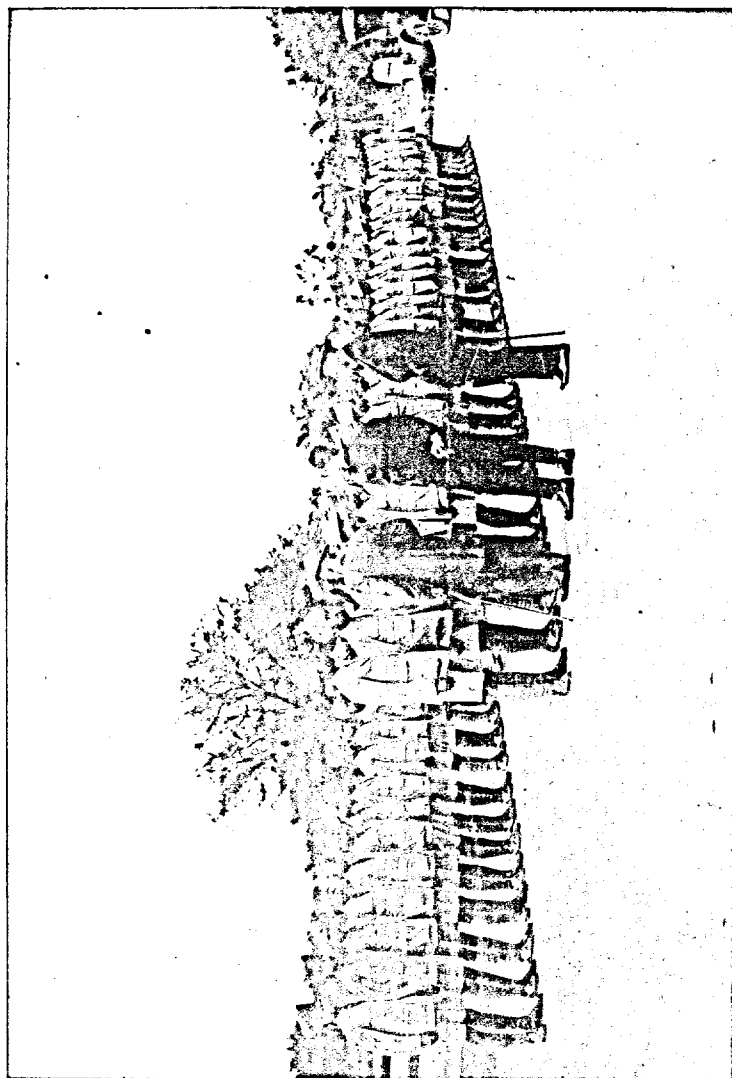


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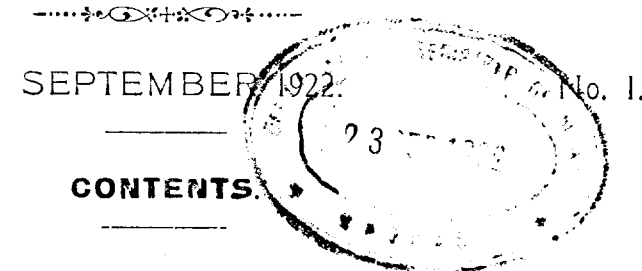


HIS EXCELLENCY, LORD WILLINGTON, GOVERNOR OF MADRAS,
Inspecting a parade of the Students of the Madras Forest College
on 'Speech Day'—30th June 1922.

THE Madras forest College Magazine.

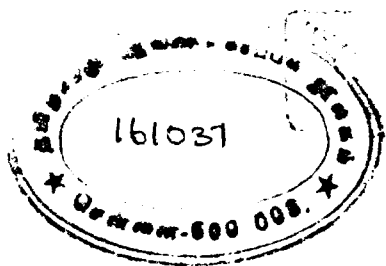
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1922/13

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THE
Madras Forest College Magazine.

PUBLISHED QUARTERLY.

Vol. VII.]

SEPTEMBER 1922.

[No. 1,

“Discuss the present campaign against the forest Department,
Is it a true reflection of public feeling?”

(Winning essay for the “Indian Forester prize” for past students ;
—by Mr. T. D. Ponniah; Range Officer, Polur.)



HE present campaign is unique in Indian History and regarding it we have no past experience to fall back upon. This is so because the organization of the Forest Department is of comparatively recent date, and even so recently as 1857 A. D. when the country had a turmoil, we find no mention of any activity of the people concerned, in the upheaval, directed against

forests. As is the case with many of the institutions and organizations existing at present in India, India till recently had practically no Forest Department, no Forest Policy, no Forest Laws, and no Forest Regulations, and consequently had no Forest grievances to speak of. Hence the forest grievances of the people may be compared to the troubles of a man who newly becomes the owner of a motor car or to the uneasiness felt by a youngster unaccustomed to wearing clothes, when made to put on a dress. There is hardly anything good in the world without some evil in it. The very useful nose, is a source of endless trouble because of its catching cold so often.

Calmly speaking no body in India from the highest to the lowest fails to appreciate the benefits of Forests. Forests are "gold mines" in the words of the Legislative assembly, and Forests are the source of crores of rupees of revenue to the state, besides being the means of immense benefits to the people.

Grievances the people have; some imaginary, some remediable and some irremediable, if the forest organization is to remain. About the eighties and nineties of the last century the trouble was chiefly due to reservation and this was not wide spread, since vast tracts of unreserves were still left between the forests and fields under cultivation. The ryot had still access to the forest for a nominal sum or even without it, for manure leaves, fuel, small timber, and grazing. The same Forest Act and the same Forest rules were in existence; But gradually the organization of the Department was

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improved, the rules were being put in force. With peace, trade, increase of population and the introduction of ground-nut cultivation into the country the demand for land to be put under plough increased. Thus two processes, one opposed to the other, were rapidly going on, and they were bound to meet and cause some heat, before each finds its place and finds it recognised as unencroachable by the other.

So I think the hue and cry against the department was bound to come, but, but for the other influence under which it came, it is sure that it would not have appeared in the form in which it appeared in 1920 and 1921. Murmurs and grumblings against the department have always been, ever since its inception, but, never appeared in organised form as in 1921. The causes for the campaign have been many; direct and indirect, immediate, and remote. Direct and immediate causes were the prohibition of removal of manure leaves, the raising of the grazing fee, the better enforcing of the forest rules. All these practically happened at one period i. e. during 1918 to 1921. For it is about that time that removal of manure leaves was totally stopped; it is about then that grazing fees were raised from 3 annas per cow to 8 annas, and it is in 1919 and 1920 that the Forest staff was considerably increased, and consequently rules were more put into practice. These direct causes had roused the ryots and prepared the ground so to say. About this time other influences began to play their part. Reforms were introduced. As never before known in the country it was filled with aspirants of all sorts, aspirants.

to congress fame, aspirants to council fame, and aspirants to memberships and President-ships of Boards. The ryots were armed with votes and votes had to be begged by all sorts of orators. Aspiring orators are the last people to be scrupulous. They found out that the people had some forest grievances. They reiterated them, exaggerated them and promised lightning remedies and it is not a wonder that a campaign against the department resulted. Above all came the Non-cooperation movement headed by Mr. Gandhi, who in his own words, once liked the British Government, because it was the one Government in the world that "governed least". That sentiment is typically Indian. Of all the people in the world, probably the people of no other country like "being left alone" so much. When according to one of theories and ideals of the country all action leads to rebirth and life itself is trouble, what else could be expected? All changes are disliked. Benefits are wanted without any accompanying responsibility.

The Non-cooperators took advantage of this mentality and roused the people to action against the department. In certain districts the action took the shape of removal of manure leaves, wholesale felling of trees in numbers, refusal to pay grazing fees, boycotting and doing violence to forest officials. All this is in a way happily ended now, but still the feelings against the department are present, and at any time things may repeat themselves, with probably greater force.

Thus to sum up, the campaign against the department is based upon certain real and mostly imaginary grievances or irremediable inconveniences that the people have, and it is chiefly due to the presence of the agitator class in the midst of the people. It is a true reflection of public feeling so far as some of the remediable and real grievances of the people are concerned, and so far as the other aspects of it are concerned it is not so, certainly.

Some of the remediable grievances will be mentioned here and the essay closed.

The chief source of grievances to the people, is the Forest menial—the Watcher—the Guard,—and even the Guard-made Foresters. He lacks character and self respect, and the people—the ryot—he has to deal with, and who is the subject of all the forest grievance is no better. That menial thinks he must make hay when the sun shines. The ryot thinks it is better to give the Guard paddy worth five rupees and remove a tree or two for agricultural implements rather than pay a rupee in cash for them and get them from the coupe contractor. Paying is not usual with them and that is probably the only reason. Till both realise things better any effort at remedying the troubles in this direction is likely to be futile. But one thing could be done. Guards and Foresters have been recently nearly doubled in number but, have the Rangers who have to look after them, been? True, there has been some increase in their number but that is more because of the new schemes of works. Thus

in most of the ranges with plains forests the number of subordinates the Ranger has to deal with, has doubled and so he is not able to control all. If there is a range in each one of whose beats the Ranger could not be for 3 days in the month—15 days being the minimum camping time now required of him—then that range must be reduced in size. There are scores of such ranges at present and there are ranges where a Ranger could not visit beats for months together. Certainly during that time the Guard plays "hell" with the people. At present the department expects the Ranger to control his Guards without seeing either him or the people he has to deal with, for weeks and months. Indeed for things not to be what they are, under the present conditions we should have Guards who are men of a high sense of self respect, responsibility and duty. This we have not. The Guard is entrusted with a vast and valuable property and the temptations he has are many. The people he has to deal with, are tempters by nature, and what else could happen but what are happening now. I really believe with better and closer control, much of the grievances of the people will disappear. Some may say we have foresters. But these Guard-made Foresters are really Guards on Rs. 38 a month. They do no better work and in many respects are no better than Guards. One Ranger in the place of 3 such Foresters will certainly, do much more work than what they do.

Another chief source of grievance is the presence of some small and isolated reserves in the midst of cultivations, still. Of course our policy is to give these up but some of these have not yet

been given up and are still the source of trouble. In this respect it could be better for the department to be less analytic in the classification of our Forests. The classification of all forests may be re-examined with a view to bring some of the class II Forests under class V. These and most others may be profitably entrusted to panchayats.

Most of the imaginary grievances of the people are due to their ignorance of Forest Rules and matters connected with the Forest Department. It is true that the Forest menial has an interest in keeping the people ignorant of Regulations, viz. that some trees in Poramboke can be cut and utilized by ryots etc., for this will be a source of profit to him. The remedy for this will be in making the Ranger have more time to meet villagers and talk to them. As said above he must have time to spend at least 3 days in each beat and talk to the people. It is not possible now. While there are now so many in the field playing upon the feelings and ignorance of the people against the department, the department has practically no one actually engaged in counteracting these bad influences. The Ranger is buried always among papers, reminders, works and cares of the sort and he has hardly any time to friendly move with the people. Ignorance of the so called educated people in Forest matters is by no means less than of the ordinary people. It is this class that is with its half knowledge rousing the people and it is this class that must be got at, without delay. Forest Officers should associate with these people and association of the Forest Ranger with educa-

ted people of other professions should not be interpreted to be the beginning of some mischief. The isolation, voluntary and enforced, circumstantial and otherwise, in which the Forest Officers—chiefly Rangers are kept, is also one reason for the ignorance of the public and for the ignorance of the Officers about the public feelings.

In conclusion it may be said that the present campaign against the department is a twisted or coloured reflection of the feelings of the people and remedy lies in the sources of some of the real grievances being removed and in the education of the masses and classes in Forest affairs.

“BONA SI SUA NORINT”.

“Why I chose forestry as my profession.”

(Winning essay for the “Indian Forester Prize” for present students.
by P. Sithapathi Ayyar.)

“Why did you choose Forestry as your profession”; this same question was asked of me by many of my friends, when first

I joined the Department, well-nigh, three-and-a-half years ago I gave them some of the reasons which induced me to do so, and I do not blush to repeat the same again now. I only crave the indulgence of the readers to put up with me for a while, as what I write below is only a dull and uninteresting chapter in the life of an insignificant individual in the Department.

I was put to school, rather late in life, when I was 10 years old. The school was in the Metropolis of Madras, and the fact of my being a student there made me very proud. My parents could not afford to transfer themselves to this town for my sake, and I was left entirely in the immediate charges of a rather eccentric relation of mine, whose very sight would often make me tremble within my sleeves. Of course, I must, in justice to him, own now at least, that he was not bad at all in reality. Like Samuel Johnson, of the Dictionary fame, he had nothing of the bear in him except his exterior. Under his roof, I passed about half-a-score of years, being all the time impressed with the duty of implicit obedience, which, according to the poet is the bond of rule.

My father, however, did not entertain any high ambitious schemes for my future, and was satisfied, at the start, to find me a regular school-loving boy. So was I, and no better for some time. As years passed on, however, I rose from class to class, until at last,

I managed to pass out of the college with a big certificate in my pocket. About this time, the resources, on which I had been drawing so far, became exhausted, with the result that I could not proceed further up with my studies. Neither was I in a position to mark out my future. Here was I, at the crossing of the roads of life, hesitating which of them I should take and follow.

This hesitation is, of course, a common experience with many of our college-going youngsters. The education, which is obtained, nowadays, in our schools, and colleges, does not enable us to train ourselves up for those walks of life, to which we might have dormant natural aptitudes. It does not provide us with the necessary heat and warmth which Nature offers to the dormant buds at the bases of stems, to make them shoot out and grow towards the sun and the sunlight. Under this system of education—at least as far as this Presidency is concerned—, a boy of less than 15 years of age, is often called upon to choose the subject, which he would like, to specialise in later life. Once he makes his choice, he devotes the major part of his time to that subject alone, and has barely any time or inclination to learn something of the other branches of knowledge as well. I knew of a student, not many years ago, reading in the Intermediate class, who had chosen History for his special study, and could repeat pages after pages of printed matter on that subject, but could not know such ordinary things as the composition of pure water, its colour, taste etc. He blundered half-a-dozen times before he understood that pure water is made up of two elements viz Hydro-

gen and Oxygen in the proportion of 2 to 1, and that it has neither colour nor taste. This may be an exaggerated instance; but it shows, at any rate, what silly defects there can be in the system. For surely, the age chosen for specialising is, not at all, the time at which the average Indian student, realises or displays, his special aptitudes.

Trained under such a system, we do not think seriously of our future until we are actually brought to face it. It does not matter at all to those who can afford to read long for the sake of reading alone. Others who read with a different purpose in view act like a flock of sheep, knocking at the gates of the University, and forcing them open at the sacrifice of much that is valuable for them, viz health wealth and time. It is after this, that we ask ourselves "What are we fit for? and what shall be our future?" Everything then becomes a matter of chance, whether we hit the right path and be happy or take the wrong course and wander about blundering and blundering.

So then I was on the brink of making my fatal selection, even as I was standing at the crossing of the roads in blissful ignorance, as to which of them I should take, and whither I would go. After some hesitation, however, I took up one of them, which was said to pass through some important markets hoping to sell myself up in one of them, if I could. The first two markets were rather dull, and I found them already flooded with my kindreds far in excess of the demand. I therefore paused in them, only for a short space

of time, and then proceeded in quest of a letter market. On the way, suddenly I thought of the two sentences of Rosalind in Shakespeare's "As you Like It" wherein she says to the shepherdwoman "you are not for all markets, sell yourself when you can." I pondered over these throughout my further path, until I was convinced of their apt applicability to myself I forth with made up my mind to accept any price in the very next market, and walking brisker than before, soon came in sight of a very busy market indeed! The crowd of sellers was nearly as great as in the too I had passed through and the price was decidedly less. My only consolation was that there were not many of my kindred in that large busy and humming crowd. I thought I could rise in value more easily here, than I could do in the midst of a large number of equals, all trying to reach the same end. Added to this there was also a strong remour afloat in the air, that the prospects of this market would be very soon be made much brighter than what it was just then. I therefore sold myself up at once and without any further hesitation.

For I could not afford to wait any longer, having already wasted more than 2 years in choosing my line. The necessity of settling myself in life was meanwhile, becoming more and more acute. If I wanted I could have found a corner in the metropolis itself for a humble settlement. But from a long stay of over 13 years, a stay which was characterised by the absence of even the most ordinary pleasures and enjoyments, which are generally associated with the town life, I had developed a strong aversion for the hum and drum of the

town, its society, pleasures and enjoyments. Unless I got a very favourable start, for which I had very little chance, I knew that I could not swim successfully in the current of that society. I was afraid lest my strength should fail and land me in an ugly creek, whence escape would be practically impossible. The pride with which I started my school life was still in me, though in a dormant state. I could not easily reconcile myself to a hard life in comparative poverty, and that too, in a place where I would be daily seeing so many of my school and college mates, who would be treading in a higher plane of life. Every time I meet one of them, the lowness of my position will be brought home to me with a severe pang. I could never be happy in such a place, however much of outward show I might put on. I was thus prompted to take leave of the town, which had, so far, been the nursery of my boyhood, and the training ground of my youthful intellect, but, which for multifarious reasons, could not afford me the opportunities of a decent living in the future.

In the forest retreat, however, I could but very rarely meet with such old acquaintances as to make the recollection of the past days a source of pain. Very often one has to deal with illiterate folk, for removed from the busy centres of civilisation, and consequently, less tainted with its shams, pretences, and corrupt practices. There is much that could be learnt from their life, especially, their simplicity, honesty, sincerity and Good-fearingness, if only one could lay aside his pride of birth, social status, high education and official position. To quote only two such noble instances, there is the immortal 'Guha' (the boatman) in

the Ramayana and the equally good and lovable 'Friday' in the 'Robinson Crusoe'. In a noisy town, one rarely cares for developing such traits in his character. The old, but still familiar, saying also goes that the nearer you are to the church the farther from God you will be, and (vice versa), the farther from it you are very probably, the nearer to Him also.

Another minor consideration was the love of the adventurous, which I, like many other youths had developed in the most impressionable period of my boyhood. When I read at the age of 13 or 14, of the stories of the adventures of 'Robinson Crusoe', or the wanderings of the children in the 'Swiss Family Robinson', or read those lines written on Alexander Selkirk, beginning with, 'I am the monarch of all I survey. My rights there is none to dispute', my imagination was tickled, and I began to picture to myself every incident of these stories and not infrequently, felt a sort of personal interest in the adventures of those heroes. So also was the effect on me of the reading of our popular epics like the Ramayana and the Mahabharata. The poet who wrote them has described every scene with such fineness that one could not fail to visualise them, and become possessed of a strong and passionate longing to see some such places of beautiful sylvan retreats. With some of us, such impressions pass off soon without leaving a permanent mark, while with some others, these sum form a sort of everlasting background to all their thought and action. I belonged to this latter category of people and so when I realised the fruitlessness of the town, at once turned to the forest as the only other alternative. Curiously enough on the very

third day after joining the department. I had to spend an adventurous night in the forest, on a machan like apparatus on a tall tree, about 50ft. from the ground surface. The Forest was full of elephants in their wildest state, and the jungle tribes, who were my companions for the night told me that they used to pass several nights like this only. The whole of the night, I could hear the loud trumpets of these animals and the noise of their breaking the branches of trees, and the tearing of bamboo culms, not over a couple of a hundred yards away from where I was perched. This was good beginning, I thought in one sense, but later experience has not been so very wholesome. Yet, I pulled on in the hope that better days will yet dawn upon me also. The Reorganisation scheme of which I had heard a lot talked of in the beginning, came at last like a mouse out a mountain's labours so far as I and the others of my grade were concerned. Still I persisted true to my original determination. Thus have I passed, till now, nearly 3½ years in service, within which nothing very good had happened, and nothing very bad also. All my hopes lie only in the future towards which I shall march as hopefully and cheerfully as I can.

HONI SOIT QUI MALY PENSE".

Notes on "*Balanocarpus utilis*".

A large handsome evergreen tree surmounted by a dense crown; its growth is strictly confined to shola forests. It reaches a height of 80 to 100 feet and a girth of 8 to 14 feet and produces a straight clean cylindrical bole 40 to 50 feet in length. It is often buttressed. At one time, it must have been a common tree, but it is now seldom met with in accessible localities, owing to excessive fellings in the past four decades. In the heart of the shola forests, not yet exploited, this species is somewhat abundant and gregarious.

Balanocarpus utilis belongs to the order "Dipterocarpeae," which is a very important order comprising trees of very large dimensions and of great value, on account of their hard and durable timber, besides (the majority at any rate) producing resin. *Balanocarpus utilis* is very similar to *Hopea parviflora* botanically. The early stages in their growth are almost identical except that the latter grows a little faster than the former. *Hopea* seeds are winged while those of the other are not.

The species occurs in Borneo, The Federated Malaya States, The strait settlements and in parts of India. It is found in the Shola forests of Kannikatty and Kodamady of Ambasamudram Range in the Tinnevely District, where its area is rather limited but regeneration is very good. It is found in abundance along the banks of the Serviar, the

Tamparaparani and the Kuduvar. It flourishes on deep rich moist soil, on river-banks in ravines and moist valleys but is also found on laterite and in gravel soils. Owing to its gregarious nature, this species is generally found in extensive patches forming an almost pure crop. The close proximity of running streams, appears to be indispensable for its growth. In the Ambasamudra Range, the elevation congenial to the growth of this species varies from 700 to 1800 feet; and it is not found growing at such high elevation as *Hopea parviflora*. Along the Ghat road leading to Kannikatty, we see *Balanocarpus* growing luxuriantly, on both sides of the road, but as we approach Pachapil, elevation of which is about 1500 feet, the species becomes rarer.

Its chief associates are *Hopea parviflora*, *Balanocarpus crosa*, *Gluta travancoricæ*, *Hurdwickia pinnata*, *Filicium decipiens*, *Acrocarpus fraxinifolius*, *Pygeum Wightianum*, *Hydnocarpus alpina*, *Engenia* Spp., *Garcinia* Spp., *Xanthophyllum flavescens*, and other species characteristic of moist tropical forests. The undergrowth is usually of a dense evergreen character with various palms such as *Arenga*, *Caryota*, *Ardisia* spp., and an abundance of climbers such *Spatholobus Roxburghii* and *Calamus*.

The tree does not grow to the height reached by *Hopea parviflora*, but it sometimes attains a greater girth and is unfortunately often unsound. Along the Ghat road leading to Kuttalam Kullaruvu

near Kodamady, I observed a *Balanocarpus* tree having a girth of 14 feet; but the trunk sounded hollow. The wood is darker in colour and coarser grained than *Hopea parviflora*. Owing to the darker colour of the wood of *Balanocarpus* it is, known locally as "Karunkongu" (in Tamil), while *Hopea parviflora* is known as "Vellai kongu". It really seems strange that this tree should have been known as a *Hopea* to the local people; and stranger still that it should have been classified for a long time by Botanists as *Hopea longifolia*.

The seeds of *Balanocarpus utilis* germinate two or three days after they are sown. The germination starts by the radicle emerging through the seed coat from near its apex. The radicle continues growing till it strikes the soil after which it gradually forms a tap-root. The radicle is tipped with a conical root-cap which is often mucilaginous. The further development of the young seedling is similar to other broad leaved species.

The leaves are simple, alternate, entire, lanceolate, stipulate, 5 to 6 inches long by $1\frac{1}{2}$ inches broad 10 to 12 pairs of secondary nerves, petiole $\frac{1}{2}$ inch, coriaceous, glaucous above and pale green beneath. Under surface of leaf, veins, and petiole are beset with stellate hairs.

The species flowers periodically, generally in alternate years during May. By the end of October, the fruit is quite ripe and begins to fall. The inflorescence is in axillary racemose panicles; the flowers are unilateral (that is, arranged on one side of the flowering branch).

Such is also the case in *Hopea parviflora*. Flowers are dull white small about $\frac{1}{8}$ inch long and numerous. The floral parts and peduncle are invested with hoary pubescence. Flowers are regular, bisexual, and hypogynous, having five equal sepals, imbricate in the bud. There are five petals connate at the base and contorted. The stamens, terminating in a bristle number 15. The ovary is free and superior.

The fruit is a globose one seeded nut and has a rough brownish rind. The average diameter of the fruit examined, was between $\frac{1}{2}$ inch to $\frac{3}{4}$ inch. The calyx is persistent in the fruit forming a shallow cup round it, each calyx segment being tuberculate. The Fruits lying on the forest floor under one parent tree, were heaped up, measured and found to be over 35 measures. One measure contains about 250 seeds. The seeds are of various sizes and it is not difficult to pick out the good sound seed from the rotten unsound ones. An acre sown in the pits 3 feet apart will require about 19 measures of seed, one seed being sown in each pit.

Hydnocarpus alpina, and *Pygmaea Wightianum* are sometimes mistaken for *Balanocarpus utilis*, because of the resemblance of the leaves. In *Hydnocarpus*, the bark is greyish brown and slightly rough, the fruit is ovoid and 3 inches in diameter. In *Pygmaea Wightianum* the leaves and bark smell strongly of prussic acid. *Balanocarpus-erosa*, which is also associated with *B. utilis*, has a larger and heavier fruit. *Balanocarpus utilis* is easily distinguishable at a distance by the bluish green tint of its foliage.

The natural regeneration depends largely on the seeding (for as already pointed out good seed years occur periodically generally in alternate years,) but chiefly on the monsoon. The natural regeneration is splendid where conditions of soil and climate are ideal, and the leaf canopy uninterrupted. Under the parent trees, the seedlings, establish themselves under very heavy shade in vast numbers. In a typical plot of about an acre, approximately 5000 seedlings were enumerated under dense overhead cover.

Seeds sown are eaten by pigs mice, Sambhur and other animals. To prevent this destruction, as an experiment the seeds were coated with red lead before being dibbled. The result was good; and the coating of red lead appeared to have had the desired effect. To scare away animals, by day white washed pots were placed in the dibbled areas; and by night cheap kerosine oil lamps were burnt; these two operations also contributed to the success of the experiment.

