in the face of the Range officer's requisition to take up the case and fines the accused on a trial conducted by him or he induces the Range Officer to withdraw the case. In both cases there are serious disadvantages, other than the trouble and expense to which the parties are put. In the first case, refund of the compounding fees paid into the treasury will have to be made—a serious addition to the Ranger's, District Forests officer's and Conservator's office work and in the second case the offence will appear under "acquitted cases" which as already said above is a reflection on the Ranger Officer. The remedy to this evil is suggested in the Forest Manual (Page 34) which is that "when compounding fees are paid to the treasury officers or magistrates by the parties, they should be credited to forest revenue and the fact intimated to the Range Officer

immediately by means of a post card." No Treasury officer seems to attend to this rule and even after several unfortunate experiences the Range officers have not drawn the attention of the former to the omission on their part. On the day we attended the Stationary Sub-Magistrate's Court, on 25-3-1918, at Coimbatore, out of 6 cases posted for the day, 2 cases were of this kind. On a previous occasion when we attended the Bench Court there was one such case. This has been going on for years past and the rule is there in the Forest Manual which is the Ranger's daily companion in the office and which he brings to the court, perhaps, as an ornament to himself or for semi literate people to recognise him as the Range Officer. When this rule is pointed out to some Range officers, the Treasury officer was at once blamed in the matter. To such Range Officers I say "What have you done? When you met with one such instance was it not your duty to have referred to books and Standing Orders and pointed out the Treasury Officer's apparent neglect to your District Forest Officer so that a circular from the District Magistrate will set the matter right?"

Another most common omission in conducting forest cases in court is that sworn statement from Prosecution witnesses is not obtained as to the fact of reservation of the forest in which the offence took place. The date and page of the Fort St. George Gazette wherein the concerned Section 16 notification appeared will have to be sworn to. For this omission in the lower court, the High Court set aside the conviction passed by the former in a certain case and acquitted the accused. A Government order was at once issued laying down that the first thing to be proved in a trial of forest case is the fact of reservation having taken place. This rule is not to this day observed in several courts to my knowledge and appeals to

the High Court being very rare the neglect is being perpetuated without the serious consequences following it.

4. With the subordinate magistracy recruited directly from the Bar and not from the lower subordinate clerical service as done at present, the Range Officers will find that their lack of knowledge of Law will no longer be passed unnoticed in courts. They won't get the help they now do from the magistrates in eliciting the important points in the prosecution case. The Evidence Act is a bit terse but has to be studied to face the opposing *vakil* and to win the day. A thorough knowledge of our departmental orders, the Evidence Act and the procedure in conducting cases in a court is sure to stand us in good stead at all times.

S. G. Venkatraman,
Student, Senior Division.

The Practice Trial.

Protection of Forests in his charge is one of the primary duties of a Range Officer and forms one of the most important items of Range Administration. The Range Officer arranges for suitable protection, through his Forest Guards and beat watchers, aided by the Foresters and other subordinates under him.

The Forest Guards while patrolling their beats have to detect offences such as illicit fellings, grazing etc., and promptly report the occurrence to the Range Officer, after taking preliminary steps themselves such as finding out the accused, seizing property and tools, if any, and proper entrustment of the seizure with some responsible person. The Range Officer proceeds to make his own investigations and takes further steps.

To know all details of such important work and to properly conduct prosecutions in courts as Rangers, with due regard for all court formalities, a practice trial of a forest case was arranged in the Sadivayal camp. Both the Divisions took part in it, the Seniors being the prosecutors and the Juniors the accused who had to defend themselves, the Instructors being the Magistrates.

The case was proceeded on the basis of the following offences having been committed. Two persons were found carrying timber in the Reserve to load a cart standing on a fire line. The offence was detected by the Forest Guards of two neighbouring beats and a watcher, when they were returning after an inspection of a common fire line. While the men were being taken to the village, some of the villagers assaulted the Forest Subordinates and the cart was rescued. The next morning the cart was identified by a hammer mark, and this was seized and left in charge of the Village Magistrate.

The Forest Guards reported the occurrence to the Range Officer who, after investigating the case, sent up the usual forms of report to the District Forest Officer who sanctioned prosecution. Thereafter the case was sent for trial. Summonses were served on the accused and the witnesses in time before the trial. During the trial the prosecution witnesses blundered as to the locality itself where the offence was alleged to have taken place. There was only one hammer mark on the cart made by one of the guards and of which neither the watcher nor the other guard had any idea and it was passing strange why the guard should mark it only once and that unnoticed by others.

However the charge sheet was framed. The defence was mainly based on the evidence of the Tahsildar of the Taluk who stated that the accused were with him on that

particular date and hour when he was inspecting one of their fields. Although he betrayed some ignorance of Board's Standing Orders and of the exact duties of Revenue Inspectors, his evidence was considered to have weight. The defence brought forward another fact that there had been a quarrel between the accused and the guards about 'mamools' which the latter demanded and to which the Karnam of the village and another old man, who is next door neighbour to the accused, bore witness.

Even setting aside the defence, the prosecution evidence clearly showed that there were mistakes of fact and the benefit of doubt was given to the accused and they were acquitted.

M. Umapati,
Assistant Editor.

Athletics at the Madras Forest College, January to March 1918.

The months of January and February were spent in camp and March in head-quarters. Our playing field was ready on 1st March and we can have our games and Annual Sports on our own grounds in future. The Senior Division had no practice in any game at Walayar in January as a suitable ground could not be found near the camp. With heavy rains and a longer time spent at Kodamadi than last year, the Junior Division had no regular practice at foot-ball in Mundanthorai, where the excellent playground in the camp site has been further improved this year with the District Forest Officer's permission for which the students feel very grateful.

Marathon race. The annual Marathon race was run by the students of both divisions on the morning of 16th

February 1918. A detailed account of this appears elsewhere. On the whole, the results were well balanced between both divisions the 1st and 3rd prize winners being from the Senior Division and the 2nd, 4th and 5th from the Junior Division. The interdivision competition in this race was started for the first time this year and in this connection the students feel very grateful to Rissaldar Major Bahadur Amir Mahomed Khan (late XX Deccan Horse) for his generous present to the Athletic club of a Challenge Cup to be called the "Marathon Challenge Cup." The order of finishing of the first ten in each division was taken and the numerals indicating this order when added together gave 103 and 107 points respectively for the Juniors and Seniors, the former winning the cup by 4 points in their favour. On the evening of the 20th February, our Principal announced to us the institution of this cup so kindly presented by a friend of the College. He expressed his sympathy with the Rissaldar Major Bahadur in his present illness on return from active war service and wished for his speedy recovery. The students, to indicate their appreciation of the above, gave three vociferous cheers for the donar of the "Marathon Challenge Cup" Mr. Bennett Vice-President Athletic Club, presented the cup to the Junior student C. B. Chengappa.

The Six-a-side Foot-ball Tournament. This annual event was held from 20th to 26th February 1918 at camp Sadvayal. When he had played only 5 teams out of 6, Seshagiri Rao had won more points than the other captains and won the tournament. The successful team was unique in not allowing a single goal to be scored against it in all the five days it played. On the evening of the 27th idem, our Vice-President explained to us the defects in our play and the object of this annual tournament as being the fit opportunity for the Vice-President and the

Captain to select the best match players of the College Eleven. Mr. C. B. Dawson, the Senior Imperial Instructor then gave away the prizes to the successful team which were kindly awarded by our Vice-President.

This term is wholly devoted to foot-ball, but for occasional indulgence in cricket. The following matches were played.

Foot-ball. We met the Agricultural College on their grounds on 5th March 1918. A keen game was played which ended in our narrow defeat by nil to 1 goal. The return match was played on the 12th March on our grounds and the game ended in a draw neither side scoring.

We tackled the Stane's European High School on their ground on 19th March. This time better luck attended us and we won to the tune of 4 goals to 1, for 2 of which our Provincial Instructor Mr. Hart was responsible by kicking 2 good corner balls which were headed into the opposite goal by Students Venugopal Naidu and Seshagiri Rao. The return match with the Stanes School was played on 26-3-18. A well contested game was played and the result was draw both sides scoring 2 goals. Our 2 points were scored by Student Venugopal Naidu.

Cricket. On 24th March a Cricket match was played at the Agricultural College the Staffs of the 2 Colleges opposing the students of the Colleges. Sudden rains interrupted the game which had to be left unfinished. Details of scores and bowling analysis etc., will be given in the next issue of the Journal.

Colours. The following students were awarded their colours for foot-ball. (1) Seshagiri Rao, (2) C. L. Narayana Rao, (3) P. K. Parameswaram Pillay, and (4) A. Bhaviah.

Student Seshagiri Rao was appointed Vice-Captain for foot-ball.

S. G. Venkatramanon,
Assistant Secretary,
Athletic Club.

The Marathon Race.

The Marathon Race over a distance of 6 mile 5 fur. 100 ft. is one of the chief events during the combined camp at Sadivayal in February.

The distance is rendered difficult owing to steep ascents and descents which really make the course much more tedious than the measured length. The race starts at the College camp. The next obligatory point is on the hill side leading to Muthikulam ridge—a stiff ascent. Thence the third point is reached by a compartment line. From this point to the winning post at the camp the competitors can choose their own course. Two streams crossed have deep steep banks. Passing these obstacles takes the breath out of the men of heavier build. The difference in height between the starting point and the highest point along the course is about 650ft. Competitors must touch the obligatory points, and at each point one of the members of the College Staff checks them.

The race of this year came off on the 16th February. Students, particularly the enduring set, evinced great zeal and keenness in the contest and were enthusiastically speculating on the possible winner.

We were given the start at 7 A. M. There was a very keen competition between Parameshwaram Pillay and C. B. Chengappa. They were very close together as far as the foot of the hill, when the latter had to lag behind a little owing to a cramp in his leg. On reaching

the first obligatory point, the order of the 1st few runners was Parameshwaram Pillai, C. B. Chengappa Narasinga Rao, Kondathu Goundan, Narayana Rao and B. S. Chengappa. In the beginning there were a large number of Senior students among the first twenty and it was thought that the Divisional prize would go to them. But the Juniors pulled up and at last they won it. As for the heavier set of students, although they kept up a tolerably good speed as far as the foot of the hill, very much to their credit, they were afterwards beaten down by others of lighter bodies in going up the hill.

Snap-shots were taken as the winners were nearing the winning point. The Principal had been very kind to give drinks which everyone fully appreciated and felt thankful for after a hard run. The arrival of the last man was watched for with as much excitement as the first runner.

The Principal delivered a short speech after the race explaining how the Marathon Race brings out the latent physical capacities in a man and tries his powers of control. Although the 1st man was 2' 45" behind that of last year's race the Principal congratulated the runners on the good finish. He expressed his regret that the Instructors who were stationed at the intermediate points were not able to witness at least some of the winners reaching the winning point. He wanted the winners to help him if possible, to find out another course enabling the Instructors to reach the winning post as soon as possible. The medal and cups were then presented by Mr. Hart, the Honorary Secretary of the Athletic Club. The morning was brought to a close with loud cheers for the staff who had provided a gold medal and four silver cups to the first five successful competitors.

The times of the first five winners are :—

		Min.	Secds.
1.	P. K. Parameswaram Pillai	54	45.
2.	C. B. Chengappa	57	27.
3.	M. Narasinga Rao	60	30.
4.	C. L. Narayana Rao	61	24.
5.	B. S. Chengappa	62	0.

The time of the last man was 1 hr. 41½ min. 2 students were unable to finish the course owing to a break-down.

The times of the 1st man for the last 3 years are as follows :—

1918	P. K. Parameswaram Pillai	54'	45".
1917	C. S. Nanjappa	52'	0".
1916	C. S. Nanjappa	56'	15".

The Senior students gave a treat to the winners the next evening and all of them enjoyed themselves thoroughly. A pleasant interlude of this nature breaks the routine work of camps and helps in a large degree to draw the students together.

A day or two after the Marathon, Vice-President, the Athletic Club presented the Divisional Cup offered by Amir Mohammed Khan Resaldar Major Bahadur of 20th Deccan Horse, to C. B. Chengappa who represented the winners. The Principal after warmly eulogising the donor in fitting terms briefly alluded to the object of instituting such cups by men like the Resaldar Major, which is to bring about better co-operation among the students. It may not be out of place here to give a brief history of the donor of the prize. His age is now about 51 years. He went to England in 1892 and was member of Guard of Honour to His Majesty King George V on the occasion of His Majesty's marriage. He rendered valuable services during the last Burmese War and was awarded the War

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medal. During 1914, soon after the out-break of the present War he went to France and was in the Front till 21st December 1915, when he was severely wounded in his hip. He was then sent to Brighton Hospital where he remained for 7 months. His Majesty the King Emperor paid him a visit in the hospital and recognised him as having been in His Majesty's company in 1892. He then returned to India and was awarded Order of British India II class.

M. Umapati,
Assistant Editor.

**Key to the Trees, Shrubs and Climbers observed
about the Madras Forest College camp at
Mundanthorai, Tinneveli District.**

The following list is the result of a single short visit to Mundanthorai and though Mr. H. A. Latham, Conservator of Forests, somewhat amplified the writer's notes, it must be held that the list is still very far from being complete.

The visit was paid at the end of January and so the seasonal notes regarding flowers and fruit refer to that time alone i. e., from 20th to 31st January.

The Tamil names were obtained, with a very few exceptions, from the working plans of the locality and have also been examined of Mr. Latham; they are entered in italics.

Unless otherwise stated, the dimensions given are of length.

The figures in square brackets refer back to the serial number of the plant when it occurs more than once in the list. The numbers in curved brackets refer to the serial

number of the converse specification to that against which it appears.

The following abbreviations have been used:

ab.	=above.	mem.	=membranous.
ac.	=acute.	Ner.	=nerve-s-d.
acm.	=acuminate.	num.	=numerous.
alt.	=alternate.	ob.	=obtuse.
Ap.	=apex.	obg.	=oblong.
ba.	=base.	obl.	=oblique.
bel.	=below.	obv.	=obovate.
cart.	=cartilaginous.	opp.	=opposite.
cau.	=caudate.	ov.	=ovate.
cor.	=coriaceous.	pel.	=pellucid.
cord.	=cordate.	Pet.	=petiole-d.
cre.	=crenate.	Petl.	=petiolule-d.
d.	=diameter.	Pin.	=pinna-e.
dis.	=distichous.	pint.	=pinnate.
dist.	=distinct-ly.	pr.	=pair-s.
El.	=elliptic.	prom.	=prominent.
Ent.	=entire.	pub.	=pubescent.
Fl.	=flower-s.	publ.	=puberulous.
fol.	=foliate.	pun.	=punctate.
Fr.	=fruit-s	Rch.	=rhachis.
Gl.	=gland-s	rou.	=round-ed.
gla.	=glabrous.	Sc.	=scale-y.
gld.	=gland-dotted.	sca.	=scabrous.
glr.	=glandular.	ser.	=serrate.
ha.	=hair-s-y.	ses.	=sessile.
L.	=leaf, leaves.	sim.	=simple.
lan.	=lanecolate.	Sp.	=spine-s.
lat.	=lateral.	St.	=stipule-s.
Lo.	=lobe-s-d.	stel.	=stellate.
Lt.	=leaflet-s.	str.	=stipular.
Mar.	=Margin.	Ten.	=tendril.

This completes the series of Keys for the camps of the Madras Forest College.

I would be very much obliged if any one using these keys will inform me of any errors or short comings and any difficulties he has met with in their usage to enable me to improve future ones.

A. Trees (97).

I. L. sim. or 1-fol. (62).

1. L. alt. (50).

(i) Juice milkly (11).

§ Thorny.

1. *Euphorbia antiquorum*, *Linn.* (Euphorbiaceæ)
Thirukalli.

§§ not thorny.

(a) L. sca. or hispid.

(b) L. under 4", 1-Ner at ba.

2. *Streblus asper*, *Lour.* (Urticaceæ).

(bb) L. over 4", 3-5-Ner. at ba.

3. *Ficus hispida*, *Linn. f.* (Urticaceæ).

(aa) L. not sca. or hispid.

(b) L. 3-or more Ner. at ba.

(c) Reticulate Ner. pel.; Ap. of L.
shortly caud.

4. *Ficus Arnottiana*, *Miq.* (Urticaceæ).

(cc) Reticulate Ner. not pel.; Ap. of
L. not caud.

(d) L. pub. or tom. bel.

(e) Tom. fine; aerial roots large, abundant.

5. *Ficus bengalensis*, *Linn.* (Urticaceæ) Fr.

(ee) Tom. dense; aerial roots small, few.

(f) Tom. rusty-grey; Ner. of 4 about 5 pr.

6. *Ficus tomentosa*, *Roxb.* (Urticaceæ).

(ff) Tom. not rusty; Ner. of L. 10-13 pr.

7. *Ficus mysorensis*, *Heyne.* (Urticaceæ).

(dd) L. gla.

(e) L. cor.; Pet under $\frac{1}{4}$ ".

8. *Ficus retusa*, *Linn.* (Urticaceæ) Fr.

(ee) L. mem.; Pet. over 1".

9. *Ficus glomerata*, *Roxb.* (Urticaceæ).

(bb) L. 1-Ner. at ba.

10. *Mimusops hexandra*, *Roxb.* (Sapotaceæ).

(ii) Juice watery (1).

§ Thorny (17).

(a) L. gld.

11. *Atalantia monophylla*, *Corr.* (Rutaceæ).

(aa) L. not gld.

(b) L. white or buff tom-bel.

(c) L. very obl.; Fr. $\frac{3}{4}$ " d., woody.

12. *Zizyphus xylopyra*, *Willd.* (Rhamnaceæ) *Kotta.*

(cc) L. not or slightly obl.; Fr. $\frac{1}{2}$ " d.,
fleshy.

13. *Zizyphus Jujuba*, *Lam.* (Rhamnaceæ) *Elandai.*

(bb) not white or buff tom.

(c) L. 1-Ner. at ba.

(d) Ner. prom., straight.

14. *Bridelia retusa*, *Spreng.* (Euphorbiaceæ).

(dd) Ner. not prom, or conspicuously
straight.

15. *Diospyros montana*, *Roxb.* (Ebenaceæ).

(cc) L. 3-Ner. at ba.

16. *Alangium Lamarckii*, *Thw.* (Cornaceæ).

§§ Not thorny (11).

(a) L. Lo.

- (b) L. 2-Lo.
 (c) L. Lo. $\frac{1}{2}$ way down.
 17. *Bauhinia racemosa*, *Lam.* (Leguminosæ) green Fr.
 (cc) L. Lo. $\frac{1}{4}$ way down.
 18. *Bauhinia malabarica*, *DC.* (Leguminosæ) green Fr.
 (bb) L. 3-or more Lo.
 (c) L. gla. or nearly so.
 19. *Gyrocarpus americanus*, *Jacq.* (Combretaceæ)
 (cc) L. tom. bel.
 (d) L. velvety bel. Lo. cau-acm.
 20. *Sterculia urens*, *Roxb.* (Sterculiaceæ).
 (dd) L. white tom. bel.; Lo. ac.
 21. *Cochlospermum gossypium*, *DC.* (Bixaceæ).
 (aa) L. not Lo.
 (b) L. cre. or ser. (33).
 (c) L. white or grey pub or tom. bel.
 (d) L. sca. with white discs ab.
 22. *Cordia fulvosa* *Wight.* (Boraginaceæ) Fr.
 (dd) L. not sca.
 (e) Ton. stel.
 23. *Givotia rottleriformis*, *Griff.* (Euphorbiaceæ).
 (ee) Tom. not stel.
Zizyphus xylopyra, *Willd.* (12).
 (cc) L. not white or grey bel.
 (d) L. 3-6-Ner. at ba.
 (e) L. 6-Ner. at ba.
 24. *Grewia tiliaefolia*, *Vahl.* (Tiliaceæ) *Unnu.*
 (ee) L. 3-Ner. at ba.
 (f) L. pel.-pun.
 25. *Croton klotzschianus*, *Wight.* (Euphorbiaceæ) Fl.
 and Fr.

- (ff) L. not pel.-pun.
 (g) L. very cor.
 26. *Celtis Wightii*, *Planch.* (Urticaceæ).
 (gg) L. mem.
 27. *Grewia disperma*, *Rottl.* (Tiliaceæ) green Fr.
 (dd) L. 1-Ner. at ba.
 (e) L. obv.; ses. or sub-ses.
 28. *Careya arborea*, *Roxb.* (Myrtaceæ) *Pootatanni-maram.*
 (ee) L. not obv.; Pet. dist.
 (f) Bark very smooth, greenish-white.
 29. *Terminalia Arjuna*, *Bedd.* (Combretaceæ) Fr.
 (ff) Back not conspicuously smooth or white.
 (g) L. pel.-pun.
 30. *Gelonium lanceolatum*, *Willd.* (Euphorbiaceæ). Buds.
 (gg) L. not pel.-pun.
 (h) L. lan., narrow.
 31. *Vaccinium neilgherrensis*, *Wight.* (Vacciniaceæ) Fl.
 (hh) L. El. or ov., not narrow.
 32. *Elædendron glaucum*, *Pers.* (Celastraceæ).
 (bb) L. ent. (22)
 (c) L. sca. with white discs ab.
Cordia fulvosa, *Wight.* (22).
 (cc) L. not sca.
 (d) L. with scarlet Sc. bel.
 33. *Mallotus philippinensis*, *Muell.-Arg.* (Euphorbiaceæ)
 Fl. & Fr. *Kapilapodi.*
 (dd) L. without scarlet Sc.
 (e) L. 3-or more Ner. at ba.
 (f) L. 5-7-Ner. at ba.
 34. *Thespesia populnea*, *Solaud.* (Malvaceæ) Fl. Planted
 as road avenue.

- (ff) L. 3-Ner. at ba.
 (g) L. pel. pun.
Croton klotzschianus, *Wight*. (25).
 (gg) L. not pel.-pun.
 (h) L. very cor.
Celtis Wightii, *Planch.* (26).
 (hh) L. mem.
 (j) L. nearly as broad as long.
Gyrocarpus americanus, *Jacq.* (19).
 (jj) L. 2 or 3 times as long as broad.
Alangium Lamarckii, *Thw.* (16).
 (ee) L. 1-Ner. at ba.
 (f) L. pel.-pun.
 (g) L. with St.; branches with str. lines at nodes.
Gelonium lanceolatum, *Willd.* (30).
 (gg) L. Ex St.; branches without str. lines.
 35. *Polyalthia Korinti*, *B&H.f.* (Anonaceæ) Fr. *Nadunari*.
 (ff) L. not pel.-pun.
 (g) L. ha. or pub. at least bel.
 (h) L. with 1 or 2 Gl. at Ap. of Pet.
 (j) Bark resembling crocodile hide.
 36. *Terminalia tomentosa*, *Bedd.* (Combretaceæ).
 (jj) Bark not resembling crocodile hide.
 37. *Terminalia Chebula*, *Retz.* (Combretaceæ) *Kadukai*.
 (hh) L. without Gl.
 (j) L. thick, cor.
 (k) L. with 6-10 pr. of Ner., ba. ac.
 38. *Diospyros melanoxyton*, *Roxb.* (Ebenaceæ).
 (kk) L. with 10-20 pr. of Ner., ba. rou.
 39. *Buchanania latifolia*, *Roxb.* (Anacardiaceæ).

- (jj) L. thin, mem.
Diospyros montana, *Roxb.* (15).
 (gg) L. gla.
 (h) L. under 1", close set.
 40. *Phyllanthus Emblica*, *Linn.* (Euphorbiaceæ) *Nelli*.
 (hh) L. over 1", not close set.
 (j) L. dis.
 41. *Holoptelia integrifolia*, *Planch.* (Urticaceæ).
 (jj) L. not dis.
 (k) Bark very smooth, light coloured.
 (l) Bark greenish-white; Ner. of L. pel.
Terminalia Arjuna, *Bedd.* (29).
 (ll) Bark white or yellowish; Ner. of L. not pel.
 42. *Anogeissus latifolia*, *Wall.* (Combretaceæ) *Vekkali*.
 (kk) Bark not conspicuously smooth, not light coloured.
 (l) Mar. of L. pel.
 43. *Terminalia belerica*, *Roxb.* (Combretaceæ) *Tanikai*.
 (ll) Mar. of L. not pel.
 (m) Bark resembling crocodile hide.
Terminalia tomentosa, *Bedd.* (36).
 (mm) Bark not resembling crocodile hide.
 (n) L. obv. or cuneate-obv.
 (o) L. under 3".
 44. *Erythroxylon monogynum*, *Roxb.* (Liniaceæ) Fl. & Fr.
 (oo) L. over 3".
 45. *Anacardium occidentale*, *Linn.* (Anacardiaceæ)
 Planted at Papanasam.