Transplanting of seedlings is preferred to broad-cast sowings. The former operation entails a good deal of care, in preserving the root intact when putting out the young plants, and is a little costlier. The seedlings are planted in suitable localities in the forest, where there is plenty of overhead cover. The seedlings put out in the upper Kodamady forest in the Ambasamudram Range were quite healthy and the percentage of success was very good. Seeds sown in the nursery beds, germinated well and the seedlings flourished. A nursery

for this species should invariably be located under a dense canopy and in the vicinity of water.

It is not possible to arrive at any conclusion as to the proper degree of light required during the seedling stage; but the natural regeneration under the parent trees is quite good and crops of new seedlings appear to thrive under shade. In places where creeper cutting was done, and light let in suddenly, it was observed that some of the seedlings withered in the hot weather, between April and June. This was specially noticed in the Ullar Valley Kongu area, a few miles from Kanni Katty. Summing up we may say that the seedlings do well under shade; but in the open they die. Hence to have a plantation of *Balanocarpus* alone is not possible. In *Usipothai* near Kodamady some big *Balanocarpus* trees standing over profuse regeneration were felled some years back, (of course damaging many a neighbouring tree) but we see in the area a crop of poles presenting the appearance of a plantation. Again in Karkatmottai near Kodamady, huge *Balanocarpus* trees also overtopping a dense growth of seedlings, were girdled many years ago, to see the effect of light on the species. We now see in that area fine trees well past their pole stage. From these two instances we naturally infer that a certain degree of light is essential for the development of the species from the sapling stage upwards; otherwise there is no way of accounting for the disappearance of most of the seedlings which germinate year after year under the parent trees in the forest. *Balanocarpus* does not coppice. In

he leased out coupes, contractors are prohibited from felling trees of this species or in any way damaging them.

Some *Balanocarpus* trees were planted in the compound of the Forest bungalow at Kannikatty about 10 years ago. The saplings are now about 15" in girth. The growth during the early stages is very slow (perhaps for the first ten years) but afterwards becomes more rapid.

The tree is ill adapted to withstand damage by fire. The bark is comparatively thin, rather smooth, and deeply fissured. Fire however occurs very rarely in the shola forests.

The difference in the leaves and in the nature of the seed entails a considerable difference in the silvicultural methods of treatment required by the two species, namely *Hopea parviflora* and *Balanocarpus utilis*. The latter with its larger and thicker leaves is essentially more a shade bearer than the former. The light nature of the *Hopea* seed, with its wings, results in its under distribution over more exposed areas. On the other hand, the heavy seed of *Balanocarpus* falls directly on the ground and under the shade of the parent tree.

In forests, in which *Balanocarpus utilis* occurs we meet with a number of dead and fallen trees of other, perhaps inferior, associate species. From this we can I think deduce that it attains its exploitable

age later than most of its associate species. The age of exploitability of *Balanocarpus* is about 175 years. The bark of the tree is darker than that of *Hopea*. The sapwood is pale. The heart wood is light brown when freshly cut but darkens with exposure. The annual rings are more or less distinct and are about 8 to 10 to the inch. The medullary rays are fine, clearly marked and parallel. The pores are numerous, irregular and filled with a bright gummy substance. The weight of the wood is about 65 lbs per cubic feet. The wood is very hard, dense and easily worked; the finished surface from the plane exhibiting glistening patches which add considerably to the appearance of the wood. It is durable and is largely used for constructional works, railway sleepers and other purposes where great strength is required. It is not subject to attack by white ants but mature trees are often found to be unsound.

It exudes a waxy coloured, and very shining resin, which is a good supporter of combustion and it might be well worth experimenting to see if it is of any value for candle making; owing to the glistening nature of the resin, it might also prove useful in the preparation of varnish.

The tree at present it not being exploited in the Government forests in the Ambasamudram range, but special attention is being paid to the regeneration of the species before it is extracted. In the near future, however, we may expect the sale of this timber in large quantities. At present it is being sold at Rs. 1—8 - 0 per C. foot.

from the Kattalaimalai estate, belonging to the Jesuit fathers of Tinnevely from their depot at Uchankulam near Ambasamudram.

S. DORAIRAJA,

M. F. C- 1921-23 Du

The Madras Forest College June Week.

On the 28th of June last, the Madras Forest College exhibited in the local Cinema an interesting and instructive series of films of up-to-date lumbering operations in America, and a few slides representing similar work as it is now being done in the Government forests at Dhoni in South Malabar. This exhibition formed a special feature of this year's programme among the usual attractions of the "Forest Week". A big audience including many members of the Legislative Council, of the Forest advisory Committee, and other Public men as well as Forest Officers, Government officials and a large number of the general public were present.

Mr. C S. Martin—Chief Forest Engineer—whose services have recently been secured by the Madras Government, explained the films in a very lucid manner, demonstrating, in particular, the superiority of the "Clyde Caterpillar Tractor" to the present slow, and wasteful method of using buffaloes, etc, for dragging timber. The "Variety Hall" was, in a most public spirited manner, lent for the occasion by the Proprietor Mr. S. Vincent.

The Annual Engineering Park Demonstration took place on June the 29th, when the students under Messrs. Robinson and Hart gave some interesting displays of bridge building, brick laying, tramline laying, and erection of derricks, sheers etc.

On the 30th of June which was the concluding day of the "Forest Week", an unusually large and distinguished gathering of officials, and non-official Europeans and Indians assembled in the recently enlarged hall in the Madras Forest College to witness the distribution of certificates, medals, and Prizes to the ninth batch of successful students. His Excellency the Governor presided, while Her Excellency Lady Willingdon did the College and Students the honour of distributing the Prizes and Certificates.

Prominent among those present were:—

The Hon'ble the Raja P. Ramarayaningar, The Hon'ble Dewan Bahadur K. Venkata Reddi Naidu, Ministers for Local Self Govern-

ment, and Development respectively; S. Cox, Esq, C.I.E., I.F.S., Chief Conservator of Forests, Madras, and Mrs. Cox; W. F. Peree, Esq, C.I.E., I.F.S., Chief Conservator of Forests and President of the Imperial Forest Research Institute and College, Dehra Dun, and Mrs. Peree; the six Conservators of Forests of the Madras Presidency; H. C. Sampson, Esq., C.I.E., Director of Agriculture; H. L. Braidwood Esq, I.C.S., Collector of Coimbatore; C. S. Martin, Esq., M.R.Ry Dewan Bahadur T. A. Ramalingam Chettiar, Avergal, B.A.B.L., M.L.C., M.R.Ry, C. V. Venkataramana Ayyangar, Avergal, M.L.C., M.R.Ry V. C. Vellingiri Gonnder, Avergal M.L.C., M.R.Ry. R. K. Shanmugham Chettiar Avergal M.L.C. M.R.Ry. Rai Bhadur Nallathambi Sarkarai Mandrariar, the Pattagar of Palayakottai; M.R.Ry. Rao Sahib Rathnasabapathy Mudaliar Avergal, and M.R.Ry. M. Sambandam Mudaliar Avergal M.L.A.

Their Excellencies were met at the main entrance to the College by the Chief Conservator of Forests and the Principal. His Excellency then inspected the Guard of Honour formed by the students. After being introduced to the Conservators of Forests and the staff of the College, Their Excellencies proceeded upstairs to the Prize Distribution Hall. The Function was opened by Mr C. C. Wilson the Principal of the College, who spoke as follows :—

YOUR EXCELLENCIES, LADIES AND GENTLEMEN,

“It is now two years since the Madras Forest College was honoured by the presence of His Excellency, and nearly three since Her Excellency was so gracious as to pay us a visit.

“During the past two years many and vital changes have taken place in the Madras Presidency and in India.

“It was consequent upon these that the Forest Portfolio was relinquished by His Excellency the Governor of Madras, and since then he has, naturally, not been able to devote as much time as he used to do, and we like to think he prefers to do, to Forest matters. It is perhaps on this account that he has been unable to appear amongst us since 1920, and by so much the more do we appreciate the honour of His, and Her Excellency Lady Willingdon's presence here to-day.

“The changes that have, during the past two years, taken place are of the greatest and most far reaching importance to India and to the Empire.

“Conditions have altered very greatly in this great country and the wheel of destiny has for her turned appreciably

“She has been entrusted with a great measure of self Government and is on her way, and not far from, the goal of complete independence within the greatest Empire that the world has ever seen. As is inevitable in the course of any such great changes as are involved in such a revolution there have been troublous times and difficult incidents, but one by one these have been passed and surmounted, and now this great country is in a fair way to come who

her own and to show to the world how worthy she is of the trust placed in her by our Sovereign Lord the King Emperor. She has a destiny in store for her, if she is wisely ruled by her new Parliaments, that is truly great. Her resources are vast, her people industrious. The climate and conditions found within this great Indian Empire are so varied as to include practically all those found throughout the rest of the world. Of these resources, one of the least developed at present are her Forests. The Forest land in India and Burma covers some 251,000 square miles, and of this some 126,000 square miles is timber land of which about half is as yet scarcely touched.

"Of the forest, other than exploitable timber forests, a great deal is grazing ground, a great deal is fuel and bamboo forest and a great deal is protective forest. The timber forests of commercial value are now attracting much attention. But the value of the other type is really far greater.

"Without fuel forests and grazing grounds the great agricultural population of India would be completely destitute in a very short space of time. They themselves realise this but little and think only of their immediate needs, and they fight continually against the protective rules that are a necessity if these forests are to be preserved for their children.

"But of even greater importance than these are our *protective* forests, and their value is even more difficult to realise or to

demonstrate. It *cannot* be gauged in Rupees, and can indeed be demonstrated only by argument. Our hill protective forests are responsible for the whole of the water supply of the plains. Think what this means!

"We all know what even *one* year of *famine* in a district means. Well, were these forests of ours to be abandoned, and destroyed, large tracts of country would very shortly be reduced to a state of *perpetual* famine. And yet many people cannot or will not see this. The work of the Forest Department up to date has largely consisted in reserving and protecting such forests with great (though not very obvious) benefit to the agricultural population of India, and therefore to all India. Now we are turning our attention to the less important, though far more *obviously* remunerative, timber forests. With difficulty we have begun to arouse interest in these; but this interest must *not* be allowed to overshadow the greater importance of our protective forests and our fuel forests.

"Well, in our timber forests are found some 5,000 different varieties of timber trees; that is to say we have here, within our borders, timber for every conceivable purpose for which timber can be used. And we have vast quantities of it. Moreover all is at present controlled by as highly trained and highly organised a Forest Service as any in the World. Of this Forest Service the Rangers, are the backbone. There is therefore little danger of any of these Forests ever disappearing so long as you young men and those who

follow you do your duty. But this great property, an asset of enormous value to the Indian Empire, is at present largely undeveloped. In the past the Department has been undermanned. At present many schemes for development are afoot and much potential wealth is almost within sight of realization; but these schemes are, we will hope only for the moment, held up owing to lack of financial backing. As matter stands, India, who could export timber for every conceivable purpose to every corner of the Civilised globe and thereby vastly increase her wealth, herself imports crores of cubic feet every year; she imports lakhs of sleepers for her Railways, and yet she has sufficient timber *suitable* for sleepers not only to supply all she requires but to export to other lands; she imports laks of bobbins for great cotton and Jute Mills and yet she has ample supplies of timbers better suited to the purpose than those which are imported; Madras, alone imports timber for boxes for Tea and Rubber in the form of three-ply wood to a value of 5 lakhs of Rupees per annum; and yet Madras herself could supply all this and still have enough to satisfy a large export trade. You see therefore that the timber forests of India are a potential source of great wealth to the country and they are ripe for development. During the past 60 years the Forest Department has been gradually and steadily growing. It has had and still has much to contend with, and many calumnies to meet. But with forests of so great a value and with such an infinity of potential good in them its ultimate success is inevitable.

"During the past 60 years or so, from very small beginnings, the Department has gradually grown and expanded. With a small and sadly inadequate staff it has steadily advanced and has worked in the face of adverse criticism on all sides steadily and doggedly. First the reservation and then the protection and organisation of the forests have been taken in hand. There are only a few among us who realise now the desperate struggles of our predecessors, just as there are few among the general public who have any conception of the difficulties with which we have to contend. So little indeed is known, even among those who ought to be better informed that the Forest Officer's life is by some often considered and stated to be just one continual round of pleasant shady camps and happy shooting excursions. Yet it is a curious thing that when one has once been able to take any one of these scoffers out and really show him what work in the forest means, he almost invariably changes his tone and becomes as enthusiastically pro-forest, as any forest officer; and he often realises that he himself is not physically capable of doing the "Kusky job" he has always so much envied before.

"Well, of all the Forest officers' jobs I think that without doubt the Ranger's is the hardest, and the most fraught with possibilities for good and ill. If our Range officers are good, and by good I mean not only well trained but upright, keen, active, and energetic we need have little fear for our future.

"Once again, then, you Rangers who are leaving the College to-day, remember that it is not for your own hand that you are working, not to your own profit you must look; you are the servants of your motherland and of a great Empire, and by your honesty and hard work you will be able appreciably to affect her prosperity. If a man can feel that he has done this in even a little measure, it is something to have lived for, and I believe I can say that among our present Seniors, who are about to leave us I could name more than one who does indeed at present intend to work to such an ideal.

"Now you may *start* with such ideals and find it difficult to live up to them.

"Discouragements are many and the actual drudgery of a Ranger's life is sometimes appalling, but don't let this dishearten you. Develop a sense of perspective and keep on trying. What seems almost a *tragedy* in the evening, after a long day's work, will wear quite a different aspect when looked at in the sunshine of the next morning.

"Remember that so long as you work well and really try to do your best your superior officers are your friends. But remember too that "eye wash,"—by which I mean just brightening things up temporarily when an inspection is expected,—will not deceive even a fool, for long.

"Remember that no self respecting officer has any use for a subordinate who is *without* self respect.

"Try to develop independence and initiative. But once again let me impress on you that independence is not established by discourtesy to either subordinates or superiors, strangers or friends.

"Try to cultivate an interest in your work for its own sake. Don't be easily "discouraged", that is a word that is heard far too frequently. Maintain your own courage, and don't expect a pat on the back, or promotion, every time you do your duty! A good man is *not* forgotten, but he cannot expect to be continually being told what a fine fellow he is, though undoubtedly that is very pleasant when it does come.

"Let me come now to the more immediate business of the day, and review the years's work of the College.

"The late Principal, Mr. Cowley-Brown has now definitely retired from service and I am afraid we will not see him again in this country. He has written me a letter of farewell which is addressed I think more to the College than to myself and it will not be out of place to read it to you now:—

"I have by this Mail received from the Government of Madras permission to retire.

'I must therefore bid farewell to the College. In taking this opportunity of doing so I want to express to you however inadequately—my feelings of regret at the official severance of my connection with the College, and to assure you of my future sympathy with its ideals, its difficulties, and its triumphs.

'In efficiency and conscientiousness the College, I believe, has no superior in India—and in these critical times such an example must be of special value to the country.

'The staff has made the College; it is for the students, past, present and future, to carry on its traditions.

'The Brasier Prize was founded in memory of a great Forest Officer, whose fine character overcame adverse circumstances from which the present generation is happily free. May the winners of this Prize be always inspired by the same spirit of courage and tenacity.

'It is ten years to-day since I left the charge of Salem North to take up the business of starting the College. They have been the happiest years of my service—not always easy but always full of interest; and it is in grateful remembrance of the loyal help I have received from you and other members of the Staff during those years that I say to all connected with our College *Vale atque valete*."

"Well, what this College is Mr. C. Cowley Brown made it; he lived for it and for it alone during his last few years of service and by the success that he made of it he has left his mark on India.

"Another most painful episode of the past year has been the death of Mr. Sundaram Ayyar, Instructor in Forestry to the Senior Division.

"He was a keen and able Officer devoted to duty and much respected by all who knew him. His death came as a great blow to all of us at the College.

"As regards the general health of the residents on the Estate it has on the whole been good. We were visited a few months ago by an outbreak of smallpox, but by careful segregation of those affected, and largely owing to the efforts of Mr. Hart, the House Tutor, and of a young Sub Assistant Surgeon—Mr. B. Manjunatha Baliga who had just returned from camp with us, and who was placed on special duty to assist the Local Sub Assistant Surgeon,—the disease did not spread.

"This was a very great relief.

"In camp the health of the students has generally speaking been better than usual. The Juniors have been especially free from sickness, and this may be very largely attributed to a really wonder-

ful quinine tonic, with which the Officer Commanding doses them regularly.

“As regards the general ability of the present Senior year, who are now leaving the College, I think I can say that it is rather above the average. The *best* of the students are a very level lot and are certainly more efficient than the best of the two previous years I have known. *But* there is a marked tendency to tail off amongst those at the bottom of the year.

“Five Honours Certificates have been awarded which is a greater number than has, I think, been given before.

“Higher Standard certificates have been won by 15 students and Lower Standard by 15.

“In the Athletic line the year has been a successful one. Hockey is our recognised game and at this we have played 6 matches and have won 5.

“In the local Tournament we reached the finals but were beaten by our old friends the Agricultural College after a really good game.

“The Interdivisional match for the Cowley Brown Cup was won by the Senior Division.

“Many of us here witnessed the game a few days back and a very good struggle it was.

“The Marathon race was won by M. B. Ayanna. It was over 7 miles in length and he ran it in the very good time of 48 minutes. In this connection I may mention what is to my mind one of the most sporting and unselfish things I have heard of recently. There is another Coorg student here, N. S. Poonacha by name; who is an unusually good long distance runner, and who won this race last year. Now, one of the greatest honours at the College is to win the *Pentland Shield* for athletics in general; this is awarded on marks given for all the different athletic events at the College, and it has been won by a student from Coorg more often than by one from any other State or Province. Last year Coorg failed to win it. This year, then, to make sure of it our long distance runner Poonacha ran the 7 mile Marathon race—which counts a large number of marks towards the *Pentland Shield*, side by side with his fellow Coorg Ayanna and then allowed him to win by one yard, in order to make certain of carrying back this coveted trophy to their own country. Ayanna was already well in the running for the Shield and this win made him practically certain of it. The loser was not in the least distressed and without doubt could have won easily had he wished to. I consider that he deserves the greatest credit for his very sporting and disinterested action.

“The Inter-Divisional Challenge Cup presented by the late

Risaldar Major Amir Muhammad Khan Sahib for the Marathon Race was won by the Senior Division.

"I have an announcement to make in connection with this race, namely that M. R. Ry. K. Rama Raja Mannarghat Moopil Nair Avergal has very generously founded a fund to provide a personal Prize for the winner of this Race, it being one in which all students have to compete, and an athletic event of some importance at the College. For his generosity the thanks of whole College are due. He has no direct connection with the College and his action can have no other aim but to foster a sporting spirit among our young Rangers.

"At the Athletic Sports good form was shown and the College record for the mile was lowered by 1/5th of a second by M. B. Ayyanna. This same student, who is a natural runner, won the *Victor Ludorum*, a Challenge Cup presented by Mr. R. D. Richmond of the Forest Service

"A few weeks previously at the Grigg Memorial Sports when all the schools and Colleges in Coimbatore compete against each other, we had several successes, M. B. Ayanna won the quarter mile in one minute and one third seconds and N. S. Poonacha won, and brok the local record for the mile

"The Pentland Shield for the best all round Athlete to which I have just referred has been won by M. B. Ayanna with 25

marks K. A. Bhandary is second with 21 and N. S. Poonacha 3rd with 20.

"To turn to the Estate itself. One or two changes worthy of note have been effected. Of these the most important is the improved water supplly. We have now just enough for our present needs. Formerly we had not; and a lack of water is one of the most serious of inconveniences. But we are still without our very necessary *auxiliary* engine for pumping our water and a few days back our old one gave out and has not yet been repaired. Needless to say such an occurrence in a large colony like this causes a great deal of trouble, and the arrangements for temporary water supply which have had to be made are costing Government an appreciable sum daily. It is hoped that the auxiliary Engine which was asked for two years ago, but which was only quite recently sanctioned, will soon be installed

"For the improvement in the quantity of water available we must thank the Public Works Department who in spite of the general financial stringency have done their best for us their year. Not the least of their achievements on our behalf is the preparation of this Hall in which we are now collected. Less than 3 weeks ago it was two small separate rooms, and for many years we have had to suffer under the serious disability of having to limit ourselves in the number of guests we invited to our Prize Giving.

"Now we have a Hall of ample dimensions, which, by the ingenuity of the Public Works Department, can be reconverted when required into two separate rooms by the fixing of a removable partition in the place of the old wall.

"It was originally proposed to build a new wing to the College to contain such an Assembly Hall as this presents, as well as certain other necessary Research Offices and Record rooms.

"We have succeeded however, in saving Government the considerable expense this would have entailed, and at the same time have not denied ourselves the accommodation that was indeed a necessity.

"With our neighbours the Agricultural College and Research Institute our relations have, as always, been of the very best. With our other near neighbours, the Coimbatore Municipality our relations have this year, I am glad to be able to record, been most cordial. Their popular and efficient Chairman, M. R. Ry. Rao Sahib C. S. Rathnasabapathy Mudaliar Avl. has met us in many small ways and has done for us many of those little things which always mean so much.

"The discipline of the College is satisfactory." At the beginning of the year we had an unruly element to deal with amongst a certain clique, largely confined to the newly arrived Juniors.

"We dealt with it, quite satisfactorily.

"I think I can rightly say that now the Juniors are a well behaved set of young men, with a good working knowledge of their obligations and privileges. It is often difficult for new arrivals at the College to realise the meaning of the word discipline, a thing some of them have never met with previously. However here they do learn to obey, that very necessary preliminary to the controlling of others which is a large part of their life's work.

"Our camping has been in accordance with the revised programme sanctioned by the Board of Visitors last June, and it has been found to be more satisfactory than the old one. The main change consisted in the institution of a short 3 weeks camp in the middle of the first long monotonous 3 months term in Headquarters. Not only does this break the monotony but it gives the Juniors that very necessary *practical* insight into the *theory* they learn at their lectures, and enable them to understand what they are being taught.

"The forest College tours throw considerable strain on the Districts in which they take place, and this we realise well. In some cases this strain has been even greater this year than usual as we are in a transition stage,—*between tents and sheds*. However those who are assisting us in this matter can console themselves with the reflection that they are conferring a small but very real financial benefit on the country at large, since the change will save Government some Rs 5000 a year for the next 25 years at any rate.

"We must offer our very hearty thanks to the Conservators, and District Forest Officers in whose jurisdictions we have camped. Our thanks are also due to those of the Range officers who have helped us. *Nearly all* have done their best for us and some have given themselves much heavy extra work in their endeavours to assist. With such assistance these camps are of great value to the Department generally, as the Students learn far more from one month's such touring than from 3 in Head quarters. But without the help of the Range officers and local subordinates very little can be accomplished, and the students might equally well remain in Coimbatore.

"We must come now to what is the serious business of the afternoon.

"May I request Your Excellency to be so gracious as to give away the Prizes.

"I will read out the list of Prize winners and as I read each name, the student will come forward and receive his Prize and certificate at the hands of Her Excellency, Lady Willingdon.

"(1) The Campbell Walker Prize, for the Student who is likely to make the best all-round Ranger, won by, K. Annappa Bhandary."

There were several others whose names came up for consideration and these were

N. S. Poonacha.
P. Sithapathy Ayyar.
M. Mologoda.
V. Ramalingam.

"(2) The brasies Prize for the Students likely to make the best outdoor Ranger; won by K. Annappa Bhandary again; there were several others whose names came up for consideration and these were

N. S. Poonacha.
M. Mologoda.
M. Mandanna.
M. B. Aiyanna.

"(3) The Gold Medal for the best Senior Division Student on Marks, presented by Government:— won by P. Sithapathy Ayyar.

"(4) Silver Medals for Honours presented by Government won by

P. Sithapathy Ayyar.
A. K. Kunhunni Nair.
M. Mologoda.
V. Ramalingam.
K. Annappa Bhandary.

The fifth medal is not yet ready as the necessity of distributing 5 honours medals in one year was not anticipated.

"(5) The Madras Conservator's Prize for Forestry : won by P. Sithapathy Ayyar.

"(6) The Lodge Prize for Engineering: won by P. Sithapathy Ayyar.

"(7) The Indian Forester Prize for an Essay by *past* students.

"It is gratifying to note that there were more competitors this year than there have been formerly. Presumably this was due to the fact that the subject of the Essay interested them. It was in connection with the recent criticisms of the Forest Department in the Press. and Legislative Council. The Essays received were above the usual standard and showed much thought had been given to the subject.

"The Prize was won by the past student who chose as his motto "*Bona si, sua, norant.*"

I will open the sealed envelope which contains his name. The winner is Mr. T. D. Ponniah, Range officer, Polur Range.

"(8) The Indian Forester Prize for an Essay by *present* students. The subject was "why did you choose Forestry as your profession".

Several good Essays were received. The prize was won by the student who chose as his motto "*Honi soit qui mal yepense,*"

"I will open the sealed envelope which contains his name. The winner is P. Sithapathy Ayyar.

"(9) The Chief Conservator's Prize for the best student in the Junior year has been won by K. Sankaranarayana Rao of VIth Circle, Madras.

"(10) The Pentland Shield for the best all-round Athlete in the College has been won by M. B. Ayyanna, from Coorg.

"(11) The Fischer Challenge Cup for Gymnastics has been won by S. C. Ramalingam of Ceylon.