- (nn) L. not at all obv.
 (o) Axils of Ner. of L. usually glr.
 (p) L. under 4".
46. *Hopea parviflora*, *Bedd.* (Dipterocarpaceæ) *Vellaiikongu*.
 (pp) L. over 5".
47. *Balanocarpus utilis*, *Bedd.* (Dipterocarpaceæ) Planted at Mundanthorai.
 (oo) Axils of Ner. of L. not glr.
 (p) Ner. of L. prom., straight.
Bridelia retusa, *Spreng.* (14).
 (pp) Ner. of L. not prom., not conspicuously straight.
- (q) L. over 6", smelling of turpentine.
48. *Mangifera indica*, *Linn.* (Anacardiaceæ) Fl.
 (qq) L. under 6", not smelling of turpentine.
 (r) L. subses.
49. *Blachia calycina*, *Benth.* (Euphorbiaceæ) Fl.
 (rr) L. dist. Pet.
Elæadendron glaucum, *Pers.* (32).
2. L. opp. (1).
 (i) St. interpetiolar or connate (56).
 § St. connate.
 (a) Buds resinous; L. ob.
50. *Gardenia latifolia*, *Ait.* (Rubiaceæ).
 (aa) Buds not resinous; L. ac.
51. *Morinda citrifolia*, *Linn.* (Rubiaceæ) *Manjapavattai*.
 §§ St. free.
 (a) Ba. of L. narrowed to Pet.
52. *Hymenodactylon excelsum*, *Wull.* (Rubiaceæ) Fl.

- (aa) Ba. of L. rou. or cord.
 (b) L. abruptly acm.
53. *Adina cordifolia*, *H. f.* (Rubiaceæ) *Manjakadambai*.
 (bb) L. usually ob., not acm.
 (c) Ner. of L. 6-8 pr.
54. *Stephegyne parvifolia* *Korth.* (Rubiaceæ).
 (cc) Ner. of L. 8-10' pr.
55. *Stephegyne tubulosa*, *H. f.* (Rubiaceæ) green Fr.
 (ii) St., if present, not interpetiolar or connate (50).
 § L. ha. or hispid.
56. *Tectona grandis*, *Linn.* (Verbenaceæ) Fl. *Tekku*.
 (a) Juice watery.
Ficus hispida, *Linn. f.* (3).
 (aa) Juice Milky.
 §§ L. gla.
 (a) Juice milky.
57. *Wrightia tinctoria*, *Br.* (Apocynaceæ) green Fr.
 (aa) Juice watery.
 (b) L. gld.
58. *Eugenia Jambolana*, *Linn.* (Myrtaceæ) *Naval*.
 (bb) L. not gld.
 (c) L. 3-Ner. at ba.
59. *Strychnos potatorum*, *Linn. f.* (Loganiaceæ) *Tetankottai*.
 (cc) L. 1-Ner. at ba.
 (d) L. subses.
Blachia calycina, *Benth.* (49).
 (dd) L. dist. Pet.
 (e) Twigs quadrangular.
60. *Pleurostylia Wightii*, *W & A.* (Celastraceæ) Fr.

- (ee) Lt. cuspidate, not shining,
over $4\frac{1}{2}$ ".

Bombax malabaricum, DC. (69).

- (bb) L. not digitate.
(c) L. 1-pint.
(d) L. paripint.
(e) Mar. of Lt. ent.
(f) Lt. 20 or more.
(g) L. gld.
79. *Chloroxylon Swietenia*, DC. (Meliaceæ).
- (gg) Lt. not gld.
80. *Tamarindus indica*, Linn. (Leguminosæ) *Puli*.
(ff) Lt. fewer than 20.
(g) Lt. pub. bel.
81. *Sapindus laurifolius*, Vahl. (Sapindaceæ) Fl.
(gg) Lt. gla.
(h) Lt. 4-8 pr., equal, ac.
82. *Cassia Fistula*, Linn. (Leguminosæ) green Fr. *Konnai*.
(hh) Lt. 3 pr., basal ones smaller, ob.
83. *Schleichera trijuga*, Willd. (Sapindaceæ) *Poovan*.
(ee) Mar. of L. ser.
84. *Azadirachta indica*, A. Juss. (Meliaceæ) *Veppam*.
(dd) L. imparipint.
(e) Main Ner. num., close, prom.
85. *Pterocarpus Marsupium*, Roxb. (Leguminosæ) *Vengai*.
(ee) Main Ner. few, not close or prom.
(f) L. gld.
86. *Clausena indica*, Oliv. (Rutaceæ).
(ff) L. not gld.
(g) Lat. Lt. opp.
(h) Lt. ob.

87. *Aglaia Roxburghiana*, Miq. (Meliaceæ) Fl. Rarely
3-fol.
(hh) Lt. ac.
(j) Lt. 7-11, cau.; Petl. under $\frac{1}{4}$ ".
88. *Odina Wodier*, Roxb. (Anacardiaceæ).
(jj) Lt. 5-9 (usually 5), not cau.; Petl. over $\frac{1}{4}$ ".
89. *Pongamia glabra*, Linn. (Leguminosæ) *Poongamaram*.
(gg) Lat. Lt. alt.
(h) Lt. not more than 1".
90. *Dalbergia paniculata*, Roxb. (Leguminosæ) *Arivagai*.
(hh) Lt. over 1".
91. *Dalbergia latifolia*, Roxb. (Leguminosæ) *Thothakattai*,
(cc) L. 2-or 3-pint.
(d) Rh. & rhachides of L. articulated.
92. *Moringa pterygosperma*, Gærtn. (Moringaceæ) Fl.
Planted at Papanasam.
(dd) Rh. & rhachides of L. not articulated.
- (e) L. without Gl.
93. *Melia dubia*, Cov. (Meliaceæ).
(ee) L. with Gl. on Rh.
(f) Pin. 6 or more pr.
94. *Albizzia amara*, Bow. (Leguminosæ) *Woonga*, Usil.
(ff) Pin. 4. pr. or less.
(g) Lt. 5-9 pr., over 1".
95. *Albizzia Lebbek*, Benth. (Leguminosæ) Fr.; leafless.
Vagai.
(gg) Lt. 10-20 pr., under 1".
96. *Albizzia odoratissima*, Benth. (Leguminosæ) Fr.
Karuvagai.

B. Bamboos (1).

97. *Bambusa arundinacea*, Willd. (Graminaceæ) Introduced.

C. Shurbs & under-shurbs (145).

I. L. sim. (129).

1. L. alt. (115).

(i) Thorny.

§ L. over 3 feet.

98. *Pandanus fascicularis*, Lam. (Pandanaceæ).

§§ L. under 1 foot.

(a) L. over 2', bearing Sp.

99. *Solanum indicum*, Linn. (Solanaceæ) Fl.

(aa) L. under 2", not bearing Sp.

(b) Thorns straight, bearing L.

100. *Flacourtia sepiaria*, Rich. (Bixaceæ) Fr.

(bb) Thorns hooked, not bearing L.

101. *Capparis spinosa*, Linn. (Capparidaceæ).

(ii) Not thorny.

§ L. ent. (109).

(a) L. stel. woolly.

102. *Solanum verbascifolium*, Linn. (Solanaceæ) Fl.

(aa) L. not stel. woolly.

(b) L. sca.

103. *Ehretia buxifolia*, Roxb. (Boraginaceæ).

(bb) L. not sca.

(c) L. with peltate Sc. bel.

104. *Homonoia riparia*, Lour. (Euphorbiaceæ).

(cc) L. without Sc.

(d) L. gla.

(e) L. ac. or apiculate.

105. *Dodonæa viscosa*, Linn. (Sapindaceæ) Fr. *Virali*.

(ee) L. ob.

(f) L. hard & shining.

106. *Maba buxifolia*, Pers. (Ebenaceæ) *Erumbili*.

(ff) L. mem., not shining.

107. *Cadaba indica*, Lam. (Capparidaceæ).

(dd) L. publ. bel.

108. *Actephila excelsa*, Muell.-Arg. (Euphorbiaceæ) Fl. & Fr.

§§ L. not Ent. (102).

(a) L. Lo.

(b) L. 2-Lo.

109. *Bauhinia tomentosa*, Linn. (Leguminosæ) Fr.

(bb) L. more than 2-Lo.

(c) L. under 1½".

Ehretia buxifolia, Roxb. (103).

(cc) L. over 2".

(d) L. gla.

110. *Jatropha Curcas*, Linn. (Euphorbiaceæ).

(dd) L. sca. or pub.

111. *Helicteres Isora*, Linn. (Sterculiaceæ) Fl. *Valamburi*.

(aa) L. not Lo.

(b) L. 3-Ner. at ba.

(c) L. sca.; Fl. white.

112. *Grewia orientalis*, Linn. (Tiliaceæ) Fl.

(cc) L. not sca., Fl. yellow.

113. *Grewia flavescens*, Juss. (Tiliaceæ) Fl.

(bb) L. 14-or 7-Ner at ba.

(c) L. 4-Ner. at ba.; densely villous bel.

114. *Grewia hirsuta*, Vahl. (Tiliaceæ) Fr.

(cc) L. 7-Ner. at ba.; thinly stel.-ha. bel.

Helicteres Isora, Linn. (111).

2. L. opp. (98).
 (i) Thorny (121).
 § Juice milky.
115. *Carissa Carandas*, *Linn.* (Apocynaceæ).
 §§ Juice watery.
 (a) St. interpetiolar or connate.
 (b) L. 1" or less.
116. *Canthium parviflorum*, *Lam.* (Rubiaceæ) Fr.
 (bb) L. over 1".
 (c) L. pub. bel.; Fr. $\frac{3}{4}$ " d. or more.
117. *Randia dumetorum*, *Linn.* (Rubiaceæ) Fr. *Kadukarai*.
 (cc) L. gla.; Fr. under $\frac{1}{2}$ " d.
118. *Randia malabarica*, *Lam.* (Rubiaceæ) Fr.
 (aa) St. neither interpetiolar nor connate.
 (b) L. pub., ser.
119. *Lantana Camara*, *Linn.* (Verbenaceæ) Fl.
 (bb) L. gla., not ser.
120. *Gmelina asiatica*, *Linn.* (Verbenaceæ).
 (ii) Not thorny (115).
 § St. interpetiolar or connate.
 (a) L. shining.
 (b) L. el. or lan., ac. or acm.
121. *Webera carymbosa*, *Willd.* (Rubiaceæ).
 (bb) L. obv., ob.
Randia malabarica, *Lam.* (118).
 (aa) not shining.
122. *Pavetta indica*, *Linn.* (Rubiaceæ) *Pavettai*.
 §§ St. neither interpetiolar nor connate.
 (a) Juice milky.

123. *Holarrhœna antidysenterica*, *Wall.* (Apocynaceæ)
Danthapalai.
 (aa) Juice watery.
 (b) L. gla.
 (c) L. ser.
124. *Fernna procumbens*, *Moon.* (Verbenaceæ) Fr.
 (cc) L. not ser.
 (d) Ap. of L. ac.
125. *Memecylon Edule*, *Roxb.* (Melastomaceæ) Fr.
 (dd) Ap. of L. rou.
Gmelina asiatica, *Linn.* (120).
 (bb) L. ha. or silky, at least bel.
 (c) L. rugose.
126. *Lantana indica*, *Roxb. var. alba.* (Verbenaceæ) Fl.
 (cc) L. not rugose.
 (d) Ba. of L. rou. or cord.
127. *Clerodendron infortunatum*, *Linn.* (Verbenaceæ).
 (dd) Ba. of L. tapering.
128. *Stenosiphonium Russellianum*, *Nees. var. subsericea*
T. And. (Acanthaceæ) Fl. *Uringi*. Often thought
 to be a species of *Strobilanthes*.
- II. L. Com. (98).
 1. L. 3-5-fol.
 (i) L. white-tom. bel.
129. *Vitex Negundo*, *Linn.* (Verbenaceæ).
 (ii) L. not white-tom.
 § L. ha.
130. *Allophilus Cobbe*, *Bl.* (Sapindaceæ).
 §§ L. gla.
 (a) Thorny.
131. *Balsamodendron Berryi*, *Arn.* (Burseraceæ).

- (aa) Not thorny.
 (b) Secondary Ner. dist.
132. *Cadaba trifoliata*, *W & A.* (Capparidaceæ) Fl.
- (bb) Secondary Ner. very indist.
133. *Nieburhia linearis*, *DC.* (Capparidaceæ).
2. L. pint.
 (i) L. 1-pint. (143).
 § Lt. gld.
 (a) Lt. 3-7 (rarely 1 or 2).
134. *Glycosmis pentaphylla*, *Corr.* (Rutaceæ).
- (aa) Lt. 10-20.
135. *Murraya Koenigii*, *Spreng.* (Rutaceæ) Fr. *Kariveppam*,
The curry-leaf plant.
- §§ L. not gld.
 (a) Thorny.
 (b) L. under 6".
136. *Dalbergia mimosoides*, *Franchet.* (Leguminaceæ) Fr.
- (bb) L. over 3 feet.
 (c) Lt. plicate, Sp.-tipped.
137. *Phoenix humilis*, *Royle.* (Palmaceæ) *Ichampannai.*
- (cc) Lt. flat, not Sp.-tipped.
Cycas circinalis, *Linn.* (66).
- (aa) Not thorny.
 (b) St. large, ear-shaped.
138. *Cassia auriculata*, *Linn.* (Leguminosæ) Fl. *Avaram.*
- (bb) St. small, not ear shaped.
 (c) Large shrubs.
 (d) Lt. 17-23, bark corky.
139. *Mundulea suberosa*, *Benth.* (Leguminosæ) Fr.
- (dd) Lt. 7-12, bark not corky.
140. *Cipadessa fruticosa*, *Bl.* (Meliaceæ).

- (cc) Undershrubs.
 (d) Lt. 9-13, obv.-obg., nearly gla.
141. *Indigofera tinctoria*, *Linn.* (Leguminosæ) Fr. Run
 wild from cultivation.
- (dd) Lt. 13-19, narrow obg., silky bel.
142. *Tephrosia villosa*, *Pers.* (Leguminosæ) Fl.
- (ii) L. 2-pint. (134).
 § Large shrub, Thorns large,
 L. not sensitive.
143. *Dichrostachys cinerea*, *W & A.* (Leguminosæ) Fl.
Vadatarai
- §§ Small plant, prickly L. very
 sensitive.
144. *Mimosa pudica*, *Linn.* (Leguminosæ) Fl.
The sensitive plant.
- D. **Climbers** (98)
 or straggling shrubs.
- I. L. sim. (78).
 1. Ap. of L. ending in a
 Ten.
145. *Gloriosa superba*, *Linn.* (Liliaceæ) Fl.
2. Ap. of L. not ending
 in a Ten.
- (i) L. alt. (60).
 § Ten. present.
 (a) Stems acutely 4-angled.
146. *Vitis quadrangularis*, *Wall.* (Vitaceæ) Fl.
- (aa) Stems rou.
 (b) L. without Gl.
147. *Momordica dioica*, *Roxb.* (Cucurbitaceæ) Fl.
- (bb) L. with 1 or more Gl. bel.
 (c) Plant with viscid ha.
148. *Passiflora foetida*, *Linn.* (Passifloraceæ).

- (cc) Plant gla.
149. *Modeca palmata*, *Lam.* (Passifloraceæ).
 §§ Ten. absent.
 (a) Thorny.
 (b) L. minute with axillary cladodes.
150. *Asparagus racemosus*, *Willd.* (Liliaceæ).
 (bb) L. patent.
 (c) L. silky bel., ba. obl.
151. *Zizyphus ænopia*, *Thuill.* (Rhamnaceæ) Fr.
 (cc) L. gla., ba. not obl.
152. *Pisonia aculeata*, *Linn.* (Nyctaginaceæ) Fl. *Mosannai*.
 (aa) Not thorny.
 (b) Ba. of L. 3-5-Ner.
 (c) Mar. of L. cart.
153. *Dioscorea oppositifolia*, *Linn.* (Dioscoriaceæ) Buds.
 (cc) Mar. of L. not cart.
 (d) L. cor., stem smooth.
154. *Pachygone ovata*, *Miers.* (Menispermaceæ) Fl.
 (dd) L. mem., stem grooved.
155. *Aristolochia indica*, *Linn.* (Aristolochiaceæ) Fl.
 (bb) Ba. of L. 1-Ner.
 (c) L. fleshy.
156. *Basella rubra*, *Linn.* (Chenopodiaceæ) Fl.
 (cc) L. not fleshy.
 (d) Many opp. spirally hooked branchlets.
157. *Hugonia Mystax*, *Linn.* (Linaceæ) Fr.
 (dd) No spirally hooked branchlets.
 (e) L. light green, not shining.
158. *Blepharispermum petiolare*, *DC.* (Compositæ) Fl. & Fr.

- (ce) L. dark green, shining ab.
159. *Ventilago madraspatana*, *Grah.* (Rhamnaceæ) Fl.
 (ii) L. opp. (146).
 § Juice watery (164).
 (a) L. gla.
 (b) Mar. of L. cart.
Dioscorea oppositifolia, *Linn.* (153).
 (bb) Mar. of L. not cart.
 (c) Ten. present.
160. *Strychnos colubrina*, *Linn.* *Var:* *Zeylanica.* (Loganiaceæ) Buds.
 (cc) Ten. absent.
 (d) Young shoots jointed & swollen at nodes.
161. *Gnetum scandens*, *Roxb.* (Gnetaceæ).
 (dd) Shoots neither jointed nor swollen at nodes.
 (e) L. 4-7", Ner. prom. bel.
162. *Hiptage Madablota*, *Gartn.* (Malpighiaceæ).
 (ee) L. 2-4", Ner. not prom. bel.
163. *Combretum ovalifolium*, *Roxb.* (Combretaceæ).
 §§ Juice milky (160).
 (a) Young parts fulvous tom.
164. *Ichnocarpus furtescens*, *Ait.* (Apocynaceæ) Fl.
 (aa) Young parts not fulvous tom.
 (b) Small Gl. just ab. Pet.
165. *Marsdenia volubilis*, *T. Cooke.* (Asclepaidaceæ).
 (bb) No Gl. or L.
 (c) L. gla. bel.
 (d) L. 1" or more, broad.
166. *Cryptolepis grandiflora*, *Wight.* (Asclepaidaceæ) Fl.

- (dd) L. $\frac{1}{2}$ " or less broad.
167. *Secamone Emetica*, *R. Br.* (Asclepaidaceæ).
- (cc) L. pub. or hoary bel.
- (d) L. deeply cord.
168. *Dæmia extensa*, *Br.* (Asclepaidaceæ). Fl.
- (dd) L. not cord.
169. *Hemidesmus indica*, *R. Br.* (Asclepaidaceæ).
- II. L. Com. (145).
1. Ten. present.
- (i) L. 3-fol.
170. *Vitis carnosæ*, *Wall.* (Vitaceæ) Fl. & Fr.
- (ii) L. pedate.
- § Plant pub.
171. *Vitis pedata*, *Vahl.* (Vitaceæ).
- §§ Plant gla.
172. *Vitis lanceolaria*, *Roxb.* (Vitaceæ).
2. Ten. absent.
- (i) Thorny.
173. *Toddalea aculeata*, *Pers.* (Rutaceæ) Fr.
- (ii) Not thorny.
- § L. 3-fol.
- (a) Lt. shining, 2" or less.
174. *Jasminum calophyllum*, *Wall.* (Oleaceæ) Fl.
- (aa) Lt. not shining, over 3".
175. *Canavalia ensiformis*, *DC.* (Leguminosæ) Fl.
- §§ L. more than 3-fol.
- (a) L. 5-7-fol.
176. *Clitoria ternatea*, *Linn.* (Leguminosæ) Fl.
- (aa) L. pint.
- (b) L. paripint.; Lt. 20-40.
177. *Abrus precatorius*, *Linn.* (Leguminosæ) Fl. & Fr.

- (bb) L. imparipint.; Lt. 9-19.
178. *Derris scandens*, *Benth.* (Leguminosæ).

C. Fischer.

Occasional Notes.

Thi premes umbonem: coetera nos facimus.

We should like it to be generally understood that the Magazine is produced primarily by the Ranger class and for the Ranger class (inclusive of Deputy Rangers). We therefore particularly welcome contributions from that class. No one need hold back on the plea of unfamiliarity with idiomatic journalese.

We will do our best to remedy any defects of composition: but we want *you* to supply the copy—lots of it and often *ut veniant omnes*.

The Students and Staff are now supplied twice a day, with milk and dairy produce from the Agricultural College and are no longer dependent on the interested efforts of outsiders and servants whose aim was to make as large a profit as possible at the expense of the health of those condemned to take the adulterated mixture that the vendors were pleased to term 'milk.'

The following roads and paths are now under construction.

Road round the Athletic Ground.

Path from the College to the carpenter's shop.

Path from the College to the Athletic Ground.

" " " the Gymnasium to No. I Hostel.

" " " each Hostel to the Hostel Road.

The East end of the Lodge road is being straightened.

The Athletic ground has been practically completed. The first foot-ball match was played on it against the Agricultural College on 12-3-1918.

Two Badminton courts are being formed between the Hostels.

The College Challenge Cups will in future, on Prize Day, be placed on brackets in "Gamble."

The Tablets commemorating captains of games, winners of the Pentland Shield, winners of Marathon &c., are being put up in the rear Entrance Hall.

An Engineering Park has been formed opposite the Arboretum.

Arrangements are being made to form Students Gardens near the Hostels.

Mr. C. E. C. Fischer, late Principal, the Madras Forest College, read a paper at the Science Congress lately held at Lahore.

The appointment of Mr. T. R. D. Bell, as Chief Conservator, Bombay Presidency, has now been gazetted.

Mr. Hanumantha Rao has been appointed Estate and Sanitary Overseer of the College.

Miscellanea.

Derivation of Forest: Latin *Foresta-ubi-fera-stat* (where the wild beast stands), or *Ferrarum statio* (The standing place of wild beast).

Sind is said to possess only some 10 species of trees.

Rainfall over the whole of India averages 42".

6% is utilised in irrigation, 35% runs to waste into the sea, 59% is absorbed by the soil or lost by evaporation.

Sandal: 10 tons of wood fuel or 4 tons coal required to distil 1 lb sandal oil (value Rs. 37—8—0).

Madras Forest College is 1405' above M. S. L.

A hundred years ago the *Landes* country in the South-West of France consisted of morasses and swamps on which the sand from the sea was rapidly encroaching. The tract was infested by a deadly fever, that left the sparse inhabitants anaemic and emaciated. The country could only be traversed on long stilts and was over-run by wolves and wild horses. To purchase land, a man stood on a hillock and called as far as his voice would carry in every direction was his for Rs. 15. Owing to the work of the Forest Department that land now brings in a net return of Rs. 7—8—0 per acre per annum. The Forest Department has restored a lost Province to France.

The highest class of sandal is now worth about Re. 1 per lb. or Rs. 50 per cubic foot.

In 1914, the value of matches imported into India amounted to about lakhs 74; the whole of this quantity could be manufactured in India.

The import of non-safety matches into Burma is prohibited.

Borassus flabelliformis—about 15 leaves are produced every year.

In France about Rs. 20,25,600 are annually spent on the restoration of denuded slopes. No financial return is expected from this expenditure.

For every 100 tons of coal raised, 1 ton of timber is required.

A first class battleship requires 1000 tons teak for its construction.

Pinus palustris—Pitch pine from Florida—is said to be superior to a girder of wrought iron of its own weight; if employed as a beam it will bear, without bending, 7 times the load of an iron bar of the same length and weight. It has the same carbonisation or melting point as steel: i. e., if used in building the same insurance rates only are demanded.

Bombax malabaricum is a reserved tree in Travancore.

In 1871, John Scott established the fact that sandal is a parasite on various species.

The ultra violet rays causes heat and light strokes—also sunburn. They are beyond the V and X rays in the spectrum.

Glass is impermeable to them, but the camera plate is sensitive to them.

They induce Parthenogenesis: e. g., they cause the eggs of sea urchins to divide. True ants (Hymenoptera not Termites) detest ultra violet rays. A colourless solution of quinine sulphate or of certain other compounds is impermeable to these rays. If placed over violet, and hence ultra-violet rays, the ants are content. White light therefore must present to the ants a very different appearance to our view of it: hence a difference in the out-look of life.

In 1876—77 the net Forest Revenue of the Madras Presidency was Rs. 1342: in 1916—17 Rs. 19.95 lakhs.

Capital at $3\frac{1}{2}\%$ compound interest doubles itself in 20 years.

Capital at 4% in just over 17 years.

„ 5% in just over 15 years.

At the explosion of the mine at Messines in Flanders last June, 50,000 lbs. of blasting substance were used and Rs. 1,200,000 worth of timber (in the form of props, planking &c.) was destroyed.

“In its forests lies the heart of a nation, and a people without forests is very close to extinction.”

A. Theuriet.

Correct method of flying the Union Jack.

“If you look carefully at the flag you will see that the diagonal red cross has thick strips of white on one side of each arm and a thin border on the other, but they are arranged alternately. You must first decide which end of the flag is to be attached to the line or pole, and then place the flag so that the thick white strip is above (and the thin white strip is below) the two red diagonal strips that run from the centre of the flag to the points of attachment to the pole.”