"(12) The Examination in First Aid to the injured held this year as usual, resulted in 21 students out of 35 gaining certificates. These will be distributed now along with the College certificates

"(13) The Madras Forest College certificates have been awarded as follows:—

Honours Certificates:—

- | | | | |
|--|----|----|-----|
| 1. P. Sithapathy Ayyar, who also obtained a 1st aid certificate. | | | |
| 2. A. K. Kunhunni Nair, | Do | do | do. |
| 3. M. Molagoda, | Do | do | do. |
| 4. V. Ramalingam, | Do | do | do. |
| 5. K. Annappa Bhandary, | Do | do | do. |

“(14) *Higher Standard Certificates*, in the following order;—

6. K. Seetharama Hebbar.
7. N. S. Poonacha, who also obtained a 1st aid certificate.
8. B. Kotilingam, Do do do.
9. M. S. Krishnasawmi, Do do do.
10. G. V. Mohe, Do do do.
11. M. Mandanna
12. Balak Ram Anand.
13. K. Gopalakrishna Rao, who also obtained a 1st aid certificate.
14. S. C. Ramalingam, Do do do.
15. J. K. Bodas, Do do do.
16. M. Ganesan
17. P. A. Madhavan
18. N. Rajagopalachetty, Do do do.
19. M. Abdul Hamid, Do do do.
20. G. A. Vagle, Do do do.

“(15) *Lower Standard Certificates*, in the following order:—

21. A. Thirupathy Rayadu, who also obtained a 1st aid certificate.
22. G. R. Kelkar, Do do do.
23. M. Warris Husain.
24. Balakrishna Das, who also obtained a 1st aid certificate.
25. A. Narayana Rao, Do do do.
26. Hans Raj Dutt.
27. H. Wijiesinghe.

28. K. O. Anandan, who also obtained a 1st aid certificate.
29. L. S. Chati.
30. J. B. Rodrigues.
31. M. Hasnuddin Khan.
32. S. R. Punde.
33. M. B. Ayanna, who also obtained a 1st aid certificate.
34. D. A. Abeyaratne.
35. P. Gopalan.

“(16) For loyalty to the British Government, and for personal bravery, in carrying a letter through to Malapparam and bringing back a reply last August, when the loyal garrison there was cut off by the rebellious Moplah forces, the College Duffadar, M. Kuniyara, late Naick of the 2/73rd Malabar Infantry, has been awarded a certificate, which will now be presented to him by Her Excellency Lady Willingdon.

“(17) For good work in connection with the Census Operations of 1921.

P. Kuttappan Pillai
Prithichand
and J. S. Vedanayagam
have been granted certificates.

“THANK YOU, YOUR EXCELLENCY.

Ladies and Gentlemen, I must crave your patience for a few minutes longer. It gives me great pleasure to thank the Examiners

for the trouble they have taken in coming, many of them a long distance, to conduct these Examinations; and for the patience they have shown with the more nervous of the examinees. I have no doubt they themselves remember well the terrible ordeal of their own "civics" and that this has made them by so much the more long suffering. Their reports on the Students they have examined are on the whole most encouraging.

"It gives us great pleasure to see here to-day so many members of the Legislative Council, and Public men who are not in any way really connected with the College or the Forest Department. Their presence is an evidence of that growing interest in the Forests of India which it is so important should be aroused.

To Mr. and Mrs. Peree, for coming all the way from Dehra Dun, we are sincerely grateful; we hope that Mr. Peree may be able to give us the benefit of his council founded on his riper experience, at the Father of our Forest Schools as well as in the organization, and co-ordination with the Central Research Institute at Dehra Dun, of our Research branch which we have recently started in a small way and hope to extend. Our heartiest thanks are due to Mr. and Mrs. Cox and the Conservators of Forests for their help in the past busy fortnight, and for the encouragement to all that their presence here on this occasion is.

"And to Their Excellencies, the Governor and Lady Willingdon we would express our sincerest gratitude for the honour they confer on

us and on the College by their gracious presence here to day. We are most grateful for this renewed evidence of the interest we know they take in our welfare, and we venture to hope that we may again be honoured by Their Presence on not too distant a future date".

HIS EXCELLENCY then rose amidst loud applause and addressed the audience as follows;--

"MR. WILSON, LADIES AND GENTLEMEN,

"My first duty of course is to express Her Excellency's very sincere pleasure at having had this opportunity of coming this afternoon to present those Prizes to the successful students, and to condole with the unsuccessful students. I want to thank very particularly Mr. Wilson for his warm welcome to us here, and I can tell you that it has been a great pleasure to us both, but I think it is particularly to me, because I like coming down to look round and to inspect certain departmental activities of the two departments. Agriculture and Forests, in which I have been deeply interested, and practically interested, the whole of my life; and I want to say that I like particularly coming to see the Forest College. I think there is an *esprit de-corps*, a sense of discipline, and that goodwill and friendliness among the students and Officers of the Forest College, which I do not always see during my tours through the country.

"I want however to enter a protest against certain references which Mr. Wilson made in the early part of his speech. He rather said that it was due to the Reforms that His Excellency the Governor had not been able to come so frequently to the Madras Forest College as he used to do in the early part of his career. His Excellency has been Governor of the Madras Presidency for 3 years and 3 months. He has visited the Forest College on three occasions. He has therefore visited the College,— within three months,— once a year, and considering his other activities it shows he is very deeply interested in all that you do.

"There is another matter that I want very particularly to make a few remarks upon, this afternoon, in connection with Mr. Wilson's speech made just now. He showed with reference to the changes of the present times, the spirit which, I believe, runs through the whole forest Department, a spirit of recognition of changes that are going on, a spirit of complete optimism in the future. I am quite certain that we shall get over the difficulties that are in our way. I want to say to Mr. Wilson very sincerely, "I am grateful to you, for I also am an optimist." Let me add that there are too many pessimists just now both in the political and other spheres, but difficulties are made to be overcome and I am perfectly certain that by the co operation of British and Indians, we shall soon overcome these difficulties and we shall deal with all with absolute fairness and justice. Our object must be to hand over as soon as possible the full control of the administration to Indians; and that, after all, must be the ideal in the future. Well, I consider

that for many years yet we shall find British and Indians in close co-operation, the British advising and the Indians learning, until the British can say, "we have come to the consummation of our great task and can now hand over the whole control of the Administration to Indians."

"I want to say one word to you, Ladies and Gentlemen, with regard to a certain message that was sent to me by the Chief Conservator *only two nights ago*. He sent word to say that it is usual on this occasion for the Governor to discuss generally the speech of the Principal and also to give a general survey of the activities of the Forest Department.

"I will tell you that whenever His Excellency is going on tour, practically every Department of the Secretariat during the last 12 hours before he leaves Head Quarters throws files at him without cessation. I had therefore no time to look into the Chief Conservator's message until this morning. Having made this confession, I do want to say a few words on certain matters which interested me extremely in Mr Wilson's speech; in the first place I should like to say that it was an admirable speech,—in every way a comprehensive survey of the past year and containing many valuable pieces of advice to the students

"There was one matter which interested me deeply. He spoke of the vast possibilities of development in the forest department. He spoke of the amount of timber that for various purposes we import

into this country which could be replaced by timber we grow ourselves; he went on to say that there were four different sorts of forests in this Presidency; there were the timber forests, the grazing grounds, the fuel and bamboo forests and the protective forests; and he further added that he thought that the three latter were far more important than the former. Now I can realise and I appreciate the extraordinary value of the three latter, but I hope he will agree with me when I say that the first one is equally important; for I believe, and I am bound to say this, that for the Forest Department it is important that they should develop their timber, their vast supplies of timber, so adding enormously to our revenue. In past years the activities of the Department have been almost entirely confined to looking after grazing or fuel or protection, and the development of the timber forest has not been going on at all. This is because we had not yet got a big enough staff to deal with this side of forest development. I will tell you that recently we have discussed with the Chief Conservator at considerable length whether there is not any possible means of handing over the responsibility for our fuel forests to some other organisation in the future, thereby leaving the Forest Officer to that extent free to do his other duties. We have outlined a general scheme which has been passed by the majority of the Legislative Council, and I hope very much it will mean more future activity in the way of development of our evergreen and deciduous timber forests.

We in this Madras Presidency are extremely fortunate in the fact that we have secured the service, of Mr. Martin, as our Chief

Forest Engineer to organise the development of our great forests in the future. He is a man of great experience. I understand he has been showing you some Magic lantern slides in the Coimbatore City only very recently and that will show the general sort of schemes he has in his head.

"The whole scheme with regard to the utilisation and Engineering branch of the Forest Department is under the consideration of Government. Our Chief Conservator has been good enough to send up the full scheme for our discussion and I sincerely hope and trust that the Legislative Council will do the right thing and pass the scheme when it comes before them, for it is of the utmost importance if we are going to develop our forests in a satisfactory way in the future.

"There are certain matters with regard to this development which I should like to lay before you. The points which the Chief Conservator has endeavoured to elaborate are:—

1. The absolute necessity of obtaining the best technical advice possible;
2. The desirability of going slowly until we have organised the technical branch to deal with these technical schemes;
3. The necessity of treating all these schemes on a commercial basis with a proper system of accounting;
4. The necessity of looking ahead and training our establishment in advance to cope with future development;

5. The need for economy and the desirability of expanding only in proportion to the success obtained.

“These are the general principles which we are going to lay down for ourselves and I sincerely trust that the Legislative Council will sanction the scheme.

“Ladies and Gentlemen, I want to say one word on a matter on which I dilated at some length this morning at a certain ceremony at the Agricultural College with regard to departmental criticism. I think that the general atmosphere of feeling towards the Forest Department now is not one of rather hostile criticism but one of general support. I should like to add this: in the old days in every department there was practically no public criticism but in these galloping days of reform the educated Indian wishes to know the reason why,—and I think he is perfectly right. If, in every department as also in this, we lay all our cards on the table and give the fullest information possible to the public I think that they will become the blessers and not the cursers of our Forest administration.

“I only want to refer to one more matter which relates to the administration of the Forest Department. It is the question of housing. I fully realise the extraordinary difficulty of the housing question to officers not only of this Department but of every other department under our administration. The matter is being discussed and being looked into with great care and will be dealt with in a generous fashion

before long. My Hon'ble colleague is alive to the situation and you may be quite sure that Government are doing their best to improve this serious difficulty as soon as possible.

“Ladies and Gentlemen, I should like to echo every word Mr Wilson has said with regard to Mr Cowley-Brown. He is a great loss to this College; he is a man of most electric energy and he lived for this College during his last few years. I feel quite sure however that his successor will fully uphold the traditions of the College.

“I should also like to express my deep regret at the death of Mr. Sundaram Ayyar; I am given to understand that he was an officer of very great promise and it is most regrettable that he should have been taken from us at so early an age.

“My sincere gratitude is due to the Chairman of the Coimbatore Municipality, who, I understand, has shown a most co-operative spirit in every way towards this College.

“Ladies and Gentlemen, having said as much as this with reference to Mr Wilson's speech, I suppose you are expecting at the end to receive a lecture before the oration is finished. Well, I am only going to ask you students to remember every word that Mr. Wilson has said to you this afternoon. Always be self-respecting, always be courageous, always be high-principled, and always have a great sense of honour. If you do this and keep these things in your mind you will

not go wrong I want to impress upon you particularly, not to be easily discouraged even though you *may* think that things are going badly for you; if you do feel inclined to be discouraged, let me tell you that, after 7 years of strenuous life as head of various administrations during rather serious times in India, I had allowed myself to be discouraged, I should have had a bad time indeed. It is true that Rangers are the backbone of the service. Remember that good service always does get its reward; many of you young men standing at the back of the Hall may, as the Department is now constituted, rise to high position in the forest service in future years, if you work well and keep straight.

"Before I sit down, one word more. Our Chief Conservator Mr. Cox is leaving us to go on leave within a few months and I want, before you all, personally to express my very sincere and grateful thanks to him. During the past three years that we have been associated, he as Chief Conservator and I as Governor, he has always shown me loyal support and given me constant good advice and constant encouragement. I can only say this: I think the Forest Department is extremely fortunate in having had such a good captain of their eleven, and I sincerely hope that after a short sojourn in England he may return with renewed energy and full of vigour to carry on the great schemes that he has outlined for us".

Mr. S. Cox, the Chief Conservator of Forests then called for three Cheers for their Excellencies, which were most enthusiastically respond-

ed to. A move was then made to the ground floor of the College where the guests partook of refreshments. After witnessing a dance by the Coorg students, attired in their National dress. Their Excellencies left, for Bangalore; shortly after, the other guests also dispersed, and thus ended a most successful function.

forcing frames for Eucalypts in the Nilgiris.

In the Coonoor and Ootacamund Bluegum plantations the artificial means adopted to induce the germination of seeds of the Eucalyptus hardwoods, is rather interesting. Considerable difficulty seems to have been experienced in getting seeds of these species to germinate. To obtain satisfactory germination the device employed is that of "Forcing Frames," which not only brings about germination but also protects the young seedlings from external dangers, such as frost, rain, wind and excessive light and heat, during the early and critical stages of their development.

Each individual frame is set in four masonry walls enclosing a rectangle 24 feet by 4½ feet. Of the two longer walls, one is 2½ feet high, while the other measures only 1½ feet. This gives a considerable slope to the frame when fixed in position and provides the necessary drainage. The walls are of burnt-brick-in-mud masonry 13½ inches thick, and plastered with mortar both inside and out. On these walls is fitted the main frame, made of well seasoned Teak scantlings 4 inches by 5 inches in section. Each frame contains 3½ sets (that is 7) of

windows, which close securely on hinged joints, similar to any ordinary window. Since the windows lie in a slanting plane they can be closed practically air tight, so that little or no air is admitted to the chamber enclosed between the four walls and the overlying frame. The panes of the windows are painted with ordinary lime, so that only diffused light is admitted into the chamber. These glazed windows also serve as a means of regulating the temperature and circulation of air, so that extremes—both heat and cold—are not felt within the chamber where the boxes containing the seeds (and subsequently seedlings) are placed. Twenty boxes go to each frame. Bamboo mats are spread over the windows during storms, to protect the glass panes from hail and heavy rain. The whole frame is detachable and can be removed and reset in another masonry structure built in any other desired locality. The cost of the whole structure, including masonry, amounts to about Rs. 350.

The contents (that is soil packing) of each box is as follows:—

The bottom most layer consists of two inches of $1\frac{1}{2}$ " aggregate of newly burnt brick; over this, there is a two inch layer of inverted turf. The third layer of two inches is made up of moss spread loosely; and the remaining three inches is filled in with sterilised shola earth. The broken brick serves as a filter, admitting air from below, and also eliminates any chances of a water logged condition creeping in. The turf placed above, is a means of preventing the water from carrying away by percolation the upper layer of sterilised shola soil, and being inverted aids in maintaining a condition of suitable humidity within the earth above. The moss retains moisture, and in so doing eliminates any tendency towards drought. The top most layer of shola earth, being sterilised, is free of all germs, seeds and other foreign bodies.

"Sterilising" is a scientific method of purifying earth used for nursery beds, by destroying germs, eggs, and larvae of insects, seeds and other organic matter which exist in the earth, and which might later on prove injurious to germination and early growth. A galvanised corrugated iron sheet is raised at both ends on two low masonry piers. A bag of shola earth is evenly spread over the sheet and it is heated from underneath. The earth is constantly raked up, so that all its particles come in contact with the heat. A blue smoke is emitted, during the process as a result of the destruction of all organic matter found mixed in the earth. When this blue smoke ceases, the sterilization is complete and the earth is allowed to cool and may then be used for nursery beds.

In Coonoor, "Forcing Frames" are erected near the Black Bridge reserve on a level bank of a small stream the site having been chosen to facilitate the watering of the seedlings. The seeds are mixed with shola earth, bulk for bulk, and are sown broadcast in the boxes, the species selected being *Eucalyptus pilularis* and *Eucalyptus paniculata*. The seeds are obtained from Australia. Twelve ounces of seeds are sown in the twenty boxes contained in one frame. In this manner, seeds were sown on 9—4—22. The *Eucalyptus paniculata* has germinated well, while the *Eucalyptus pilularis* is a failure, due probably to bad seeds. The boxes are watered both in the morning and in the evening.

The admission of heat and light is regulated by closing and opening the windows, which are, until germination, kept completely closed at night, and opened about an inch during the day. After germination, which takes place after the lapse of about a fortnight, the windows are opened from 6 to 9 inches at night and from 1 to $1\frac{1}{2}$ feet during the day. This degree of ventilation appears to give

the young seedlings a sufficient quantity of warmth, and affords a uniform temperature, diffused light, and protection from frost, wind and rain. Without this regulation and protection, in a severe climate like that of the Nilgiris, the young seedlings would not be able to survive the extremes of temperature. It will thus be seen that conditions congenial to the germination and early growth of the Eucalyptus hard woods, are supplied artificially, since they do not exist naturally in the locality in question. Hence this method of germination is known as that of "Forcing Frames".

Unfortunately by experience it has been found that the moss and inverted turf have proved the breeding places of insects. This fact, to a certain extent, considerably reduces the beneficial results obtained by sterilising the soil used in the topmost layer of the boxes. However to minimise, if not to completely eradicate this danger, excessive watering has been resorted to, and it now remains to be seen if the desired result will be obtained.

When the seedlings are about $\frac{3}{4}$ inch high, they are transplanted $\frac{1}{2}$ inch apart in a second set of boxes (also kept in the Forcing Frame). Thus each box holds about 2500 seedlings. When the seedlings attain a height of 4 inches, they are spikéd out and mossed, and placed in open beds, watering being continued as before. The mossed seedlings are transferred from bed to bed once a week, so that any likelihood, of their roots striking the ground, is prevented. When the seedlings are 8 inches high, they are transplanted out into the forest (Black Bridge Reserve of Coonoor and Kodapamund Reserve of Ooty).

The further tending of these young plants, is a separate subject and need not be dealt with here. It is sufficient to say, that the Eucalyptus hard woods found in the Nilgiris—or at any rate most

of them—though delicate in the critical stages immediately following germination and transplanting, become more hardy as they grow older and promise to be a most valuable source of revenue and a solution to the long-thought-about problem of the supply of Railway sleepers and a durable timber in the Nilgiris, now solely dependent for its requirements on the well known Bluegum.

S. DORAIRAJA,
1921-1923 Division.

Occasional Notes.

I The Inter-divisional Hockey-Match.

The Inter divisional Hockey Match came off on the 27th June 1922. Both the divisions were represented by almost equally strong teams, but it must be said, to their credit, that the seniors had a decided advantage for the obvious reason that they had had a full year's start, over the juniors, to brush up their rusty practice. It was difficult at first to say which side would carry the day; but, hardly had half the time passed, when the superior game of the seniors began to manifest itself, with the result that the seniors were the winners by six goals to nil.

In this connection it may, with due regard to our late worthy seniors, be mentioned that their creditable achievement on

this day is balanced by the victory we gained on an equally important occasion—"The Inter divisional Foot-hall Match".

* * * *

*II. Unveiling of the Portrait of
the late Mr. M. R. Sundaram Iyer, B. A., June 29th 1922.*

It was a very impressive ceremony. The portrait that was unveiled was a bust enlargement of one of the most popular of the College instructors, the late M. R. Sundaram Iyer. The unveiling was done by our Chief Censervator, Mr. S. Cox. The function took place in the Students' Club of the Madras Forest College in the presence of a large gathering of Forest Officers, the Principal and staff of the College and the students of both the divisions, every one standing in solemn respect.

Mr Cox, before unveiling the portrait briefly dwelt on the rare and highly trained intellect of Mr. Sundaram Iyer which, with moral qualities of an equally elevated degree, was amply displayed in Mr. Sundaram Iyer's short though brilliant career in this College. He was an eminent botanist and an intrepid working plans officer. Beloved by students and staff alike, he was an ardent well wisher of the College. His loss was a great blow. May his portrait ever remind us of the keen and abiding interest that he took in the well being of the College. May it also prompt in future students the strong sense of duty and the noble endeavours to maintain the tone of the College, which were always the guiding principles of his every day life.

K. SHANKARANARAINA RAO,
1921-23 Division.

III. Y. M. C. A. Tournament for the Father Rhondy's Shield.

On August 12th much enthusiasm was displayed in the course of a Cricket Match on the grounds of the Agricultural College, when the Forest College Eleven met Stane's School Eleven. The Forest College winning the toss, elected to bat. Though they had the misfortune to lose their best men early in the innings, they knocked up a total of 106 in two hours, after a hard fight against a fine bowling side. Stanes' school went in and when play was stopped for lunch at 1-45 p. m. they had put up a score of 25 runs for three wickets. Soon after play was resumed at 2-45 p. m. Stane's School Eleven had the misfortune to lose their best batsman W. Banford, the score being 57 for 4. His loss proved irreparable and the rest of the side collapsed, their innings ending tamely for 72 runs. The Madras Forest College in their second innings scored 126 runs for 6 wickets, chiefly through the fine batting performance of Mr. C. C. Wilson, Mr. E. K. Krishnan, Saiyed Hadi Hussain, Jayasundara and P. T. Jayakody. They then declared their innings closed, leaving 1 hour in which to try and get their opponents out a second time. Stane's School, however, managed to play out time, their score being 40 runs for 5 wickets when play closed at 6-15 p. m. The Madras Forest College won the match by 34 runs on the first innings.

S. DORAIRAJA,
Secretary,
M. F. C. Athletic Club.

Miscellanea.

I. Notes on a fight between the Indian Screech Owl and a Cobra.

"Sometime ago, whilst stationed at Ferozepore, I had in my possession a pet black cobra, about five feet in length and also some young screech owls

One afternoon, when the cobra was out for exercise, on the drive of my bungalow, it crawled near to the owlets cage; suddenly a bird flew past my head and attacked the cobra, giving it a blow with its wing, the bird proved to be an adult owl.

The snake at once coiled up and raised its head at the same time expanding its hood; the owl hovered in front of the snake, but kept out of reach; whilst the snake's attention was attracted by the first owl, a second owl attacked it from behind, knocking it down to the ground. The owls then alternately attacked the snake, knocking it down each time it raised its head. After this had happened four or five times, I thought that the snake had been sufficiently troubled for one day and so picked it up; on examining it I found that its lower jaw was fractured, so had to kill it. I was sorry to do this as it had been in my possession for several months and was very tame.

It might be of interest to hear whether any of the readers of the Journal have ever seen a similar encounter between a cobra and owls or other birds in the wild state".

J. E. M. BOYD, F. E. S.,
Major, R. A. M. C.

II. Hatching of Cobras (*Naia Tripudians*) with remarks on the Oodont, Genitalia, etc,

"On the 12th of May Mr. J. Flynn, the Honorary Director of the Karachi Museum, greeted me with the news that one of the cobras in captivity had laid eighteen eggs. Two more eggs were laid on the night of the 13th, and one on the 14th instant, making a total of twenty-one. One egg typical of the rest measured 46×28 mm. ($1\frac{3}{4} \times 1\frac{1}{8}$ inches). The egg is a longish oval with equally rounded poles, white in colour and the shell pliant like white kid.

Knowing from past experience the difficulties of incubating snake's eggs, I advised Mr. Flynn to place them on cotton wool in a tin box with closely fitting lid and to place a sheet of slightly damped blotting paper beneath the wool. Snake's eggs require a slightly damp atmosphere or they dry up. If, on the other hand, the atmosphere is too damp they get mouldy in a day or two and decompose. Every few days the box was opened to ascertain if the blotting paper needed further damping.

I opened one of the eggs on the 19th of June, 38 days (possibly 36) after deposition, and found to my great satisfaction a living female embryo within, that measured 212 mm. ($8\frac{3}{8}$ inches). The tissues were semi-translucent, and the epidermis showed no signs of pigmentation. The abdominal walls were completely sealed, and the heart was observed within, pulsating at the rate of 75 times a minute. There was a feeble attempt at movement on the part of the embryo, which was more pronounced when placed in spirit.

On the 23rd of June (42 days after deposition) I opened two eggs. One contained a male embryo 235 mm. ($9\frac{1}{2}$ inches) in

length, with plum-coloured genitalia extruded. This moved very distinctly, and also exerted the tongue. There was some pigmentation of the epidermis, revealing a distinct dark variegation more evident in the anterior part of the body, and a very perfect "spectacle" mark was visible on the hood. The second embryo was a female measuring 241 mm. (9½ inches). This also moved very obviously. The heart was pulsating 74 times a minute. Investigation showed that the oodont or egg tooth was perfectly developed. It was covered by a layer of mucous membrane.

On June the 26th (45 days after deposition) I opened two more eggs. One contained a male 235 mm. (9¼ inches) long, with the genitalia apparent, and the other a female 254 mm. (10 inches) in length. Each tried to shake itself free from the forceps used to extract them, and emitted the tongue repeatedly. When placed in spirit both struggled violently but aimlessly.

On the 29th of June (48 days after deposition) I opened another egg. The little cobra 279 mm. (11 inches) long, was very lively, erected itself, protruded the tongue, and hissed at me. When consigned to spirit it swam freely, and took fifteen minutes to drown. On this same day inspection of the eggs showed that two were on the verge of hatching. One had several cuts in it, and an open window through which the snakelet could be seen to move. The other egg had two small cuts converging to an angle.

The 30th of June was an eventful day. The windowed egg of yesterday was in process of hatching. The little cobra had about three inches of its length outside the shell. When touched however it withdrew completely.

On the first of July, 50 days (possibly 48) after deposition of the eggs, the first cobra of the brood hatched out. This little

hatchling was extremely alert, erected itself, expanded the hood and hissed at me violently. It was observed to be very distended, and after death, the stomach was found to be full of the residual yolk of the egg, amounting to about an eggspoonful. The snakelet measured 260 mm. (10¼ inches). Many of the remaining eggs were obviously decomposed, and I extracted four males and one female varying in length from 190 to 228 mm. (7½ to 9 inches) all dead.

Only one more egg of this brood hatched out, and this happened on the 5th of July, 54 (possibly 52) days after deposition. This hatchling had also eaten the remnant of its yolk.

On the 19th of May another cobra in the Museum deposited twelve eggs, and these were placed under the same conditions as the previous clutch. On the 6th July (48 days later) four were hatched out, and a fifth had some inches protruding from the egg. As the box had not been opened the day before, it is possible some of these hatched out on the 47th day. One of the hatchlings was dead, its naval string twisted and adherent to the yolk mass within. The others were very lively, and all tried to escape from the tin simultaneously, creating some excitement. They proved to be 256, 260, 266 and 285 mm respectively. Two had undoubtedly eaten the residual yolk, but the other two were not distended, and if they had eaten any of it had done so sparingly.

On the 7th of July the half-hatched snakelet of yesterday was free of its shell but dead, the naval string twisted and adherent to the yolk. It measured 228 mm (9 inches).

BY, F. WALL, COL., I. M. S.

*Extracted from: The Journal of the
Bombay Natural History Society, Vol. XXVIII No. 2.*

III. *Gems from the Examination hall.*

1. *Lemon*:— “A lemon is a fruit made up of a leathery epicarp and a hairy mesocarp”.
2. *Asexual Reproduction*:— “Asexual reproduction is the opposite of bisexual seeds produced from a diaeceous plant by Cross pollination”.
3. *Anatropous ovule*:— “An anatropous ovule is not a real ovule, but only some sort of structure resembling an ovule”.
4. *Crambler (Sic)*:— Some climbers are of a rambling nature and are then called “cramblers”.
—[Although hitherto unheard of, the name “crambler” might with advantage be adopted! —Ed.]
5. *A bridle path*:— “The Bridal (sic) path is often steep and difficult”.
[The above are bonafide extracts from the answer papers of the recent examinations held at the Madras Forest College]

Reviews.

Review by, M. R. Ry, E. K. KRISHNAN AVL., (Instructor in Mensuration etc, to the Senior class of the Madras Forest College)

ON

“*Hand Book of field and office Problems in Forest Mensuration*”

BY,

Hugo Winkenwerder, and Elias T. Clark.

PUBLISHED BY,

*Messrs. Chapman and Hall Ltd.,
London.*

(PRICE 10 Sh. Net.)

This book is a practical treatise on the subject of mensuration, explaining as it does, the way to set about tackling some of the problems the Forester and particularly the working Plans officer meets with in the field. That it is practical is its chief merit. The problems dealing with the calculation of distances by pacing, the calculation of the heights of trees, sample plot studies, and such other similar points as are likely to be useful to Indian Foresters are sure to interest those who are responsible for teaching in Indian Forestry schools. Many of the problems dealt with are, however, beyond the scope of Indian schools.

The ‘get up’ of the book is admirable.

* * * *

“The Survey of the Forestry journals of the world” issued as a supplement to “*Tectona*” No. 2, *Deel XV for February 1922* is a useful little pamphlet, giving in dutch and English, a Comprehensive list of the various magazines, journals, and papers edited throughout the world in connection with Forestry, Lumbering, and the Timber Trade. The details in the list include as far as possible, price place of publication, whether weekly monthly, or quarterly, and the number of the Current Volume of each publication referred to.

In the case of the *Madras Forest College Magazine*, mention of the price viz., Rs. 2—0—0 per volume of four members has been omitted.

“Ed.”

Serial No.	Contribution.	Contributor
1.	One long panel, one short panel and one block, each of (a) <i>Cryptomeria japonica</i> & (b) <i>Pinus langifolia</i>	M. R. Ry, A. Swami Kutty, Range officer, Ootacamund.
2.	Specimen of a <i>Tarantula</i> .	H. F. A. Wood, Esq., I. F. S., Conservator of Forests.
3.	Two short panels of <i>Hardwickia binata</i> .	M. R. Ry, R. Manickam Pillai, Range officer, Dharmapuri.
4.	Two tools in use in Punjab	Mr. Hans Raj Dutt, M. F. C 1920-22 Dn.
5.	Thirty five slabs (5" x 3" x 1/2" each) of timber species	The Imperial Forest Economist Dehra Dun
6.	Two short panels and one block of <i>Cedrela Toona</i>	M. R. Ry, V. D. Ramalingam Pillai, Range Officer, Namakkal.
7.	Larvae and Imago of the Coleoptera " <i>Cryptorhynchus Magifera</i> ", causing damage to mango fruits.	M. R. Ry, G. N. Subba Rao, Range officer, Alangayam.

“The President and members of the Madras Forest College Athletic Club acknowledge with thanks, the generous donation of Rs. 19—0—0 made to the club by the members of the Coimbatore

Contributions to the Madras forest College Library.

1. "Madras Forest Bulletin No. II—Sylvicultural research in Madras Presidency 1920-21"—By, *W. C. Hart*.
2. "Studies in French Forestry"—By, *Theodore S. Woolsey*.
3. "The Practice of Sylviculture"—By, *Ralph C. Hawley*.
4. "Manual of Elementary Botany for India" (Revised Edition)—By,
Rai Bahadur, K. Rangachariar, Avergal.,
5. "Records of the Botanical survey of India," Vol. II.
6. "The Tropical Agriculturist:" Volumes XXV to XXXIII.
7. "The Indian Forester" 1894. Vol. XX
 1895. Vol. XXI
 1898. Vol. XXIV.
 1899. Vol. XXV.
8. "The Indian Forest Memoirs":
 Sylvicultural series : Vol. I Part I.
 Forest Botany series : Do.
 Economic Product series : Do. & Vol. II Part II.
 Forest Zoology series : Vol. I Part II.
 „ II Part I.
 „ II Part II.
 „ III Part I.
9. Forest Bulletin No. 3. Note on the relative strength of Natural, and Plantation grown teak in Burma.—By, *R. S. Pearson, I. F. S.,*
10. Forest Bulletins Nos. 7 to 12.
11. Forest Pamphlet No. 14.—By, *R. S. Troup.*

12. Forest Pamphlet No. 15. A note on the preservation of Bamboos.—By, *E. P. Stebbing*.
13. Note on best season for Coppice fellings of teak.—By, *R. S. Hole*.
14. Note on the Bee-hole borer of Teak in Burma.—By, *E. P. Stebbing*.
15. "Notes on Arboriculture in the Bombay Presidency"
16. "Useful Insects"
17. "Household Insects"
18. "Working plan for the Central Almoora Division." 1920-21 to 1931-32.—By, *H. G. Champion*, B. A.,
19. "Timber preservation; making good savings in cost of Tie Removals"—By, *F. J. Angeir*.
20. "Bee-hole borer of Teak."—By, *C F. E. Deason*, M. A., I. F. S., F. E. S.,
21. "Government Securities Manual" Second Edition 1921.
22. Working Plan for the Gamsur Forests, Ganjam District.—By, *A. A. F. Minchin Esq.*, I. F. S.,
23. Working Plan of the Sal Forests, Western Circle, Assam.—By, *A. J. W. Milroy, Esq.*,
24. Forest Working Plan with maps, North Ghurwal, U. P., Parts I and II.—By, *A. E. Oosmaston*.
25. Progress report of Forest Research Work in India for the year 1919-20 including Administration report of Forest Research Institute Dehra Dun.
26. "The Forests of India and the development of the Indian Forest Department"—By, *E. P. Stebbing*.
27. "Forest fires in Canada" 1917,
28. Report of the Department of Industries, Madras, for the year ending 31st March 1920.
29. Dr. Schlich's Manual of Forestry, Volumes I to V.
30. "Bengal Plants"—By, *David Prain*.
31. Burma Forest Bulletins Nos. 4 and 5.
32. A history of Birds—By, *W. P. Pycroft*.

33. "Forest Mensuration"—By, *H. H. Chapman*.
34. "Records of the Botanical Survey of India" Vol. IX No. I.
35. "The Game birds of India, Burma, and Ceylon"—By, *Home and Marshal*, Vols. I to III.
36. "The Timbers of India and Burma"—By, *Alexander L. Howard*.
37. Administration report of the Travancore Forest Department for the for the year 1906 M. E.
38. "Road Proposals" Tharawady Division—By, *H. R. Blanford*.
39. "Dominion Forestry Branch Message Code"—*W. N. Millar*,
B. S. M. F.
40. "The Fauna of British India," Vol I. By, *C. J. Graham*.
41. Straburger's "Text Book of Botany" (Revised Edition.)

Gazette Notifications

6-6-92.

Mr. A. B. Jackson, Conservator of Forests, leave on average pay for six months from 5th April 1923 and permitted to retire from 5th October 1923. Mr. D. L. Sathe District Forest Officer, West Vellore, is granted under rule 81 of the Fundamental rules, leave on average pay for twelve days from 10th to 21st February 1922.

27-6-22.

Mr. A. M. C. Littlewood is granted a further extension of privilege leave for two days in continuation of the extension of leave granted to him in Proceedings No. 794, Routine dated 25th May 1922, Mr. D. L. Sathe, District Forest Officer, West Vellore is appointed also as Deputy Collector in the North Arcot District.

4-7-22.

On the expiry of the leave granted to him M. R. Ry. A Hanumanta Rao, Avl., Extra Assistant Conservator of Forests, is posted to Chittoor, to work under the District Forest Officer.

18-7-22.

M. R. Ry. P. Govinda Menon Avl., Extra Assistant Conservator of Forests, is granted an extension of leave on half average pay for one day and extraordinary leave for three months and twenty-nine days in continuation of the leave granted to him in Chief Conservators Proceedings No. 106 Routine dated 20th January 1922.

Mr. J. W. K. Wernham, Assistant Conservator of Forests, working under the Principal, Forest College, is posted to work under the Conservator of Forests, Fifth Circle, until further orders.

Mr. S. Cox, C.I.E. I. F. S., Chief Conservator of Forests, leave on average pay for two months with effect from 10th August 1922. Mr. H. Tireman, Conservator of Forests, sixth circle to act as chief conservator of Forests, vice Mr. S. Cox granted leave from or after 10th August 1922.

Mr. A. Wimbush, Deputy Conservator of Forests, to act as Conservator of Forests, sixth circle vice Mr. H. Tireman. In partial modification of the notification dated 1st May 1922. Mr. R. Mitchell, Extra Assistant Conservator of Forests, will be considered to have been posted as District Forest Officer, Lower Godavari Division, with additional charge of the Upper Godavari Division, from 17th April 1922, to 6th June 1922.

1-8-22

Mr. H. P. Ward, Assistant Conservator of Forests, Ganjam, to be in charge of the Ganjam District temporarily, vice Mr. Wimbush on other duty. Mr. F. L. C. Cowley—Brown, Deputy conservator of Forests, has been granted by the High Commissioner for India an extension of furlough on medical certificate for two months and fifteen days.

8-8-22

M. R. Ry. M. H. Krishnaswamy Ayyar Avl., Probationary Extra Assistant conservator of Forests, is granted an extension of leave on average pay for fifteen days in continuation of the leave for one month and fifteen days granted to him in chief conservator's Proceedings, No. 722; Routine, dated 8th May 1922.

Examinations, July 1922.

The officers mentioned below have been declared by the Board to have passed in the subjects specified against their names :—

Mr. H. P. Ward, Assistant Conservator of Forests Ganjam in F. R. and O. P. and A.

Mr. H. M. K. Law, Assistant Conservator of Forests, Bellary in F. R.

Mr. J. C. Wrench Do in F. R. and O. P. and A.

Mr. M. Krishna Rao, Forest Ranger, Bellary District in F. R.

Mr. H. E. Brown Probationary E. A. C. South Coimbatore in F. R., F. L., and O. P. and A.

Mr. J. M. Sweet Forest Research officer, Coimbatore in O. P. and A.

Mr. Mc. D. Currie, A. C. South Mangalore in F. L. and F. R.

Mr. C. Karunakara menon, Ranger, V Grade, Bolampatti in F. L. and O. P. and A.

Mr. V. G. Darrington, A. C. Coorg, in F. L., F. R. and O. P. and A.

Mr., J. W. K. Wernham. A. C. Coimbatore in F. L., F. R. & O. P. & A.

Mr. M. F. Bridge Do. in F. L.; F. R. and O. P. & A.

Mr. D. F. Stileman, A. C. Salem in Tamil Lower Standard prescribed for members of the I. C. S. (Languages and Tests).

Mr. J. W. K. Wernham, A. C. Coimbatore do.

Mr. M. F. Bridge, do do

Mr. C. R. I. Williams A. C. Vizagapatam Telugu Lower.

Mr. D. Mc. D. Currie A. C. South Mangalore Kanarese Lower.

Mr. J. M. Sweet. Forest Research officer, Coimbatore-Malayalam Lower.

Mr. F. D. Ardagh, Deputy Conservator of Forests, North Salem and Captain W. G. Dyson, District Forest officer, South Coimbatore in Tamil Higher Standard prescribed for members of the Indian Civil Service,

NOTE.—F. L. Forest Law, F.R. Forest Revenue, O. P. and A. office
Procedure and Accounts.

15—8—22.

Mr. Mr. R. B. Cornwell, Extra Assistant Conservator of Forest, leave on average pay for six months with effect from 15th August 1922. or date of relief.

Mr. B. F. Rigold, Deputy Conservator of Forests, leave on half average pay for nine months and sixteen days from 17th March 1922 in lieu of the leave already granted to him.

Mr. M. C. Chandy, Extra Assistant Conservator of Forests, leave on average pay for three months with effect from date of relief.

Mr. C. M. Hodgson, Conservator of Forests, has been granted by the High Commissioner for India an extension of furlough for two months and one day.

Mr. F. L. C. Cowley-Brown, Deputy Conservator of Forests, has been granted by the High Commissioner for India an extension of furlough on medical certificate for two months and sixteen days in lieu of the leave previously granted to him in notification No. 228 on page 736 of Part I of the Fort Saint George Gazette, dated the 1st August 1922.

Notifications relating to Range Officers.

First Circle

5—6—22.

M. R. Ry. K. Venkatesam Naidu, Probationary Ranger, Godavari Upper, is granted leave on full average salary for three months with effect from date of relief.

10—6—22.

2. M. R. Ry. I. Ramamurthi, Supernumerary Ranger is transferred from Ganjam to Kistna district for charge of the Ellore Range. He should be relieved as soon as the Vernacular Training School is closed and directed to join at once.

Second Circle.

31—5—22.

3. The extension of leave for 3 months granted in this office S. O. Nos, 16 and 23 of 1922 dated 2—3—22 and 21—3—22 to Ranger-Syed Ibrahim Albeiz will be considered to be leave on average pay under Rule 81 (b) of fundamental Rules.

2. He is further granted an extension of leave for 1 month as follows:—

From 7—5—22 to 31—5—22 on average pay, under Rule 81 (b) of Fundamental Rules and from 1—6—22 to 8—6—22 inclusive on medical certificate on half average pay "Leave not due" under Rule 81 (c) (i) of Fundamental Rules.

29—5—22.

4. Ranger C. G. Ganapathi is considered to have been on special duty in Markapur Range, Kurnool East Division. From 11—4—22 to 22—4—22.

5—6—22.

5. M. R. Ry, B. V. Jageswara Rao, Ranger, V Grade in charge of Kalyandrug Range, Anantapur District is granted combined leave of 6 months as follows with effects from 16—5—22.

28 days ... Privilege leave.

5 months and 2 days ... Sick leave on medical Certificate on half pay (as per old leave rules).

(2) M. R. Ry, V. N. Subramanya Iyer Supernumerary Ranger is posted to the charge of Kalyandrug Range Vice No. 1 on leave or until further orders with effect from the same date.

10—6—22.

6. M. R. Ry, N. E. Kanakayya, Ranger IV grade, is granted an extension of leave already granted in this office S. O. No. 13/22 of 26—2—22.

Note:— The nature of leave will be decided later on, after receipt of the report called for, from the District Forest Officer, Kurnool West.

7. In cancellation of service Order No. 11 of 22 dated 15—2—22 posting him to Gundlabrahmeswarem Range in West Kurnool District, Mr. Sayaid Ibrahim Albeiz Sahib Ranger, IV Grade is posted to Kurnool South Division to be on special duty under the orders of the District Forest Officer, Kurnool South.

30—6—22.

8. The leave granted to M. R. Ry. B. V. Jogeswara Rao Ranger, V Grade in this office Service Order No. 43 of 22 dated 5—6—22 takes effect from the afternoon of 25th May 1922 and not 16th as ordered therein

6—7—22.

9. On relief, by Mr. H. R. M. K. Law, Assistant Conservator of Forests Ranger A. Vyasulu of Kulligi Range, is granted leave for three months. The nature of leave will be settled on receipt of the further report called for from the District Forest Officer.

11—7—22

10. The leave granted in this office Service Order No. 54 of 22 dated 6—7—22 to M. R. Ry. A. Vyasulu Ranger, VII Grade will be leave on average pay under Rule 81 of the Fundamental Rules.

11—7—22.

11. Mr. Syed Ibrahim Albeiz, Ranger III Grade is granted an extension of "leave not due" (on medical certificate) on $\frac{1}{2}$ average pay under rule 81 (c) of the Fundamental rules for one month in continuation of the leave already granted in this office S. O. No. 42 of 22 dated 31—5—22,

12—7—22.

12. The extension of leave for 4 months granted to M. R. Ry N. E. Kanakayya, Ranger IV Grade in this office Service Order No. 44 of 22 dated 10—6—22 will be leave on average pay under rule 81 (b) (II) of the Fundamental Rules.

15—7—22.

13. In modification of this office Service Order No. 47 of 22 dated 17—6—22 the following repostings of Rangers are ordered:—

- (1) M. R. Ry. H. Rama Rao, Ranger II Grade on return from leave is posted to Kalyandrug Range, Anantapur District.
- (2) M. R. Ry. V. N. Subrahmanyam, Supernumerary Ranger on relief by No. 1 to be on Special Duty in the same District.
- (3) M. R. Ry. T. Sree-Ramulu Naidu, Supernumerary Ranger to continue in Bukkapatnam Range until further orders

18—7—22.

14. (1) M. R. Ry, O. Venkatramana Iyer, Ranger, I Grade, on return from leave on 1—8—1922 is posted to Bukkapatnam Range, Anantapur District.
- (2) On relief by No. 1, Supernumerary Ranger, T. Sreeramulu Naidu is posted to Special duty in Kulligi Range, Bellary District to assist Mr. Law, Assistant Conservator of Forests, now in charge of the Range.

22—7—22.

15. (1) M. R. Ry, G. Rama Rao, Ranger, III Grade, is posted to Sundlabrahmeswaram Range on the expiry of his leave (ie. on 17—1—22) granted in this Office Service Order No. 21-22 dated 21—3—1922.
- (2) M. R. Ry, B. Krishna Rao, Supernumerary Ranger, on relief by No. 1 to be on special duty in Kurnool west,

25-7-22.

16. The following reduction of Ranger is order:—
M. R. Ry, G. Rama Rao, Ranger, III Grade, is reduced to the bottom of the IV Grade (New arrangement) immediately after K. Balakrishna Rao.

1-8-22.

17. M. R. Ry, T. M. Krishnama Chari, Supernumerary Ranger, is granted an extension of leave on average pay for 2 months in continuation of the 1 month's leave already granted by the District Forest Officer, Kurnool South in his S O No. 59/22 dated 10-6-22.

Third Circle.

18. The two months Privilege leave granted to Mr. P. M. Mathew, Ranger, V grade, Sub protom with effect from 15th April 1922 in this office Service Order No. 20 of 22 dated 12th March 1922 is extended by one month.

10-5-22.

12. The leave granted to Mr. E. W. Fernandez, Ranger, VI grade, for 3 months in this office Service Order No. 25 of 1922 dated 23rd April 1922 is further extended by 18 days from 1st June 1922. The Ranger should on expiry of the leave report himself for duty on 19th June 1922 to the District Forest Officer South Cuddapah District

10-6-22.

20. On relief by Mr. J. A. Master, Mr. Amir Padsha Sahib, Bahadur, Extra Assistant Conservator of Forests in charge of South Cuddapah is transferred to the Nellore District, under the orders of the District Forest Office, Nellore.

21-6-22.

21. Ranger, E. W. Fernandez is granted an extension of leave for 10 days on loss of pay in continuation of the leave granted to him in this office Service Order No. 37/22 dated 10th June 1922.

21-6-22.

22. M. R. Ry, C. R. Rajagopalau, Ranger, VI grade on relief of Voutimitta Range, West Cuddapah District by Mr. P. M. Mathew, on return from Privilege leave is posted to the charge of Vonipenta Range, Charge North Cuddapah District.

(2) M. R. Ry, A. Muthukrishnan, Ranger, VI grade, in charge of Venipenta Range, North Cuddapah District on relief by No. (1) is granted Privilege leave for 3 months from date of relief.

25-6-22.

23. M. R. Ry, K. Raghuraman, Supernumerary Ranger, III Circle doing duty as Junior Instructor, in the Vernacular Training School North Cuddapah District is confirmed as Ranger, VII Grade with effect from 1st June 1922.

28-6-22.

24. M. R. Ry, S. Sankara Alwa, Ranger, VII grade, South Cuddapah District is granted on extension of leave for 1 month in continuation of the leave already granted to him in this office Service Order No. 29/22 dated 11th May 1922.

29-6-22.

25. Consequent on the regarding of Rangers ordered in Chief Conservator's Proceedings No. 274 Mis. of 1922 dated 13th June 1922, the following confirmation, promotion and reversion are ordered with effect from 1st June 1922.

Name.	From.	To.
M. R. Ry, K. R. Krishna Ayyar,	III grade Subprotom,	III grade Permanent.
Mr. T. T. Ansep,	IV grade Permanent,	III grade Subprotom.
M. R. Ry, C. S. Ramanathan,	IV grade Subprotom,	V grade Permanent.

3—7—22.

26. (1) M. R. Ry, T. E. Varadachari, Ranger, IV grade South Cuddapah District on expiry of the three months leave on average salary from 15 April 1922 granted in this office Service Order No. 28/22 dated 11th May 1922 is posted to special duty under orders of the District Forest Officer, Nellore.

(2) M. R. Ry, A. Ranganayakulu, Ranger, II grade Sub-protem in charge of Rajampet Range, South Cuddapah District is posted to the charge of Gudiyatham Range, North Vellore District to join forthwith after handing over charge either to Mr. E. W. Fernandez Ranger on special duty or the Range Officer, Kodur Range, as a temporary measure.

(3) M. R. Ry, G. Devanayakam Nayudu, Ranger, V grade, in charge of Gudiyatham Range, North Vellore District on relief by No. 2 is posted to the charge of Rajampet Range, South Cuddapah District to join expeditiously without availing the full joining time.

(4) M. R. Ry, T. Paramasivam Pillai, Ranger, V grade in charge of Vempalle Range, Nellore District to join forthwith after handing over charge to the Range Officer, Sanipaya Range of the same District as a temporary measure.

(5) M. R. Ry, H. Tammayya, Ranger, IV grade in charge Kavali Range, Nellore District, on relief by No. 4 is posted to the charge of Vempalle Range, West Cuddapah District to join expeditiously without availing the full joining time.

6—7—22.

27. Paragraph 1 of Office Service Order No. 42/22 dated 3rd July 1922 should read.

M. R. Ry. T. E. Varadachari Ranger IV grade South Cuddapah District on expiry of the three months leave on average salary from 15th April 1922 granted in this office Service order No. 28 of 22 dated 11th May 1922 is posted to the charge of Kanigiri Range, Nellore District.

(2) M. R. Ry., T. Subroil Nayudu Ranger I grade in charge of Kanigiri Range, Nellore District on relief by No. 1 is posted to special duty under orders of the District Forest Officer, Nellore.

21—7—22.

28. In modification of this office Service Order No. 40/22 dated 25th June 1922 the following order is issued:—
M. R. Ry. K. Raghuraman, Supernumerary Ranger, III Circle doing duty as Junior Instructor in the Vernacular Training School North Cuddapah District will be considered to be acting as Ranger, VII grade will effect from 1st June 1922.

23—7—22.

29. Mr. T. T. Ansep, Ranger, III grade Sub-protem is granted leave on average salary for 1 month with effect from date of relief of his present appointment as the Senior Instructor of the Vernacular Training School III Circle.

30—7—22.

30. M. R. Ry, K. Raghuraman, Ranger, VII grade acting on other duty as Junior Instructor, Vernacular Training School, North Cuddapah is granted leave on average salary for two months with effect from the date of relief.

30—8--22.

31. M. R. Ry, N. Rajagopal Chetty, Probationary Ranger, on special duty, Chittoor District is transferred to West Cuddapah District for special duty under the orders of the district Forest Officer to join forthwith.

6—8—22.

32. M. R. Ry, S. Sankara Alwa, Ranger, VI grade permanent and reduced to VII grade as a temporary measure in this Office Service Order No. 12 of 1922 dated 5th February 1922 is granted extrordi-

nary leave without allowances for two years with effect from date of relief and with a lien on his appointment as Ranger VI grade.

Copy communicated to Ranger, M. R. Ry, S Sankara Alwa, on special duty Rajampet Range, South Cuddapah District through the District Forest Officer, South Cuddapah for information. He must clearly understand that there is no guarantee whatever of his being appointed to any higher rank or grade on his return whatever qualifications he may have obtained. He will have no claim to any other post but that of Ranger VI grade subject to any possible order of reduction on account of past misbehaviour that may come to light.

8-8-22.

33. The following transfers of Rangers are ordered :—

Mr. T. T. Ansep Ranger III grade Sub-protiem on return from the one month's leave on average salary granted in this office Service Order No. 52 of 22 dated 28th July 1922 is posted to the charge of Balapalle Range, South Cuddapah District.

(2) M. R. Ry, T. S. Narayanaswami Chetty Ranger VIII grade on relief by No. 1 is posted to special duty under the orders of the District Forest Officer South Cuddapah.

(3) M. R. Ry. T. Subroil Nayudu Ranger I grade on special duty Nellore District is posted to the charge of the Vempalle Range, West Cuddapah District to join at an early date.

(4) M. R. Ry., H. Thammiah Ranger IV grade on relief by No. 3 is posted to the charge of Vontimitta Range, West Cuddapah District to join the Range at his own expense.