Quinine is said to be an excellent remedy for either wasps or scorpion stings. The part affected should be incised with a sterilised razor and powdered quinine should be rubbed gently into the wound. The application of a ligature is advisable.

Quinine may at the same time be taken internally to ward off the cold in the head and the choking sensation in the throat.

**List of contributions to the Gass Forest
Museum, since October 1917.**

No.	Contribution.	Contributor.
1.	One egg laid by a full sized hen on the Forest College estate.	W. C. Hart, Esq.
2.	Three samples of Indian paper. (1) Bambusa polymorpha, laid. (2) Saccharum spontaneum, laid. (3) Do. sample (2) woven.	F. L. C. Cowley-Brown, Esq., I. F. S.
3.	Botanical specimens, of spiked sandal.	Muhamud Abdul Karim Sahib Bahadur, Esq. E. A. C., Talamalai.
4.	A piece of sandal showing a ring of heartwood, inside which, there is a layer of sapwood.	Do.
5.	Bark of Lagerstrœmia parviflora with a climber seeming to pierce it and emerge outside, as a result of occlusion.	Mr. Swami Kutty, M.R. H., Forest Ranger.
6.	A piece of Red sanders, sound to all appearance, but revealing a healed wound inside, when sawn.	M. R. Ry., S. Chinnadorai Pillai, B. A., M. R. Hon, R. O. Balapalli Range.
7.	Ants' nest ...	Students, Narasinga Rao and Abdul Gaffur of the Forest College.
8.	A tree frog ...	Student J. A. Stephen, M. F. C.
9.	Timber specimens Long panels 50 Short " 67 Blocks 92	A. W. Lushington Esq., C. I. E., (Returned after the Madars Exhibition).
10.	Six charcoal briquettes.	The Forest Economist.
11.	4 wooden cow-bells	M. R. Ry., P. Venkatara- manan, Avl., B. A., E. A. C., Upper Godavari.
12.	A piece of the climber-Gnetum scandens.	A. W. Lushington Esq., I. F. S.
13.	Crocodile skin ...	C. E. C. Fischer, Esq., I. F. S.
14.	147 Mounted botanical specimens ...	Do.
15.	Sample of good charcoal	H. C. Bennett Esq., I. F. S.
16.	One bison head	A. M. C. Littlewood Esq.,

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

Ourselves.

The Madras Forest College started on the Hill Tour on the 15th April and returned to head quarters on the 16th of May. The Junior Division spent the month at Ootacamund and the Senior Division at Bandy Shola, Coonoor.

The Juniors studied the exotics on the Nilgiris—the different Eucalypti, Pines, Cupressus and other gymnosperms. One compartment of blue gum was marked for thinning in Muthinad to extract wood for the manufacture of charcoal. A sample-plot was opened in Aramby to see the effect of selection coppice in blue gum. The Eucalyptus punctata on the Aramby plantation was thinned by taking out 25% of the trees. A sample-plot was opened on the area, wherein, 50% of the growing stock was removed.

A road was aligned in the Muddanah blue gum plantation, for the construction of which, an estimate will be furnished to the District Forest Officer.

The Senior Division had its Final Survey Practical Examination. The students prepared the plates and submitted them in camp. The number of days for the examination was reduced this year, to give more scope for practical work in Sylviculture and Engineering.

Mr. Richmond, the District Forest Officer of the Nilgiris, was kind enough to take the students to inspect a road under construction on the Coonoor Peak. This afforded an opportunity for learning what theory could not very well teach. Mr. Richmond impressed on the students the various details which they should pay attention to as Rangers while carrying out such works.

The road was aligned by the students of the Madras Forest College in 1915. The records and estimates for about Rs. 10,000 were furnished for the execution of the work. The work was taken on hand about the beginning of the current year.

Certain deficiencies in execution gave scope for learning how not to do things. Though mistakes are possible in the first instance, an opportunity like the present, gave occasion to students to realise the possible mistakes that could be committed, and to understand how they could be avoided. Theory combined with practice during the college course is not the be all and end all of a Ranger's course. His post graduate course begins when he leaves the college. He must be observant and attentive to all details till he gains experience and gains confidence that he is able to carry out works entrusted to him.

Without meaning any offence to the officer directly in charge of the work, a few points are mentioned for the benefit of the readers.

Before starting the work or entrusting the work to a contractor, it is important to check the alignment, however recently it may have been done, as there is always the risk of the pegs being removed or displaced. The width for cuttings and the depth should be indicated by pegs on the ground. In the case of depth of cuttings, holes should be dug and pegs should be driven in the holes, so that the top of the peg is in level with the formation surface. In the case of embankments, pegs should be put in, up to the top of which the original surface has to be raised.

The Range Officer being primarily responsible for the proper execution of the work, he should never allow the contractor to have his own way. He should check the pegs frequently, as otherwise the contractor will move the pegs to the embanked portion and show the embankment as a part of the cutting. It will be difficult to find this out, unless closely supervised, and impossible to detect, after a shower of rain. The Range Officer should fix check pegs and should make his notes on each inspection.

The contractor must be made to complete each item of work, earth work for instance, over the whole length of road beginning from one end and proceeding systematically. Left to himself he will do work in patches, leaving difficult portions untouched and will make out that he has completed certain portion of the road and ask for payment. Lending oneself to the contractor's ways will lead to trouble in all directions—difficulty in checking, in following the estimate, in making payments, in maintaining correct accounts and above all in getting the work done in a satisfactory manner—. The contractor must not be allowed to start a new item of work unless he gets orders and unless provided for in the estimate.

In the present case, the contractor had put up culverts—several of them kutcha—on his own initiative, when they have not been provided for in the estimate and where there are not required. The consequence is that he would not get paid for them. Further the contractor either by removing the pegs or for some reason had cut deeper than is necessary. As a result the gradients were not as were proposed they should be. In consequence, the ground had to be raised by putting loose earth to raise the road surface. This has the disadvantage of losing a hard formation level. In other places he has to cut three feet further down. With closer supervision much of this could be obviated.

Some of the several points that would suggest themselves in the execution of the work are (1) Blasting. It may not be possible to actually determine, while estimating, the volume of rock to be blasted. After the earth work is completed, volume of all hard rock for blasting should be calculated. If this is not done, the volume of the blasted material should be subsequently measured, taking care to see that extraneous material has not been stacked with the blasted rocks. (2) Diverting natural drainage at suitable places. (3) Depth for digging foundations for retaining walls. (4) Collection of sufficient quantity of metal. Quantity of metal required to spread over definite areas of road surface should be calculated, definite places where they are to be stacked should be pegged on the road itself and the contractor made to stack just so much material at each place as would be required to spread over a definite area. (5) The width of the road and the gradient to be allowed at hair-pin curves.

It should be the object of the Range Officer not to stop any conveniences which the people close by have been enjoying such as water supply.

It should be the chief aim of the Range Officer to get work done through contractors without making advances. By making advances, one will feel tempted to accept bad work to adjust the advance, and thus become answerable for bad execution. It is possible to get work done without making advances and the custom, where it exists, should be gradually stopped.

The construction of the particular road has to be done very carefully, closely following the original alignment, as it is being constructed on a narrow strip of acquired land.

Close supervision with considerable apprehensions as to the contractor's aspirations is of primary importance.

* * * *

Owing to want of profitable means of extraction of Eucalyptus globulus from distant reserves, the areas have been allowed to grow into high forest. By removing a definite volume of wood, by thinning, from each compartment, charcoal is manufactured in the reserve and taken for sale. This is more profitable than extracting fuel. The Senior Division marked trees to be felled in compartment II of the Newman Reserve. This removal frees trees of the future.

* * * *

To obtain data for the rate of growth of Eucalyptus trees, certain trees (40 in number), marked in the Coonoor Peak Reserve for periodical measurements, have been measured and their heights and girths recorded.

* * * *

Badminton was played in camps and foot-ball at head quarters. There were no matches played during the quarter.

* * * *

Gymnastics is being practised by the Senior Division Students in which they will have an examination. Mr. C. E. C. Fischer has very kindly presented a Challenge

Cup for gymnastics to be held by the champion in the Senior Division.

* * * *

The Final Examination of the Senior Division and the second periodical examination for the Junior Division commence on the 12th June. This is a period of hard preparation.

* * * *

We acknowledge with thanks receipt of the Quarterly Journal of the Mysore Forest Association. We wish all success to the Journal.

An American Appreciation of the French Forest Service.

(Translated from the *Revue des Eaux et Forêts*).

The fixation of the Dunes in the Landes and in Gironde by seedlings of *Pinus maritima*, the different methods of harvesting resin, the correction of torrents and reafforestation in the Alps and the Pyrannees, the Exploitation of Cork Oak, and the organisation of Fire Protection in Algeria, are problems that have been solved by French Foresters in a manner that merits our admiration.

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Speaking generally, French Methods of Forestry appear to the observer to be superior to those adopted in German practice.

The reason why American Foresters will find in France rather than in Germany the more profitable instruction and the more useful demonstrations is that French methods are less rigid, more supple, and less immutably fixed by cast-iron rules. French Forestry is the expression of the vivid and practical intelligence of the French Nation, and this is

specially true with reference to its application in the French Colonies where are largely to be found conditions similar to those that the Americans have to deal with.

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In Algeria the simplicity, economy, and efficiency of the Forest Administration has a special interest for us (Americans). Similarly the report of the Commission of Forest Researches, which recognises the maintenance of cover as of vital importance, merely echoes the view of every American Forester towards his National Forests, blessed as they are with that undergrowth so beneficial for preserving the water supply in California.

It is particularly in countries where Forestry is not intensively organised that Foresters will find matters of special application to America. A Forest Administrator will find more of direct interest in the North of Africa and in Corsica than in France and more in France than in Germany. The reason is that methods of intensive silviculture have been systematically regulated in France for more than a century and important changes are now seldom necessary. In the North of Africa, on the other hand, local conditions, transport difficulties, and the low price of produce compel the abandonment of many of the silvicultural principles accepted in France; and the modifications involved are of special interest.

Tunis.

There is much to learn in Tunis with reference to the administrative principles of Decentralised Organisation, Improvement Operations, Reafforestation, Protection against sand, wind, and climate, Fire-Protection [and particularly Fire-Lines], and Modifications in prescribed fellings necessitated by lack of Transport.

In Tunis two types of Management prevail, the one intensive for Cork Oak Forests capable of yielding a high return, the other more economical for Forests of Aleppo Pine which are only of value as a protection against erosion and dunes, or as a means of increasing the supply of fire-wood to the local population.

The system of management is not over-burdened with detail. On the contrary it is characterised by simplicity and is concerned rather with the fundamental principles than with the minutiae of Forestry. As a consequence, the expenditure on Fire Protection is much higher in the Cork Oak Forests than in those of less value.

The protection of the Oases of Djerid has a particular interest for Americans, for the theory and practice of these operations are of direct application to the United States. These Oases form irrigated Private Lands, of great value, and have to be protected against moving sands, erosion, and excessive grazing.

By reason of the habits of the indigenous population the rules regulating the use of fire in or near the Forests are very strict, but it is admitted by the Administration that the settlements in the interior of the Forests are of special value as a protection against fire, for these cultivated lands form admirable fire lines. Further the settlers inside the Forests can be drawn on when it comes to fighting a fire. Grazing is forbidden on burnt areas for six years after the fire.

Each side of a Railway must be grubbed up and cleared of all inflammable material, and if necessary fire lines parallel to the line must be cut. In certain forests, which are reserved, no exploitation may be undertaken, with the exception of wood necessary for works against erosion or for the fixing of moving sands.

The regulation of pasturage, although of great interest, is much less developed than in the United States.

Simplicity is the chief characteristic of exploitation of the Cork Oak Forests. The Forester might almost be cultivating the valuable crops of fruit trees yielding periodically. The annual fellings are fairly equal in extent and cover each year the same area, but a forest is stripped only once every three years.

The most important lesson furnished by the study of Forestry in an arid and dry region is the difficulty of re-afforestation after the original forest has been destroyed, and this principle is applicable with equal force to the South West portions of the United States.

The trouble is enhanced when the dry period lasts through the summer months, as it is at that season that vegetation is less capable of resisting a deficiency in humidity than in the cold weather.

The methods of reafforestation employed are of direct application to the South of California, where the periodicity of winter rain corresponds exactly to that of Tunis.

In the more suitable spots the method of direct sowing in holes is adopted. In less favoured situations recourse is had to plantations in spite of the greater expense. To reduce the latter it is officially prescribed that the spacing should be from 6 to 8 feet, but in practice there are rarely more than 250 plants per acre.

The invariable rule is to sow or plant at the beginning of, and during, the winter rains. Up to the present reafforestation in Tunis has come on so little that it can only be regarded as an experiment, although what has been actually accomplished since 1885 is considerable in view of the small allotment made. The administration is essentially simple,

economical, and practical. Expenditure is dependent on the revenue rather than on the requirements of the situation.

Algeria.

The essential features of Forest Administration in Algeria are:—the unfortunate sale of State Forests of Cork Oak by Napoleon: the difficulty of preventing offences and theft: fire-protection (not of equal success everywhere): reafforestation: the Algerian Forest Act.

The progress accomplished by Algerian Forestry since 1900 is mainly due to the Forest Commission. The latter made a thorough study of the question, and suggested radical improvements in the methods of the Administration and in the Laws.

It is very significant that this Commission has recognised the importance of the Conservation of the existing Forests for the health, prosperity, and the amenities of Algeria. The difficulties met within the beginning are only characteristic of every commencement of Forest Administration the presence in the interior of the forests of useless and harmful cultivated lands: lack of comprehension in the forest questions: defects of local education as regards the benefits of forest conservation: the rigour of the original Forest Law which could not be put into practice and which in many cases was ill-adapted to a really effective administration. An Administrative Organisation ought to be practical rather than theoretical. This is clearly shown by the abandonment in Algiers of the classical organisation in force in France. This organisation has been found too onerous, and at the same time incapable of providing posts suitable for officers not of high rank but too senior however to be employed solely on such simple work as is involved in the extensive exploitation of the forest. Consequently the Conservator had to undertake the actual direction of

Rangers or little sub-divisions which correspond exactly to the units worked in the United States by a Forest Supervisor.

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It is interesting to note that by way of compensation for the trying life the Algerian Forest Service, Gazetted and Nongazetted Officers, receive extra pay, free travelling passes and grants for the education of children. An Officer has the right to 30 days leave per year which can be accumulated to two months every two years. He also has the right to a free passage for himself and his family between Algeria and France. The subordinates are frequently stationed far from towns and must place their children where schooling is available, but the Forest Department defrays these additional expenses of education.

The Administration is undoubtedly progressive. The development of a new industry such as the resin tapping of the Aleppo Pine in the forest of the Province of Oran is worthy of the American spirit of progress. The treatment applied to these forests seem to be practical and at the same time sufficiently conservative to ensure regeneration.

Another difference between the methods in France and those in Algeria concerns the sale of the Cork. In the French practice the Cork is sold "standing" after survey and hammer marking. The exploitation is entirely at the expense and risk of the purchaser who is subject also to the prescriptions of the Working Plans. In the Cork Forests of Algeria the Exploitation of the Cork is undertaken by the State and the Cork is only put on the market after it has been transported to the depots.

The Forest problems are similar to those that present themselves in Tunis. It is considered more advantageous to preserve the Forest from destruction rather than to have recourse to reafforestation.

Winter sowings or plantings from a commencement of the rains are the general rule.

Sowing generally made in holes carefully prepared are preferred to planting, but the conditions are so unfavourable that success is always uncertain. Local nurseries are employed in preference to central nurseries, as the latter involve troublesome and dangerous transportation of the plants. When reafforestation under difficult conditions has to be undertaken planting with balls of earth is frequently employed in spite of the increased expense.

Contrary to expectations planting on land covered with undergrowth succeeds less well if a portion of the undergrowth is preserved for protection against the sun and wind. Success will only be assured with complete uprooting of the surface to be planted; otherwise the intense radiation, extreme heat, lack of circulation of the air, very serious damage by rodents, prevent the greater part of plants from striking root.

The only expedient for lessening the damage by rodents is to entirely clear and clean up the whole area to be planted instead of being contented with uprooting merely planting holes or strips. With a complete clearing the rodents have nowhere to hide, consequently they nearly all quit the vicinity and the damage is reduced. Moreover I have myself remarked that the young Cork-Oak plants which are very delicate in their youth, particularly at the end of the summer, resist the heat better if they are uncovered than if they have to push themselves up from the midst of the thicket. I think that this phenomenon is due to the coolness caused by the aeration. The air circulates better and the plants are thus able to persist, where otherwise they would perish from the heat.

These methods of reafforestation should be studied by all foresters who have to work in arid or difficult situations. Important plantations have been made at Constantine, Algiers, Orleansville, and Oran. The local species give the best results whether by direct sowings in holes or in local nurseries. Success has been obtained only after repetition often repeated in the portions where there were originally failures.

As regards the efficacy of fire lines, the recruitment of patrols, the obligatory co-operation of local authorities, the enforcing of precautionary measures during the most dangerous season, these measures of protection have not had the same success everywhere. A network of Fire lines, principal and secondary, has been recently put down at considerable expense; but in spite of clearing these fire lines every three years fire crosses them. It seems that instead of clearing these fire lines every three years it would be preferable to clean every year one third of the width of all the lines (excepting those which are less than 45 feet wide which should be cleaned every three years) so that a part of the fire line is always free from grass and debris. For permanent lines it is recognised that, as a financial undertaking, it is more economical to uproot the undergrowth and the trees and to extract the roots instead of having each year the additional expense of cutting the shoots and the young growth. In conclusion fire lines of suitable width established on the crest or along the dry water courses are of undoubted value, both as a means of communication and as an advantageous position to arrest and fight the fire, in spite of the disastrous effects of any fire coming up from behind.

As in Tunis the administration is simple, economical, and productive of much good, and does honour to France.

Corsica.

Forest Administration in Corsica is hampered by a troublesome population, by excessive grazing, by fires, and until lately by the lack of means of communication.

If it were not for the difficulty of getting at the Corsican Pine which grows at an elevation superior to that of Maritime Pine but inferior to that of the Beech and the Silver Fir, there would be little forest wealth on the island. The principal lesson to be drawn from a forest tour in Corsica is the method of exploitation of the Pines. Originally the method of regeneration under shelterwood has resulted in young stocking of resinous trees of the same age over considerable areas. Certainly in theory such a practice is harmful in a region where fires are frequent, but theory is here subordinated to the practical necessity of large sales. Sales of great value for a long period ahead are necessary to attract purchasers able to undertake the expense of road construction. Considering the conditions necessary for the sales and also the danger of fire the Selection method by holes suitably enlarged appears to be an admirable solution of the problem of regeneration. There is much ingenuity in the application of this Selection method. There are seedlings, secondary and final fellings cleanings and thinnings as in the Uniform Method, but each operation occupies only an acre or two and the result is a forest of even-aged groups.

The danger of excessive exploitation combined with an insufficient suppression during the years clearly appears in many of the Corsican Forests where rigid and unhealthy young growth appears. In many of the contracts the conditions are similar to those prescribed by the United States Forest Service. There is however one capital difference. In Corsica the sale of coupes of great value to be realised for several years ahead is justified by the

resulting improvements in the means of communication. The sale of such coupes is regarded as an undoubted disability but necessary so that the transport of the produce of the small coupes may be rendered possible by the construction of forest roads. In the United States the development of steam transport is often harmful to the construction of a main line by the Concessionnaires. But an effort is now being made to use the running sales to contribute to the construction of a permanent Railway system. In Corsica the administration appears to have failed in the education of the indigenous population as regards the importance of the Forest Conservation. It seems incredible that of more than 600 offences charged in 1911, over half were acquitted. It is solely to the insufficiency of punishment that the retrogression of Corsican Forest must be attributed. The Magistracy has an inconceivable weakness for the shepherd, the true master of the Island, and the fines are not often recovered. Whence follow impunity and the aggravation of the evil. The rapid retrogression of the forest takes place for similar reasons in Algeria. This failure of supervision in the control and suppression of offences in Corsica makes a striking contrast with the results obtained by the Forest Department in the west of the United States where now happily offences are merely a remembrance of the past.

The people must be educated and convinced of the utility of Forest Laws if such a situation is to be improved. But no education can be made without some effort at restraint and feebleness in suppression but contributes to the maintenance of such a deplorable state of affairs.

The Uniform Method in India.

Having vivid recollections of the difficulties experienced whilst an Instructor at Coimbatore, in explaining

the above method to students, without any opportunity of showing them its practical working, the writer thinks that a few notes on the method as seen during a tour in the Kulu division of the Panjab may be of interest both to past and present students.

The species to which the following remarks refer are Deodar, Blue pine (*Pinus excelsa*) and Spruce fir, all of them Himalayan confers.

The forests are situated on slopes not dissimilar to—those to be seen from the Nilgiri railway below Coonoor at an altitude of about 6000 to 8000 feet above the sea.

The areas treated under the Uniform method are by no means in a compact block, but are scattered over various forests, most of which are "Protected" and not "Reserved." The forests are burdened with numerous rights and are subject to heavy grazing, notably by sheep and goats, but providentially, under the settlement rules, approximately $\frac{1}{4}$ of the area may be completely closed, provided that $\frac{3}{4}$ of the area is left open to right holders.

For purposes of working, the area has been divided in to 4 Periodic Blocks, the length of a regeneration period has been fixed at 30 years and the rotation is 120 years. Should experience show that 25 years are sufficient for the regeneration of a periodic block and should it be found that the financial rotation is somewhat less than 120 years, it will always be possible, at a subsequent revision of the working plan, to reduce the length of a period to, say 25 years and the rotation to 100 years.

The whole area has further been divided into compartments. Wherever possible from the nature of the growth, the size of the forest and the position of villages, the individual forests have been divided into 4 compartments

with natural boundaries, one compartment being allotted to each periodic block. Naturally this has not been possible in every forest, but being simple to understand, it is taken as a typical case.

Those compartments which contain growth, that is, for the most part mature, have been allotted to periodic block I, and they form, of course, approximately $\frac{1}{4}$ of the whole area.

The yield is regulated entirely by volume. Yield tables, showing the volume of trees of different diameters, have been compiled from thousands of trees felled during the last 20 years.

The entire stock of trees over 1 foot in diameter in P. B. I has been enumerated and the volume calculated from the yield tables. To this has been added the increment for half the number of years in the 1st period. It will thus be seen that $\frac{1}{30}$ part of the total volume so arrived at forms the annual yield for the 1st period, trees below 1 foot in diameter not being taken into account.

The steps to be taken for the practical working of the method are as follows:—

The areas in P. B. I of each forest are closed to grazing and wherever necessary they are fenced, since the keeping out of grazing animals is absolutely essential.

The D. F. O. uses his discretion in taking in hand any compartment or part of a compartment in P. B. I in different forests all over the division for regeneration. A seeding felling is carried out, care being taken to leave mother trees so spaced that a mixed crop may be expected to result. Preparatory fellings, as such, are not prescribed.

The year after the seeding felling, all felling debris, such as chips and branch-wood is collected into heaps and burnt at a cost of about Rs. 3 per acre. This operation is very necessary here and would no doubt be most beneficial in some of our Madras forests. If a good seed year follows the amount of regeneration that is obtained is very great but inevitably, nature has to be assisted. Artificial broadcast sowing is effected on the burnt patches and from the resulting seedlings any which are not required on the patches are used to plant up blanks.

Weeding, at least twice a year during several subsequent rains, is another essential and must continue till the regeneration is fully established. By degrees more light is given by carrying out one or more secondary fellings, until after a varying number of years, it is possible to complete a final felling.

The writer has recently had the opportunity of seeing areas in which all the above mentioned operations have been carried out.

The working plan, described so briefly above, is the first of its kind in India to prescribe the uniform method for deodar, blue pine and fir forests and it is not yet fully completed. The fact that the results of treatment by a regular method can already be seen is due to experimental work which the Working Plans Officer, who has been D. F. O. in Kulu for a number of years, has been carrying out for sometime past. Until quite recently the Kulu forests have been worked under the so called Selection Method, on the same sort of lines as those prescribed for so many High Forests in India.

Under the new system of concentrated working a Ranger will hold charge of about 25,000 acres of actual forest and the success or failure of the method will depend

very largely indeed on the amount of active interest and care taken by the Ranger and his subordinates, as artificial help to the regeneration must be given and its constant tending until it is fully established, must be carried out in due season, without individual orders being given by the D. F. O. on each case.

Camp Kulu, }
7—5—18.

A. W.

Fire Lines.

The interesting article in the March number of the Magazine opens up a wide field for discussion and it is to be hoped that Rangers with experience in different parts of the Presidency will send in details of their experience and their opinions and suggestions. There is an old English proverb to the effect that "what is sauce for the goose is sauce for the gander", but however true this may be when the geese and the ganders are all in the same field, it is absolutely false in the case of fire protection carried out under the varying conditions of forest and climate which have to be dealt with in the Madras Presidency. A more appropriate proverb would be "one man's meat is another man's poison" for protective measures which might be suitable in the dry forests of the Cuddapah district would possibly be fatal in the damp forests of the west coast. It is therefore useless to expect a general concurrence of opinion regarding the most suitable measures to be adopted, the width of firelines, the date by which firetracing should be completed, the number of patrols required, and so on. On general principles certain axioms can be laid down; fire lines must be just broad enough to stop a fire getting across; but how is the width to be determined? As a rule of thumb it may be laid down that the width of a fire line should be eight times the height of the grass, but local conditions

frequently necessitate modifications of any such rule. One line may be in a sheltered valley running through dense forest, while another line may run over bare wind-swept hill slopes and though the height of the grass may be the same in both cases it would evidently be a waste of forest to burn a line through the sheltered forest of the width necessary on the wind-swept slopes, and a waste of time and money to burn a line on the wind-swept slopes of the width which would suffice for the sheltered forest. Another axiom is that the guide lines must be cleared before the grass is dry enough to burn, but in some places it is impossible to get labour until the field crops are harvested by which time the grass is overdry, while in other places the grass on the fire-lines is so short that no guide line clearing is required. The writer remembers one case in which the chief expense of fire-tracing was the cost of cutting grass in the adjoining forest, carrying it and spreading it on the fire-line which was so bare of grass that no burn could be effected without the addition of dry grass. It may be argued that fire-tracing such a line was unnecessary, but many officers must have experience of similar lines which though almost devoid of grass still contain enough short growth to enable a fire to creep across the line.

The question of the relative advantages of *open* and *closed* lines must also depend on local conditions. Undoubtedly on open lines the grass dries earlier than on closed lines, but on the other hand in some forests opening the lines causes a dense growth of grass which is very difficult to deal with. In Malabar for instance the grass under forest growth is scanty and fairly short; broad open lines were cut through this forest with the result that a dense growth of grass and thorns up to ten feet in height sprang up, rendering fire-tracing a difficult, expensive and dangerous operation, and allowing thorny growth and

lantana to penetrate into areas hitherto immune from these pests.

A point for consideration is whether any improvements in the system of fire-protection are possible; experiments have been made in growing ever-green species on fire-lines; have these experiments succeeded? If not, why not? Are the results conclusive, or should further experiments be made in various classes of forests? On a portion of the Malabar—Mysore boundary the grass is kept short by heavy grazing and thereby the cost and danger of burning the lines are much reduced. Can similar action be taken elsewhere? On the other hand, in dry forests heavy grazing on the fire-lines so reduces the scanty growth of grass that there is not enough to burn freely and yet too much to leave unburnt. What remedies can be suggested? In another part of Malabar efforts were made to lease out the broad fire-lines for cultivation. What have been the results of these efforts? It may be possible to develop this idea by leasing out lengths of fire-lines for cultivation to fire-patrols, thus inducing them to live on the lines. It might be necessary to dig wells on some lines in order to encourage cultivation and in some places it might be possible to introduce wet cultivation which would make an ideal fire-line.

If the forests are worth protecting they are worth spending money on, and the Forest Department should not shy at incurring capital expenditure to ensure improved protection. In America fire protection is carried out on a much larger scale than anything in India; fire stations are connected by telephone, and permanent fire depots are maintained, in which stocks of tools etc., are kept ready for use. Fires are stopped by digging trenches along selected lines, and one method of digging such trenches is by means of a long string of dynamite cartridges connected by a quick

fuse; the string is laid along the line and then the fuse is lit; the dynamite blasts away the grass and humus and leaves a clear earth trench.

Now will some Rangers send in ideas? Enough has been said to show that there is ample room for new ideas as well as for discussing present methods and comparing their results in different classes of forests. Regarding present methods it may be remarked that what is common practice in Ganjam may be quite new to Canara, and the Magazine is an excellent medium for communicating to all districts details which at present are only known in a few.

F. A. L.

Our contributor has "touched the spot" in asking Rangers for *their* ideas. On Fire Protection, as on many other subjects, the opinion of the competent man who has to carry out the work should be of great practical value. We are all agreed that Fire Protection in India is still far from perfect, and the object of the Department naturally is to evolve the best practical means of realising a possible ideal. The present generation perhaps will hardly see in India the standards attained in America (where Aeroplanes are utilised for transporting officers to the scene of a Fire), or in the Portuguese Forest of Leira with its lofty Observation Stations furnished with degree-marked dials, heliographs, and flash-lights, and provided with stables of horses for mounted Fire-Patrols. But much may be done to render the Protection more efficient. Improvement in the amenities of life for the Fire-Patrols suggests itself. In France Forest Guards are given plots of land for cultivation. An attempt was made to introduce this system in one of the Kurnool Divisions, but the frequency of transfers defeated the project. The same difficulty would perhaps be less serious in the case of Fire Patrols who are

employed year after year in the same locality. However—
what do the Rangers think?

Editor.

Fire Protection in the Nallamalais.

It is now fully realized by the Forest Officers that provisions are to be invariably made in Working Plans for the successful regeneration of a forest. A Forest Ranger may get himself acquainted in a short time with the needs of the forest entrusted to his care and may successfully apply the methods for its improvement. But he finds it all futile when he finds that his forest is all of a sudden swept over by a fire and leaves him a dark patch with bare trees, all charred to the top standing apart from each other and through the intervening spaces of which his eye penetrates miles afar. He feels as if nature students out and laughs at him and at his hopes. In the deciduous forests like Nallamalais, where grass grows over to a height of more than 9 or 10 feet, fire is the chief danger.

In spite of the well thought-out fire lines and the care taken by the officers, fire has become a common occurrence in those forests, so much so that the Rangers start on the assumption that their forest is impossible to be protected from fire and very often leaves it to chance or fate as the Hindoo puts it. Fire watchers, as their name implies, are sent to watch and to let them know if there is any fire. By the time the Ranger collects his men and some of the reluctant villagers and proceeds to the scene of fire, the fire spreads and presents a large front. He then thinks that the job is like chasing the wild goose and begins to 'counter-fire' it and thus completes the destruction in a shorter time. A day or two after, the fire starts in another part of his range and

the same tale of yesterday is told and he goes home awfully disgusted at the Fire-god and in his private room resolves and re-resolves that he should not allow the same thing to happen next year.

Some less zealous Rangers, as soon as fire breaks out in their range, indulge in sending memos after memos to their subordinates and try to put it out from their quarters through these orders. This has a double disadvantage. The Dy. Rangers are generally inexperienced in tackling with the problem and are at a loss to know what to do. Secondly, the irresponsible subordinates, finding that the Ranger is not interested in the work, do not make a real attempt to put it out. The Ranger has then to blindly rely upon the reports given to him by the subordinates and reports in his turn that the fire was uncontrollable. The Range officer must invariably be present on the scene of fire and satisfy himself that the fire is really ravenous and unquenchable. Otherwise he is not worth the salt which he is eating.

Much trouble is saved if the Ranger takes the pains of finding out the chief causes of fire in his Range. If it is an "act of God" such as lightning or friction, he cannot of course help it. But these are extremely rare and "God's in His heaven." Almost all the fires are caused through the act of man. I may mention one or two. Most of the villagers round these hills want grass and it is cut during the fire season for then they have leisure. They go about the forests in groups and "without their ken" the spot is set on fire. They are panic-stricken, though not so much from the fire but from the idea that they would be arrested by the more fiery man (the forest subordinates) and endeavour to escape from that place. This trouble can to a great extent be minimised by the head of the gang in charge of the beat if he tries

to arrange with the villagers that they must cut grass in a certain area for a day or two and then to go to another place. He can send one of his watchers to that area to see that no fire occurs in that locality.

The bamboo coolies are also greatly responsible for the fires in the Nallamalais. These men do not generally observe the rules laid down in the contract agreements that they should lit fire only in certain places, called "pentas" approved by the District Forest Officer. Much danger from fire can be reduced if the subordinates enforce these rules.

The Chenohus, the forest tribes on these hills, who are not such honourable men as the Khonds of Ganjam, are partially responsible for the fires. They burn the forest if they have a spite against the officer in charge of them. They are awarded rewards if the forest is protected from fire. Some of them are taken as fire watchers during the fire season. But this is not sufficient. Some of them must be taken as permanent watchers in the hill beats and they must be told that they are responsible if any fire or theft occurs in their beat. A permanent appointment of this nature in the department pleases their little minds and they will do good work as long as they are honestly dealt with. I do not know if this is feasible financially but it will be beneficial in the long run.

Another cause which some Rangers put forth and which almost amounts to the ludicrous is that the fire crossed into their divisions from the adjoining Ranges. This has been well met by the authorities by an order, as ingenious as the latter is silly that the boundary lines after they are completely burnt and cleared, must be inspected by the two Range officers together and reported that it is in good condition.

Most of the fire lines in the Nallamalais are from 60 to 100 feet wide. This width is essential on account of the presence of bamboos which when they take fire, burst with great violence and instances are known of the burning cinders being carried over 200'. A 100 feet wide line should be quite safe. The spreading of fire when once it is set on foot, is chiefly due to the fire lines not being completely burnt. The fire like every other form of energy, seems to have a tendency to take the line of least resistance and passes along thin strips of grass if they happen to be sufficiently dry to burn. In one part of the Nallamalais the operation of burning the fire lines is as follows :—

The fire season begins by 1st February. The clearing of lines is started as early as October 15th and the fire tracing is done during the latter half of December. The lines are generally 60' wide. Guide lines of 15' wide on both sides of the fire line are completely cleared of all growth and the debris spread on the middle part. The regrowth on the 30 feet left in the middle is cut and the grass on it is beaten down with bamboos. The cost of this operation including the subsequent fire tracing comes to 8 to 10 Rs. per mile. In some other places the whole line is cleared of the regrowth and grass and this operation including the firing amounts to Rs. 15 per mile. Both these are successful and the former is cheaper. The rates given are for the lines in which the grass is 6 feet high. As for the medium and low grass the rates are Rs. 12 and 10 per mile respectively for the latter operation. Medium grass is 3 feet high and the low grass is 1½ feet.

The fire patrols are appointed during the fire season i. e. after the fire line operations are supposed to be over. In cases where single fire tracing is not sufficient thus necessitating subsequent burnings which are expensive,

these patrols assisted by some of the beat watchers may be asked to go along the line reburning the patches unburnt and if the grass is not sufficiently dry, it can be cut and thrown outside the line in the Reserve. If they thus go along the line twice or thrice the line will then be clear.

I have heard often exclaimed by the Rangers "Let the hill Forests go, let us take care of the plains". They may be justified in so far as it is impossible to quench a fire on hill slopes. But it is particularly desirable that the places liable to erosion should be rigidly protected from fire. Erosion not only affects the growth on the hills but also has an evil influence on the vegetation down on the plains. As an example we may cite the Hyderabad State. There the protection was loose and the grievous mistake is realized now that the agricultural crops have begun to suffer to an appreciable extent. Fire lines ought to prevent fires on these hills or at least localise them. We shall consider what action is to be taken when the hill slopes are on fire. This is a question which baffles many and we most gladly welcome practical suggestions on this important point. It is almost impossible to face the fire and beat it down on the side of steep hills for one easily loses his balance on them especially if there are boulders. *The Range Officer must prepare a plan for each block or beat showing therein all the roads, foot-paths and tracks of cattle so that these may be used as clearing lines or base lines for counterfiring when a conflagration arises.* If such paths are not close at hand, a temporary line say 3 feet wide may be cut in a line parallel to the fire as a base line for counterfiring. The supervising officer must have his wits about him and come to a quick decision. One of the dangers in such counterfires especially when the path has sharp curves, is that some men get caught in the fire.

Fire, when going up a hill, has a rapid pace and if a man goes to the other side of the path by mistake, he finds himself surrounded by fire. The impending danger easily upsets him if the supervising officer is weak and slow to realize his condition.

M. Umapathi,
Assistant Editor.

The Khonds and the hill-forests of Ganjam.

Some of the aboriginal tribes of India are the Bhils in Rajputana, Santals in Bengal, and the Khonds, the Koyas, the Chenchus and the Todas of Madras. The hill tribes living on the hills of Ganjam are known as the Khonds.

They are mainly pastoral in their habits, although the proper use of the country guns, bows and arrows, and of trained dogs are not unknown to them. They live in small thatched huts on the hills and on the outskirts of the plains, a few huts constituting what is known as a "khonds gam" meaning in Uriya a khond village. The inmates of a khond hut are generally his old parents, his wife and a few malaria-stricken pot-bellied children. Each village has got a khond head known as the "moliks" and for two or more "gams" there is a common head called a "Podra." The moliks generally an aged man has got some influence in the village and in minor family and social quarrels his advice is followed; but in grave social and religious matters concerning the community as a whole the "Podras" have got full powers, and even in criminal matters—but there is nothing very criminal with them so long as the offender stands a treat to the affected party and the other villagers—no complaint is ever carried to an outsider and they do not seek the Police or a Magistrate to intervene.

The wants of khonds are very few. On the outskirts of the plains, his dress will ordinarily consist of a narrow piece of cloth tied round his waist, and he wears no head gear generally, but replaces it with a "Talari" a kind of umbrella prepared in the form of a large hat or a rotate flower. It consists of a frame work of thin split bamboos woven nicely in two layers to hold in position the leaves of *Bauhinia Vahlia* or sal placed between them, the two layers of framework being then tied together with *Bauhinia* fibre. The umbrella has also got a thin string made of the same fibre corresponding to the chin strap of a hat and serving a similar purpose. This protects his head from the sun and rain and is a special wear common among the Uriyas and Khonds of the district. The one advantage of this kind of an umbrella is that it can be had on the head even when working in fields with both hands. He neither crops his head nor shaves it. He combs his head neatly and ties his hair up and adorns it with the same comb, a few porcupine needles, and his favourite "Khali" (a green sal leaf twisted into a pipe) when he does not want it for smoking. A glittering "tangi" (a battle axe) or a small ordinary axe, invariably in his hand completes his accoutrements; but a "mali" (necklace) made of reeds, round his neck and occasionally a bangle or a pair, made of brass, nickel or rarely silver, round his wrists and a few rings in his fingers should not be ignored when you think of jewellery. His better half is rather better than he, so far as her dress is concerned. She wears a bigger cloth covering also the upper part of her body but wears no petty coat. She dresses her hair equally well. Her necklace consists of as many strings of beads as she could procure, and whenever she waves her hands you will hear the clinking sound of her bangles, some made of inferior metals such as brass, nickel and some of lac. One of the interesting features about her person is the extensive tattooing which does not fail to

attract the attention of even a casual observer, and on her forehead, cheeks, chin, forearms, and on the back of her hand the tattoo marks shew up fantastically in different forms such as creepers, leaves, buds, flowers, human forms and what not. There is no face of a khond woman without a tattoo mark on it. This is the description of the dress of a khond pair living on the outskirts of the plains in the Gumsoor Taluk, Ganjam District. In this case, the khond comes in contact with the plains-men and is considered to be a bit civilized. In the far interior of the Agency Tracts the khond does not perhaps want to hide the beauties of nature with artificial covering such as clothes etc., and for that reason he is said to be almost sky-clad. I heard from a friend that the male there simply wears a narrow strip of cloth, while the female covers the middle of her body with a few broad leaves, leaving the other parts of her body quite exposed. This is one of the remote corners of the world, outside the pale of civilization. The khond there is naturally brought up to this and he finds no necessity for an invention of a new thing.

His meal is very simple. He can practically live upon whatever he can get to eat—vegetables, non-vegetables, roots, leaves, flowers, fruits, gums, flesh; even earth and sometimes fasting too for a day or two. His domestic animals are a few bulls necessary for cultivation, cows, dogs, pigs and fowls, and it is very rare that he keeps a small country pony. Round about the village and on the hill slopes he carries on "Podu" cultivation (which will be explained later on) and grows cereal crops such as dhol, big dhol, grams, dolichos and maize etc. The cultivation here is entirely dependant on the rains and the khond never tends his crop and is quite satisfied with whatever Providence can furnish him through the monsoons. But Providence has to look after the welfare of other objects of creation also and so

it will not be fair on the part of the khond living in the forest to harvest in full what Providence intended for all the beings in the forest, of which he is one. There are the deer, the pig and the elephant to share the produce with him. It is therefore necessary that he should be prepared for the worst that may happen when he thinks of the mottoes 'Might is right' or the "Early Bird catches the worm." He therefore tries to make the best use of whatever articles of food he may at any time procure. Most of the things that, under the circumstances, form his diet are very hard to digest and some of them he takes quite raw also, as for instance roots, flowers and fruits, and this is an advantage to him in one way, i.e., he does not require large quantities to eat, if raw. In summer he collects mohwa (*Bassia latifolia*) flowers and different kinds of fruits such as the mangoes, tamarind, Jack, Diospyros, Phoenix, Buchanania and seeds of mango, tamarind, Bauhinia, and bamboos if available; and in the rains you will see the whole family engaged in digging up different kinds of roots. The mohwa flower is dried in the sun and is then eaten either raw or fried. This is very hard to digest and heats the system very much. It is to be taken only in small quantities at a time, otherwise there may be serious trouble on account of excessive thirst. Some of us cannot even bear the smell of the flowers, so much so, that we cannot stand under the tree, while in full blossom. The mango seed is the next thing. In the first place it is very difficult to prepare it for cooking. The seed is smashed well with a stone and washed over and over again in a running stream to get rid of its sour taste. It is then boiled with some salt and eaten. This is one of the peculiar diets of the khonds and I think it is eaten nowhere else. Of course the fruits of Phoenix and Diospyros also are not very nice articles of food; they constipate and create stomach-ache very easily. The seeds of tamarind and

Bauhinia Vahlia are roasted and eaten and neither of these possess any good quality as food. But in the case of some of the roots and fruits some of the readers may surely envy the khond's position; they are very delicious. It is only very rarely that he gets the bamboo seeds.

The khond can have also his drink in the forest. He distills arrack from mohwa flowers occasionally, but usually extracts toddy ("Solop mohwa") from *Caryota urens*. Compared with the Chenchus on the Nallamalais, Kurnool District, the khond is very temperate in his habits and less atrocious in his actions. The former indulges too much in drinking mohwa arrack and is not available for work for two or three days each time he enjoys it; with the bows and arrows in his hand, a weapon more or less a part of him, and which he does not dare to part with even a single moment, especially when he is a criminal offender, the Chenchu is often quite unapproachable even by men nearest and dearest to him. In his drunkenness the Chenchu is much dreaded and very often commits murders and highway robberies.

The khond is not generally very sportive but he sometimes sets out with his dogs, axe in hand. If he wants to make use of his country gun he cannot be moving about in the forest but has only to wait on a "machan" which will be more often on his own field. A deer, sambhur, or a greedy pig will generally commemorate the day. With a khond, the bows and arrows are quite secondary which shows his idleness.

Even in such remote corners of the world, pleasant feelings are not wanting in the khonds. They take advantage of merry evenings and pleasant moonlight nights; a small group of grown up girls and bachelors is formed; they beat drums, sing and indulge in a kind of dancing

peculiar to themselves. The beat of drums and songs can be heard from the neighbouring places, and if one happens to camp in the neighbourhood on such a night he may have his sleep disturbed till very late in the night unless he is not likely to be so easily disturbed. They keep such late hours that either sleep interrupts or as a consequence of an over dose of drink the males falter. This is a prelude to marriage; they get engaged in course of time. The successful pair makes itself known by disappearing from the scene and eventually leaving the village altogether. The parents of the lovers then get them back and celebrate their marriage.

The above is rather a long description of the manners, customs and habits of the khonds; but it is necessary to shew the peculiar circumstances in which the khond is struggling for existence in the forest among many other objects of creation. He is very simple and has no cravings for luxuries. By his endurance and peculiar way of adapting himself to environments he has at least proved himself to be quite fit to live in the forest under the most adverse circumstances. So much then about the khonds themselves, living in the hill forests, their natural home.

Turning now to the condition of forests in their hands. The chief point in which the khonds made themselves conspicuous in the eyes of the forester is the "Podu" cultivation of which reference was already made. Just before the outbreak of monsoons he selects a plot of ground on the hill slopes, cuts the growth thereon and burns the stuff wholesale. This gives him enough manure for raising the cereal crops such as dhol, grams &c. For 3 or 4 years he continues to cultivate this plot, whereupon the soil becomes too poor to support any good crop on it. He then abandons it and selects some other plot and treats it in the same way as he did the first, for another 3 or 4 years.

Meanwhile some coppice shoots and other growth might have come up in the first plot. If he thinks there is enough stuff for the supply of a good quantity of manure he takes up the plot again the second time, otherwise he goes and chooses a third plot in some other place and subjects it to a similar treatment. This kind of shifting cultivation is quite incompatible with the existence of forest crop, and the very idea is repugnant to a silviculturist. The damages entailed by such cuttings and the wholesale burning, especially on a hill slope, are too well known to need any detailed description. The burning bakes the soil and impoverishes it by destroying the humus, and the cuttings expose it to further external injuries. Quick growing soft woods and bamboos occupy the cultivated patches, or erosion and gradual destruction of the hill forests may ensue, and the disappearance of the hill forests may seriously tell upon the plains in the long run. When the Forest Department originally wanted to protect these forests from the khond raids, the latter offered much resistance. They did not like the presence of the "Saibo" (a European officer and in this case the District Forest Officer) in their midst, nor did they want to hear his proposals putting a stop to the "Podu" cultivation they were so very fond of. They paid no heed to the instructions of the "Saibo," and his promises to grant them lands in the enclosures and give them facilities for cultivation were of no avail. They were not convinced. They were much enraged at the steps taken by the "Saibo" to demarcate the forests, and not only refused to supply labour but even went to such an extremity as to set fire to the whole forest with the determination of baffling the attempts of the Department, and knocked over the demarcation cairns and obliterated the boundary lines. This is what actually happened at the time the Pandakhal forests (Ganjam) were reserved. No doubt at the back of their

minds lurked the idea that the entry of Government Officers in their preserves would lead to the taxation of their lands.

The facts mentioned above do not place the khonds high in the opinion of the reader who will not for a moment think at the onset whether the khonds will be of any use to the Department or whether there was ever latent in them such spirit as to make them turn over a new leaf altogether. No doubt it is beyond an average man to bring the khonds of the above description closer together, nor can it be the work of a single day. The inference is not that the khonds are a very formidable people, but they are not to be convinced easily on any matter and made to deviate from the groove they were moving along for ages. But at last they had to yield to the stronger force of the Department. They gave up poduing the slopes of the hills and undertook to do the forest work. The Department also kept its word; in some cases presented them with ploughing bulls and buffaloes for the better cultivation of their enclosures, allowed free grazing of their cattle, provided them with congenial work in road-making, and took the further trouble of opening provision shops at convenient centres, and supplying them with the necessaries of life. They are paid in kind for the works they do in the forest, and a thoroughly new atmosphere is created around them. They eat well, dress better and live happily. This state of things refers particularly to the Pandakhal forests. The Deputy Rangers directly control their work and as far as possible they are free from contact with lower subordinates.

To speak of the khonds in relation to the forests generally. They are now true to the salt they eat from the hands of the Department. The steps taken by them to fire-protect the forests they were themselves once destroying by "Podu" cultivation is most commendable and seems to be a sincere atonement for their past actions. The credit of

drawing the khonds closer together and organising them under a more or less "Forest Village System" and of making it a thorough success is entirely due to the District Forest Officer who is now one of our Imperial Instructors in the College.

A short description of the system above referred to will explain to the reader the interest the khonds now take in fire-protection works and the reciprocal care by the Department in attending to their wants. The hill forests of Ganjam are for the most part surrounded by the Zemindari forests, and they are generally a source of great danger from fire. No steps are taken by the private owner to protect his forests from fires and as such the forests are seen burning for weeks. It was rather difficult to keep out tremendous fires from entering the Government forests when the frontier lines were not broad enough for the purpose, and the efforts of even the willing subordinates were sometimes unsuccessful. The frontier fire lines were thereupon widened to 60 feet, and the cost of fire tracing such lines was shared by both parties on either side of the line. The Forest Department recovers their share of the cost from the Zemindars and does the fire-tracing of the lines. In the beginning of the fire season the total length of the frontier and internal fire lines within the reach of the khond village is divided up into such short lengths as will be convenient for a group of two or three villages to do the work easily. The responsible Deputy Ranger, Forester or Forest Guard then takes the different groups of the villagers to their respective lines, and shows them the width of the guide lines to be cut and gives them full instructions as to how to get the lines ready for burning. Any one of the lower subordinates above referred to or a watcher will supervise the cutting though the khonds themselves usually do the work satisfactorily whether there is any supervision on their work or not. The

responsibility of fire-tracing the lines properly is never to be shoved on a watcher and so the Deputy Ranger, the Forester or the Guard invariably attends the burning of the lines. For the initial cutting and burning of the lines the khonds or rather the group of khond villages doing the work together at the same time are paid their wages calculated at so much per mile in a lump sum and the khonds divide the amount amongst themselves. Thereafter the khonds look after the lines themselves and are held responsible for keeping the lines scrupulously clean at all times during the fire season. They watch the fires in the Zemindari forests and never allow them to cross over to the Government forests. On the outbreak of fire in the Government forests, they send a messenger to the nearest forest subordinate and themselves set out to the scene of fire and extinguish it. In return for the successful fire-protection in a season the khonds get the following concessions from the Department.