(5) Mr. P. M. Mathew Ranger V grade Sub-protiem in charge of Vontimitta Range, West Cuddapah District on relief by No. 4 is posted to the charge of Madanapalle Range, Chittoor District in relief of B. K. Roy, Esq., J. F. S.

Fourth Circle.

28-5-22

34. M. R. Ry. K. Jayarama Ayyar, Ranger VI grade is granted leave on average salary for $1\frac{1}{2}$ months from 5-4-1922 under the Fundamental leave rules.

30-5-22.

35. The following promotions have been ordered in the class of Foresters with effect from 1st January 1922 in Conservator's S. O. No. 72 of 22 dated 4-5-1922.

	From	To.
(1) J. S. Vedanayagam	III grade permanent	II grade permanent.
(2) T. N. Vedartharamanujam	do	II grade acting
(3) P. S. Swaminatha Pillai	IV grade permanent	III grade permanent.
(4) Ahmedallah Sheriff	IV grade permanent	III grade permanent.

2-6-22.

36. M. R. Ry. R. Subramania Ayyar, Ranger III grade, is granted, extension of leave on average pay for 5 months from 7-5-1922 in continuation of the leave already granted to him in the Service Order No. 59 of 1922, dated 11-4-1922

(2) Existing arrangement to continue.

3-6-22.

37. M. R. Ry. K. Jayarama Ayyar on return from leave to be Range officer, Chengam.

(2) M. R. Ry. G. N. Subba Rao B.A. to be Range officer Alangayam after handing over charge to No. 1.

(3) M. R. Ry. T. K. Parthasarathy Ayyangar to be Ranger on special duty of verification of patta sandal wood trees in the Tirupattur

Javadis after relief by No. 2. He should report himself for duty to the District Forest officer after he is relieved of Alangayam Range charge.

17-6-22.

38. (1) M. R. Ry. H. Rama Rao Ranger II Grade on return from leave on 27-6-22 is posted to the charge of Bukkapatnam Range, Anantapur District.

(2) M. R. Ry. T. Sreeramulu Naidu Supernumerary Ranger in charge of Bukkapatnam Range on relief by No. 1 to be on special duty in the same District.

19-6-22

39. M. R. Ry. V. Narayanaswami Ayyar, Ranger V grade, on return from leave, is posted to the charge of Shevaroy's East Range Central Salem Division.

(2) M. R. Ry. K. P. Chathu Nayar, Ranger, V grade, on relief by No. 1, is posted to the charge of Tirupatur Range, West Vellore Division.

(3) M. R. Ry. T. D. Rajabadar Mudaliar, Ranger VI grade, on relief by No 2, is posted to special duty, Central Salem Division.

4-7-22.

40. (1) M. R. Ry., S. Nageswara Ayyar, Supernumerary Ranger on spike duty to take charge of Denkanikota Range at once from Mr. D. F. Stileman, Deputy Conservator of Forests, till M. R. Ry., S. G. Venkataramana Ayyar, Ranger VI grade joins Denkanikota on relief from the Vernacular Training School.

(2) M. R. Ry., S. G. Venkataramana Ayyar, Ranger VI grade, on relief at the Vernacular Training School about 15-8-1922, is posted to Denkanikota Range charge.

15-7-22.

41. M. R. Ry, S. Ramalinga Ayyar, Supernumerary Ranger, Junior instructor, Vernacular Training School, is granted leave on average salary for two months from date of relief.

fifth Circle.

1-6-22.

42. M. R. Ry, R. Guruswamy Ayyar, Ranger I grade, Pollachi Range, South Coimbatore Division, is transferred to Madura District, to charge of Sholavandan Range.

M. R. Ry, A. P. Sreenivasa Ayyengar, Ranger VI grade, on special duty in Madura District, is transferred to, South Coimbatore District, to Charge of Pollachi Range, South Coimbatore District.

2-6-22.

43. The Absence without leave of M. R. Ry, T. V. Thayuman Mudaliar Ranger VII grade, Madura District, from 15th October 1921 to 4th May 1922 inclusive, will be treated as leave without pay.

2-6-22.

44. The following postings of Supernumerary Rangers are ordered:—

(1) M. R. Ry, T. P. Palanikumaran Pillai, transferred from the IV Circle in place of P. Sithapathy Ayyar, transferred to that Circle in Chief Conservator's Proceedings No. 819 Routine date 2nd June 1922.

(2) A. K. Kunhunni Nayar, posted to South Coimbatore District.

(3) P. A. Madhavan, do Tinnevely District.

(4) K. O. Anandan, do Madura District.

8-7-22.

45. The leave on average pay granted to Mr. A. N. Ponniah, Ranger, VI grade, from 11th May last, in Madura District Forest Officer's S. O. No. 28 of 22, dated 26th May 1922, is extended by 4 days.

Sixth Circle.

17—6—22.

46. (1) M. R. Ry, K. L. Govindakrishna Ayyar, Ranger, VI grade, on leave is premitted to cancel the unexpired portion of his leave. He is posted to Nilambur Division for timber work.
- (2) Mr. S. F. Lobo, Ranger VII grade, is on return from leave posted to Palghat for charge of the Olavakode depot.

24—6—22.

47. (1) Mr. N. M. Mandanna on the expiry of his training in the Madras Forest College is posted for special duty in the Chedleth Range, Wynaad Division (This cancels his previous posting to South Managalore.)
- (2) M. R. Ry K. R. Krishnan Nayar Ranger III Grade on special duty, Dhoni Palghat Division is posted to South Mangalore for special duty in connection with the selection of areas for reservation in Kasaragode.

11—7—22.

48. (1) Mr. K. C. Joseph, Ranger, V grade on Forest Research duty, Dhoni, to Palghat Division for duty under the Forest Exploitation Officer.
- (2) M. R. Ry. C. Vasu, Ranger IV grade, in charge of Palghat Range, for duty under the Forest Research Officer.

13—7—22.

49. M. R. Ry, K. R. Krishna Nair, Ranger III grade, on special duty Palghat to the charge of Palghat Range.
- (2) This cancels his posting to South Mangalore Division, ordered in this office S. O. No. 32 of 22 dated 24th June 1922.

Advertisements

The following is a list of specimens required for the Gass Forest Museum. The Principal will be grateful to officers who can procure such of them as are available in their division. The long panels should be approximately 5 feet long, 3 inch thick and as broad as available; the blocks 1 foot × 9 inch × 3 inch and the bark pieces about 6 inch square.

Species.	Long panel required	Short panel required	Block required	Bark pieces required
Aglaia Roxburghiana	 1	1	1	1
Aquilaria Agallocha	... 1	1	1	1
Albizzia procera	 1	0	0	1
Acacia dealbatta	... 1	1	1	1
Acrocarpus fraxinifolius	 1	0	0	1
Chickrassia tabularis	... 1	1	1	1
Dillenia indica	... 1	0	1	1
Diospyros tomentosa	... 1	1	1	1
Diospyros paniculata	 1	1	1	1
Diospyros Ebenum	... 0	1	0	0
Dalbergia sissoo	... 1	1	1	1
Erythroxylon monogynum.	1	1	1	1
Gmelina arborea	... 0	1	0	1
Grewia asiatica	... 0	1	1	1
Holoptelia integrifolia	... 0	0	0	1
Hydnocarpus Wightiana	... 1	0	0	1
Hereteria papilio	... 0	1	1	1
Litsaea zeylanica	... 1	1	1	1
Machilus macarantha	... 0	1	1	0
Premna tomentosa	... 1	1	0	1
Sterculia foetida	... 1	1	0	1
Sterculia villosa	... 1	0	0	1
Sterculia guttata	... 1	0	0	1
Stereospermum chelonodites.	1	0	0	1

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THE **Madras Forest College Magazine.**

PUBLISHED QUARTERLY.

Vol. VII.

DECEMBER 1922.

No. 2.

Catechu Manufacture in South Kanara District.



THREE different substances are derived from the heartwood of "*Acacia Catechu*" viz, *Cutch*, *Kath* and *Keersal*.

The first two are obtained by boiling down chips of the heartwood, while the last one is found imbedded in cavities in the wood. *Cutch* is largely exported for dyeing and tanning and is much used for dyeing canvass and fishing nets a brown colour, (The nets are supposed to be considerably stronger and more durable after dyeing, the *Cutch* acting as a preservative) *Kath* or *Katha* is not exported, and is only a product of local importance and is sold in bazaars: when eaten with Pàn, it imparts a red colour to the lips. *Keersal* is very much employed in Hindu medicine

Cutch which is generally prepared in round balls, is of a dark brown colour, of brittle texture and presenting a smooth surface

when cut; while *Kath* and *Keersal* are both of a crystalline structure, the former being greyish and the latter pale brown in colour.

It is not proposed to deal with *Keersal* in the following essay as at present very little is known of its economic importance. *Cutch*, being the most important, it is intended to place before our readers, in the following pages, the manner in which it is, at present, prepared.

The tree *Acacia Catechu* is known by various names; Prain, in his "Journal Asiatic Societies, Bengal," recognizes three varieties, viz:— (1) *Khair*, *Khoirn* or *Kumaonkath* found in Central and Northern India. Calyx, petals and rachis covered with spreading hairs. (2) *Catechuoides*, *Khair*, *Koirusha* found in the North and South Kanara District of the Bombay and Madras Presidency and in Pegu-Burma: Calyx and petals glabrous, rachis puberulous (3) *Sundra*, *Kati Kute* or *Kachu* found chiefly in the Indian Peninsula and Upper Burma: Calyx, petals, and rachis all glabrous. These three varieties are believed to be practically identical in their properties and uses, although there is sometimes a distinction made in the relative value of the products obtained from each. Nothing has so far been conclusively proved as to which of the three varieties is the most valuable commercially.

In the district of South Kanara, the tree is known locally by either the sanskrit name *Kadira*, or the Kanarese name *Kachu*,

and is believed to have been used in ancient times for preparing "*Yupa*" (that is, posts to which the animal was tied in religious sacrifices). The extract is also known by the name *Kachu* or *Cacho*. The following account as to the origin of this name appears in "The Commercial Products of India" by Sir George Watt:—

The name *Cachu* would seem to be simply the Kanarese *Kachu*, and very possibly gave origin to the modern latin name *Catechu*. In 1,574 Garcia de orta gave a complete account of the plant, and of the manufacture of the extract under its Tamil name of *Kati* (*Cate*), a word, which, by some authors gave the first half of the name *Catchu*, the second being derived from "*Chuna*" to distil. It was not, however, until the 17th century that *Catechu* attracted the attention of Europe. It was then supposed to be natural earth, and as it reached Europe by way of Japan it received the name of "*Terra Japonica*." About the same time, *Gambier* also found its way to Europe, and was designated *Terra Japonica* indiscriminately with *Catechu*. Cleger exploded the mineral notion of these substances, by republishing in 1685 Garcia de orta's account of the preparation of the extract."

There are no statistical data available regarding the production of *Kachu* in South Kanara. The trade has all along been in the hands of a few local merchants and dealers. The Industry is carried on on a small scale only and the mode of manufacture is

consequently very crude; but in principle it is much the same as the Kumaon *Kath* manufacture as is carried out in Gonda, in Oudh.

The South Kanara Industry is restricted to certain limited localities marked by the growth of *Catechu* and is confined only to two taluks Coondapoor and Udipi. The tree, though gregarious in a minor degree, does not grow extensively on large areas but occurs in small patches scattered throughout the Unreserves in and around *Baindur* and *Kokkarne*. The extent of *Catechu* area may roughly be estimated at 16,000 acres of which nearly 3,000 acres, included within Reserved Forests, are not worked for *Kachu*.

Fifteen tons of *Kachu*, are, approximately manufactured annually by the Forest Department and an almost equal quantity is put on the market every year by private owners. For the departmental operation about a thousand mature trees are marked from the Unreserves annually and the boiling or extraction of *Kachu* is given on contract at fixed rates; smaller trees i.e., of not less than 2' in girth yield a better quality and a proportionately larger outturn of *Kachu* and are more easily felled than larger trees. However, to ensure a sustained annual yield of *Catechu* tree, it is not advisable to cut down any tree of less than four feet in girth.

The fuel required for boiling is also obtained from the Unreserves of which 2 to 2½ acres of typical South Kanara* *hadies*

* [That is, typical Government wasteland or unreserve.]

just sufficient for the season's working) are marked out by the Forest Department. Only unclassified trees are felled and their stumps are properly coppiced. Besides this fuel, the sapwood and branchwood of the *Catechu* trees felled in the operation are also used for boiling.

The boiling camp consists of a row of grass huts centrally situated (that is, within easy reach of an ensured yield of *Catechu* trees and the required amount of fuel) and in close proximity to a perennial supply of water. The huts, except for the two or three in which the wood is chipped and which have open fronts, are closed on all sides with grass-hurdle walls strengthened with bamboo reapers. The still proper, consists of a raised rectangular platform of stone in mud or clay containing about half a dozen fire places. On these fire places the pots containing the heartwood chips and water are boiled. The erection of the boiling camp and the entire operation is usually given on contract, the department supplying the necessary materials.

Towards the end of December or the beginning of January, the axe-men go round the forests felling trees already marked, or selecting trees for felling. In selecting a tree, the axe-man cuts a notch on each stem, and is thereby able to see the thickness of the sapwood and the colour and appearance of the heartwood. These factors enable him to decide whether the tree will yield good *Kachu* or not. All selected trees are marked and subsequently felled. Immediately a tree has been felled, its bark and sapwood

are removed, and, as stated above, utilised as fuel for boiling the heartwood in water. In private forests, even the stumps are dug up and utilized in the operation as the heart-wood they contain is supposed to yield a better quality of *Kachu* than is obtained from the heartwood of the stem. In Government forests the stumps are coppiced.

The red heart-wood is next removed to the Boiling camp and there chopped into small chips. This is done as follows: The top end of each piece is supported on a forked branch buried vertically in the ground in front of the open sheds and butt end is propped up on a square block of wood, so that the heartwood piece rests in a slanting position. In this position, the heartwood is chipped with a sharp axe into small pieces about $1\frac{1}{2}$ to 2 cubic inches in size. If an adze were used the chips would be much smaller and probably the results obtained would be better— At any rate the chips would require less boiling to yield the same amount of extract— The local workmen (*Kudubies*), however, cannot be prevailed upon to do this, as they are very afraid of the “*Devil*” and believe that some ill will befall them if they replace the method handed down from time immemorial by any other method.

About 6 or 7 lbs of chips are put into a large pot containing about ten gallons of water and boiled. In some parts only four gallons of water are used with six lbs of chips but, I am not certain which of these two proportions would yield the better result.

After about 3 hours, with the application of a steady heat, the water is reduced to half the original quantity and the chips become considerably softened, most of the catechu essence (as it may well be called) having been extracted from them. The resulting liquid, which is thick brown and oily looking is drained into another pot of approximately the same capacity as the original one, while the chips are retained in the first pot, to which 3 to 4 lbs of fresh chips and 5 to 6 gallons of water are added. Both the pots are then heated for another 3 hours, when the liquid in the second pot reaches the consistency of melted pitch. This thicker liquid (now in an almost semi solid state) is then poured out into a shallow oblong boat 4 feet long, 1'6" broad and 8" deep made of *Bombax Malabaricum* (or some other soft wood) and allowed to cool. The thinner oily looking liquid from the first pot is, as before transferred to the second pot, the fresh quantity of chips and water added and the whole again heated. This operation is repeated five or six times until the chips yield no more *Kachu* when they are finally rejected as useless and used as fuel.

The cooling of the thick, almost semi solid substance in the shallow open wooden troughs is hastened by constantly stirring with broad wooden ladles also made of *Bombax Malabaricum*. The stirring continues until the consistency of moulded clay is reached, when the substance is sufficiently solid to be rolled into balls. The rolling is done by the *Kudubies* with their hands on hard ground covered by ash, and lasts for nearly two hours. The liquid.

being sticky, the hands are frequently dipped in a supply of cool thinner liquid (especially kept aside for the purpose) to facilitate rolling; water or any other liquid should on no account be used as they materially affect the quality of the *Kachu*.

A decoction which is of poor density indicates an insufficient amount of boiling, and the liquid should be boiled again until the required density is obtained. This often happens in actual practice.

The balls are next dried. Ash plays an important part in this operation, the freshly prepared balls being rolled in ash for a short time and then removed to thin beds of ash $1\frac{1}{2}$ to 2 inches in thickness, arranged in specially prepared sheds and excluded from the direct rays of the sun. Here the balls are allowed to remain for a period of 24 hours, after which they are again rolled in ash on stone slabs when they become considerably softened. These softened balls are dried by placing them in fresh ash for 3 or 4 days when they once more become hard. This process of alternate rolling and drying (softening and hardening) is repeated three times and is a means of expelling any air bubbles, which may have been enclosed in the interior when the balls were originally rolled, and renders the balls free from cracks and less liable to break. The balls are then ready for the fourth or final drying. For this, a pit is dug 6 to 8 feet square by 3 to 4 feet deep and is lined with ash. The balls are then closely packed in the pit to within a foot from the top. A six inch layer of ash over the balls and a six inch layer of

mud over the ash completes the closing of the pit. It is essential that the maximum quantity of air possible should be excluded from the pit in this last operation. If the balls are found to be hard at the final packing, the ash covering them should be moistened with a little water, so that further drying should not be too rapid. After three or four days the balls are removed from the pit and rolled in dry ash for the last time and placed on a bed of straw on a raised platform in a closed shed where a few days further drying renders them ready for the market.

The quality of the *Kachu* may be tested by cutting open a ball. In good *Kachu* the surface should present a clean smooth appearance free from pores or air spaces. Another test is by solution in water; good *Kachu* being insoluble in cold water but easily soluble in hot. The balls should contain white spots (which indicate the presence of good tannin, technically called *Keersal*) and not red ones and should be $2\frac{1}{2}$ to $2\frac{3}{4}$ inches in diameter, heavy and not weighing more than 10,000 to the ton.

The manufacture of *Kachu* balls is generally given on contract and the department pays a rate of almost Rs. 160 per ton. Drying and rolling costs Rs. 125 per ton excluding the price of the trees utilized. The contractor has to make his own arrangements for payment of all labour employed in the operation and he has to provide them with huts.

The best time for *Kachu* manufacture is the winter season, December to March.

The chief market for South Kanara *Kachu* is Hasan, a district in Mysore state, to which all the *Kachu* manufactured in the year is carted. The price obtained there is Rs. 800 to 900 per ton. Since the exact value of the trees utilised in the operation is difficult to estimate, it is not possible to calculate the exact profit per cent; but judging from the contract rate of Rs. 160 per ton paid by Government, and the market value of Rs. 800 to 900 per ton, the profit per cent should be appreciably high. It would be interesting to work out the exact figures.

The manufacture of *Kachu*, as is carried out in South Kanara, is one of ancient origin and primitive simplicity. Nothing has, or seems to have been done to improve or in any way promote this important industry.

The following are a few suggestions, which are perhaps worthy of attention, and which if carried out, would I am sure, improve matters considerably:-

(a) (1) A thorough investigation into the silvicultural requirements of *Catechu*, the best way of treating the areas it occupies, the most suitable season for felling and the possibility of replacing of the present primitive method of manufacture by a more up to date scientific one.

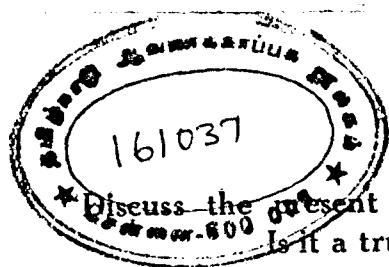
(2) Selecting the most congenial conditions, under which the artificial stocking or restocking of the forests with *Catechu* may be undertaken. The following account appears in the "Silviculture of Indian Trees" by R. S. Troup page 453:— "It is very subject to damage by browsing, and responds readily to closure to grazing. Porcupines are particularly destructive to the trees, gnawing the bark off round their bases and often killing them. Ranger Basti Ram reports that he has found a smearing of lime efficacious in keeping them off. An American plan for dealing with porcupines is to soak small boards in brine and strychnine and nail them to the bases of trees; the porcupines have a partiality for salt and gnaw the boards, dying of strychnine poisoning"

(b) Technically training the poorer classes (locally known as *Kudubees*) and making them efficient to carry on the industry properly and

(c) Increase of transport facilities. At present the facilities which exist are few.

The *Kachu* industry, though at present undertaken on a small scale, is one with great possibilities and if undertaken on more business like lines would almost certainly prove to be a most profitable source of revenue. There is no need to emphasise, that the growth of Indian Industry in general, and this in particular, depends ultimately upon trained workers, scientific administrators and enterprising capitalists; and no progress is possible without a systematic training of *all the workers* engaged in the industry. At present there is a great deal of room for improvement.

K. SANKARANARAYNA RAO,
M. F. C. 21—23 DN.



Discuss the present campaign against the Forest Department.
Is it a true reflection of public feeling?"

*Second Essay for the Indian Forester Prize for past Students,
for 1922. —By Mr. L. A. Krishna Ayyar B. A., M. R. H.
Range officer, Santanpura, Travancore.*

Introduction In dealing with this subject, a Forest Officer will be between the horns of a dilemma, as it is not a purely Forest question. For a thorough handling of the subject, an acquaintance with current politics is a desideratum, and the writer desires to be excused for trespassing on politics.

It is an acknowledged fact that, under all constitutional Governments, the will of the people should prevail in matters affecting the interests of a country. When the Forest Commissioner was about to be divested of his control over the Forest Department in 1918, this view partly found its expression in his speech thus:— "The Government will have to adjust the demands of Forest experts to the Agricultural needs, the habits and even the prejudices of the people. As the masses of the people become more educated and articulate, they will bring increasing pressure on the Government. The effect of the forthcoming political changes has to be taken into account. The moral for the Forest Department is that it must try to remove all possible causes of friction between itself and the people as soon as possible". If this truly represents the correct Forest policy of the Government, we have to see how far the Forest Department, which has been since on its trial, has met and eased the situation.

1. Indian Forester, 1918- page 495.

Recent happenings have however given occasion to gloomy forebodings as to the future of the Department. The refusal of the Legislative Council to vote supplies for the erection of a saw-mill at Russelkonda, the passing of resolutions on the disafforestation of Forests in the vicinity of villages and the improvement of grazing grounds in 1921 have given a rude shock to Forest Officers. In the Administration Report of Madras Forests in 1920, it found its expression thus:— "A full knowledge on the part of the leaders of the people of the facts connected with the forests and of the aims and objects of the Forest Conservancy would do much to dispel some of the antagonism." Though these remarks afford considerable food for reflection, there is no need for despondency. The Government can always count on the support of the Indian Councillors. As Forest administration forms a reserved subject, there need be no alarm on the part of Forest Officers, provided the Councillors are taken into confidence. In this connection it would be pertinent to draw attention to the experience of Mr. Billson, Chief Conservator. "Only personal contact with elected members will enable the chief Conservator or the Senior Conservator as the case may be, to push on with his ideas,".....

I was much impressed with the willingness of all I addressed to be convinced when arguments were placed before them. Slight

1. Please refer to proceedings of the Legislative Council 3rd August, 1920. 22nd March 1921, and Governor's veto vide G. O. No. 46S Development dated 26-3-1921.

distrust of our motives to a large extent disappeared, but the 'essential to the final extinction of that mistrust is, figuratively speaking, the placing of the whole of one's cards on the table and the concealment of absolutely nothing'.¹ This is worthy of being emulated in the Madras Presidency, and I am sure trust will beget trust.

So far as this Presidency is concerned, the passing of resolutions on disafforestation of all Reserved and Protected forests in the vicinity of villages and the improvement of grazing ground is of immediate interest.² These two problems have to be solved in a statesmanlike manner.

As a result of the labours of the Horne Committee, the Government of Madras classified the forests of the Presidency under six heads. Forests under classes V and VI constitute what are called village forests. They are entirely managed by the Forest Panchayats under the supervision of the Revenue Divisional Officer. The above resolution of Mr. Muniswami Naidu, aims at further surrender of valuable forests to the Forest Panchayats, and this has to be viewed dispassionately.

The question that now arises for determination is what percentage of the area of a country should be maintained as forest. In France and Germany, it was laid down some years ago that for a country to be at its best, 25 per cent of the surface of the country should be maintained under forest.*

1. Indian Forester 1921, page 317.

2. Proceedings of the Madras Legislative Council dated 3rd August, 1921.

* F. A. Lodge, Forest Policy and Forest Management page 3.

Let us view from practical politics what disafforestation would mean for the Madras Presidency in terms of the present resolution. In the Madras Presidency, only, about 15 per cent of the whole country is under forests.

Further in 1911, the population of the Madras Presidency was returned as 414 lakhs. The fuel worked from the Forest areas amounted to 221 lakhs of C. Ft., i.e. about 2½ lakhs of tons. At even a pound per day rate, the total demand for fuel in the Province during the year would have come to over 70 lakhs of tons. That is only 4 per cent of the demand at this very low rate could have been met by our forests during that year, even if all the forest fuel went to satisfy domestic uses only¹ Since then, the evidence of Forest Officers before the Industrial Commission was almost unanimous in denying the possibility of getting much more out of our forests than we do now² A similar note is struck by Mr. Cox in his report on the Madras Forest Department of 1920. "The truth is that the present forest resources are already insufficient to meet the demands of a vast agricultural population and that relaxation of Conservancy or actual disafforestation widens the gap between supply and demand.

"Experience has shown that if these forests are left entirely to the mercy of the villagers, they rapidly disappear. The present generation eats them up regardless of the requirements of future

1. Indian Fuel problem by Rao Bahadur K. V. R. Iyengar M. A.

2. Do, do page 18. [page 10.

generation”³ Sir Lionel Davidson in opposing another resolution, remarked “ Due partly to ignorance, and partly to selfishness, those bodies mismanaged the class of forests and had proved themselves unfit to govern them.”