(1) Concession to remove small timber, bamboo and thatch grass for the construction and repairs of their huts, at so much per hut.

(2) Concession to remove the minor forest produce for their own use. (3) Concession to graze their cattle free. In addition they are allowed to collect kamala powder from the fruits of *Mallotus philippinensis*, and sell it to the Department. The villagers in whose village limits the trees occur have got the exclusive right of collection over the other villagers. Some of the khonds also stand a chance of being employed as fire watchers, for which they are paid separately at a fixed monthly rate as elsewhere.

The concessions and the conditions under which the khonds will be entitled to them are drawn out in a concession form in triplicate, one for the khond headman, one for the Range Officer and one for the District Forest Officer, and

signed by the District Forest Officer himself. At the commencement of the fire season these forms are sent to the Range Officer for distribution amongst the khonds. At the time of issuing these concessions the Range Officer personally explains to the khonds the nature of the concessions and the conditions to be fulfilled by them if they want to claim them, and also in the course of his tours inspects their work now and then and gives them the necessary instructions. At the end of the fire season the Range Officer submits his report on the relative merits of these villages and the success in fire-protection; and with the permission of the District Forest Officer permits the successful villagers to remove the quantity of timber, bamboos and thatch grass; the timber from the unreserves as far as possible—there are vast areas of unreserved forests in the district—some of the khonds are also warned for slackness of duty. The District Forest Officer in course of his tours in the Range visits the khond villages and satisfies himself whether the khonds are enjoying the concessions granted to them. Such is the relationship between the Forest Department and the khonds at the present day. They are responsive to kindness and are the most faithful of the hill-tribes I have seen.

The instance quoted above shows clearly how by careful administration and fair play, even the stubborn hill tribes may be trained in the forest works and organised under the "Forest village system" to the mutual benefit of both. The advantages of this system are many. In the interior of forests away from the villages, labour is always difficult to procure for fire-protection, road-making etc. works and the imported labour is not available throughout the year owing to many impediments such as malaria, demand in the plains for agricultural purposes etc. The employment of the same trained men year after year hastens progress in the works and lessens cost of supervision. The work will not suffer

for want of labour supply in any part of the year. In such localities where labour supply is not permanent and where the services of the hill tribes can be utilised at least at some sacrifice such as money reward, free grants of produce, free grazing etc. such organisation as above referred to will be a great boon to the Department. The employment of khonds for general protection of the forests has a wholesome effect on lower subordinates apt to stray from the paths of honesty and on theft and illicit grazing; for little goes on in the forests without the khond's knowledge and they realise it is part of their work to report the misdeeds of others to the District Forest Officer and the Range Officer. Other instances are not wanting to prove the possibility of such arrangement by a patient, tactful and sincere officer, as in the case of the Chenchus on the Nallamalais (Kurnool Dt.) and the Malayalis on the Javadis (S. Vellore).

B. S. Sankaram Iyer,
Senior Student, M. F. C.

Hill-tribes and how to deal with them.

In the present stage of the development of our forests, in many parts of the Presidency, hill-men are the chief source of labour for all forest works and this is especially so in places which are not easily accessible owing to want of communications and also where malaria is prevalent. In such places, all attempts to get labour from the plains generally meet with little success. Hence the forest officer is compelled to make the best of the hill-people and in this task he is brought face to face with many a problem difficult of solution. In what follows, a few practical hints gathered by the writer during his experience with more than one tribe of hill-men are given with the belief they may prove helpful to his colleagues.

Hill-men, as a rule, have few wants. The usually rich soiled hill-slopes with very little trouble taken in tilling weeding &c., yield all the produce necessary for their life. The majority of the rest of their wants are supplied by their cattle, which enjoy a free and unlimited grazing in many cases. As a result, they are lazy and shirk all hard work. Wages are not sufficiently tempting to make them work hard. This combined with the effects of the independent life they have led, such as rudeness, want of respect in the due degree to superiors and want of policy and obedience limits to a great extent the utility of hill-men, as a source of labour. Hence it is that a first officer to be successful should be bold, prudent and tactful in his dealings with hill-men. This implies a study of the hill-people themselves.

The first requisite is sympathy. The mind of the oriental is peculiarly susceptible to all marks of sympathy. Talking about topics of general interest, such as the shandy, the chief events of the place, such as a criminal or civil case &c, or of special interest, such as the availability of fodder for cattle, places of good water, suitable sites for a camp &c. or enquiring about the general welfare of the individual, his status in the village, marriages contemplated or conducted in his family, &c. have a good effect in bringing the talker and the man or men talked to into closer relation. So it is important that a forest officer should cultivate such habits. He should not confine his sympathy to words but should extend it to deeds also. Occasions are not rare when he can by acts of his, impress the people very well by his sympathetic attitude. This principle has now been generally accepted by all forest officers and attempts at practising it are not wanting, especially with the younger set of Rangers. But a word of caution is necessary here. Examples are not wanting

of cases in which new men—especially Rangers through lack of caution have had many pit falls. The writer is aware of blunders committed in the name of sympathy. It is important to remember that familiarity breeds contempt and sometimes involves irremediable evils. Everything has a place and a limit and the unwise man may destroy what the wisdom of many has built. The more ignorant your people are the more prudent you require to be.

The next suggestion is—‘Help the sick.’ This is in fact another form of sympathy—but this requires special mention as this is a very important factor. The best time to gain a man is when he is sick. So the forest Officer, should undertake the roll of a medical man occasionally. The chief forms of sickness the hill-people in general are subject to are fever, wounds and boils or ulcers. Their treatment requires little medical skill. Many are the common medicines which can cure their maladies. The forest officer, should provide himself with them and administer them to the people as occasion requires it. By experience the writer has found this to be a very potent means of getting at the people. Even here caution is necessary. Too much of anything is good for nothing. We do not value things which we do not strive to get.

The third hint is—‘Respect the man on the spot, or if it be you, respect yourself.’ This means much and requires little explanation. First if you are not the man on the spot, with due limit respect the man on the spot. The Range officer is only an occasional visitor, and it is the officer on the spot who has much to do with the people. All utterances which tend to lower him in the eyes of the people should be avoided. Some, either out of ignorance or inexperience, fail to do this and thus cut

their own legs. For invariably it so happens, that the superior officer himself loses control, gets slighted, finds himself inefficient and consequently compelled to move to another sphere. Trust your man. He may not always be worthy of trust, but as long as he is there, you have to show that you trust him, though with all precaution. On the other hand, if you are the one on the spot respect yourself, watch your own behaviour. Shun all mean things; you will in a short time find that this is a great asset in gaining you control over the hill-men and in spreading your influence.

The fourth hint is 'Be slow to promise and quick to perform.' When coolies are got to do your work, your promise to pay their wages goes without saying. This promise should never be delayed in being fulfilled. Promptness in paying all wages is one of the surest means of getting men whenever you require them. This is so with people in the plains also. But this is more so with hill-men. Fail to clear off all arrears of wages once, the next time you go to get your coolies, none will be at home to you, though in reality they be at home. Serious troubles have, besides, resulted from irregularity in payments. In this, one thing has to be borne in mind. Hill-people are quick in spending what they get and are eager to get whatever they can, after work has been done. So habit of coming for wages, whenever they like or want and in case of failure to be paid, taking offence at it or pretending to do so, so as to make it an excuse for not going to do forest work is likely to be formed. The forester should be careful to avoid such mishaps and the best way to do this is to be regular and systematic as far as possible in his business. He should fix regular days for payment and see that he clears off all arrears on that day.

Many more are the points which will suggest themselves to an observant and studious mind; which can be made use of in getting a full control over hill-men, such as playing the part of an arbitrator occasionally, in village quarrels defending and freeing them from the worries of outsiders &c. But in the beginning, a forest officer, before he knows where he is and what he is about, should proceed cautiously lest he should commit irreparable blunders, for, as above said, what it takes many to build, one can shatter to pieces.

T. D. Ponniah,
Junior Student.

The First Elephant Capture in the Bolampatti Valley.

Both the Divisions of the Madras Forest College arrived at the Sadvayal Camp on the 4th February last and were greeted with the news of the fall of a tusker in a pit about 4 miles from the camp. Elephant capturing operation had been newly started in the Bolampatti Valley and there was considerable speculation as to how far they would be successful. Many of us were rather pessimistic when we learnt that the "Kumki" elephants were not at the spot and had to be wired for and brought all the way from Mount Stuart. We were further told that this was the second fall, the first having escaped from the pit while waiting for the "Kumkies." Some of the more outspoken among us freely criticised this arrangement of having to wait long for the Kumki elephants. It is indeed a serious and responsible task to keep a fall in the pit for considerable length of time. The chief interest of this capture centres round the manner in which the wild tusker was kept in health for a week in the pit. He was about 7 feet high and was in the pink of condition when he fell into the pit. He was young and

handsome with long symmetrical tusks. He was in every way a desirable capture. Much credit is due to the Range Officer and his assistants for keeping this powerful animal safely for a week in the pit till the decoys arrived, quite new as they were to the work. The walls of the pit were soft and the onslaught of the tusker on them with his powerful tusks soon began to fill it up with earth. As the pit became filled up the difficulty of keeping in the animal became more and more difficult. Logs were thrown across to prevent him from escaping. Fires were lit all round the pit both day and night. In spite of all these precautions the animal was several times on the point of escaping. On such occasions the watchmen had to attack him from the front with long poles and drive him back into the pit. The coolies were at first timid to approach the pit and whenever the animal made a determined attempt to escape, they were inclined to bolt. It was on such occasions that the Range Officer had to set the example and boldly approach the pit and frighten him back. His example had the desired effect and the men gradually became bolder.

The feeding and watering of the elephant in the pit was rather a serious problem. The suggestion of the coolies to under-feed the animal so that he may become weak and less troublesome, though seemingly cruel, was in the circumstance perhaps pardonable. The Range Officer in his anxiety to keep the animal in the pit till the "Kumkies" arrived was rather inclined to favour this view but fortunately he consulted some of his friends among the students who had experience in this matter and in the end more humane counsel prevailed. The way in which the elephant was given water in the pit was a study in itself and showed how an animal would adapt itself to changed conditions of life. Water was poured down the pit in thin streams from bamboo tubes and it was a wonderful sight how the elephant

caught the water in the barrels of his trunk and spurted it out into his mouth. It is perhaps doubtful whether the elephant received sufficient quantity of water in this manner but it is a useful lesson to be remembered in similar circumstances. In the pit he received a liberal quantity of sugar cane and to this may be attributed his good condition when taken out of the pit.

On the seventh day after the fall two Kumki elephants Abdul Rahim and Kunju arrived from Mount Stuart and the next day the tusker was safely enkraaled in the new Kraal at Vellapathi about 6 miles from the pit. The details of capturing elephants in pits have appeared more than once in the columns of this Magazine and so I do not propose to repeat them. The D. F. O. Central Coimbatore Division and Messrs Crothers and Hart of the Madras Forest College were present at the noosing and rendered valuable assistance by some of their timely suggestions. Senior Student Sambasiva Rao and myself were present to witness the operations and we modestly claim the satisfaction of having rendered some slight help at the first capturing of an elephant in the Bolampatti Valley.

C. Vasu,
Senior student.

3-4-18.

Babul Working Plans of the Tinnevely District.

. The treatment of Babul (*Acacia arabica*) under the Coppice with Standard System brings home to the mind of the Forest Officer how far the demands of silviculture have to be sacrificed for the seemingly growing interests of the ryot population.

The existing Working Plans which are now lapsing have adopted the Coppice with Standard System for the working of Babul. The species is found pure along the

beds and waterspreads of tanks and being the only suitable one available in the plains has been much in demand for small timber and fuel. Thus it has been a source of enormous revenue to Government and foresters in the early ninties had drawn up a Working Plan for the systematic exploitation of such areas. The babul trees in the Government tanks were completely enumerated and the possibility fixed by number of trees. All the trees except the standards were to be removed the stumps being 'cut flush with the ground with the bark intact...' The standards were retained as seed bearers and after they had served the purpose, the period being generally three or four years, were to be felled for the supply of agricultural implements to the cultivators. Reproduction was provided for in coppice shoot from the felled stumps and seedling regeneration. How far the fore cast of the future crop has come true it is interesting to inquire.

The writer has been in charge of Babul areas for over two years and he ventures to set forth his observations on the subject. Though the rules about coppicing have been strictly enforced there has been no regeneration by coppice. He has taken the trouble to verify the stumps in the felled coupes and had no occasion to fear that the stumps had been dug up and removed illicitly after the fellings. The stumps were dead though not decayed and showed no signs of having given out any shoot. On inspection of Kalappai-patty, Thulayakulam and Alankulam just a couple of months after the fellings he observed vigorous coppice shoot, but on a subsequent inspection after the tank had dried up again after being filled in the rainy season he could not find a single shoot alive. This and observation of other tanks would lead one to infer that it is the periodical flooding that kills the coppice shoots. But further observations do not confirm this. In the Kaliavar Reserved Forest babul

trees were coppiced—but there has been no reproduction by coppice shoot. This area is high above the flood level of Tambraparni and the Kila Kal (Irrigation channel) and does not suffer from periodical flooding. The only conclusion that can be arrived at is that Babul does not coppice in this locality and that the system specified in the Working Plan will require alteration.

Reproduction by seedling germination has generally not been successful owing to the depredations of the Tinnevely ryot and his indispensable goat. It may here be noted that these areas are reserved under section 26 of the Madras Forest Act and as such grazing could not be excluded altogether therefrom. There has been good regeneration only in areas where goats have been admitted at a minimum. In the Muthur Tank in Wolfhill R. F. the conservation of Babul growth has been successful and the tank which was originally worked in 1902-04 for the Palamcottah District Jail supply contained an almost impenetrable growth of young Babul with an overwood of the old standard. These babul trees were sold with the exception of 2000 young standards and fetched over Rs. 11,000. A similar amount can be expected to be realised in another 15 years' time.

The Working Plans have lapsed and the control of the Forest Department has ceased and it is late in the day to suggest schemes for the management of Babul areas. Provided goats can be excluded, the Babul areas form a valuable asset to Government and the Revenue officers can have little time and opportunity to devote to the protection of these areas.

T. I. Chacko.

It has been established that Babul will not coppice in Sind, but will coppice in Kurnool. It is obviously a question of environment.

Editor.

Water ejected by Trees.

We have heard of the "Rain tree," *Pithecolobium saman*, though I doubt very much if it was ever seen actually raining in India. It is a native of South America. I have had the opportunity of observing the phenomenon of trees raining in the Shola forests of Kannikatty recently. These forests are situated at an elevation of 2000-3000 ft. in the Ambasamudram range of Tinnevely district.

On the first day of observation I saw a tree, *Alstonia scholaris*, which was just beginning to put on a fresh flush of leaves sending down a light shower of rain, but I took it to be due to clouds. Passing by the same tree the next day I found the ground quite wet while the ground was dry around other trees adjoining it. Towards evening large drops of water were falling at regular intervals. I was not able to trace the origin of the shower to any part of the tree as it was about 100 feet high. Subsequently, in a different locality a climber was found ejecting water with some force from its stem; the stem was cut and after some time the water stopped flowing. Similiar showers were observed under several other species, e. g., *Cinamomum*, *Albizzia stipulata*, *Vateria indica*, *Terminalia belerica* &c. The water was ejected at various angles to the vertical, and with some force to form a jet about 18-24 inches in length before it fell in sprays and also at regular intervals as if the water was being pumped out.

This is not Transpiration which is invisible when it takes place and it takes place only in the form of vapour through the stomata in the leaves; in all the instances in which the exudation of water was observed the trees were either leafless or with very young leaves and the water flowed out from the leafless branches through probably,

the openings caused by the fall of leaves, when the connection between the petiole and the stem is severed and the conducting vessels ruptured; or it may be through the cortical pores and breathing organs of the stem.

The amount of transpiration taking place in plants is astonishingly large. The sunflower is said to give off about 60 lbs. of water during the five months of its life, while a beech tree gives 175 lbs. a day—an acre of beech about 1500 tons during the summer, equivalent to about 15 inches of rainfall over an acre. (Figures for Indian trees are not available.) Compared with these figures, the quantity of water brought up from the depths of the earth to the atmosphere must be much greater by the method just described and it can be understood how important the preservation of forests is and how materially they add to the rainfall of the country. The rainfall around Kannikatty exceeds 100 inches per annum. How much of this is contributed by the forests would be interesting information.

Another point of interest furnished by the phenomenon referred to is a consideration of the nature of the various forces that cause the rise of sap in trees, apparently defying the law of gravity.

Capillarity is one of these forces. The vessels of the wood through which water is conducted from the root are very narrow and some of them are as much as 3 to 5 yards in length. The surface tension to produce a rise to a height of 3 to 5 yards must be very great. Root pressure is another force by which the sap is forced up the stem. Leaf suction plays an important part in drawing up a column of water to the foliage and finally it is thought that living cells perform a sort of pumping

action known as wood lift. To produce a jet of 24 inches the pressure exerted must be considerable.

R. E. Lemos,
Forest Ranger, Ambasamudram.

Life in the Madras Forest College as compared with the life in a Range.

Almost all the students, either Government or Native states, should have had at least 6 months, practical training in a forest before they have been deputed to the Forest College for training. So when we compare our present life in the College with that of our previous life in the ranges, many vivid advantages and disadvantages appear before our minds. A discussion of a few of these, at least, will not be out of place here.

Of the many advantages, some of them can be summarised as follows:—

(1) Here in the College, we lead a pure student life (with of course practical exercises), in headquarter terms increase our knowledge by attending to lectures and studying books whereas in the Range we will have no scope and time for doing this. Moreover, the duties of a Range Officer, are such that a high responsibility is thrown around his neck. He must deal with the cash properly, spend it in works as sanctioned, pay the subordinates, collect & remit revenue in time, protect the forest and so forth. So he must be very careful in the correct discharge of his duties; but, we, at the College have no such responsibilities except our application to the studies.

(2) Then again, there may be villages of many factions in a Range and no party should be specially favoured as the aggrieved party may cause such a severe damage to

our forests such as setting fire to the forests &c., So one must be very impartial and must carefully act so that one may gain the good will of the people, which is one of the important measures for preventing forest fires. Here at the College, we do not have any of these troubles.

(3) We improve our mental knowledge by frequent references to the books at the College Library and to the various journals and magazines, which are easily accessible to us, whereas, in a Range the scope for this is very much limited.

(4) As our touring places are distant and varied and as we visit various forests of different aspects we improve our practical knowledge by such visits, whereas, in a Range, we will confine ourselves to our ranges only and hence there is very little chance of improving our practical knowledge in Forestry.

(5) We are always under the supervision and guidance of the Principal and the Instructors whose watchful eyes are always for correcting and remedying our faults and defects. But in a Range, we will meet the District Forest Officer, only once in 2 or 3 months as he has work in other ranges also, and hence our defects and faults cannot be properly remedied.

(6) As our Instructors camp with us in our tours, we have every chance of clearing our doubts whenever any difficulty arises but in a Range, in the absence of the District Forest Officer, we have no other chance of clearing our doubts except from books or we have to wait till the District Forest Officer arrives.

(7) True to the saying, that example is better than precept, we learn every piece of work by doing it practically in our tours such as forming nurseries, weeding, cleanings and thinnings &c., in silvicultural excursions and road

alignment, building bridges and culverts, Levelling &c., in our Engineering and Survey excursions, whereas, in the range we were only supervising and extracting work from coolies.

(8) Here we have a good scope of taking active part in the games such as foot-ball, badminton, cricket hockey &c., and thus we can cultivate the habit of endurance. But in a range, there is very little chance for this, as we will be camping in the interior of the forest for a major portion of the month.

(9) Here we meet students come from different parts of the Presidency and even from outside it and a close friendship springs among us which gives rise to many social functions such as social gatherings &c., whereas, in a range, this is not possible.

(10) We get good vacations such as summer and Christmas holidays, to give a complete rest to our brains but in a Range, this is not possible.

The main disadvantages may be said as follows:—

(1) As our touring places are far and distant, the cost of the journey and the transport of our kits, drains our pockets at times, but in a Range, we need not travel so long a distance and need not spend so much thereby.

(2) Some of our camping places, are somewhat malarious such as Nedungayam &c., and the cold weather tour is rather a long one. Hence one must be very careful about one's health so that one may not suffer from the attacks of malaria.

In conclusion, by comparing the above merits and demerits of the question, the merits form the majority and hence it goes without saying that the life in the College is

more advantageous to one than one's previous life in the Range.

A. Junior.

A junior might have added that a student is saved the burden of tappal, that his time for a large proportion of the day is his own, that all transport arrangements are made for him, that he is provided with most comfortable quarters, that a medical officer is almost always with him, and that he is secure from all the worry and strain of protection against Fire, Theft, and illicit Grazing. He is certainly under strict discipline, the advantages of which he will some day vividly appreciate.

Editor.

Forest Administration in the Punjab.

(Extract from the Pioneer, Monday, May 13. 1918).

There is little doubt that the Forest Department owes such appreciation of its work as is observable to the great expansion that has taken place on the commercial side of its activities. As a nation, the British are woefully ignorant of forestry but few people can better realise successful commercial enterprise when they see it. It is for this reason probably that the commercial aspect of forest work makes the greater appeal to the general public, for it is able to visualise the progress that is being made when the results can be expressed in rupees. It requires little knowledge of forestry for instance, to appraise at its true worth the development in the resin industry, in the Punjab, for there can be no question as to the success of an undertaking which can show a return on the year's working of 144 per cent on the capital invested. But for the most part the results of the forest officer's labours are not so obvious. "It may safely be said," it was stated in the introduction to a little book that was published on the

work of the Forest Department, some time last year "that there is hardly any Government Department in India whose work and aims are so little realised by the general public as are those of the Forest Department. For one thing the work of the forest officer lies for the most part in remote places, so that few have knowledge of it. For another the practical results of forest work are apparent only after long periods of time, so that the forest officer has to cultivate the habit of thinking in half centuries and to be content that the full effects of his labours shall be visible only to future generation." Although at the moment commercial development is serving its purpose by bringing the work of the department more into the limelight and forcing attention to the vast resources that are waiting to be exploited, yet the fact cannot be overlooked that the future of our Indian forests depends, to a very large extent, on less obtrusive work in the jungle and on patient investigation both in the field and in the laboratory, for commercial expansion might well lead to disaster unless it were accompanied by equally, or even more, rapid progress in silviculture.

The latest report on forest working shows that in the Punjab there is no cause for anxiety on this account, for although on the commercial side expansion has been abnormally rapid, progress on the technical side has, if anything, been even more pronounced. In fact, the enormous advance that has been made in the silvicultural knowledge of the more important forest trees of the province has, for those who can measure progress in this direction, been one of the outstanding features of forest work in the Punjab in recent years. The problem of the regeneration of deodar, a question which has taxed the ingenuity of more than a generation of forest officers, is now well on its way to solution. Sufficient experience has been gained to justify the replacement of the present,

admittedly unsuitable, methods of treatment by a more intensive system of management, which will not only bring the forests into a condition more nearly approaching the ideal, but will also in course of time tend to produce a yield far surpassing anything hitherto obtained. With the advance of silvicultural knowledge many of the existing working plans have become obsolete, and steps are being taken to revise them as rapidly as the present shortage of establishment will permit. Up-to-date management has already been introduced in the Rawalpindi division, and the revision of Kangra and Kulu plans on similar lines has been taken up and considerable progress, it is stated, was made during the year under report. There is little doubt that the war has greatly retarded any movement in this direction, and when conditions are again normal a great deal of headway will have to be made up, particularly in revising the working plans for the hill forests. The provisions of the existing sanctioned plans were generally carried out, though the prescribed yield could not be fully worked out in the Rawalpindi and Kangra divisions, despite the enormous demand for all classes of timber. It is anticipated that with the splitting up of the Rawalpindi division which has recently been sanctioned, it will in future be possible to work out the whole of the prescribed yield, but in Kangra the quality of chir timber that is grown is so inferior that unless the development of subsidiary industries creates a market for this class of material, there is little hope of being able to dispose of the full outturn.

Altogether there was a reduction of nearly 600 square miles in the area under the control of the Forest Department during the year 1916-17. But this was due almost entirely to the surrender of waste lands in Multan for colonisation purposes, and there was no reduction in the area under forest growth, for as the resolution on the

report points out, it is not the policy of Government to disforest such areas in the plains which can hereafter be utilised as fuel reserves. In fact the necessity for establishing extensive irrigated plantations has already been recognised, and the scheme for maintaining 60,000 acres under plantation in the new colonies is now complete. Further progress is reported in the attempt to evolve some sort of order out of the chaos of the Kangra Forest Settlement. The general principle which has been adopted is to select and demarcate the areas to be retained by the department under a system of rotational closures and to hand over everything outside the demarcation to the Deputy Commissioner for management. In his review on the report, Sir Michael O'Dwyer expresses the hope that "a further advance in the transfer to district management will be made as soon as possible, as this will afford a practical demonstration to the people of the desire of Government to withdraw restrictions so far as may be, and will thus help to reconcile them to the scheme of rotational closures in the areas selected for conservation and regeneration." It remains to be seen whether the people will find district management any less irksome than the control of the unpopular Forest Department, but in any case the latter will score in being saved the expense and worry of having to manage a large number of areas which can never repay the attention devoted to them, and in being able to concentrate its energies on the forests, which really are worth looking after. Settlement operations were also being carried out in the Sutlej Valley forest of the Bashahr State the main feature of which was the voluntary giving up by the Zamindars of a great deal of included cultivation in exchange for portions of forest near their villages, and there is little doubt that this readjustment of areas will be beneficial both to the villagers and to the department.

Occasional Notes.

The catalogue of the College Library has been printed.

The catalogue of the Students' Library has been printed.

The January number of the Agricultural Journal of India, which will in due course be placed on the table of the College Library, contains an illuminative and significant article dealing with the toxicity of trees. We commend its careful perusal to all thoughtful students.

We understand that a 2nd Conservator-ships has been formed in the Panjaub for 1st April 1918.

In the Sundarbans (the largest block of Forest in India, the second largest block being the Nullamalais) about one tiger per week is shot.

In Bengal nearly the whole of the Reserved Forests is closed to all grazing.

Miscellanea.

Capital at $3\frac{1}{2}\%$ compound interest doubles itself in 20 years.

at 4% in just over 17 years.

at 5% in just over 15 years.

"In its forests lies the heart of a nation, and a people without forests is very close to extinction."

A. Theuriet.

The Zurich Town Forest has been a High Forest for over 1000 years, and under systematic management since the 13th century. It is to-day one of the most perfect and profitable forests in the world. The clean annual profit is Rs. 37-8-0 per acre.

Many villages in France and Switzerland, thanks to the profits derived from their Village Forests, pay no taxes: on the contrary the schools, Village Offices etc., are built at no cost to the inhabitants who also get all fuel and even electric light free.

It is merely a question of the true communal spirit and efficient Forest management.

"A treeless earth would be an inferno. The difference between the maximum and minimum temperatures would be enormous. The result would be floods, typhoons etc., etc., and springs would dry up. Instances are well known of the effects of deforestation in Mauritius and in many parts of India etc. and no amount of statistics will disprove the practical results observed.....Given two worlds, one with the surface covered with forest and the other covered with ploughed fields, and I do not think that even the Weather Bureau at Washington would necessitate very long in plumping from the forest-clad earth: a penn'orth of practice is worth a pound of theory."

It has been suggested that coffee leaves should be suffused for "Tea" and that tea berries should be ground for "Coffee"

For each minute of time the world strikes 3,000,000 matches.

The *Acacia dealbata* was introduced on to the Nilgiris in mistake for *Acacia decurrens*.

The original price of *Euclypts globulus* at Ootacamund was 12 annas per plant.

The world's annual supply of paper is 9,000,000 tons. For paper making India's geographical position is exceptionally favourable, as it is half way between the east and west: China, Japan, Australia should all come to India for paper or pulp.

The average bamboo forest should be worth from Rs. 2 to 3 per acre in Royalties.

Locusts are said to hold up trains in Bikanir.

An arrest of growth is the immediate result of working elephants too young.

A bamboo culm transplanted to Europe seeds and dies at the same moment as the parent culm.

The sporadic seedling of bamboos is said to give infertile seed only.

Pinus longifolia coppices.

Women in the Vizagapatam District are said to carry 120 lbs. firewood on their heads.

Madras produces more indigo than any other province.

"Carat" as a weight for diamonds comes from the fruit of *Ceratonia siligna*—the locust tree—Daisy-Day's eye.

The Albizzia lebbek is said to be the tree of the Knowledge of Good and Evil.

"For many years Billian, a wood that grows in Borneo, was considered the strongest timber in the world, but a new rival has been found in Australia known as Yate. Its average tensile strength is 24,000 lbs. per square inch, equal to good cast iron. Many specimens are much stronger, one being tested up to $17\frac{1}{2}$ tons per square inch. The tree grows to a maximum height of 100 feet, with a diameter of $2\frac{1}{2}$ to 3 feet. There are many purposes in machine construction, to which such timber might be applied: probably also in the structure of vehicles, and particularly of wooden wheels.

(Indian Textile Journal).

Balsa (*Ochroma lagopus*) is a tropical American tree having a very soft wood that the Missouri Botanical Garden has shown is only about half as heavy as cork.

This wood is being used in life-rafts, life-belts, and for buoys of various kinds, and is claimed to be preferable to cork in other respects as well as in lightness-(Capital).

The Highest Tree in the world is a Redwood on the Eel river-340' measured by Sargent in 1896. The highest known Eucalypts are an *Amygdalina* 303' and a *regnans* 326' (Elves and Henry). The Edallutty Teak, which used to be visited by former Divisions, is situated about 7 hours journey to the east of Nedungayam: when last measured was about 187' in height and 15' 8" in girth.

A right-handed chank shell is worth one lakh, a left-handed chank nothing at all.

To render all mushrooms safe: boil them for 2 hours in water to which salt or vinegar has been added: strain off: wash them in hot water and cook.

Sequoia Washingtonia is supposed to live 3000—5000 years.

Largest recorded teak log $82\frac{1}{2}$ ' X 10' m. g. girth over 12' at base: 7' at top end; volume 517 cubic feet, weight $10\frac{1}{2}$ tons; launched into a tributary of the Sheveli river by Messrs. Darwood in 1898.

African elephant has 3 toes on the hind foot.

Indian " " 4 " "

An African elephant 12' 2" has been shot.

The African elephant has probably never been tamed. It is believed that the elephants used by Hannibal for war purposes were the Indian species.

Evidence of intelligence in plants.

(i) A living insect was pinned $\frac{1}{2}$ " from the leaf of the American sundew. In 2 hours the leaf had moved near enough to secure its prey by means of its tentacles.

(ii) A tiny pebble placed among the tentacles of a sundew is at once seized by them, but peptic fluid is not exuded. Hence the plant possesses a power of discrimination.

A tea-spoon of quinine smoothed off equals 20 grains.

Cholera remedies.

I. Acid Acetic dilute	....	6 drams.
Tincture Camphor Co.	....	3 "
Spirits Aetheris Nitrosi	...	2 "

Spirits Chloroform 1½ „
 Liquor Hydrargyri Perchlorid 2 „
 Aqua or decoction Cinnamom 6 ounces.

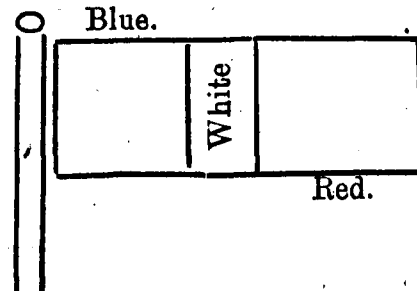
Mix in a bottle and give about quarter to half a wine-glassful (or half to one ounce) of the above mixture every half an hour till amelioration sets in, and then less frequently every 1, 2 or 3 hours.

In places where there is no chemist's shop the ingredients and an ounce measure and a minim glass may be purchased and kept ready for use and the mixture compounded whenever required.

II. 30 drops strong acetic acid.
 10 drops sweet spirit of nitre.
 Wineglass of water.

The very first dose will check the disease in many cases. One dose alone proved successful in curing the disease. No water is to be given for the first three hours. If very thirsty you may give a piece of ice, if procurable, or a few drops of water to wet the month. After three hours arrowroot conjee should be given, also water if required. If the disease is not controlled by the first dose, give second dose after six hours time.

The French Flag Blue, white and red: thus.



The red occupies the widest proportion.

The white occupies the narrowest

The blue „ mean „

The proportions [here intentionally exaggerated]

of the three colours are so adjusted by the Science of optics, to ensure the greatest visibility at the maximum distances.

The origin of the tricolour is that each of the three villages called Martigue (near Marseilles) had one of these colours as its own flag. The villages were contiguous.

“Every Forest Officer is the Priest of a true religion”

Edwin Arnold.

List of Contributions to the Gass Forest Museum since April 1917.

No.	Contribution.	Contributors.
1.	One mat made by beating out the inner bark of <i>Kigelia pinnata</i> .	Mr. Sankara Alwa, Student M. F. C. 1916—18 division.
2.	A plate showing charcoal burning operations at Sadivayal by M. F. C. Students.	Mr. A. Seshagiri Rao, Student M. F. C. 1917—19 division.
3.	Three photographs of a fungus (<i>Dictyophora phalloidea</i> Desv.)	F. L. C. Cowley-Brown, Esq., I. F. S.

List of contributions to the Collage Library.

The following books have been kindly contributed to the Students' Library by the Principal.

Glimpses of the Globe.
 Starry Heavens.
 Social Sketches.
 Tale of French History.

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Gazette Notifications.

March 5, 1918.

Under article 260 of C. S. R., M. R. Ry., K. R. Venkatarama Ayyar, Avergal, District Forest Officer, South Vellore, is granted privilege leave for two months and fifteen days from or after the 16th April 1918.

M. R. Ry., K. A. Chengappa Avergal, District Forest Officer West Vellore, to be in charge of South Vellore, in addition to his present duties, during the absence of M. R. Ry., K. R. Venkatarama Ayyar Avergal on privilege leave.

M. R. Ry., P. Govinda Menon, probationary Extra-Assistant Conservator of Forests, South Malabar, is granted privilege leave for one month from or after 16th March 1918.

M. R. Ry., R. Manikkam Pillai, Ranger, fourth grade, Perambalur, is granted privilege leave for fifteen days from the date of relief.

M. R. Ry., M. Rangasayi Nayudu, Ranger, fourth grade, is granted privilege leave on medical certificate for two months and twenty four days from 1st February 1918.

W. A. Mekkeri Sahib, Ranger, fourth grade, is granted an extension of leave on medical certificate for six months in continuation of the leave granted to him in this Office Service Order No. 101, dated 4th August 1917.

March 12, 1918.

Under articles 242 (a) and 260 of the C. S. R. Muhammad Abdul Hafiz Sahib Bahadur, probationary Extra Assistant Conservator of Forests, South Cuddapah, is granted privilege leave for one month and twenty-two days from or after 15th March 1918.

The following grade promotions are made in the class of Rangers with effect from 1st March 1918.

M. R. Ry., C. Sankunni from second grade permanent to first grade *sub pro-tem*.

Mr. C. Mahony from second grade *sub pro-tem* to second grade permanent.

(i)

Gazette Notifications.

June 5, 1917.

Mr. Francis Loftus Cowley-Brown, on return from leave, to be Principal of the Forest College, Coimbatore.

Mr. Cecil Ernest Claude Fischer, Deputy Conservator and Principal Madras Forest College, Coimbatore, to be District Forest Officer Nellore, vice Mr. H. F. Arbuthnot deceased.

D. V. Krishna Rao, Deputy Ranger, third grade, Upper Godavari is posted to act as Ranger, sixth grade, with effect from date of taking over charge of the Cherla range i, e., 23rd March 1917.

M. R. Ry., C. D. Parthasarathi Chetti, ranger fourth grade, is granted extension of leave on medical certificate for three months from 26th April 17 in continuation of the leave granted to him in service order No. 41, dated 14th April 1917.

June 12, 1917.

1. M. R. Ry., K. M. Gopala Achari, Ranger IV grade, in charge of Palnad range, Guntur District, is granted privilege leave on medical certificate for six weeks from date of relief (afternoon of 26th May 17).

2. M. R. Ry., B. K. Krishna Rao, Ranger IV grade in charge of Vinukonda range, Guntur district, to be in charge of Palnad range in addition to his own, vice No. 1 on leave.

The following men are confirmed as Rangers VI grade from 1st May 1917 to fill up the existing vacancies.

(1) P. S. Varadakrishnamachari, M. R. H., Deputy Ranger 1st grade and acting ranger VI grade, in charge of Sriharikota range, Nellore district,

(2) B. V. Vaideswara Iyer, Deputy Ranger first grade and acting Ranger VI grade in charge of Bukkapatnam range, Anantapur district.

(3) M. Krishna Iyer, Deputy ranger first grade and acting Ranger VI grade in charge of Vempalli range, West Cuddapah district.

(4) L. Govindasami Pillay Deputy Ranger second grade and acting Ranger V grade in charge of Chittoor Range, Chittoor District. The appointments of Nos. 3 and 4 are subject to the approval of the Board.

M. R. Ry., G. Rama Rao Ranger, fourth grade sub-protem in charge of Harpanhalli range, Bellary District, to hold charge of Kudligi range, as a temporary measure in addition to his own, till he is relieved by

(ii)

C. S. Ramanathan, Deputy Ranger, second grade, on return from Madras Forest College.

M. R. Ry., G. Rama Rao, Ranger, fourth grade sub-protem Bellary district is reverted to his permanent post in fifth grade with effect from 1st June 1917.

G. D. David, Deputy Ranger 3rd grade Upper Godavari, is dismissed from Government service as he was convicted, under section 409, Indian Penal Code, in C. C. No. 8 of 1916 on the file of the joint Joint Magistrate, Bhadrachalam, which conviction was upheld on appeal.

The following postings and transfers of rangers and deputy rangers are ordered:—

(1) A. Subramaniya Iyer, now at the Madras Forest College to Owk range, Kurnool South.

(2) B. Gulam Destagiri, to Berhampur range, Ganjam district.

(3) K. Tiruvenkatachari, to Gundalabrameswaram range, Kurnool West.

(4) A. Manikka Mudaliar, to Cherla range, Upper Godavari.

(5) Mr. S. A. Dawson, Pecheruvu range Kurnool West.

(6) M. R. Ry., A. Rama Hebbar, on expiry of the privilege leave for one month and fifteen days granted to him is posted to Bandar range, Kistna district.

(7) M. R. Ry., C. Ramasami Naidu, Ranger 3rd grade, on expiry of privilege leave for three months granted to him is posted to the Dhone range, Kurnool West.

M. R. Ry., C. Ramasami Naidu, Ranger 3rd grade Upper Godavari is granted privilege leave for three months with effect from date of relief. Range Officer Marrigudem will be in charge of Palusumamidi range also in addition to his own.

M. R. Ry., B. Krishnaswami Rao M. R. H., Ranger, fifth grade, Kurnool West, is transferred to Upper Godavari for the charge of the Pulusumamidi range.

M. R. Ry. T. G. Sankaran Nair M. R. Honors, Range Officer Polur is granted privilege leave on medical certificate for three months from date of relief.

M. R. Ry., G. N. Subba Rao, Probationary Ranger, is posted to the Polur range temporarily until he is relieved by

(iii)

S. M. Srinivasagam Pillay posted to this range in S. O. No. 53 dated 1st May 1917.

The combined leave for seven months granted to M. R. Ry., N. Swaminatha Iyer, Ranger 2nd grade, in S. O. Nos. 147 of 16 dated 13th October 16 and 9 of 1917 dated 24th January 1917, is extended by two months.

A. G. Jesudasan Pillay, Acting Ranger, sixth grade, South Malabar, is granted privilege leave for one month with effect from 15th June 1917 or date of relief.

June 19, 1917.

M. R. Ry., George Venugopal Avergal, District Forest Officer, West Vellore, to be also Deputy Collector in the North Arcot district.

M. R. Ry., K. Gajaraja Mudaliar, Extra Assistant Conservator of Forests, working under the District Forest Officer, South Coimbatore, will be considered to have been on privilege leave for three days from the 23rd to the 25th December 1916.

M. R. Ry., A. Hanumantha Rao, Extra Assistant Conservator of Forests, on probation, to act as District Forest Officer, Nellore, until relieved by Mr. C. E. C. Fischer.

Under article 260, Civil Service regulations, the Board grants privilege leave for one month to M. R. Ry., A. Raju Naiyaker, District Forest Officer Vizagapatam, from date of relief.

Mr. D. A. Stracey, Extra Assistant Conservator of forests, will be in charge during M. R. Ry., A. Raju Nayaker's absence on leave.

The one month's privilege leave on medical certificate granted to M. R. Ry., T. K. Ramaswami Ayyar, Ranger 3rd grade North Cuddapah District is extended up to 4th July 1917. The existing arrangements to continue.

Mr. Syed Munavar Sahib M. R. H., Ranger 6th grade, south Salem division, is granted privilege leave for twenty days from 28th May 1917 or from date of relief.

M. R. Ry., C. P. Garudachala Mudaliar, Ranger, 4th grade South Coimbatore is granted twenty days' privilege leave with effect from the 16th June 1917 or from date of relief.

(iv)

A. Nicholas, M. R. H., Ranger 5th grade, working-plans duty is granted privilege leave under article 260 of the Civil Service Regulations for the period from 18th March to 16th June 1917.

June 26, 1917.

The leave without allowances for two months granted to Mr. W. S. Fernandez, Ranger, Kristna District is extended by four months' leave on medical certificate.

The following transfers of Rangers in Ganjam district are ordered :—

M. R. Ry., B. Punniiah, Ranger, 5th grade, from Mojjagoda to Bontha range.

Mr. C. S. King, from Bontha to Mojjagoda range.

V. Jaganatham Pillai, Deputy Ranger, 1st grade, Anantapur district is appointed to act as Ranger, 6th grade, with effect from 18th May 1917 afternoon, viz., S. M. Razvi Sahib appointed as Assistant Instructor, Vernacular Training School and is posted to Kalyandrug range of the same district till his relief by Deputy Ranger P. Dhananjaya Rao, on return from the Madras Forest College early in July 1917.

Mr. J. M. Abraham, Ranger, 4th grade in charge of Adoni range, Bellary district is granted privilege leave for fifteen days from 10th to 24th July 1917, both days inclusive.

M. R. Ry., T. Subbarayalu Nayudu, Ranger 2nd grade, Madanapalli range, Chittoor district is granted privilege leave for one month, with effect from or after the 5th August 1917.

2. Mr. S. M. Razvi Sahib, 5th grade, now doing duty as Assistant Instructor at the Vernacular Training School for 1917, is at the close of the school session, i. e., at the end of July 1917, posted as a temporary measure to the charge of Madanapalli range in relief of No. 1.

July 3, 1917.

Mr. Francis Loftus Cowley Cowley-Brown to be Deputy Conservator of Forests with effect from the date on which he assumed charge of the post of Principal of the Forest College, Coimbatore.

(v)

Mr. Hugh Alison Latham, Deputy Conservator of Forests, to be Conservator of Forests, third grade sub-protem, with effect from 21st May 1917.

In modification of this office service order No. 143 dated 6th October 1916 accepting the resignation of M. R. Ry., B. Sanniah, ranger 4th grade, he will be considered to have been on furlough from 26th October 1916 to 4th June 1917, both days inclusive, and permitted to rejoin duty on 5th June 1917.

1. M. R. Ry., M. Muthuswami Ayyer, ranger 3rd grade is transferred from West Vellore to South Salem District for the charge of Salem East Range. To join at once.

2. On relief by No. (1) M. R. Ry., L. R. Narayana Ayyer, Ranger 3rd grade, is transferred from South Salem to Madura for the charge of Cumbum range, vice., S. Venkataswami Nayudu, Temporary ranger 6th grade who reverts to Tinnevely District.

3. M. R. Ry., T. G. Sankaran Nayar, Ranger 3rd grade sub-protem, is on return from privilege leave, transferred from South Vellore to West Vellore, for the charge of Tiruppattur range.

4. S. M. Srinivasagam Pillai, deputy ranger 2nd grade, is, on return from the Forest College, to hold charge of Tiruppattur range until No. 3 joins.

This cancels Srinivasagam Pillai's posting to Polur range ordered in this Office Service Order No. 53 of 1917 dated 1st May 1917.

On the closing of Vernacular Training School M. R. Ry., A. K. Kandam, M. R. H. Ranger 5th grade, is posted to Polur range South Vellore District.

M. R. Ry., T. V. Govinda Row, acting Ranger sixth grade is posted to the Cuddalore range, South Arcot District.

M. R. Ry., R. Guruswami Ayyer, ranger 1st grade South Mangalore division, is granted privilege leave under article 260 of the Civil Service Regulation for two and a half months from 1st July 1917 or date of relief.

R. Rama Ayyar, Deputy ranger 2nd grade to be in charge of Kasaragod range during the period S. Srinivasa Rao, M. R. H. Deputy ranger 2nd grade or acting ranger, sixth grade to be ranger sixth grade with effect from 29th June 1916.

(vi)

M. N. Raman Pillai, M. R. H. Probationary Ranger 6th grade to be Ranger, 6th grade with effect from 10th August 1916.

B. Sambamurthi Ayyar M. R. H. Probationary Ranger 6th grade, to be Ranger, 6th grade with effect from 1st September '16.

K. Venkataramanan M. R. H. Deputy ranger, 1st grade to Satyamangalam range, North Coimbatore.

C. Karunakara Menon, student Forest College M. R. H. to Sankaranarayana range, Mangalore North.

M. Rama Rao Kine, M. R. H. Deputy ranger 2nd grade to Uppinangadi range, Mangalore South.

P. Karunakara Menon, M. R. H. student Madras Forest College to Coonoor range, Nilgiris.

July 10, 1917.

M. R. Ry., T. M. Duraiswami Pillai, Head Clerk District Forest Office Chinglepet District on Rs. 40—2—50, is appointed to act as Ranger, 6th grade, on probation for 6 months and is posted to Chinglepet District in connection with the introduction of the Kancha grazing system into that district.

The leave on medical certificate for six months granted to Mahammed Asadulla Ghatela in the Office Service Order Nos. 17 and 37 of 1917 is extended by 3 months and Deputy ranger K. T. Venkatachari, will continue to act for him pending further orders.

1. M. R. Ry., N. L. Narasimham ranger 4th grade upper Godavari is granted privilege leave for 3 months with effect from date of relief by D. V. Krishna Rao.

2. D. V. Krishna Rao, on relief by A. Manikka Mudaliyar, M. R. H. is posted to Lakkavaram range to relieve No. 1.

The following revision of postings of Deputy rangers coming out of Madras Forest College is ordered :—

A. Manikka Mudaliar M. R. H. to Gundalabrahmeswaram range, Kurnool west.

K. Tiruvenkatachari M. R. L. to Pecheruvu range, Kurnool West.

S. A. Dawson, M. R. L. to Lakkavaram range, Upper Godavari.

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This cancels the postings of the above three to Cherla, Gundlabrahmeswaram and Pecheruvu ranges respectively.

M. R. Ry., S. M. Krishnaswami Ayyar, ranger 4th grade, Ambur range, North Vellore division, is granted two months privilege leave from date of relief by K. Jayaram, M. R. H. returning from the Forest College, Coimbatore.

July 17, 1917.

The six weeks privilege leave granted to M. R. Ry., K. M. Gopalachari, Ranger 5th grade Palnad Range, Guntur District in this Office Service Order No. 71 of 1917 dated 31st May 1917 is extended by a week, that is up to the end of 14th July 1917. The existing arrangements already ordered will continue.

M. R. Ry., L. S. Krishnan Avergal, Probationary Extra Assistant Conservator of Forests, is transferred from Madura to Tinnevely to work under the order of the District Forest Officer.

M. R. Ry., K. Ramaswami Ayyar, Ranger 2nd grade, the Nilgiris is granted combined leave for 6 months privilege leave for 3 months and furlough for 3 months) with effect from the date of relief from Coonoor Range.

The following appointments of Rangers are ordered with effect from 30th June 1917.

P. K. Karunakara Menon, M. R. H. to act as Ranger 6th grade sub-protem.

K. Venkataramanan, M. R. H. Deputy Ranger 1st grade to act as ranger 6th grade sub-protem.

C. Karunakara Menon, M. R. H. to act as ranger 6th grade sub-protem.

M. Rama Rao Kini, M. R. H. Deputy Ranger, 2nd grade to act as Ranger, 6th grade sub-protem.

E. T. Ramapuram, Deputy Ranger 2nd grade and acting Ranger 6th grade is transferred from Mangalore South division to Mangalore North division to take charge of Mangalore Range.

M. R. Ry., N. Swaminatha Ayyar, Ranger 2nd grade, Nilgiris, on combined leave, is posted to Bhavani range, North Coimbatore on return from leave.

Mr. R. Mitchell, Probationary Extra Assistant Conservator, the Nilgiris, is transferred to Working plans duty under the District Forest Officer, South Coimbatore. To join expeditiously.