It has to be first recognised that “ the State is responsible for the maintenance of those forests in the interest of the future and see that the present generation does not diminish the invested capital. In other words, village forests have to be managed as carefully as state forests.”⁴

What has been above stated is a cold storage of facts which require serious reflection at the hands of the leaders of the people. However, the grievances of ryot are not fancied. They have to be met half way. If there is any imperfection in the present organisation and management of the forests by the forest Panchayats, these have to be made not only perfect but there should be separate organisation to supervise the working of the Panchayats. Just as each District Board has its own Engineer, Medical Officer, and others it should have on its Staff a Forest Officer of the status of an Assistant Conservator for the management of the “ District village Forests ” with a Conservator of forests at the head of the administration analogous to the Inspector of Municipalities and District Boards. This would lighten the work of the Forest Department, while it has the advantage of meeting popular demands.

3. Notes on Forest Policy and Forest Management Pages 8, 9.
4. Do. do. 9.

The resolution of Mr. Vellingiri Gounder,² aimed at increasing grazing facilities by improvement and development of grazing areas, and providing water supply for cattle in the grazing blocks

The Madras Government have already improved grazing facilities on the lines of the Horne Committee, and the present resolution aims at further liberalisation of the measures already taken by Government. Sir Lionel Davidson opposed the resolution on the ground that any money spent on improving grazing areas in unsuitable soil would be much better spent in raising fodder crops in good soil and that the attempt to cultivate grass in forests where there was promiscuous grazing ended in failure. Though there is much force in this, Government have already signified their interest in the improvement of grazing grounds. During 1919-20, about Rs. 10,000 was spent by government on improving water supply within the forest for the benefit of cattle. The grazing revenue amounted to Rs. 8,53,555. In their review of the Department, the Government pointed out that additional income was in no sense, the main object of the Government. Government are already partially committed to the policy of improvements to grazing areas on the lines of the resolution, and so long as additional income is not the main object, additional funds can be ear-marked for the improvement of grazing blocks.

As Mr. Lodge points out, the gift of a village Forest is a generous act on the part of the State, and care must be taken to limit

2. Proceedings of the Madras Legislative Council dated 3rd August, 1921.

the extent of the gift to the area of forest necessary to supply the actual domestic requirements of the village.¹

The management of village forests by the Forest Panchayats has already been pointed out to be a dismal failure. They should be remodelled on the lines already indicated. As Mr. Elphinstone points out, our principal instrument must continue to be the Panchayat, though one may not agree with him, when he says 'that must be exempt from all new forms of interference and regulation on our part.'

It has already been pointed out that 'a fuller knowledge of the part of the leaders of the facts connected with forests would do much to dispel some of the antagonism.' In other words, a sound forest opinion has to be created in the country. This leads us to the subject of Forest Education.

In this connection, there are three avenues along which advance may be made:—

The present method of imparting instruction through the Imperial Forest College at Dehra Dun and the Provincial forest colleges will not be adequate to meet the demands of the Empire.

1. Development of education in the higher branches of Forestry.

Here we have to follow the wake of the English Universities, and benefit by them. Burma, however, holds the palm, as Sir Harcourt

1. Notes on Forest Policy and Forest Management Pages 8-9.

Butler said in 1917, "I am one of those who hope there will be a Forest faculty in the future University of Burma."¹

The recommendations of the Calcutta University Commission have not come up into line with this pronouncement. They say "We think that, for the present, advanced training in Forestry can be most economically dealt with by the Imperial Forest College at Dehra Dun, but we should not like to exclude the possibility of developing in Bengal at some future time training in, at any rate, some of the special branches of Forestry."² That day will be a red-letter day when each of the Indian Universities, following in the wake of Burma and the United Kingdom, establishes chairs of Forestry and special courses of Botany. Even the Committee presided over by the Rt. Hon. Lord Clinton recommends that existing University courses should be co-ordinated to bring them up to a common level and to utilise them as a preliminary to a higher course of training at a central Institute.³

2. The other avenue along which advance is desirable is the promotion in the public mind of greater interest in Forest matters. This can be done by making the journals of the land more readable to lay men, and through the Publicity Bureau as in Madras.

3. Lastly, public attention should be drawn to the urgency and gravity of the question and it should form the special study

1. Indian Review 1921 page 174.
2. Calcutta University Commission Report Vol. II, page 149 150.
3. Indian Forester 1921, page 374.

of experts. This can be done through the Standing Forest Committee and organisation of Annual District Forest Conferences. The Madras Government have done well in appointing a Standing Forest Committee for it will be an asset to development as well as to educate the people on forest matters.

From what has been said above, it may be clear that a Forest Officer cannot afford to live in a world of his own. He must rise to meet the present situation. He is on his trial. Should he fail to do so he will be left out of the race. "Folly is that wisdom which is only wise behind hand." Therefore "awake, arise, or be for ever fallen"

"YE AND YOUR FATHERS HAVE SOWN THE WIND,
YE SHALL REAP THE WHIRLWIND."

The Working of Sandal Areas in Dharmapuri Range.

Dharmapuri Range is situated in the North Salem Forest District, the Range Head Quarters being at Dharmapuri, a comparatively large town on the Morappur-Hosur narrow gauge Section of the South Indian Railway. Though the Head Quarters of the Range is Dharmapuri the Forests comprising it are situated at about 20 miles distant from the Head Quarters.

These Forests consisting of 8 Beats and including 10 Reserves form one compact Block, situated on the North-Western side of the Dharmapuri Taluq. Irregular patches of Sandal lie scattered through-

out the Block. Some of the Reserves contain fairly large villages; while in others, especially in those containing Sandal, the villages are small and few and far between. The *Woddapatty* and the *Guthirayan* Reserves, in which the main Sandal areas occur, are practically devoid of villages.

The areas supporting Sandal form a Series of upland plateaus, hills, and valleys, the elevation varying from 1000 feet to 4577 feet, the latter elevation being the summit of the *Guthirayan* Hills. Excepting the steep slopes and ridges, which are stony and bare, the soil is a red loam on the hills and dark alluvial clay in the valleys.

The climate is moderately hot in Summer and mild in Winter. The annual rainfall is about 30 to 35 inches.

The chief timber species are *Chloroxylon Swietenia Hardwickii Binata* and some of the *Albizzias*. *Teak* is found poorly distributed on the slopes of the *Guthirayan* hills and *Rosewood* is seen occasionally in the *Bavanur* and *Woddapatti* Reserves along the banks of the Cauvery. Sandal is found in a mixed crop and occurs in large patches, most of which consist of young growth and which may, in due course, form typical sandal areas, provided the young growth is tended and protected.

There is no systematic working plan as in the case of the *Denkanikota* and *Anchetti* Ranges. A preliminary working plan was drawn up in 1916 by Mr. B. R. Salisbury the then Range Officer

and according to this preliminary plan, the Sandal areas are divided into two series "A" and "B", each series containing six coupes. This actual division of the area into two series is based on the particular kind of work to be done in each series. In "A" series, fellings are carried out and are followed by tending and cultural operations; but in series "B", the main object is to obtain artificial regeneration of sandal, there being no principal felling operations.

Until 1918, the work was conducted by the Forest Guards under the supervision of the Section Officers, who took care to see, that a certain quantity of Sandalwood was collected annually cleaned and despatched for sale merely to show a certain amount of work and to satisfy the District Forest Officer. In 1918 however, a Deputy Ranger and two Forest Guards were deputed, to be engaged solely in extending and improving the existing Sandal by cultural and tending operations on a comparatively large scale. As this special staff was not engaged until late in the year 1918, coupe I (*Marandahalli* South) of "A" series, to be worked in 1918, was not satisfactorily worked and a very large number of dead trees were omitted in the enumeration and the total yield amounted to only about $4\frac{1}{2}$ tons.

In 1919, Coupe II (*Guthirayan* Reserve) was taken up for working. As mentioned above this is an area almost entirely devoid of villages, so that, when the new staff was posted, the subordinates were able to find only a few wild, half-naked "*Irulers*." With great difficulty these hill men were collected together and provided with food

and clothes; and their fear for civilized people was gradually removed. The District Forest Officer was addressed on their behalf and a few acres of land was distributed among them at one or two acres per head. With the help of these people, the main Sandal area, portions of which had not yet been visited by the Forest Subordinates, was thoroughly explored, and a quantity of 15 tons of dead Sandalwood was extracted and despatched to *Tirupattur*. It is very interesting to note that instances of theft, practically unknown in other parts of the Range appear to have been a common occurrence in these remote and unfrequented parts. Sandal trees of all ages were found to be indiscriminately hacked by graziers, the leaves being used for feeding their cattle. The stripping off of the bark was also much in evidence (the local graziers and villagers using it for their own consumption as a substitute for areca nut). Steps were immediately taken by the Range Officer to stop this illicit removal and wanton destruction of Sandal and I am sure that, by this time, matters must have improved considerably.

Sowings also were undertaken and about 100 acres in each of the *Bavanur*, *Guthirayan* and *Pennagaram* Reserves were sown with Sandal but owing to the failure of rains, not even 10 per cent of the seeds germinated.

Until 1917 all operations (i.e. final cleaning and billeting which I will deal with in the next issue of our magazine) connected with the extraction of Sandalwood, were done in the Forest at some selected spot chosen mainly with regard to available labour. The

finally cleaned wood was transported in headloads to the nearest road, whence it was carted to the nearest Railway Station. It was then despatched by rail to Tirupattur, which forms one of the sale depots for Sandalwood in the fourth circle. By this system of working the, finally-cleaned wood, was exposed to the variations of weather, with the result that its quality was considerably reduced; cracks, loss in colour and scent due to evaporation of the Sandal oil being the most important defects. In addition to these defects, the possibility of theft, in this method of exploitation, might easily be placed at the maximum, the place of final cleaning being at a considerable distance from the Railway Station and in the Forest itself.

In 1917-18 this system of cleaning and transport was completely changed, and the following more satisfactory system adopted. A central depot was constructed at *Dharmapuri*, on the railway and the final cleaning of the wood is done here. The sandalwood obtained in the operatin is only rough cleaned in the forest—that is the heart-wood is left with a thin layer of Sapwood to protect it from being damaged by the weather. This roughly cleaned wood is transported to the depot at *Dharmapuri*, where it is finally cleaned immediately packed in gunnies and loaded on to the train for Tiruppattur. By this system the wood is not only not exposed to deterioration, but the chances of theft are considerably reduced.

In 1920 *Tholuvabetta Extension* Reserve Forest was worked but the special duty Forester in charge of the operation

frequently fell ill on account of the malarial conditions prevalent in the locality. The result was that the work was not properly carried out and the total yeild was only about $2\frac{1}{2}$ tons.

In 1921, *Madappanur* unreserve was successfully worked and a quantity of nearly $6\frac{1}{2}$ tons was despatched for sale.

This new system of cleaning and transport has solved the problem of placing on the market Sandalwood of the highest quality with as little loss as possible due to theft.

S. RANGASWAMI IYENGAR,

M. F. C. 1922—24 Dn.

"Why I adopted forestry as my profession."

—*Second Essay for 'The Indian Forester Prize for M. F. C. Students, 1920—22—By Mr. K. A. Bhandari M. R. Hons (1920-22 Dn.)*

It is not in mortals to command success.

But we will do more —deserve it.

Forestry in India as a profession does not occupy such a prominent place as it ought to, the public having no high appreciation of it. This is mainly due to the fact that people have no idea about forests and their management. From the numerous cases that arise between

the ryots and the forest department public are led to believe that the department is opposed to their interests. The forest college trains up sufficient number of rangers from the deputy rangers' class. Non-stipendiary students rarely come to the college, because they have no great demand. Two big projects are in the move now, the Russelkonda Saw-mills and the Dhoni-scheme. On the profitable working of these depends to a great extent the popularity of the forest department and the sanction of many more of such projects. These schemes necessarily want more trained men, and the keenness with which it will be competed for will to a degree gauge the public opinion gained.

At present the importance of forest conservancy in India is not realised by the ryots and people in general. Under this head the forester has two separate duties:—

Firstly to convince the ryots as to the necessity of maintaining forests and protecting them against external injuries and secondly to tell our educated Indians and Legislative Council Members, about the vast resources of the Indian forests, and how by investing a comparatively small capital on modern schemes, we could place India's forest resources on a more industrial and commercial basis and thus join the most advanced nations of the world in the development of the greatest of natural resources.

As regards the first, we have to tell the people how the indiscriminate exercise of rights and privileges interfere with the systematic

working of the forests and the extent of the injuries done to the forest by overgrazing and fire. Then we must impress on them the necessity of maintaining forests to prevent extremes of climate, to increase rainfall to protect the hill slopes from land slips, and erosion and to feed springs, streams and rivers. The preservation of the water supply ought to appeal to all ryots as on it depends the success of agricultural crops.

There are, lots of private forests in Canara and Malabar, the districts I know of the only treatment given to them being exploitation of saleable produce. They have no idea about the value of these forests because no information is available to them.

Forest Officers ought to give as much information as they can to all private forest owners and induce them to work their forests on some system, with an eye to the future of these forests, which at present is totally neglected. Thus a forester becomes the creator and guardian of a property which generation after generation enjoy.

The second part of the duty lies with educated Indians and Legislative Council Members. We have to tell them that the vast resources of Indian Forests are as yet little drawn upon. The country is realising about a tenth of the annual products of her forests, while the amount of lumber grown annually would permit her to become a large exporter of lumber with the resulting benefit to her commercial position. India timbers are if not better at least equal to the world's best timbers, and new uses are being found almost every day. Yet

India imports Swedish pine box-shooks, boxes and general structural lumber. This year the Indian Railways are importing a large number of treated fir sleepers from British Columbia and the states, while she has forests of her own rotting within forty miles of some of her railways. Placing these facts before them we can ask for a capital to lay down our transport schemes, and some saw-mills at central points. We can then drive all foreign lumber off the market, can undersell them, to Australia Mesopotamia, and Egypt, can place our valuable woods in the London and even New York markets at a very satisfactory profit. By having our materials cut in saw mills, we can afford to put in modern seasoning plants using steam from the saw-mill boilers. In modern timber treating plants, we can chemically treat our timber and sleepers to preserve them against white ants and decay. This will enable us to use our less valuable woods for construction and sleepers and sell the more valuable species at high prices in Indian and foreign markets. In return a very large increase in revenue will be available in a few years and the country as a whole will benefit in many ways. All these mean opportunities for India's young men, expansion of her trade, and increase in her Industries. Thus by educating public opinion and trying to work up India's natural resources we will surely be devoting ourselves to the true progress of India and in these days of much platform speaking and N. C. O. it is a great consolation to know that by a forest career, we will be helping our country more than we could do in most other careers.

From times immemorial our community are agriculturists and since by occupation and the natural features of our district, we are made

strong, sturdy and enduring, and as forestry is the only vocation which requires these rare gifts more than any other, it is the profession best suited to us. Besides some of my near relatives are in the agricultural department and one is learning medicine. I being fond of a more adventurous and out-door work, chose forestry as my optional, so to say as being the most congenial to my tastes.

Modern education as is imparted in the arts colleges at present is far from being satisfactory, in that it is too narrow and not sufficiently interesting. We cannot all care about grammar and even about mathematics. Those who love natural science, for instance, find little at school which appeals to them, and even those with literary tastes are surfeited by the monotony of classics, so that few keep up their studies after leaving schools—they might have learnt much, but they have too often lost what is far more important, the wish to learn. Besides they have the false dignity in thinking that labour is 'infradig' for a college man. But we in the Forest College are taught about the dignity of labour, and our education is an all-round technical one, so that we know something of everything and everything of something, which in my opinion is an ideal education. A forest ranger at present besides specialising silviculture, botany, and utilization, is also a forest engineer, a policeman, a forest merchant, a forest lawyer, and a surveyor and a draftsman. Over and above this he is given a course of instruction in First aid, some training in drill and gymnastics, and has played some hockey, foot-ball, cricket and tennis.

The aesthetic advantages of a forest are inestimable. "How much our lives owe to the beauty of flowers" says Ruskin "they seem intended for the solace of ordinary humanity," The peaks rising one above the other, their slopes clothed with trees of all shapes and sizes, their foliage and flowers presenting a diversity of colours is most pleasing to the eye. The little rills dashing with headlong speed down the steep hill slopes glimmering in the morning sunshine present a beautiful sight.

For concentration of mind solitude becomes a necessity. Byron says :—

There is a pleasure in the pathless woods
 There is a rapture in the lonely shore
 There is a society where none intrudes

 If society teaches us how to live
 It is solitude that should teach us how to die.

By day or by night summer or winter beneath trees, the heart feels nearer to that depth of life which the far sky means. The rest of spirit found only in beauty, ideal and pure, comes there because the distance seems to be within touch of thought.

"Health is Wealth", and to keep the body in a healthy condition should be the aim of everyman. A forester is always enjoying the pure ambrosial atmosphere of the forest and his daily walk in the forest not only makes him healthy but also strong.

The open air is not a cure for the body only, but for the mind also.

Variety is the spice of life. A ranger's work is not a monotonous one, but it is a combination of the work of the chair and of the field. After a few days of office work, especially towards the close of the month, he goes out camping. He looks to a silvicultural operation one day, does a little of engineering, the next day, and inspects a timber depot on another day. Sometimes he attends courts and conducts forest cases, while at other times he may have to conduct auction sales of coupes, or of timber. Thus his work is a varied one and is not worried by the dull monotony which characterises most other occupations.

The forest department has yet another great attraction to many young men, and that is shikar. Many of the forests abound in game and the forest officers have ample opportunities of collecting many excellent and rare trophies.

In times of trouble or anxiety the lover of trees will feel with Tennyson that:—

"The woods were filled so full of song.
 There seemed no room for sense of wrong."

So far I have been dwelling on the bright sides of the department. I admit that the forest department as every other department has a few trials. Some characterise it as a restless and rather adventurous existence. But as it is only meant for those of good and healthy constitution, many of the so called difficulties can be disregarded. One serious draw-back which however we have to own is malaria. But all ranges are not malarial and if proper care is taken this fever can be minimised to a great extent.

I cannot affirm here with any experience that the ideals set forth here are realised during one's service in the department, for experience of the department I have none. My short practical training under a kind D. F. O. and a very practical range officer has been a pleasant experience for me. My College life has been another pleasant chapter to add to my short experience of the forest department.

In conclusion I have to state that for the several advantages that forestry has over many other professions, I have selected it. Forestry is specially suited to our community and more particularly it appeals to me as it is mostly an out-door life. Then the Forest College gives an all round excellent education useful in every walk of life. Besides, forests afford ample opportunities for shikar. For these reasons and others enumerated above, and the fact that India has a great forest future I maintain that perhaps with the exception of the medical, forestry stands second to no other profession in India.

*Our doubts are traitors,
And make us lose the good we oft might win,
By fearing to attempt."*

The Village-war Lump Sum Grazing Revenue System

In *Sriharikota* Reserved Forest (Nellore District) the cattle belonging to the local villagers are of a semi-wild nature. Every year during the grazing season the Forest subordinates find it very difficult to collect the grazing revenue due on account of these cattle, because when the cattle see any persons other than their owners, they become furious and run away, so that the subordinates are unable to impound them. Their owners taking advantage of this boldly evade the payment of grazing fees.

These animals break through the fences of felled coupes, enter, and destroy the coppice shoots either by browsing or trampling down. Annually, during the grazing season, the Forest Department used to, until quite recently, engage men, who patrolled the Reserve, and, with the aid of their dogs, rounded up and caught any trespassing cattle and impounded them. The dogs caught the cattle by their ears, legs or tails and then the men secured them, with ropes and drove them to the pound. This system of rounding up the cattle proved very cruel as the animals bled profusely, and sometimes died of the dog bites. It was therefore discontinued.

However in order to collect the full grazing revenue and solve the semi-wild cattle difficulty, other methods were adopted, but proved ineffective. In one instance it was proposed to publicly warn the villagers to catch their animals and remove them from the Reserve

within a fixed time, after which they (the cattle) would be liable to be shot by the Department. This was not approved, because Hindus worship cows and the proposed procedure would breed discontent.

Another proposal (which would also, to a considerable extent eliminate the smuggling of Minor Forest Produce, by which the Department was losing more than Rs. 5,000 annually) was to acquire the villages (enclosures) lying within the Reserve and provide the villagers with new village sites and lands for cultivation in some other healthier taluk of the Nellore District, the Sriharikota Taluk being notoriously unhealthy, where virulent types of fever and the worst form of elephantiasis are prevalent. The villagers utterly refused to leave their native homes, and this proposal also failed.

It was then proposed to strengthen the fencing round coupes and barbed wire was tried but proved too costly. Endeavours were also made to induce the people to accept the "Kancha System" of grazing under which Reserves are leased out at a fixed rate per acre as is usually done in the District.

The people refused, because the Sriharikota Reserve has a vast area of 25,000 acres, and the number of cattle in the villages contained in it is limited. Calculating at Rs. 0—1—0 per acre, the grazing revenue of this Reserve would amount to more than Rs. 6000/- yearly; whereas when collected at one rupee per cow unit the grazing revenue is about Rs. 1000—0—0 only. It is, therefore, quite clear why the villagers in this Reserve do not agree to the "Kancha System".

Eventually during the current year (1922-23) a modified "village-war" system known as "The Lump Sum Grazing Revenue System" was introduced. Under this system the villagers pay a lump sum at the beginning of the grazing season, the lump sum being fixed by the Department for each village separately. Cattle census figures are obtained from the Revenue Department and the lump sum amount fixed for each village is calculated, so as to more or less agree with the average annual grazing revenue of previous years. The people of each village nominate one or two headmen, who on behalf of the villages they represent, execute an agreement with the Department, undertaking to pay promptly, at the beginning of each grazing season, the lump sum amount fixed by the Department and to abide by the following Conditions.

- (1) Goats are strictly prohibited.
- (2) The people should pay particular attention that their cattle do not enter the coupes closed to grazing, and that they, (the villagers), should take an interest in the proper maintenance of the fences round felled areas.
- (3) After a lapse of three years a census of the cattle will again be taken and the amount already fixed will be revised.

This system has been introduced in seven different villages and the villagers think that it is a great improvement on any previous system, and remit the "Lump sum" revenue due promptly through their headmen. This relieves the Department of considerable worry, as the collection of revenue from individual cattle owners was always, a tedious and troublesome business.

The advantages of this system, briefly speaking, are ;

- (1) The full grazing revenue is promptly collected in a lump sum, with no resultant ill-feeling on the part of the villagers.
- (2) Extra work in the Range and District offices, maintenance of accounts by permit-issuing officers, possibilities of embezzlement by them, and the range subordinates, and the payment of commissions to permit issuing offices are all avoided.
- (3) The question of illicit grazing automatically disappears.
- (4) The people are bound by the terms of the agreement to take a certain amount of interest in forest conservancy especially in the protection of coupes and thus the prevalent anti-Forest feeling may, in the course of time, disappear.

This system may, with advantage be applied to the Reserves where the application of the "Kancha" system of the Nellore District is not practicable or is in any way unsatisfactory.

ALAGIRISAMI NAIDU,
Range Officer.
(Sriharikota Range, Nellore District)

The "Wattle & Daub" method of house-Building in Ceylon.

Among the many different methods of house-building, from the construction of the crudest hut to the erection of a costly & elaborate building, practised in Ceylon, the "Wattle and Daub" method is one of the most useful, as it combines cheapness with a comparatively long durability and good appearance.

The rapidity with which buildings are constructed under this method is also a point in its favour.

I shall now endeavour to describe this "Wattle and Daub" method. To start with, it is adopted by the Public Works, the Irrigation and the Forest Department, as, as already pointed out, the method is economical, both in original outlay and in the cost of maintenance, and provides buildings of a semi-permanent type, and of an appearance, very similar to that of buildings constructed on more elaborate lines.

To proceed with the actual construction :—

A level plot of land, is chosen on well drained soil, with due regard to communications and the proximity of a perennial water supply, and is cleared of all growth and foreign matter. The outlines of the proposed building are then pegged out, care being taken that the building does not face either monsoon.

Straight and sound posts of "Cassia Fistula" or some other suitable species are chosen, roughly squared with the adze and planted firmly in the ground in holes ($2\frac{1}{2}$ to 3 ft. deep or more according to size of the proposed building) dug for the purpose at the corners and along the lines to be occupied by the walls, at intervals of 6 ft. or so. In selecting these posts, care should be taken that they are of a very durable nature, of uniform shape and size and strong enough to bear the weight of the whole superstructure of the building and between the posts originally planted.

Door and window frames are placed in the positions they will eventually occupy and are held in position by staves, to which the frames are lashed. These staves are in turn lashed to the posts planted originally, and must be so arranged that they will eventually be covered with the mud and plaster.

Split pieces of bamboo, or wattles of round timber and then fastened horizontally to the posts both inside and outside the building at intervals of 6" to 9".

Good stiff earth, containing a large percentage, about 25—30 per cent of clay, and of fine texture is cut and removed to the site. Care must be taken to get earth free of all organic matter. All stones and other hard substances are then removed, water added in small quantities and the earth well puddled until it acquires a plastic consistency.

The puddled earth is then left on the ground for some hours. In fairly large buildings these posts are usually set on blocks of stone sunk into the ground to present a larger bearing surface to the foundation bed.

It will also be advantageous to tar the ends of the posts before they are put into the ground.

The roof of the building is then built on these posts, and if the building is to be tiled the tiles are also placed and fixed in position.

The reason for this procedure is that the heavy monsoon rains of the Island would otherwise interfere with the efforts of the workmen and would considerably delay the completion of the building. It is also on account of this heavy rain that houses in Ceylon are built with low eaves and wide verandahs.

The whole superstructure less the walls being completed the work of building the walls begins.

An excavation with a breadth equal to the thickness of the required wall and about one foot or so deep is dug along the length and breadth in order that it may ferment and attain a condition which would result in immediate setting directly it is plastered on the wall.