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24th July, 1917

Mr. V. T. Staggs, ranger 3rd grade, lower Godavari, is granted privilege leave for three months with effect from date of relief.

M. R. Ry., S. Ramaswami Ayyar, ranger 1st grade on return from leave is posted to Gokavaram range, lower Godavari, to relieve No. 1. This cancels the posting of ranger Ramaswami Ayyar to Berhampur.

M. R. Ry., V. P. Narayana Menon, ranger, 4th grade, in charge of Badvel range, North Cuddappah District is granted privilege leave for one month with effect from date of relief.

M. R. Ry., Sidha Pillai, ranger 5th grade in charge of Porumamilla range of the same district to hold charge of Badvel range in addition to his own in relief of No. (1).

The privilege leave for one month and fifteen days granted to ranger A. Rama Hebbar in Service Order No. 77 of 1917, dated 5th May 1917, is extended by fifteen days.

T. E. Varadachari and C. T. Tiruvengadam, Supernumary rangers, sixth grade, on probation, are confirmed as rangers, sixth grade, in the regular line in the above order.

M. N. Raman Pillay, ranger, 6th grade on Working Plans duty, is granted leave on medical certificate, under article, 336 of the Civil Service Regulations, for two months with effect from 11th July 1917.

July, 31st 1917:

(1) M. R. Ry., V. N. Seshagiri Rao, sub-protem ranger, first grade, Chittoor District, and Senior Instructor, Vernacular Training School, 1917, Central Circle, is granted privilege leave for one month with effect from or after 5th August 1917.

M. R. Ry., L. Govindaswamy Pillay, Deputy ranger, 2nd grade appointed to act as ranger 6th grade, in this Office Service order No. 30, dated 2nd March 1917, will continue to act, vice No. (1) on leave and to be in charge of Chittoor range.

M. R. Ry., V. N. Seshagiri Rao, ranger 1st grade sub-protem, is on return from leave, posted to the charge of Chalama range, Chittoor District.

M. R. Ry., T. V. Subba Rao Nayudu, ranger 6th grade, on expiry of his suspension is posted to Ganjam District for duty.

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Departmental Test--Notification dated 7th July 1917, page 1164 Part II, dated 17th July 1917 publishing the results of the Forest Departmental Examination held in January 1917.

All the candidates have passed in the second class.

August 7, 1917.

The fifteen days' privilege leave granted to Mr. J. M. Abraham, Ranger, 4th grade, Bellary District, in this office Service Order No. 95 of 17 dated 23rd June 1917, will take effect from 11th July 1917 (afternoon) instead of 10th July 1917 (forenoon).

The following Deputy Rangers who came out of the Madras Forest College course of 1915-17 with Higher Standard Certificates, are appointed as Acting Ranger sixth grade from 1st July 1917:—

1. C. S. Ramanathan, M. R. H.
2. D. E. Lewin, M. R. H.
3. P. Dhananjaya Rao, M. R. H.
4. T. Paramasivam Pillai, M. R. H.

W. A. Mekkeri Sahib, ranger, 4th grade, is granted combined leave for six months, i. e., privilege leave for fourteen days and leave on medical certificate for the remaining period from date of relief.

M. Amir Padshah, Acting Ranger 6th grade is transferred from North Salem to South Salem for the charge of Pappireddipatti range

Imperial Forest Service.

MONOGRAM.

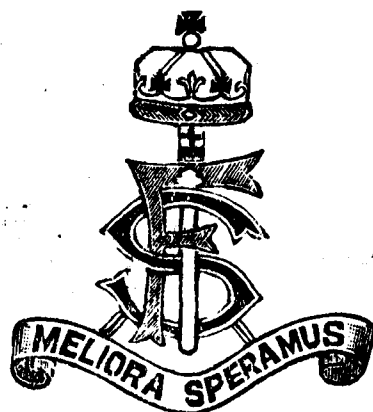
Servants Puggri Badges.

Silver plated Rs. 3 each.

Brass Rs. 2/8 each.

Servants.

Waist and Puggri Bands in I.F.S.
Registered colours Rs. 1/8 set.



Dark Green Kulla to wear
with Puggri each Rs. 0/8/0.

Dark Green arranged ends in
I. F. S. colours Rs. 4/8 each.

Syces' Puggries.

Rangers and Deputy Rangers' silver plated, English made, best quality whistles, complete with whistle cord each Re. 1.

Plain stars for Rangers and Deputy Rangers per pair Rs. 2.

Khaki or Dark green superfine wool, stockings, heavy weight, noted for the excellence of texture, durability and cheapness, turned down tops per pair Rs. 4/12.

Dark green forage caps with black patent peaks and chin straps and silk linings each Rs. 12. Khaki Helmets each Rs. 15.

Besides the above, we hold a large stock of Uniform for Officers and Lower Subordinates, Chowkidars, Chaprasies and Syces, etc., etc. Brass and silver plated badges for belts, leather and cotton belts complete with Badges, Lungies, Kullahs, Putties, Fringes, Gold & Silver, Worsted badges of all description, Durries, etc. etc., samples & prices on application.

We can make and engrave the names of Forest Department on brass plates as per customers instructions and can submit samples for approval immediately, when called for

Tibet musk best quality ... per tola Rs. 36.

Genuine Kabul Asafoetida 12 tolas fresh & best per tin Re. 1.

Cashmere Saffron best No. 1. ... per tola Rs. 2.

Cotton Socks our own make most durable ... per pair Rs. 0-6-0.

Pashmina Shawls with best embroidery work on four corners
3 yards by 1½ yards for gentlemen ... each Rs. 25.

All orders and Communication to be addressed to The Manager,

Munshi Ram Kishan Chand & Co.,

Forest Contractors & Military Outfitters,

LUDHIANA (Punjab.)

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The unexpired portion of the privilege leave granted to M. R. Ry., S. M. Krishnaswami Ayyar, Ranger, 4th grade, is cancelled.

He is transferred from North Vellore division to Tinnevely district for the charge of Tinnevely range. To join at once.

September 11, 1917.

In modification of this office service order No. 114 dated 30th July 1917 the following Deputy Rangers who came out of the college course of 1915—1917 are appointed as permanent Rangers sixth grade, with effect from 1st July 1917 :—

1. D. E. Lewin, 2. C. S. Ramanathan, 3. P. Dhananjaya Rao, 4. T. Paramasivam Pillay.

M. R. Ry., C. D. Parthasarathi Chetti, Ranger, fourth grade, South Arcot district, is granted further extension of leave on medical certificate for two months in continuation of the leave granted to him in this office service order No. 65 dated 28th May 1917.

September 18, 1917.

In suppression of this office service order No. 171 of 1917 so far as it relates to the posting of Ranger P. W. Subbaramayya to Owk range, Kurnool South, the following transfers of Rangers are ordered.

(1) M. R. Ry., P. V. Subbaramayya, Ranger, fourth grade on return from leave to Ellore range, Krishna District.

(2) Mr. K. P. Benjamin on relief by No. 1 to Bezwada range Kistna district,

(3) M. R. Ry., P. Duraiswami Ayyar, Ranger, fourth grade on relief by No. (2) to Cherla range Upper Godavari.

The leave on medical certificate for four months granted to ranger W. S. Fernandez in service order No. 113 of 1917, dated 19th June 1917, is extended by two months.

On the expiry of the leave granted to him, Ranger W. S. Fernandez is posted to Ganjam district for the charge of the Pondakhhol range.

(2) Acting Ranger Abdul Khalak Sheriff will revert to his permanent post of Deputy Ranger, first grade, from date of relief.

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(1) M. R. Ry., C. D. Parthasarathi Chetti Ranger fourth grade, on leave is transferred from South Arcot to North Salem division for the charge of Krishnagiri range.

(2) Mr. L. J. Taylor, M. R. H. on relief by No. 1 is transferred to South Vellore division for taking charge of Santavasal range.

E. Ramaparam, Deputy Ranger, third grade and acting Ranger, sixth grade Mangalore range is to revert to his permanent post and to do duty in the Mangalore North division until further orders.

M. N. Raman Pillai, M. R. H. Ranger, sixth grade, on working plans duty is transferred to Mangalore division to charge of Mangalore range.

In modification of this office service order No. 108, dated 13th August 1917, K. R. Krishnan Nayar, Ranger, fourth grade, the Nilgiris, is granted privilege leave for one month from 3rd October 1917 or date of relief.

September 25th, 1917.

Mr. F. L. C. Cowley-Brown, Deputy Conservator of forests, will be considered to have been on special duty at the Forest College on the 19th and 20th May 1917.

Consequent on the confirmation of Mr. A. Bastain, Ranger, third grade, as Deputy Tahsildar Vizagapatam district, and the removal from service of two rangers, fifth grade, the following promotions are ordered in the class of rangers with effect from 1st July 1917.

Mr. B. R. Salisbury, from third grade sub-protem to third grade permanent.

M. R. Ry., K. N. Sarma, from fourth grade sub-protem to fourth grade permanent.

M. R. Ry., T. Srinivasa Acharya, from fifth grade sub-protem, to fifth grade permanent.

M. R. Ry., P. Chandrasekara Mudaliar, from fifth grade sub-protem, to fifth grade permanent.

Muhammad Asadullah Sahib Ghatala, M. R. L. from 5th grade sub-protem, to fifth grade permanent.

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Mr. Henry Mac Bride, from sixth grade permanent to fifth grade sub-protem.

M. R. Ry. N. E. Kanakayya, M. R. L. from sixth grade permanent to fifth grade sub-pro tem.

M. R. Ry. K. Gajaraja Mudaliar Avergal Extra Assistant Conservator of Forests, South Coimbatore division, is granted privilege leave for a month from date of relief.

(1) M. R. Ry. S. Chidambara Ayyar, M. R. H. Ranger, fifth grade, in charge of Rupur range, Nellore district, is granted privilege leave for one month with effect from 1st October 1917.

(2) M. R. Ry. T. N. Seshagiri Rao, Ranger, second grade, in charge of Udayagiri Range of the same District, to hold charge of Rupur range in addition to his and relieve No. (1).

M. R. Ry. C. M. Kunhiraman Nayar, M. R. hons. Ranger fourth grade, in charge of Rajampet range, South Cuddapah district, is granted privilege leave for one month with effect from 25th October 1917.

Mr. Muhammad Abdul Hafiz Sahib Bahadur, Probationary Extra Assistant Conservator of Forests, in charge of Kodur range, South Cuddapah district, is posted to the charge of Rajampet range in the same district in addition to his own as a temporary measure.

L. Govindaswamy Pillai, Deputy Ranger, second grade, is appointed to act as Ranger, sixth grade, in the arrangement of Mr. Saiyid-ud-din Ahamid Sahib Bahadur, Ranger, second grade, on other duty as temporary Extra Assistant conservation of Forests and to continue to be in charge of Chittoor range, Chittoor district.

M. Krishna Ayyar, Deputy Ranger, 1st grade, is appointed to act as Ranger, sixth grade in the arrangement of M. R. Ry. A. Hanumantha Rao Pantulu Garu, Ranger, first grade, on other duty as probationary Extra Assistant Conservator of Forests and to continue to be in charge of Vempalli range, West Cuddapah district.

The one month's privilege leave granted to M. R. Ry. V. P. Narayana Menon, Ranger, fourth grade, in charge of Badvel range, North Cuddapah district with effect from 12th August 1917 (forenoon) in this office service Order No. 109 of 1917 dated 16th July 1917 is extended by one day.

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October 2, 1917.

Under article 260 of civil service Regulations the Board grants privilege leave for one month from date of relief to Mr. J. S. Scot District Forest Officer, North Salem division.

M. R. Ry. Rai Sahib E. C. M. Maacarenhas Avergal District Forest Officer, South Salem, will be in additional charge of the North Salem division during Mr. Scot's absence on leave.

The leave on medical certificate for six months from 4th February 1917 granted to Ranger R. Veeraswami Nayadu in this office Service Order No. 27, dated 11th February 1917, is extended by six months.

K. Tiruvenkatachari M. R. L. and S. A. Dawson, M. R. L. Deputy Rangers, second grade, are promoted to act as Rangers, sixth grade, with effect from date of taking charge of Pecheravu and Lukkavaram ranges, respectively, vice Rangers B. V. Jogeswara Rao and C. G. Ganapathi on leave.

The leave without allowances for three months granted to Ranger C. G. Ganapathi M. R. L. in Service Order No. 89, dated 20th May 1917, is extended by one and a half months.

On relief in the Parlakimedi Maliahs, K. Narayan Nayar, Ranger, fourth grade, is posted to Kurnool South for the charge of Gundlakamma range.

A. Manikkam Mudaliyar M. R. H. and A Subramanya Ayyar, M. R. H. Deputy Rangers, first grade are appointed as Supernumary Rangers, sixth grade on probation, in the order given above with effect from date of joining Gundlabrahmeswaram and Owk ranges respectively.

M. R. Ry. C. Rajagopal Nayadu, Ranger, second grade South Vellore division, is granted leave on medical certificate for three months from date of relief.

October 16, 1917.

M. R. Ry. M. R. Sundaram Ayyar Avergal is confirmed as Extra Assistant Conservator of Forests with effect from 28th July 1917.

M. R. Ry. O. Venkataramana Ayyar, Ranger first grade, Nellore district, on relief of the Kavali range charge on the forenoon of 27th September 1917 will be considered to have been on special

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duty under the orders of the District Forest Officer Nellore, till 1st October 1917, before proceeding to West Cuddapah district.

M. R. Ry. M. Subbaroil Nayadu, Ranger, third grade, in charge of Nellore Range, Nellore District, is granted combined leave (privilege leave for two months and private affairs leave for four months) for six months from date of relief.

M. R. Ry. T. M. Doraiswami Pillai Probationary Ranger, sixth grade, Chingleput District, is transferred to Nellore district to the charge of Nellore Range and relieve No. (1) forthwith.

M. R. Ry. N. S. Anantacharlu, Ranger first grade, Vizagapatam is granted privilege leave for three months with effect from date of relief.

Mr. V. T. Staggs, Ranger, third grade, on expiry of the privilege leave granted to him is posted to the charge of Palakonda Range, Vizagapatam to relieve No. (1).

P. A. Krishnaswami Mudaliyar, M. R. H. acting Ranger, sixth grade, is granted extension of privilege leave for one month in continuation of the leave already granted to him in this office Service Order No. 113, dated 24th August 1917.

October 23, 1917.

M. R. Ry. T. N. Seshagiri Rao, Ranger, second grade, in charge of Udayagiri range, is transferred to the charge of Nellore range, Nellore district.

M. R. Ry. T. M. Doraiswami Pillai, probationary ranger, sixth grade Chingleput district is transferred to the charge of Udayagiri range Nellore district to relieve No. (1). This cancels paragraph 2 of the office service Order No. 157, dated 15th October 1917.

M. R. Ry. A. Hanumantha Rao Garu, Probationary Extra Assistant Conservator is transferred from Godaveri Upper to Ganjam to work under the District Forest Officer on relief of Mr. Rigold by Mr. P. Venkataramanan.

On expiry of the leave granted to Ranger C. Ganapathi M. R. L. in Service Order Nos. 89 and 205 of 1917 he is transferred to Kurnool East for the charge of the Dornal range.

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(2) M. R. Ry. N. Sundaresa Ayyar, Range Officer Dornal, is transferred to the Korricheruvu range to relieve Ranger Jothinayagam M. R. H. granted leave.

M. R. Ry S. M. Krishnaswami Ayyar, Ranger, fourth grade, is transferred from Tinnevely Range to the charge of Courtallam range.

A. Nicholas, M. R. H. Ranger, fifth grade is posted to Tuna-cadavu range, South Coimbatore. To join at once.

October 30, 1917.

Under article 260 of the Civil Service Regulations M. R. Ry. V. Raman Menon Avergal, District Forest Officer, Trichinopoly, is granted privilege leave for two months with effect from the date of relief.

Mr. D. A. Stracey, Extra Assistant Conservator of Forests, is transferred temporarily to West Kurnool to work under the District Forest Officer until Mr. Madan's (District Forest Officer, East Kurnool) leave is sanctioned. To proceed forthwith.

Advertisement.

NOTICE.

Applications invited for post of Overseer on the permanent scale, Madras Forest College, Coimbatore. Pay Rs. 25/-. Free quarters. Preference to pensioned trained Ranger. Testimonials etc., in original should accompany applications which should reach the undersigned at once.

The work consists mainly in supervising Planting Operations and Sanitation.

F. L. C. Cowley-Brown,
Principal,

Madras Forest College.

Dated 21-1-1918.

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Gazette Notifications.

November 6, 1917.

The one month's privilege leave granted to M. R. Ry., C. M. Kunhiraman Nayar, M. R. Hon. Ranger, fourth grade, South Cuddapah district, from 25th October 1917, in this office Service Order No. 140, with effect dated 19th September 1917, is cancelled.

1. M. R. Ry., A. Siddan Pillai, M. R. H. Ranger, fifth grade, in charge of Porumamilla Range, North Cuddapah district, is granted privilege for two months with permission to affix Christmas holidays with effect from date of relief.

2. M. R. Ry., V. P. Narayana Menon, Ranger, fourth grade, in charge of Badvel range of the same district, to hold charge of Porumamilla range in addition to his own on relief of No. 1.

M. R. Ry., N. E. Kanakiah, M. R. L. Ranger, fourth grade, sub-protem, in charge of Bellary range, Bellary district, having been appointed as Assistant Recruiting Officer, Bellary district, the following arrangement is ordered as a temporary measure subject to the Board's approval:—

V. Jagannadham Pillai, Deputy Ranger, first grade, Anantapur district, appointed to act as Ranger, sixth grade, in this office Service Order No. 126, dated 15th August 1917, on relief of Kadiri range charge by M. R. Ry., R. Alagiriswami Nayudu, Ranger fifth grade, on return from privilege leave, is posted to the charge of Bellary range, Bellary district.

M. R. Ry., V. Narayana Ayyar, Ranger, second grade, Paralakinedi Malahs, is granted privilege leave for one month and fifteen days with effect from date of relief.

(1) M. R. Ry., N. L. Narasimham, Ranger, fourth grade, on expiry of the privilege leave for three months granted to him, is posted to Kurnool East for the charge of Cumbum range.

(2) On relief by No. (1) M. R. Ry., R. P. Jeevappa Nayack, Ranger, second grade, is granted furlough for one year.

Mr. T. I. Chakko, Ranger, third grade is transferred from Tinnevely for duty under Mr. T. N. Hearsey, Extra Assistant Conservator of Forests, on special duty. To join at Denkanikota forthwith.

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M. R. Ry., S. M. Krishnaswami Ayyar, Ranger, fourth grade, is posted for the charge of Tinnevely Range.

November 13, 1917.

Under rule 2, under article 339 of the Civil Service Regulations, Mr. A W. Lushington, temporary Assistant to the Forest Commissioner, is granted leave without allowances for three weeks from 13th October 1917.

November 20, 1917.

The following postings of Forest officers are ordered:—

Mr. D. L. Sathe, District Forest Officer, Chittoor on return from leave to be District Forest Officer, Nellore.

Mr. C. E. C. Ficher, District Forest officer, Nellore to be District Forest Officer, Chittoor from or after 13th January 1918.

Mr. F. R. Madan, District Forest Officer East Kurnool to be District Forest officer West Kurnool.

M. R. Ry., K. Gajaraja Mudaliyar Avargal, Extra Assistant Conservator of Forests, to be District Forest Officer, East Kurnool.

(This cancels notification 372, dated 31st August 1917, published at the page 1077 of part 1 of the Fort St. George Gazette, dated 4th September 1917, granting Mr. F. R. Madan, privilege leave for two months).

Consequent on the retirement of M. R. Ry. A. P. Singaravelu Mudaliyar, Ranger third grade permanent and second grade sub-pro-tem, the following promotions are made in the class of Rangers with effect from 25th August 1917, the date of retirement.

M. R. Ry., P. Velayudhan Nayar from third Grade permanent to second grade sub-pro-tem.

M. R. Ry., T. G. Sankara Nayar, M. R. H. from third grade sub-pro-tem to third grade permanent.

M. R. Ry., P. Muduraimuthu Pillai, from fourth grade, permanent, to third grade sub-pro-tem.

M. R. Ry., A. P. Srinivasa Ayyangar M. R. H. from fifth grade permanent, to fourth grade sub-pro-tem.

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Mr. D. E. Lewin M. R. H. Ranger sixth grade on special duty Kodur Range, South Cuddapah district is granted privilege leave on medical certificate for one month with effect from 9th November 1917.

November 27, 1917.

In the vacancy caused by the reversion of Mr. N. E. Shrigley to the Bombay service, M. R. Ry., V. S. Subramania Ayyar, Forest Ranger, second grade, Northern Circle, is appointed special Forest Officer, Golconda Agency and Hill Madgole in the Vizagapatam district.

Muhammad Habibullah Saheb Bahadur, Extra Assistant Conservator working under the Working Plans Officer, Tinnevely, to the Western circle to work under the District Forest Officer, Coimbatore South.

M. R. Ry., R. Guruswamy Ayyar, Ranger, first grade, from South Mangalore division to North Mangalore division to charge of Coondapoor range.

Mr. K. C. Joseph, M. R. H. Ranger, sixth grade, Puthur range, to charge of Kasargode range, South Mangalore division.

December 4, 1917.

Under article 260 of the Civil Service Regulations, the privilege leave for two months and twenty days granted to Muhammad Habib-ul-lah Sahib Bahadur, Extra Assistant Conservator of Forests is extended by one day.

M. R. Ry., Vallore Raman Menon Avergal, Extra Deputy conservator of Forests on leave, to be District Forest Officer, Guntur, on return from leave.

M. R. Ry., Muthuswami Ayyar Panchapakasa Ayyar Avl., District Forest Officer, Guntur, to be District Forest Officer Trichinopoly, on relief by M. R. Ry., V. Raman Menon Avergal.

M. R. Ry., S. Ramachandra Ayyar, M. R. Hons. Ranger, fourth grade, in charge of Muddanur range, is appointed on special duty to be in charge of hay operations to work directly under the orders of the District Forest Officer, West Cuddapah.

M. R. Ry., D. Venkatramana Ayyar, Ranger, first grade, in charge of Cuddapah range to be in charge of Muddanur range in

addition to his own during the absence of No. (1) on other duty or until further orders. He will relieve No. (1) forthwith.

December 11, 1917.

Under article 260 of the Civil Service Regulations Mr. W. H. Woodhouse Adolphus, Extra Assistant Conservator of Forests, is granted privilege leave for two months with effect from date of relief.

The three week's leave without allowances granted to Mr. A. W. Lushington, C. I. E., temporary Assistant to the Forest Commissioner, is cancelled.

M. R. Ry., Muthuswami Ayyar Panchapkesa Ayyar Avergal District Forest officer, Guntur to be District Forest officer South Arcot *cum* Tanjore, on relief by M. R. Ry., V. Raman Menon Avergal (This cancels notification No. 496 dated 28th November 1917 published on page 1355 of part 1 of the Fort St. George Gazette dated 4th December 1917).

M. R. Ry., K. A. Chengappa Avergal, District Forest officer South Arcot *cum* Tanjore, to be District Forest officer Vellore (West) on relief by M. R. Ry., M. Panchapakesa Ayyar Avergal.

M. R. Ry., George Venugopal Avergal, District Forest officer, Vellore (West) to be District Forest officer, Trichinopoly, on relief by M. R. Ry., K. A. Chengappa Avergal.

Mr. M. C. Chandy is confirmed as Extra Assistant Conservator of Forests with effect from 1st November 1917.

On return from leave M. R. Ry., C. Rajagopala Nayudu, Ranger second grade, is transferred from the South Vellore division to South Arcot for the charge of Tirukkoyilur Range.

M. R. Ry., M. Ambu, M. R. II. Ranger on Working Plan duty, is granted privilege leave under article 260 of the Civil Service regulations for three weeks from 6th November 1917.

December 13, 1917.

Mr. T. Clear, Deputy Conservator of Forests and District Forest officer, Kurnool West, to be on special duty in connexion with the supply of fodder to the Military Department with effect from 31st October 1917.

Consequent on the deputation of Mr. E. W. Fernandez, M. R. H. Ranger, fifth grade, in charge of Kanigiri range, Nellore district, to put in his drills under Indian Defence Force Act at Bezwada, the following posting is ordered:—

Mr. D. E. Lewin, Ranger, sixth grade, working in South Cuddapah is transferred and posted to the charge of Kanigiri Range. He should join forthwith and relieve Mr. E. W. Fernandez.

M. R. Ry., A. Ranganayakulu Ranger, fourth grade, in charge of Sanipaya Range, West Cuddapah District, is appointed as Senior Instructor of the Vernacular Training School of the Central Circle for the 1918 session to be held in the same district.

(2) Kuttappan Pillai, probationary Deputy Ranger, third grade, North Cuddapah is appointed to act as Deputy Ranger, first grade and is posted as Assistant Instructor, Vernacular Training School, Session of 1918. To join immediately on relief in time to open the school on 1st February 1918.