This mud-mortar is then taken up by hand and is thrown violently into the spaces between the posts and the pieces of split bamboo running horizontally so as to occupy the entire space enclosed. By this process the wall is gradually built up in successive layers and lengths.

When the whole structure is complete, well set and dry the walls are very evenly plastered over with mud or lime mortar. The latter is always used in the case of Government buildings to improve their appearance.

The plaster, when half set, is polished with a smooth piece of wood, called a float, in order to give the walls a smooth glossy surface.

The floor of the building is then filled with gravel to a depth of about 8"—12", and rammed with wooden or iron rammers until quite hard and well consolidated. It is then either tiled, or plastered and cement-washed.

The walls are then white-washed and the minor details of pointing, etc., seen to. The building is then ready for use.

I need not impress on my readers the advantages of this method of building.

It is inexpensive both to construct and to maintain, and is at the same time neat and habitable.

For such buildings as outhouses, cooly lines, etc., where sufficient funds for the construction of Pucca buildings are not forthcoming the "wattle and daub" method may with advantage be adopted.

K. P. RAJALINGAM,
Junior Student.

The Prickly Pear (Nagathali) and Lantana

The Prickly Pear, (*Opuntia Dillenii*) is classified under "cladodes" which are stems coloured green (with or without inconspicuous leaves) which more or less resemble leaves and perform the functions of a leaf. The Lantana is a very common armed shrub of the Verbenaceae Natural order.

Both these plants were originally brought to India from America as fancy garden plants. Now, they, once perhaps valuable garden plants, are universally considered to be among the most obnoxious of our forest pests. Extensive areas of both forest and cultivable lands have been exclusively occupied by them and it is difficult to say which of the two is the most aggressive. The scrub jungle and grass lands in the neighbourhood of villages ("Vilage Porambokes") are very often reduced to mere wastes owing to their complete occupation by Prickly Pear; while Lantana appears to concentrate its efforts in remoter and perhaps moister localities.

In *Pennagaram* Reserve of Dharmapuri Range, almost the entire area of the Reserve is covered with Prickly Pear. In many places footpaths have been completely overgrown and public thoroughfares are getting narrower and narrower every year. Annually special coolies are engaged on monthly pay to keep such routes clear and comparatively large sums of money are spent. Similarly in the Wynaad, and other Lantana abounding places, considerable expenditure is incurred annually in endeavouring, by uprooting, to completely eradicate the Lantana pest. In the *Denkanikota* Range

of the North Salem District, until 1920, there existed a special staff consisting of a Deputy Ranger and two Forest Guards, for this purpose only and thousands of Rupees were spent with no effect and at present I can, for certain, say, that there is practically no difference between the eradicated and uneradicated places.

Village communities, have, from time to time, attempted to remove the Prickly Pear entirely, but it has not been possible to do so, nor will it be possible unless all ryots join together and work their hardest. I believe, in one of the Native States, probably Mysore, the Government has offered a reward of Rs 10,000 to any person or persons, who find a remedy to eradicate this pest. It is also believed, that some expert is investigating the question and is trying to find some other plant, of a gregarious type, which, when introduced, will suppress and completely exterminate the Prickly Pear. But in this, as in all other such problems, we are confronted with the difficulty of finding a plant which will prove a remedy only and which will not eventually turn out to be a pest itself.

Of the two pests, Prickly Pear can, I think, be considered as the lesser of the two evils, at any rate from a Forester's point of view. Localities infested with Lantana take fire every year on account of the highly inflammable nature of the shrub in the dry weather, and extensive tracts of forests containing numerous seedlings of valuable timber species are devastated annually. Secondly the Prickly Pear is useful, when green, as food for cattle and when decomposed yields a valuable manure. It is also used as a mordant in white or colour washes.

Since no use has yet been found for Lantana, I shall confine the remainder of this essay to a short account of the various uses of Prickly Pear.

In Coimbatore District, and probably many other districts also Prickly pear manure is extensively used in the cultivation of dry crops, such as Cholan, Ragi and Cambu. It is also used in the cultivation of chillies, tobacco, plantains etc.

In raising forest nurseries, a certain amount of manure is useful, if not essential; and may easily be obtained from the decomposed remains of prickly pear clearings in the vicinity. The Madras Forest College Estate Nursery may be mentioned as an instance in this connection.

The origin of prickly pear as a leaf manure appears to be founded on the following short anecdote:—

A ryot removed the litter which he found accumulated under prickly pear and used it as manure in his fields and in due course other ryots tried the same experiment, until eventually everybody in the locality recognised the virtue of prickly pear manure.

Now, when a ryot finds the prickly pear growing by the side of his field or encroaching on his lands, he clears it and converts it into manure. This practice is not at present wide spread, but in places where it is customary, the earth near prickly pear is sold at the

rate of 2 to 4 annas per cartload (The rate, I understand, is rising on account of the general increase in the cost of labour) This earth is naturally valuable, as it contains a large proportion of the decomposed remains of prickly pear, which yields 15 per cent of organic matter. By utilizing prickly pear as manure the ryots derive two advantages (1) they get rid of the pest, or prevent it from encroaching upon their field or keep it under control in their grass land areas and (2) they obtain good manure for enriching the soil.

Now as regards the actual preparation of the manure, three methods are commonly practised.

(1) Trenches of $2\frac{1}{2}$ feet to 3 feet depth and about 6 feet broad are dug to any length (usually 20 to 30 feet), at a time occurring between the two monsoons, immediately the agricultural works, (that is, sowings and plantings), are over, and the ryots instead of idling away their time, clear the prickly pear bushes and fill them into the trenches, which are then covered up with the earth originally removed from them. After a time, the earth sinks on account of the decay of the vegetable matter, when the hollows are again filled up with the earth dug up from under the bushes. The first layer of earth is ordinary earth and lies in direct contact with the prickly pear. The second layer is earth already enriched by prickly pear litter. The whole is left over for a year. If there is sufficient rain, the decay of the prickly pear will be complete in one year and the manure may be used for the following years' cultivation. If there is insufficient rain

the thorns will still remain undecayed and the pits should be allowed to remain for another year. In opening the pits the actual decomposed remains of the prickly pear become unavoidably mixed with the two layers of covering earth and the whole is used as manure.

(2) In places where there is scanty rainfall, the ryots, in their leisure time, up root the bushes, collect them into large heaps and leave them for some days in the hot sun. They then cover them with dry twigs, leaves, etc., and set fire to the lot. When the thorns are partially burnt, the heaps are covered over with the earth obtained from under the bushes and are left to rot for a period varying from 3 to 5 years. After this period, decay is complete and the remains of the originally up rooted prickly pear, which is again unavoidably mixed with the covering earth is available in a fit state for use as manure.

(3) The last method, though the easiest, is a little costly. The bushes are cut and ground in mortar mills (chaman grinders) On account of the high percentage of water in prickly pear (about 85 Percent) the whole becomes a pulp. The thorns are also ground to some extent. The pulp is then removed to pits (the excavation of which has already been described under the first method) and covered with earth obtained from below the bushes. By this process the pulp decomposes in about 6 months and the manure is fit to be used in about 8 months' time. The reason why earth obtained from below existing bushes is used is, that, it contains a larger proportion of

organic matter than is present in earth excavated in the open, and therefore adds to the value of the manure, with which it eventually becomes mixed when the pits are uncovered.

As already pointed out, the prickly pear is used as cattle food, but before it is available as such, it is treated in the following manner. The branches are cut into large pieces and the thorns removed either by roasting the pieces over a black-smith's furnace, or by removing them with the aid of a pair of tongs; (the latter method is very slow and tedious). The pieces, when cleaned of thorns, are cut into smaller pieces and may then be given to cattle. Usually cotton seed is mixed with the prickly pear to enrich the food and make it sweeter. (By itself prickly pear does not form a nourishing food). This practice is common in some parts of the Bellary, Anantapore and Coimbatore Districts and in certain other places of the Mysore State.

Regarding its use as a mordant in white or colour wash, the following is a short description of its preparation. An ordinary pot is filled with prickly pear cut into small pieces. The pot is then filled with water and boiled for about 3 to 4 hours, being stirred frequently. It is then allowed to cool, and after cooling, the liquid is filtered, and the filtrate is added to the white or colour wash in the proportion of 1 to 150. In walls washed with this mixture, the color is not only fast and longstanding but is also not easily brushed off and has a glossy surface.

Lastly in many localities devoid of other fruit trees, the fruit of the prickly pear forms the chief food of monkeys and other animals; jungle tribes, or even the poorer classes, live upon these fruits during certain seasons of the year. Good fruits may on hot days be eaten to quench the thirst.

The fruit of prickly pear is also useful as a mucilage, but on this point I need not comment further as it has already been dealt with elsewhere in this number by M R Ry. E. K. Krishnan Avl.

S. RENGASWAMI IYENGAR,

Junior Student.

ATHLETICS.

Minutes of the Annual General Meeting of the Madras Forest College Athletic Club.

A meeting of the Madras Forest College Athletic Club was held on the 9th August 1922 at 11-45 A.M. in the Principal's Office Room when the following were present:—

Mr. C. C. Wilson	(President.)
Mr. G. C. Robinson	(Vice President)
Mr. W. C. Hart	} (Instructors)
Mr. E. K. Krishnan	
Mr. A. R. Brand	

Students

S. Hadi Husain.	S Sankaran.
N S Ayyanna	P. T. Jayakody.
P. A. Venkataraman.	B H. Ananthathirtha Rao.

S Doraraja

The following is a resume of the proceedings:—

1. Election of Secretary.

Student Doraraja was elected as Secretary.

2. Accounts 1921-1922.

The apparently heavy expenditure on sports day was discussed and it was decided that the expenditure was not excessive; and that similar arrangements should be made for the coming sports day.

3. Accounts 1922-1923.

The total anticipated receipts was estimated at Rs. 825 exclusive of the Government donation of Rs. 400. The total anticipated expenditure worked out to Rs. 1000. In order to make up the deficit it was proposed and carried:—

- (1) that students whose pay was Rs. 50 and over per mensem should pay an annual subscription of Rs. 6, instead of Rs. 5, recoverable in monthly instalments of 8 annas.

- (2) that such of the private students as can show that they are unable to pay the enhanced rate may continue to pay at the rate of Rs. 5 per annum.

- (3) that the members of the staff should subscribe one full day's pay instead of $\frac{3}{4}$ of a day's pay as hitherto.

4. Revision.

A special committee was appointed to investigate and revise the Rules of the Athletic Club, and the rules governing the award of the Pentland Shield, and to frame rules for the "Fisher Cup" Tennis Tournament.

5. Appointments.

The following appointments of Captains for the various Games were made.

- (1) Hockey—Hadi Hussain.
- (2) Tennis — Sankaran.
- (3) Foot-ball—Anilkumar Bose
- (4) Cricket—Ayyanna.

6. Marathon Race.

The question of the place where, and time at which, the Marathon Race should be held was left to the Sports Committee to decide.

8. General Duties.

Mr. Brand was requested and kindly consented to assist the Vice-President of the Athletic Club in his general duties

9. Prizes for the coming sports.

The question of presentation of prizes for the sports was discussed and Mr. Robinson promised to do his best to collect such donations from the staff as they were generous enough to give.

The meeting then adjourned.

(Sd.) S. DORARAJA,

Secretary Athletic Club,

Madras Forest College.

The Madras Forest College

Athletic Sports, 1922

The annual athletic sports of the Madras Forest College, were held on Saturday the 21st October on the College Athletic ground. Messrs. C. E. C. Fischer, F. R. Parnell, C. G. Tottenham, C. S. Ratnasabapathi Mudaliar, M. R. Ramaswamy Sivan, Captain W. G. Dyson, F. D. Ardagh and J. W. K. Wernham very kindly acted as

Judges. Messrs H. F. A. Wood and C. C. Wilson were referees; Rev. Father Jambeau and Mr. E. K. Krishnan the time keepers; Messrs. W. C. Hart and A. R. Brand the starters & Mr. G. C. Robinson the recorder.

The ground was tastefully decorated and the tents bedecked with flags. The proceedings began punctually at 3 p.m. with the first event on the programme – the 100 yards flat race. The weather was exceptionally fine, though the rain of the previous evening had slightly affected the ground. In response to our invitation a large number of European and Indian ladies and gentlemen together with a large gathering of students of the Agricultural College, and other local institutions were present. The function was a great success & this was in no small measure due to the indefatigable efforts of the Vice-President, Mr. G. C. Robinson, whose work in this direction was not confined to this day and the one before only, but extended over some weeks previous and was in addition to his many other pressing duties.

The Principal, staff, and students were at home to the guests. Mrs. Wilson very kindly under-took the entertainment of the European guests which she did very successfully after a great deal of labour and patience. Mr. E. K. Krishnan assisted by Mr. K. A. Bhandary and a few student volunteers entertained the Indian ladies & gentlemen, who numbered over two hundred. Needless to say, their task, though an arduous one, was also very successfully accomplished.

The Athletic display was as good as that of any previous year and in one event even better, student Madavan Nair beating the College record for the Mile Race, his time being 5'-28 2/5" against 5'-29 4/9" created by M. B. Ayanna last year. Madavan Nair was awarded the Special Prize for breaking a College record, very kindly given by Mr. H. F. A. Wood, Conservator of Forests. Among the most exciting and interesting events may be mentioned the obstacle race and the sack scrimmage.

It was rather (disappointing to see only three old students of the College (one being Mr. K. A. Bhandary, an honours student of last year and attached to the College) present this year to compete for the old students' race. However this was a bit better than the previous year, when only one was present, with the result that the race could not be run. We hope that there will be a much larger attendance of old students in future years at this, one of the most important functions in our College year.

The first prize for all major events was a cup, and the second a silver medal engraved with the name of the event.

We offer our hearty congratulations to P. Madavan Nair, and Bushanam, the winners of the Richmond Cup, both having scored 12 points each. Unfortunately no Athletic Colours were awarded this year, as the award is only made in cases where the winner scores at least thirteen points, but it is hoped that the President and Vice-President

of the Athletic Club will be pleased to reconsider the minimum number of points governing the award of "Athletic Colours" and also to decide that the winning of the "Richmond Cup" should in itself justify the award of athletic colours.

The competitors who were in the running for the Richmond Cup and their Athletic Colours and the marks gained by each are as follows:—

(5, 2 & 1 marks respectively are allotted for the 1st, 2nd & 3rd places in each of the events noted below. Those who gain 13 points and above are entitled to Athletic Colours. The highest aggregate wins the Richmond Cup)

Name of student	100 yards	1/4 mile.	1/2 mile	1 mile.	120 yards hurdle	Long Jump.	High Jump	Throwing the Cricket ball.	Total.
1 Madavan Nair		2	5	5					12
2 Bushanam.	5	1			5	1			12
3 Rahim tulla Khan.	2	5			2				9

It will be seen from this that even the winners of the Richmond Cup, are below the standard (viz 13 points) demanded by the rules of the club even though one man broke a previous year's record. This

comparatively low aggregate gained by the winners of the Richmond Cup- is obviously due to the much keener competition than has been experienced in past years.

The results of the various events are as follow:—

A- competed for on the “Semi-final” day:-

I. Throwing the cricket ball.

1st K Ganapathy (72 yds. 1ft. 7 in.)

2nd Mumtaz Hussain.

3rd A. Jayasundra.

B Run off on the day of the sports:-

I. 100 yards Flat race.

1st T. R. Bushanum (11 $\frac{4}{5}$ sec.)

2nd Rahimtulla Kahn.

3rd Hadi Hussain.

II. $\frac{1}{2}$ mile Flat race.

1st Madava Nair (2 min. 24 $\frac{1}{5}$ sec.)

2nd Divulvewa

3rd K. S. Timmayya.

III 120 yards Servants Handicap race.

1st Momad.

2nd Chinnasawmy.

3rd Baba.

IV. 120 yards Hurdle race.

1st T. R. Bushanum (20 $\frac{2}{5}$ sec.)

2nd M. Rahimtulla Khan.

3rd A. Jayasundara.

V. Invitation $\frac{1}{2}$ mile race.

1st Srinivasan (L. M. S. High School).

(2 min. 20 $\frac{1}{5}$ sec.)

2nd Small. (Stanee School)

VI. High Jump.

1st Bose (4 ft. 8 $\frac{1}{2}$ in.)

2nd Appadurai.

VII. $\frac{1}{4}$ mile Flat race.

1st M. Rahimtulla Khan. (6 $\frac{3}{5}$ sec.)

2nd P. Madava Nair.

3rd T. R. Bushanum.

VIII. Long jump

1st Mumtaz Hussain. (16 ft 11 in.)

2nd Hadi Hussain.

3rd T. R. Bushanum.

IX. 100 yards Flat race for past students.

1st Appiah. (13 sec.)

2nd Bhandary.

- X. One mile Flat race.
 1st P. Madava Nair. (5 min. 28 $\frac{2}{5}$ sec)
 2nd Patras Kandir.
 3rd Mumtaz Hussain.
- XI. Visitors' Children's race.
 1st Walter Hart.
 2nd Gladys Dee.
- XII. Obstacle race.
 1st T. R. Bushaniam.
 2nd Amos Dempta.
- XIII. Relay race. Winning Team:—
 Bihar and Orrisa. Hyderabad
 and Central India students.
- XIV. Sack Scrimmage Winning Team: —
 1. Vedanayagam.
 2. Amos Dempta.
 3. Jayakody.
 4. Rajalingam.
 5. Divulwewa

After the last event Mr. G. C. Robinson, the Vice-President of the Athletic Club made the following speech :-

"Ladies & gentlemen, before I ask Mrs. Parnell to give away the prizes, I would request your indulgence for a few minutes as there are one or two points on which I wish to touch.

"I must offer our heartiest thanks to those who have kindly officiated to-day in various capacities. Our thanks are also due to the Instructors of the College and others who have contributed towards the prizes to-day, and Messrs. Barton & Sons for supplying the cups and medals at special rates.

"The performance to-day was very good. The prizes are more or less equally divided among both the divisions. The Richmond Cup for the largest number of marks has been won by two students (Madava Nair and Bhushanam) this year. We congratulate them heartily on their success. We have further to congratulate Madava Nair on his success in breaking the College record in the mile race and thus winning the prize very generously offered by Mr. H. F. A. Wood, Conservator of Forests for breaking a College record.

"It is gratifying to see that 3 old students have turned up this year for the old students' race as against one in the previous year. We hope that more old students will attend this function in the next and future years.

"I will not keep you any longer, but will ask Mrs. Parnell to be so good as to distribute the prizes so arduously won."

The prizes were then very kindly presented by Mrs. Parnell. The Medals for the "Hockey Sixes" and the Father Rhondy Cricket Shield, won for the first time by the Forest College, were also given away, the latter at the request of the Secretary of the Local Athletic Association.

[The "Hockey Sixes" is a tournament completed for by teams from both divisions. The matches were played mostly in camp, and the final was played in the head quarters. The Principal has very kindly given medals to the winners. This year winners are Rahim's team composed of Rahim, Bushanam, Gupta, Meta, Sukkal and Divulvewa, of the Junior Division.

After the distribution of prizes, three hearty cheers were in turn given for Mrs. Parnell, Mr. G. C. Robinson and Mr. H. F. A. Wood, and every body dispersed having spent a most enjoyable evening.

S. DORARAJA,

Athletic Secretary,

M. F. C.

Cricket.

The Madras Forest College Cricket Eleven played several matches against The Agricultural College, Stanes' High School, The United Club, and the Anamalai Planters. In all these matches the

college won by a comfortable margin. The Team competed for the Y. M. C. A. Cricket Tournament and won The "Father Rhondy shield".

The following extract from "The Hindu" gives an account of the Final match in the tournament :—

"Cricket at Coimbators"

Competition for Father Rhondy's shield

MADRAS FOREST COLLEGE. Vs. MADRAS AGRICULTURAL COLLEGE.

The above Fixture came off on Saturday the 2nd September on the Agricultural College ground. The Forest College winning the toss, elected to bat & sent in their opening batsmen. The home team started well by capturing the first wicket for no run. But with Hadi Husain and Mr. E. K. Krishnan, together, matters took a different turn. Hadi was bowled after scoring a useful 29. Mr. Krishnan continued batting merrily and in this respect was ably seconded by Mr. Bhandary who although not batting very long, played a bright innings, and scored off a number of well timed strokes eventually being caught well out in the deep Field. Then Jayasundara went on to complete the century contributing 33. Ill luck, however, seemed to pursue the Forest team as they lost three of their best batsmen Mr. C. C. Wilson, Mr. G. C. Robinson and Ayyanna the Captain in quick succession. They made 127 runs in the first innings.

The Agricultural team fared worse at the hands of their opponents' bowlers; the whole side was able to muster up 95 runs.

In the second innings of the Forest College, Mr. Krishnan and Mr. Bhandary played faultless cricket hitting all round the wicket. The scoreboard recorded the tens every 3 or 4 minutes. Mr. Bhandary's 43 (not out) included 1 sixes & 3 fours and Mr. Krishnan's 48 included 5 fours. The Forest team declared their innings closed at 105 runs for the loss of 4 wickets.

With 40 minutes to play the home team went in a second time, and soon lost 2 wickets. Cricket was very fast and in the end the Forest team had taken 5 wickets for 71 runs when stumps were drawn. The Match thus resulted in a win for the Madras Forest College by a innings and 66 runs."

The following students were awarded "Colours" for Cricket

- (1) Jayasundara.
- (2) Jayakody.
- (3) Ayyanna.
- (4) Hadi Hussain.
- (5) Sankaran.

Hockey.

Since the arrival of the present Junior Division last August, the College Hockey Team has played 6 matches, of which 5 were won and 1 lost. In October the College Team entered for the Stanes

Hockey Tournament. The number of entries was six, which is unusually large. In the first two rounds of the tournament the College defeated the Reserve Police and the Madras Agricultural College; and met the Auxiliary Force Team in the final -- where unfortunately we were beaten by 5 goals to 4. It was an excellent match and there is no doubt that the Auxiliary Force had a very strong team. However let us hope that next year we will have better luck.

No Hockey colours have been awarded this year.

Football.

Our Football Team this year is not as strong as usual, and more time has been devoted to Cricket and hockey. Only two outside matches were played during the season, and we were defeated in both. Student Anil Kumar Bose of the Senior Division was awarded his colours for Football.

A. R. B.

Prickly Pear Mucilage.

It may not be known to many people that Prickly Pear produces an excellent mucilage which is very valuable as an adhesive. Take the developing fruit *just after* the yellow petals have been shed (I refer to *Opuntia Dillenii*) the top of fruit will then be greenish white in colour. If it is reddish or yellowish the fruit has been allowed to be

come too mature and no mucilage will appear. Take a thin slice off the top, and gently press the fruit. From the ducts of the fruit, whitish semi-transparent mucilage will be seen to exude. Collect this in a spoon or a tube and try it for mounting photographs, or for other purpose where gum would be used. It is an excellent adhesive and the fact that it does not discolour photographic mounts, or paper is a point in its favour.

I once used this mucilage to stick a rubber patch on a unctured bicycle tube. The patch stuck fast on the tube all the way Pback to my camp some six miles distant.

The mucilage however, does not keep. It becomes mouldy and dry if kept longer than a week. It loses its adhesive property too in that time.

E. K. KRISHNAN, E. A. C.

MISCELLANEA.

THE MADRAS FOREST RANGERS' ASSOCIATION.

PROGRAMME

of the

3rd Annual Conference of the Association

to be held at Madras between the 27th and 30th DECEMBER 1922.

27th. Rally and Business Committee Meeting.

28th. 8 A. M.— Welcome Address by Mr. A. Sithapathi Aiyar,
B. A., (Chairman of the Reception Committee).

2 P.M. to 4 P.M.:— Discussion of the subjects to be passed at the General Conference

29th. 8 A.M. to 11 A.M.:— Executive Committee Meeting.

2 P.M. to 6 P.M.:— (1) Opening speech by Mr. C. D. Parthasarathi Chetty.

(2) Annual report by the Secretary.

(3) Presidential address.

(4) Subjects:—(a) "Time scale and improvement of pay" by, Mr T. D. Ponniah,

(b) "Forest Ranger in the scale" by Mr. S. G. Venkataramanan.

(c) "Our pernicious habits and emancipation" by Mr. G. N. Subba Rao Pantalu, B. A.

(d) "A paper on Forest Re-generation" by, Mr. T. G. Sankaran Nair, B.A.

30th.

(5) Amendment to the rules of the Association by Mr. M. Muthusami Aiyar.

(6) Re-affirmation of the resolutions passed in the 1st Annual Conference.

(7) "Difficulties of Range Administration" by, Mr. P. A. Krishnaswami Mudaliar.

(8) "A paper on Spike" by Mr. Nageswara Iyer.

(9) "Some practical methods of retrenchment in the Forest Department" by, Mr. T. M. Krishnamachari to be supplemented by Mr. T. D. Ponniah.

(10) Concluding speech by the President.

(11) Vote of thanks by Mr. C. P. Garudachalam Mudaliar.

T. D. PONNIAH,

Secretary.

P. S.-Those members who are willing to speak on the resolutions passed in the 1st Annual Conference may communicate to the Secretary.

T. D. P.

THE MADRAS FOREST RANGERS' ASSOCIATION. PROCEEDINGS.

of the
MEETING OF THE EXECUTIVE COMMITTEE HELD AT SALEM
on the 19th and 20th August 1922.

RESOLUTIONS:—

I. Resolved that a deputation of the following members of the Association headed by Rao Bahadur M. R. Ry. V. Alwar Chetty Garu, Retired Extra Deputy Conservator of Forests, do wait on the Honourable Member of the Government in charge of Forest Portfolio to represent the cause in connection with our recent memorial in continuation of the deputation, before the Chief Conservator of Forests on 15-7-1922 at Salem:—

(1) M. R. Ry. Rao Bahadur V. Alwar Chetty Garu, B. A.,
Retired Extra Deputy Conservator of Forests to be the
spokesman of the deputation.