(3) P. M. Mathew, M. R. H. and probationary Deputy Ranger, first grade, South Cuddapah district, is appointed as Ranger, sixth grade, on probation for six months vice Ranger S. A. Ramakrishna Nayadu dismissed and is posted to the charge of Sanipaya Range and to relieve No. (1) immediately after the Christmas holidays.

(4) K. S. Raghavachari, M. R. H. is appointed to act as Ranger, sixth grade, vice No. (1) on other duty as Senior Instructor or until further orders and is posted to the charge of Muddanur range, West Cuddapah district.

The unexpired portion of the two days' privilege leave granted to Mr. D. E. Lewin M. R. H. Ranger, sixth grade, on special duty Kodur Range, South Cuddapah District granted in this office Service Order No. 174, dated 17th November 1917, is cancelled.

M. R. Ry. S. Ramaswami Ayyar, Ranger, first grade is posted for the charge of the Rajahmundry range in addition to his charge to relieve Ranger V. S. Subramaniya Ayyar appointed as Special Forest Officer, Golconda and Hill Madgole.

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M. R. Ry. S. Jothinayagam, M. R. H. Ranger, fifth grade, on expiry of the leave granted to him is posted to the Gokavaram range of Lower Godavari.

(1) M. R. Ry. A. K. Kandan M. R. H. Ranger, fifth grade, South Vellore division is granted privilege leave for one month from 10th January 1918.

(2) M. R. Ry. G. N. Subba Rao, probationary Ranger sixth grade, is posted to the charge of Polur range during the absence of No. 1.

December 29, 1917.

In modification of notification No. 470 dated 16th November 1917 published in Fort St. George Gazette dated 20th November 1917, Mr. D. L. Sathe, District Forest Officer, Chittoor (now on leave) is posted to be District Forest Officer, Nellore, on relief by Mr. C. E. C. Fischer.

1. M. R. Ry., C. Rajagopal Nayudu, Ranger, Second grade, is transferred from South Arcot district to North Salem Division for the charge of Dharmapuri range.

2. Mr. B. R. Salisbury Ranger, third grade, is on relief No. (1) appointed as Instructor Vernacular Training School to be held in South Vellore Division.

January 8, 1918.

On expiry of the leave for six months (i. e. 29th December 1917) Ranger B. V. Jogeswara Rao is posted to Kurnool East for the charge of Morricheruvu range.

On expiry of the privilege leave for three months (i. e. on 1st February 1918) Ranger N. S. Anata Acharlu is transferred to Ganjam for the charge of the Surada range.

C. Narayanan Ranger third grade Kollegal Range is appointed Instructor Vernacular Training School, Nilgiris with effect from the 16th January 1918.

V. G. Appadurai, Deputy Ranger, third grade, South Coimbatore is transferred to Kollegal range. To proceed at once and relieve Ranger C. Narayanan. V. G. Appadurai to act as Ranger sixth grade temporarily.

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The following candidates have passed the departmental test held in July 1917:—

Forest Code and accounts.

V. B. Parameswara Ayyar, Accountant, Collector's Office, Coimbatore—first class.

D. T. Padbhanaba Ayyar, Accountant, Collector's office, Coimbatore—second class.

January 15, 1918.

Under article 260 of the Civil Service Regulations, M. R. Ry., M. R. Sundaram Ayyar Avergal, Extra Assistant Conservator of Forests, is granted privilege leave for two months and seven days from or after the 13th January 1918.

Mr. A. A. F. Minchin, Deputy Conservator of Forests, is, on the termination of his special duty, posted as District Forest Officer Ganjam.

The appointment of K. S. Raghavachari, M. R. H. to act as Ranger, sixth grade vice M. R. Ry., A. Ranganayakalu, Ranger, fourth grade, on other duty as Senior Instructor of the Vernacular Training School, 1918, ordered No. 187 of 17, dated 11th December 1917, is cancelled.

Mr. D. E. Lewin, M. R. H. Ranger, sixth grade, in charge of Kanigiri Range, Nellore district, on relief by Mr. E. W. Fernandez, M. R. H. Ranger fifth grade, is posted to the charge of Muddanur range, West Cuddapah district.

M. R. Ry., T. M. Duraiswami Pillai, Head clerk, District Forest Office, Chinglepet district on Rs. 40—2—50, appointed to act as Ranger, sixth grade on probation for six months in this Office Service Order No. 104 of 17, dated 5th July 1917, and now in charge of Udayagiri range will continue to act as Ranger sixth grade on probation, vice Mr. C. Mahony, Ranger, second grade, sub-protem, on other duty.

M. R. Ry., V. D. Ramalingam Pillai, M. R. H. Ranger, sixth grade, North Vellore Division, is granted privilege leave for one week from 3rd January 1918 in continuation of the Christmas holidays.

January 22, 1918.

M. R. Ry., R. Viraswami Nayudu, Ranger, fourth grade, is posted to the Ganjam district on expiry of the leave granted to him.

January 29, 1918.

Deputy Rangers K. Tiruvenkata Achari M. R. L. and S. A. Dawson, M. R. L. are promoted to act as Rangers, sixth grade, vice Rangers V. S. Subramanya Ayyar promoted as Special Forest Officer, Golconda Agency and Hill Madgole, and R. P. Jeevappa Nayak, granted furlough with effect from date of reversion.

February, 5, 1918.

The unexpired portion of a day's privilege leave granted to M. R. Ry., S. Chidambara Ayyar, M. R. H. Ranger, fifth grade, in charge of Rapur Range, Nellore district in this Office Service Order No. 139, dated 17th September 1916, is cancelled.

(1) M. R. Ry., N. Sunderesa Ayyar, Ranger, fourth grade, is transferred to Kurnool West for the charge of Barluty Range. He should be relieved at once to join expeditiously.

(2) M. R. Ry., M. Krishna Rao, M. R. H. Ranger, fifth grade, is on relief by No. (1) transferred to Kurnool East, for the charge of Dornal Range.

Mr. R. E. Lemos, M. R. Hons Ranger, third grade, is granted privilege leave for one month from 11th January 1918.

P. A. Krishnaswami Mudaliyar, M. R. H. Deputy Ranger, second grade, and G. Devanayagam Naidu, Deputy Ranger, first grade, and acting Rangers, sixth grade are confirmed as Rangers sixth grade with effect from 1st February 1918.

(1) M. R. Ry., N. Swaminatha Ayyar, Ranger, second grade, from Bhavani to Bargur Range North Coimbatore Division,

(2) B. S. Ramaswami Ayyar, Ranger, sixth grade, from Bargur to Bhavani Range North Division.

February 12, 1918.

Under article 260 of the Civil Service Regulations. Mr. H. B. Bryant, Conservator of Forests, Central Circle, is granted privilege leave for forty days from 3rd April 1918 with permission to prefix the Easter holidays to the leave provided the conditions of article 220 of the C. S. R are fulfilled.

February 19, 1918.

Mr. Hugo Francis Andrew Wood, Deputy Conservator of Forests and District Forest Officer, South Coimbatore, to act as Conservator of Forests, third grade, and to be in charge of the Central circle, during the absence on leave of Mr. H. B. Bryant or until further orders.

The privilege leave for one month from 11th January 1918 granted to Mr. R. E. Lemos, M. R. Hons, Ranger, third grade, in this office, Service Order No. 10 of 1918, dated 25th January 1918, is extended by fifteen days. The existing arrangements will continue.

Mr. B. K. Taylor, B. A., is appointed acting ranger, sixth grade, and is posted to Tinnevely for training under District Forest Officer at Tinnevely.

M. R. Ry. Krishnan Avargal, Probationary Extra Assistant Conservator of Forests is transferred from Tinnevely to North Salem.

M. R. Ry. K. R. Krishnan Nayar, Ranger fourth grade, the Nilgiris, is granted privilege leave under article 260 of the Civil Service Regulations for two months from date of relief.

February 26, 1918.

M. R. Ry. V. N. Seshagiri Rao, Ranger, second grade, to be Extra Assistant Conservator of Forests on probation for two years.

Consequent on the retirement of second grade Ranger M. R. Ry. K. Ramaswami Ayyar, the following promotions are made in the class of Rangers with effect from 1st February 1918.

(1) Mr. M. E. Dawson, from second grade sub-pro-tem to second grade permanent.

(2) M. R. Ry. H. Rama Rao from third grade permanent to second grade sub-pro-tem.

(3) M. R. Ry. M. Kuppuswami Nayudu, from third grade sub-protem to third grade permanent.

(4) M. R. Ry., R. Manikkam, from fourth grade permanent to third grade sub-pro-tem.

(5) M. R. Ry., C. Srinivasa Rao, from fourth grade sub-protem to fourth grade permanent, but to be on probation for one

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year from the date of his passing out of the College. This promotion is subject to his securing at least a Higher Standard certificate at the College.

S. Venkataswami Nayudu, Deputy Ranger, first grade, is appointed to act as temporary Ranger, sixth grade, from the date he reports himself for duty before the Special Working-Plans Officer, Tinnevely.

A. Kadir Badsha, Deputy Ranger, second grade and temporary Deputy Ranger, first grade, North Malabar, is appointed temporary Ranger, sixth grade, and posted as Assistant Instructor, Vernacular Training School, Mudumalai, Nilgiri district.

Advertisement.

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

Apply to the Principal,
The Madras Forest College,
Lawley Road Post Office,
Coimbatore, South India.

Indian Forester Volume I.

- " Volume II.
- " Volume III.
- " Volume VIII Nos. 1 and 2 of 1882.
- " Volume IX Nos. 3 and 4 of 1883 (March & April).
- " Volume IX Nos. 6 and 7 of 1883 (June & July).
- " Volume XI No. 5 of 1885 (May).
- " Volume XIII Nos. 3 and 4 of 1887 (March & April) (or the whole of Vol. XIII).

F. Cowley-Brown.
Principal.

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M. R. Ry., C. Ramaswami Nayudu from third grade permanent to second grade *sub pro-tem*.

M. R. Ry., T. K. Ramaswami Ayyar, from third grade permanent to second grade *sub pro-tem*.

Mr. J. D. David, from third grade permanent to second grade *sub pro-tem*.

M. R. Ry., M. Muthuswami Ayyar, from third grade permanent to second grade *sub pro-tem*,

M. R. Ry., M. Maduramuthu Pillai, from third grade *sub pro-tem* to third grade permanent.

M. R. Ry., C. P. Garudachella Mudaliyar, from fourth grade permanent to third grade *sub pro-tem*.

M. Hussain Khan Sahib, from fourth grade permanent to third grade *sub pro-tem*.

M. R. Ry., P. Ramunni Menon, from fourth grade permanent to third grade *sub pro-tem*.

M. R. Ry., R. Subramaniya Ayyar, from fourth grade permanent, to third grade *sub pro-tem*.

M. R. Ry., K. Karunakara Nambiyar, from fourth grade *sub-pro-tem* to fourth grade permanent.

M. R. Ry., A. P. Srinivasa Ayyangar, from fourth grade *sub-pro-tem* to fourth grade permanent.

M. R. Ry., A. Swamikutti, from fifth grade permanent to fourth grade *sub pro-tem*.

M. R. Ry., G. Rama Rao, from fifth grade permanent to fourth grade *sub pro-tem*.

Mr. A. Nicholas, from fifth grade permanent to fourth grade *sub pro-tem*.

Mr. J. A. Paul D'cruz, from fifth grade permanent to fourth grade *sub pro-tem*.

Mr. C. S. King, from fifth grade permanent to fourth grade *sub pro-tem*.

Saiyid Ibrahim Albeiz Sahib, from fifth grade permanent to fourth grade *sub pro-tem*.

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Mr. H. Meyers, from fifth grade *sub pro-tem* to fifth grade permanent.

M. R. Ry., D. Ramalingam, from sixth grade permanent to fifth grade *sub pro-tem*.

M. R. Ry., K. Balakrishna Rao, from sixth grade permanent to fifth grade *sub pro-tem*.

M. R. Ry. K. S. Ramayya from sixth grade permanent to fifth grade *sub pro-tem*.

Mr. C. H. Ashe, from sixth grade permanent to fifth grade *sub pro-tem*.

Saiyid-ud-din Ahmad Sahib Bahadur Special Forest Officer, Parlakimedi, Maliahs is granted privilege leave for three weeks from 3rd April 1918, with permission to prefix the Easter holidays to the leave.

M. R. Ry. S. Chidambara Ayyar, Ranger, fifth grade, is transferred from Rapur Range, Nellore District, to the charge of Chingleput Range, Chingleput District. To join expeditiously on relief by No. 2.

M. R. Ry. T. N. Seshagiri Rao, Ranger, second grade, is posted to relieve No. (1) and hold charge of the Rapur Range in addition to Nellore Range as a temporary measure.

T. V. Govinda Rao, Deputy Ranger, first grade, and acting Ranger sixth grade, is confirmed as Ranger, sixth grade, from 4th March 1918.

March 19, 1918.

Under article 260 of the C. S. R. M. R. Ry. J. Sadasiva Ayyar Avargal, District Forest Officer, North Mangalore is granted privilege leave for two months from or after 10th April 1918.

M. R. Ry. K. A. Chengappa Avargal, District Forest Officer West Vellore, to be also Deputy Collector in the North Arcot District.

(This cancels notification No. 271, dated 13th June 1917, published at page 775 of Part 1 of the Fort St. George Gazette, dated 19th June 1917).

Muhammad Habib-ullah Sahib Bahadur, Extra Assistant Conservator of Forests, to be District Forest Officer, South

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Coimbatore, with effect from 3rd April 1918, *vice* Mr. H. F. A. Wood appointed to act as Conservator.

The following candidates are declared to have passed the Forest Departmental test provided for in section 68 of the Madras Forest Code held in 28th January 1918.

Code and accounts.		
Name.	Rank.	Results.
1. R. Raghavendra Rao.	Permanent fourth clerk and acting third clerk, District Forest Office, Bellary.	Second class.
2. R. Ramachandra Rao.	Permanent clerk, Chendragiri Divisional Office.	do.

Board's Standing Orders.

3. R. Raghavendra Rao.	Permanent fourth clerk and acting third clerk, District Forest Office Bellary District.	Second class.
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M. R. Ry. S. Chinnadorai Pillai, Ranger, third grade, in charge of Balapalli Range, South Cuddapah District, is posted to the charge of Kodur range in addition to his own during the absence of Muhammad Abdul Hafiz Sahib Bahadur, Probationary Extra Assistant Conservator on leave or until further orders. He will relieve the Extra Assistant Conservator forthwith.

K. Shaik Mahammad, Deputy Ranger, first grade in charge of Bontha range, Ganjam, is promoted to act as Ranger sixth grade, *vice* M. R. Ry. C. G. Ganapathi, Ranger, fifth grade, deputed to the Military grass farms.

M. R. Ry. C. M. Belliappa, Ranger, first grade, North Salem, is granted privilege leave for three months from date of relief by Ranger Devanayagam Nayudu.

M. R. Ry. G. N. Subba Rao, Probationary Ranger, sixth grade, is transferred from South Vellore, to South Salem Division for the charge of Attur range.

S. V. Sibgatullahi Sahib, Acting Ranger, sixth grade, on special duty in West Vellore division is posted to the charge of Alangayam Range.

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M. R. Ry. G. Devanayagam Nayudu, Ranger, sixth grade, on relief by No. (2) is posted to the charge of Denkanikota Range, North Salem division.

This office Service Order No. 27, dated 14th February 1918, granting privilege leave for two months to K. R. Krishnan Nayar, Ranger, fourth grade, the Nilgiris, is cancelled.

The following Candidates have passed the Departmental test held in January 1918:—

Forest Code and Accounts.

1. P. Seshadri Ayyangar, second clerk, District Forest Office, the Nilgiris. ... 1st class.
2. P. Sankunni Menon, tour clerk, Forest Conservator's Office, Western circle. ... do.
3. K. Sankaranarayana Rao, acting third clerk, District Forest Office Mangalore North ... Second class.
4. M. Kutti Krishnan Nayar, third clerk, District Forest Office, Malabar North ... do.

Boards Standing Orders.

1. Sankunni Menon, tour clerk, Forest Conservator's Office Western Circle ... 1st class.
2. M. Kutti Krishnan Nayar, third clerk, District Forest Office Malabar North. ... do.
3. B. Parameswara Rao, second clerk, District Forest Office, Mangalore South ... do.
4. K. Sankaranarayana Rao, acting third clerk, District Forest office Mangalore North ... Second class.

M. R. Ry. K. R. Krishnan Nayar, Ranger, fourth grade, the Nilgiris, will be considered to have been on privilege leave under article 260 of the C. S. R. for seven days with effect from 3rd January 1918 in continuation of the christmas holidays.

March 26, 1918.

Mr. J. H. Longrigg, District Forest Officer, South Mangalore, to be in charge of North Mangalore in addition to his present duties during the absence of M. R. Ry. G. Sadasiva Ayyar Avargal on privilege leave.

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Mr. D. E. Lewin, Ranger, sixth grade in charge of Muddanoor Range, West Cuddapah District, is transferred to Vempalle range of the same District. To proceed forthwith and relieve the acting Ranger M. R. Ry. M. Krishna Ayyar at once.

M. R. Ry. M. Krishna Ayyar, acting Ranger, sixth grade, in charge of Vempalle range on relief by No. 1, to assume charge of Muddanoor range.

The leave on medical certificate for one year from 4th February 1917 granted to Ranger R. Virasami Nayudu in this office Service order Nos. 27 and 212 of 1917, dated 11th February 1917 and 20th September 1917, respectively, is extended by six months.

M. R. Ry. K. R. Krishnan Nayar, Ranger, fourth grade, the Nilgiris is granted leave on medical certificate under art. 336 of the C. S. R. for one month from date of relief.

April 2, 1918.

M. R. Ry., O. Venkataramana Ayyar, Ranger, first grade, in charge of Cuddapah Range, West Cuddapah District, is posted on special duty to Guntakal in connexion with the hay operations conducted by the Forest Department.

M. R. Ry., S. Ramachandra Ayyar, Ranger, fourth grade, on special duty in West Cuddapah District, is posted to the charge of Cuddapah Range to relieve No. (1) at once.

In modification of this Office Service Order No. 35, dated 11th March 1918, Mr. R. Krishnaswami Ayyar, B. A., Acting Deputy Ranger in the Travancore Forest Department and appointed as Probationary Ranger, sixth grade, South Cuddapah District, is posted to work under the orders of the District Forest Officer, West Cuddapah.

April 9, 1918.

Under article 260 of the C. S. R. M. R. Ry., E. C. M. Mascarenhas, District Forest Officer, South Salem, is granted privilege leave for two months and twenty-eight days from 28th March 1918.

M. R. Ry., M. R. Sundaram Ayyar Avargal, Extra Assistant Conservator of Forests, on return from leave to be District Forest Officer, South Salem, with effect from 28th March 1918.

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P. K. Kuttappan Pillai, promoted to act as Deputy Ranger, first grade and appointed as the junior Instructor of Vernacular Training School, 1918, in this Office Service Order No. 185, dated 11th December 1917, is appointed to act as Probationary Ranger, sixth grade from first March 1918 *vice* M. R. Ry., A Ranganayakulu Nayudu, Ranger, fourth grade, on other duty as Senior Instructor, Vernacular Training School, 1918 or until further orders.

M. R. Ry., K. P. Krishna Ayyar, Ranger, second grade, North Salem division, is granted privilege leave for three months from date of relief.

April 16, 1918.

M. R. Ry. E. B. Ramachandra Rao, Extra Assistant Conservator of Forests on probation will revert to the post of second grade Ranger with effect from date of relief.

Mr. D. T. Barry, District Forest Officer, Tinnevelly *cum* Ramnad, is granted privilege leave for one month from 15th April 1918 with permission to prefix the holidays on the 12th, 13th and 14th April 1918, provided that the conditions of article 220 of the C. S. R. are fulfilled.

The privilege leave for three weeks which was granted to Saiyid-ud-din Ahmed Sahib Bahadur, Special Forest Officer, Parlakimedi Maliahs, in Board's Proceedings Forest No. 338, Routine, dated 5th March 1918, is extended by one week.

M. R. Ry., C. T. Thiruvengadam, Ranger, sixth grade, is granted privilege leave for three months from date of relief.

B. Gulam Dustagir, Junior Instructor, Vernacular Training School, is posted for the charge of the Chelama Range on termination of Vernacular Training School Session.

April 23, 1918

Under note 1 to article 336 of the C. S. R., Mr. R. Mitchell, Extra Assistant Conservator of Forests (on probation) is granted leave on medical certificate for three months with effect from 12th February.

Under article 260 of the C. S. R., Mr. J. A. Master, District Forest Officer, Bellary, is granted privilege leave for one month with effect from date of relief.

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Mr. G. C. Robinson, Working Plans Officer, Southern Circle, to be in charge of Tinnevelly *cum* Ramnad in addition to his present duties during the absence of Mr. D. T. Barry on privilege leave or until further orders.

M. R. Ry., B. Punniiah, Ranger, fifth grade, is considered to have been on privilege leave under article 260 of the Civil Service Regulations from 4th February 1918 to 31st March 1918 both days inclusive.

M. R. Ry. T. E. Varadachari, Ranger, sixth grade, Ganjam, is granted privilege leave for three months under art 260 of the C. S. R. with effect from date of relief.

M. R. Ry., V. Narayana Ayyar, Ranger, second grade, Parlakimedi Maliahs is posted to Russellkonda Range, Ganjam, on reversion.

April 30, 1918.

The following postings of Forest Officers are ordered.

Mr. J. A. Master, District Forest Officer, Bellary, on return from leave, to be District Forest Officer, South Salem.

Mr. E. C. M. Mascarenhas, District Forest Officer, South Salem on return from leave to be District Forest Officer, Bellary.

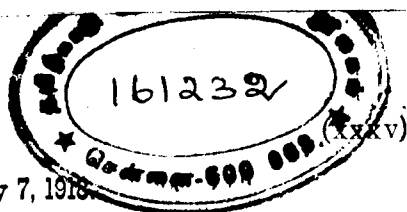
Mr. D. A. Stracey, Extra Assistant Conservator of Forests to act as District Forest Officer, Bellary from the date on which Mr. J. A. Master proceeds on leave to the date on which Mr. E. C. M. Mascarenhas takes charge of the district.

Mr. F. A. Seager, District Forest Officer, Lower Godaveri, to be in charge of the Kistna District in addition to his own duties.

The privilege leave for one month granted to M. R. Ry., M. Krishna Rao, Ranger, fifth grade, Kurnool East, in this Office Service Order No. 38, dated 9th March 1918, is extended by six weeks.

The Ranger's leave is to take effect from 21st February 1918 instead of 20th idem as previously ordered.

M. R. Ry., M. Subbarayalu Nayudu, Ranger, third grade, on return from leave, is posted to the charge of Rapur Range, Nellore District.



May 7, 1918.

Mr. G. C. Robinson, Working Plans Officer and Acting District Forest Officer, Tinnevely, having been called out for Military training, Mr. D. T. Barry, Deputy Conservator of Forests now on leave, is recalled to duty. Mr. Barry should relieve Mr. Robinson at Tinnevely on 4th May 1918.

Mr. Barry will hold charge of the Working Plans Office at Tinnevely in addition to his duties as District Forest Officer, during the absence of Mr. Robinson or until further orders.

Mr. Mitchell, Probationary Extra Assistant Conservator of Forests will be considered to have been on privilege leave on 1st August 1917.

M. R. Ry., S. M. Krishnaswami Ayyar, Ranger, fourth grade, Tinnevely Range, is granted privilege leave for one month.

Deputy Ranger K. Sankaralinga Kone is posted to the charge of the Range during the absence of No. (1)

M. R. Ry., C. D. Parthasarathi Chetti, Ranger, fourth grade, is granted combined leave for two months, i. e., privilege leave for eleven days and leave on medical certificate for the remaining period from 6th April 1918.

(1) M. R. Ry., G. Devanayagam Nayudu, Ranger, sixth grade, on relief by Ranger C. M. Belliappa from leave, is transferred to West Vellore Division for the charge of Alangayam Range.

Saiyid Vazi-ud-din Sibgathullahi Sahib, Acting Ranger, sixth grade, on relief by No. (1) to special duty in West Vellore Division.

The following postings of Rangers and Deputy Rangers who complete their course in the Madras Forest College, Coimbatore, in June next, are ordered :—

(1) M. R. Ry., S. G. Venkataramanan, Probationary Ranger, sixth grade, to North Salem, to work under the orders of the District Forest Officer.

(2) P. B. Saiyid Yahia Sahib, Probationary Ranger, sixth grade, to South Salem, to work under the orders of the District Forest Officer.

(3) B. T. Sitaraman, Deputy Ranger, first grade, to the charge of Krishnagiri Range, North Salem Division.

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J.B. L. G. No. 21, 1918, 1918