(2) Mr. J. D. David First Circle.

(3) „ D. E. Lewin Do.

(4) „ Syed Ibrahim Albiz Second Circle.

(5) „ G. Rama Rau Do.

(6) „ T. M. Doraisami Pillai Third Circle.

- | | | | | |
|------|------------------------------|-----|-----|-------------------|
| (7) | „ A. Sitha Pillai | ... | ... | Do. |
| (8) | „ M. Muthusami Aiyar | ... | ... | Fourth Circle |
| (9) | „ S. G. Venkatramanan | ... | ... | Do. |
| (10) | „ T. D. Pooniah (Secretary) | ... | ... | Do. |
| (11) | „ A. B. Fenn | ... | ... | Fifth Circle. |
| (12) | „ C. P. Garudacham Mudaliar. | ... | ... | Do. |
| (13) | „ C. Karunakara Menon | ... | ... | Sixth Circle, and |
| (14) | „ P. S. Nair | ... | ... | Do. |

II. Resolved that the Secretary be authorised to communicate to the Honourable Member and take all other steps necessary in connection therewith.

III. Resolved that a single Railway fare be paid to and fro, to the members of the deputation from the funds of the Association.

IV. Resolved that Messrs. G. N. Subba Rau Pantaln, B. A., and C. P. Garudachalam Mudaliar do wait on the Honourable Member of the Government of India to represent our cause.

V. Resolved that the 3rd Annual Conference of the Association be held at Madras between the 27th and 30th December 1922.

VI. Resolved that steps be taken to approach Government to recognise the Association as contemplated in G. O. No. 772 dated 9-11-1921.

VII. Resolved that Mr. P. B. Syed Yahia Sahib, Range Officer, Salem Range, be nominated Treasurer of the Forest Rangers' Association and vested with powers to open accounts with the Imperial Bank of India, Salem Branch, in the name of the Forest Rangers' Association to be operated on by the Treasurer for the time being, and that the accounts that stand in the name of Mr. M. Muthusami Aiyar, Forest Range Officer, President and Treasurer of the Association be transferred to the name of the said Association.

VIII. Resolved that the accounts of the Association up to 20-8-22 be audited by Messrs. S. Chidambara Aiyar, S. G. Venkatramana Aiyar, C. P. Garudachalam Mudaliar and P. B. Syed Yahia Sahib and a report sent up. (Accounts since checked and report submitted on 20-8-22).

IX. Resolved that the following members be nominated as Executive Members for the districts noted against their names.

(1) Mr. A. Rama Rau Pingale, Range Officer, Palakonda, Vizag. } ... Vizagapatam District.

- (2) „ M. N. Raman Pillai Range } ... Malabar South.
Officer, Begur Range
- (3) „ P. S. Nair, Range Officer, } ... Do.
Mannarghat Range.
- (4) „ M. Ambu, Range Officer, } ... Mangalore North.
Sankaranarayana Range.
- (5) „ Mr. P. Miranda, Range Officer } ... Mangalore South.
Upinangadi.

M. MUTHUSAMI AIYAR,

Honorary President.

T. D. PONNIAH,

Honorary Secretary.

Contributions to the Gass Forest Museum.

Serial No.	Contribution.	Contributor.
1.	Eleven bark samples, Nine seedlings and Twelve botanical specimens.	F. D. Atdagh Esq., I. F. S.
2.	Four short panels, Four bark samples and Three seedlings.	M. R. Ry, M. Ambu, Range Officer, San- karanaraina Range,

3. Three sample boxes of matches, made } C. E. C. Fischer Esq.,
at Gudur, (Nellore District.)— the } I. F. S., Conservator, of
boxes made of card board; and the } Forests, III Circle.
sticks made of the wood of Gyro-
carpus jacquini, Euphorbia antiquo-
rum and grass stems.
4. Botanical specimens of Xylia dolabri- } R. H. Mitchell Esq
formis.
5. Nine short panels of Evergreen species. } Captain H. A. Irwin,
M. C. Forest Exploi-
tation officer.
6. Lettsomia elliptica, with a knot. } K. Looma shetty,
M. F. C. 1922-24 Dn.

Additions to the Madras Forest College Library.

1. "Forest Research in India"—1920-21.
2. "Catalogue of the Exhibits in the Economic section of the
Madras Government Museum,—except wood specimens"
—By, S N Chandras'kara Ayyar, M. A.
3. Burma Forest Bulletin No. 6 Rough Volume Tables for
Teak Tharawaddy Dn.—By H. R. Blanford Esq.

4. "Methods of communication adapted to Forest Protection."
5. The Cambridge Bulletin No. XLI Feb 1922.
6. "Lumbering and Wood-working Industries in the United States. Canada" III Volumes.--By, *F. A. Leete*.
7. (a) Progress Report of Forest Administration in the Province of Behar and Orissa for 1920-21—By, *E. R. Stevers Esq*,
I. F. S.
(b) Do. Do. in Punjab, for 1920-21.
8. Schedule of rates of the Coimbatore District Local Fund,
P. W. Department for 1922-23.
9. Indian Forest Records:-
Vol. VIII part (v).
Vol. IX part (ii).
10. Ceylon Administration Report 1921.
11. Report of the Department of Industries for the year
ending 31-3-1921.
12. Proceedings and Resolutions of the Utilization Conference
held during 16th to 21st January 1922 at Dehra Dun.

13. Proceedings of the Sylvicultural Conference held in
January 1922 at Dehra Dun.
14. Bulletins of Indian Industries and Labour, — By, *F. Marsden*
(on paper and paper pulp production).
15. Madras Forest Bulletin No. 3. Sylvicultural Research in
the Madras Presidency 1921-22.
16. Proceedings in the Revenue Department (Forests) in the
Government of Bombay:—
February, to March 1920.
May, to November 1920.
January, to December 1921.
17. The Botany of Behar and Orissa,—By, *H. H. Haines*,
C.I.E., F.C.H., F.L.S.
(Part III—Calycifloræ).
18. "Mechanical, Physical, and Structural properties of wood
grown in India."—By, *L. N. Seaman M.A., B.Sc., A.M.E.I.C.*
19. Nilambur Valley Working Plan, By *R. Bourne, I.F.S.*
Vols. I and II—1917-18.
Vol. III—1919-21.
Vol. IV part (vii)—Maps showing the Nilambur
and Amarapallam Rangers, and working circles 1917-18.
20. Control journal for the Mudumalai and Benne Forests
(Nilgiri and Wynaad) for 1909-20—By, *J. H. Longrigg*,
I. F. S.
21. Report of the Forest Department in Western Australia for
the year ending 30-6-22.

* * * * *

Balance Sheet of the Madras Forest College Magazine for the year 1921-22.

RECEIPTS.

Serial No.	Particulars.	Amount.	Serial No.	Particulars.	Amount.
		Rs. A. P.			Rs. A. P.
1	Donations:- Donation from M. R. R. Rao Bahadur T. Numbemal Chetty Gann M.L.C. "Entrance donation" from: 1 Imperial officer 10-0-0 5 Officers of the Madras Forest } 25-0-0 Service @ Rs 5/- each 30 " the Subordinate } 60-0-0 Forest Service @ Rs 2/- each	Rs. 25 0 0	1	White paper.	Rs. 244 8 0
2	Subscriptions:- (a) From 37 new members @ Rs. 2/- each 74 0 0 (b) " 244 old " 488 0 0 (c) Arrear subn. for 1920-21 from 2 members @ Rs 1/- each 2 0 0 Recovery of V. P. Registration fee 27 1 0 Advertisements 139 10 0 Interest accrued on deposit in Bank 14 6 9 Cash balance with the Treasurer at the beginning of the year 24 12 2 Balance at Bank at the beginning of the year 325 9 0	Rs. 1215 6 11	2	Art and tissue paper.	14 13 0
3			3	Cover paper.	26 2 0
4			4	Receipt books.	7 0 0
5			5	Printing Charges.	363 4 0
6			6	Binding "	30 0 6
7			7	Postal "	91 15 0
			8	Sundries.	3 12 8
			9	Cash Balance with Treasurer on 30-6-22.	13 2 0
			10	Balance at Bank on 30-6-22.	420 13 9
	Total.	1215 6 11		Total.	1215 6 11

G. VISWANATHAM,
(Editor and Treasurer.)

A. R. BRAND,
(Business Superintendent.)

C. C. WILSON, I.F.S.
(President.)

We have pleasure to acknowledge, with thanks, receipt of a copy of "American Forest Regulation"—By Theodore Salisbury Woolsey Jr. M. P. (author of studies in French Forestry, etc. consulting Forester etc., Lecturer, Yale school of Forestry, etc.)

The book is priced 18/- net, and published by Messrs. Chapman and Hall 11 Henrietta Street, Convent Garden, London W. C.

The Principal, Madras Forest College, acknowledges with thanks, receipt of the following donations, promised by ex-students of the college, and paid during the period, September to December 1922.

Date of payment.	Name of ex-student.	Amount paid.
		Rs. A. P.
25-9-22	Mr. P. Dhanajaya Rao ...	13 0 0
Do.	" L. A. Krishna Ayyar ...	7 0 0
Do.	" D. Krishna Ayyangar ...	15 0 0
21-10-22	" T. E. Varadachari ...	10 0 0
2-12-22	Do. ...	5 0 0
2-12-22	" C. M. Ayyappasari ...	5 0 0

Statement showing amounts promised and still due by ex-students of the Madras Forest College, towards the Students' Club.

Mr C. S. Ramanathan ...	10	14	0
" M. R. Doraisami ...	3	0	0
" Gulam Dastagir Sahib ...	9	0	0
" S. A. Dawson ...	11	0	0
" M Krishna Ayyar ...	10	0	0
" S. V. Sigbatullahi Sahib ...	10	0	0
" W. Balakrishna Mudaliar ...	10	0	0
" P. V. Ramana Rao ...	12	0	0
" R. E. Lemos ...	50	0	0

The Madras Forest College Magazine.

Published Quarterly.

Rules regarding Subscription etc.,

1. For all classes of subscribers, an annual subscription of Rs. 2—0—0 (Two only) will be charged.
2. For the different classes of subscribers, an entrance donation will be charged as follows:—
 - (a) Foresters, Students of the Madras Forest College, and Rangers Rs. 2—0—0
 - (b) Assistant Conservators, and Extra Assistant Conservators Rs. 5—0—0.
 - (c) Other officers [higher than (a) and (b)] Rs. 10—0—0.
3. On first subscribing, that is, for the first year of membership, the september number—the first number of every volume or year of the Magazine—will be sent by V. P. P. for Rs. 4—2—0 or Rs. 7—2—0 or Rs. 12—2—0, according to the status of the subscriber. This covers all subscriptions due for the first year and no further payment need be made.
4. For subsequent years, the september number of every new year will be sent by V. P. P. for Rs. 2—2—0 only.

It is not intended that the magazine should be run at a profit, so that as our subscribers increase the magazine will be issued in a more attractive form. More illustrations, will then be possible.

It is the aim of the management to run the magazine for the Ranger-class (including Foresters) and mainly by their contributions. Correspondents are needed to supply suitable matter to maintain the magazine on these lines. We feel confident that this appeal will not go in vain. There must be a number of our readers who have something of interest to write on.

Subscribers are requested to inform the editor of all changes of address, and communicate with the principal by name in the event of copies not being regularly received.

Obtainable from the Business Superintendent,

Madras Forest College Magazine,

Lawley Road, P. O., Coimbatore.

SOUTH INDIA.

THE **Madras Forest College Magazine.**

PUBLISHED QUARTERLY.

Vol, VII.]

MARCH 1923.

[No. 3.]

“Discuss the present Campaign against the Forest Department. Is it a true reflection of the public feeling?”

[Third Essay for the “Indian Forester Prize for PAST Students” for 1922. By M. R. Ry. S. G. Venkataramana Ayyar, R. O. Den-canicutah.]

IN India, Forestry is not so well advanced as in many other countries so that the real aims and benefits of Forest Conservancy are appallingly unknown not only to the masses but to a certain extent the educated people too. It is a sad irony of fate that the better class of educated men have not risen to their height of responsibility in the matter of educating the illiterate people about the beneficial effects of forestry. This state of affairs is all the more deplorable when it is remembered that India is mainly an agricultural country and as such cannot get on without forests. The Indian ryot is always shrewd and

has never been slow to recognise the *direct* advantages of forests. He wants wood for house construction, for his cattle-sheds, for his furniture crude though it may be—for his working, and last but not the least for agricultural implements. He regularly purchases permits for his cattle and sheep for grazing in reserved forests and thereby realises the usefulness of forests as grazing grounds. He collects thatching grass, leaves, edible and medicinal fruits and roots from the forests and thereby has further proofs—if proofs were needed—that he cannot get on without forests. If one cares to have a free talk with the ryots, one will find how frankly the ryots admit that their very existence will be threatened if forests disappear. But what is the present hue and cry against the forest department due to? Who are leading the agitation?

It is not wrong to say that even several cultured people are under the erroneous impression that the policy of the forest department is to squeeze the maximum revenue out of the forest estates. To dispel this ignorance, the department can do no better than continue its present methods of propaganda work for teaching the ryots the advantages of forest conservancy. Nowadays one often sees forest officers at shardies and village conferences preaching most solemnly on the work and achievements of Forest Department.

The ryot finds that his long enjoyed privileges are taken away as a consequence of reservation. The semi-literate village budmash gives false hope to the ryots and assures them that disafforestation could be secured through the efforts of a B. A. B. L. whose words they wrongly presume always carry weight with the Government. The

ignorant ryots easily fall a prey to this allurements and so much money per head is collected which often aggregate to good three digits. A petition is then written and sent, but much is not bound to come out of it. Only the Vakil's coffers swell. If only the villagers take the forest officers more into their confidence and resort less to petition writer, they can have all their grievances redressed and without waste of their hardearned money. At present the only work which educated people do for the ryots in connection with their forest grievances is to contest forest cases in courts irrespective of whether the cases are true or otherwise. The lawyer profession at any rate in this Presidency is overcrowded and there is keen competition among the pleaders—often among the Junior members—to plead on behalf of the accused *for the lowest bid*. As a direct result of this unhealthy competition it is not surprising to see that certain villages have drawn up muchilikas or agreements enjoining the people to contest all forest cases—true or false—in the courts and to cook up evidence suitably. The standard of morality has degenerated so far. If therefore educated people find other means of avocation than the law, the condition of the ryots will be ameliorated to some extent.

Again, the non-official members of the Legislative Councils should go more deeply into questions effecting forest management and collect first hand information from the ryots by going round the villages instead of depending on their Vakil friends for information. As instances of lack of knowledge in this respect on the part of our representatives in the council, I can quote the proposal they brought forward sometime back for the abolition of all the posts of conservators (!) and extra assis-

tant conservators, and in another instance their refusal to sanction funds for the Russelkonda saw mill!! At present India imports timber both in the raw and in the finished state. The values of the many indigenous timber species are not yet ascertained. As pointed out in an interesting article on 'Forest utilization in Northern India' in a recent number of the 'Madras Forest College Magazine' the wood working institutes at Barielly and Chutterbuckganj have brought about in a remarkable way the uses of the at-present-little-known and little valued Indian woods. Two such instances namely *Adina cordifolia* (Manja kadambai-Tamil) and *Anogeissus latifolia* (Namai) are mentioned. My point in narrating these facts is that lot of money and time will have to be spent in research work to find out the strength, durability and other qualities of our timber species before we embark on a regular scheme of exploiting our virgin forests. This argument applies with particular force to the Evergreen forests of the Presidency. If therefore the Legislative stints to sanction funds for research works, the developement of our forests cannot be carried on. From what I have said it can be seen how necessary it is that our representatives in the councils should post themselves up with first hand information in order to faithfully fulfil their responsibilities. Some of the staunch advocates of the ryots ought to go round the forests and personally witness the damages to the forests owing to the deliberate fires started by the neighbouring villagers. The damages to such valuable species as Teak and Sandal are incalculable and unless putting themselves in the position of owners of forests they realise the harm done to forest growth and soil by these devastating fires, the arm chair politicians cannot understand why the Department cannot some-

times yield to the wishes of the ryots in the matter of excessive grazing, goat browsing and so on. Large savings on the expenditure side could be shown if the people stop deliberately setting fire to the forests which means that the elaborate and costly system of fire protection measures need not be undertaken. This is by the way.

After all, Forestry is allied to agriculture in several respects and the ryot can see this easily. Both the crops require tending and manuring though in varying degrees. Both require protection against men and animals and insects and fires. When I talked on these points to the ryots they seemed to appreciate my arguments quite well. What has to be dinned into the minds of the ryots is that they do not think of harvesting their crop before it is mature and that similarly what we forest officers try to do is to cut down the forest crop after it is mature. If this point is realised by all and sundry, much of the ill will against the department will soon disappear. The Forest officer however has acquired wonderful patience by the nature of his work and environments not to take seriously the absence of a word of praise from the general public for his unselfish work and activities, 'unselfish' because in many cases the benefits of the works now carried out will be reaped only by generations yet come.

Is it not a slur to India that several people should think that the Forest Department can stop its activities without causing them any inconvenience? Does it not show lack of thought and foresight on their part? Every peasant knows that life is impossible for human kingdom without wood. Many of the discontents however seem to forget this

fundamental point. They also assume that Forest Officers are overzealous in the discharge of their duties and that they overlook the difficulties of the ryots. Nothing can be farther from the truth. Against this argument I can quote several instances where the Department foregoes large amounts of profits in favour of the ryots. The leasing out of fuel coupes (standing growth) is an instance in point. Under the old system of departmental working the net profits to Government were several times more than what they are under the present system. Yet why should the Government resort to a system that gives it less monetary returns unless it be to benefit the people at large.

Closely allied to the campaign against the Forest Department is the attitude of the Press in India. It is unfortunate that the Press in South India has not generally taken an unprejudiced and earnest interest in Forest management and development. It has got into the habit of stirring up the emotional side of the people. In several cases the tenor of the writings indicates the idea of appealing to the imagination of the readers with little regard to the facts of the case. Little wonder then that we often hear "Much ado about nothing." This is a matter for as deep a concern to us as the apathy of the educated people in the matter of enlightening the masses about the benefits of Forest conservancy.

The mischievous activities of some of the newspapers against the Forest Department as part of their stupid campaign against the Government as a whole notwithstanding, it is a good testimony to the intelligence of the ryots that they could not be forced to actively non-

co-operate with the Forest Department. It is true that there were isolated instances of disturbances but on the whole the words of the platform orators were not heeded to in the villages; this shows the perspicacity of the ryots and we Forest Officers have to take note of this fact in dealing with them.

The evil lies in the inarticulate masses expressing their grievances through the literate or semiliterate people who have at last in some cases their own axes to grind. The latter also very often desire to gain cheap notoriety and so either exaggerate or misrepresent facts whereas in fact with the introduction of the Forest Village scheme and the Panchayat system of managing fuel and grazing forests, the few grievances which the ryots had against the department have really disappeared. Of those who carry on this campaign I ask only one question. How many of these who pose themselves as workers on behalf of the ryots have actually visited the forests? How many at least have gone to the villages and collected first hand information on the subjects about which they thunder forth in the council halls? It is far from my idea to be little the work may the self sacrificing work of many of these public men. But surely they have no business to be lacking in first hand information which is so essential to a grasp of the subject they deal with at any time.

I have so far depicted the hollowness of the movement. Even I do not want to be one sided. Before concluding therefore I cannot help recording the fact that the subordinates of the Department, the lower subordinates more especially have by their corruption and oppression of the ryots contributed somewhat to the present campaign against the

Department. Here again the ryots have not much room for grievance as the superior officers have been always ready to be free with the viliagers and to hear complaints and put down the evil tendencies of the subordinates. Also the recent re-organization scheme has done much to alleviate these difficulties and it is not expecting too much when I say that in the near future one may hear of a thoroughly honest forest subordinate staff.

On the whole the present campaign has been one sided and in some cases carried on by interested people. The ryot is as ever fully appreciative of the need of the existence and working of forests but he should be educated about the indirect benefits of Forest Conservancy and in general about the work of the Forest Department. It is up to every Forest officer to rise equal to the occasion and to allay the ryot in the dubious plight in which he is now placed.

"AN OLD STUDENT."



"Why did you choose Forestry as your profession?"

*Third Essay for the "Indian Forester Prize" for present
Students for 1922.*

BY S. DORAIRAJ M. F. C. 1921—23 DIVISION.

THE future of a country lies in the hands of her young men, and as such a young man should be prudent in choosing a profession. It must be beneficial to the individual in question, and also to the world at large; forestry is a calling which is after the heart of an aspiring young man.

Forestry is one of the most important Services in India. It is a generation since the Forest Department was constituted. Pioneers laboured much before a true foundation has been laid. We look forward hopefully for the rapid progress in the constructive work of development and productive achievement which the pioneers have left to us for fulfilment. The Forest Department sets about the task of conserving, protecting, regenerating, and improving by scientific managements, of meeting the just demands of the people from the forest, of replanting, and reclothing denuded areas, of ensuring the catchment areas of rivers and lastly of checking erosion in the mountains by raising plantations. Owing to the activities of the department, bare hills are being covered with true growths and scrub jungle is growing up into crops of value.

Young men who rebel against the confinement of indoor employments and who have a genuine love for the woods, mountains and

nature in its virgin state, have a great regard for the vocation of forestry.

Forestry is the-art of maintaining forests for the benefit of mankind. The purport of forestry is to serve humanity. It is the science and art of making the best permanent use of the forest. It increases the wealth and comfort of man. It seeks to preserve forests only in so far as these may minister to men's well being.

Ignorant rural people entertain the idea that the Forest Department stands as a stumbling block in the way of agricultural activities by withholding arable lands from being cultivated. Further the ryots think that they are deprived the rights of grazing, of collecting green manure, etc. No less than 2½ millions of sheep and cattle are grazing in the Government forests of the Presidency. Villagers require to be allowed in the forests to hack and hew the trees and thus to ruin them

Forestry begins where agriculture stops. Land on and under the margin of cultivation, forms the field of operations of the Forester. Hence no scheme of afforestation can be looked upon with suspicion as being detrimental to agriculture. Increasing interests in industrial progress have opened the eyes of thinking men to realise that sylviculture and agriculture are inter-related eventually; conservation and improvements of those sources of motive power for which we expect from our forest clad hills and perennial streams, are instrumental to any lasting industrial development.

The results of recent forest research activities have manifested to us the potential value of the Forests of India and it is impossible almost to estimate the capitalized value. It is a sin if the sons of India, do not feel it a duty to study Forestry in order to realise the value

Forests afford both direct and indirect benefits, in the former case by their products and in the latter case by their influence upon climate and by the way in which they regularise rainfall, and water-supply and protect the soil. The forest-produces are classified as major products forming timber and fuel and minor products the rest, comprising a great variety of articles such as tanning materials, dyes, medicines, gum, leaves, flowers, fruits, seeds, fibres, grass, bamboos, canes, lac, honey, wax, horn. Thus forests represent a big capital presenting numerous opportunities for lucrative investments and an enormous amount of labour. The industrial prosperity of a nation can be gauged by its timber consumption. The increase or decrease of the quality of timber used is paralled with economic rise or fall of a nation for practically all industrial activities involve the utilization of wood. There is no limit to the use of wood. It is used for railways, aeroplanes, ships, camps and commonly for house construction, fuel, telegraph poles, pulp for paper, vinegar, alcohol, formalin, sugar turpentine, tars, acids, drugs, drugs, scents, shoe-soles, tanning, etc. The War has opened the eyes of the world, to the demands of the various kinds of forest produce.

A treeless earth is an inferno. The difference between the maximum and the minimum temperatures will be considerable. The consequence will be inundations, and typhoons; and springs will dry up

Agriculture, irrigation, and navigation will stand still if there is a scarcity of water; water supplies sometimes the motive power to machinery. Thus water is a potent factor in the routine of man's life and it depends upon the forests. Forests offer fine catchment areas; the forest floor is littered with humus, and unrotted vegetable debris which drink in the rain water like a sponge. This absorbed water is slowly percolated to feed the springs and rivers; thus a continuous water supply is maintained. But for the forests, the rain water, finding no catchment areas, rushes down causing erosion, swells up rivers and thus endangers the interests of the villagers. Scarcity of water brings upon the failure of crops, and famine takes hold of the country. We cannot lose sight of the aesthetic and hygienic effects of forests. Citizens of large cities repair to forests to recoup their lost health. The wild beasts in the forests offer fields for sport. What an important part forests play in the prosperity of a country! "In its forests lies the heart of a nation, and a people without forests is very close to extinction." Is it not then the duty of a youngman to choose forestry as his vocation?

What a vast field, Forestry, as a profession, offers to an youngman. India possesses enough raw materials to make it self-supporting, if these products are utilised for the manufacture of finished goods. The Forest Department has inexhaustible stores of raw products which are not exploited because the game is not worth the candle. Our exploitation is confined to the extraction of a few known species which fetch good prices in the market. There is the chance for a Ranger to influence local capitalists to launch their capital on enterprises of the kind to tap

the vast possibilities of our forest resources. It was Mr. Gladstone who said "The consumption of paper is the measure of a people's culture." The consumption of paper in the last score of years is increasing. There is an inexhaustible store of bamboos in the Anamalais and their extermination is engaging the attention of the Forest Officers, in order to promote the growth of Teak crops. If we can turn them into paper, it will be a two fold advantage derived. If we can prevail over any capitalists to venture, the perennial waters of the Anamalai river, can be used for the running of a plant. If the continental countries can capture our markets with the produce of their mills transported across thousands of miles, it is really a pity if we cannot profitably make use of a river for the running of a plant, flowing a score of miles from the bamboo-area. Thus we see a student of forestry is enabled to contribute his most towards making India a self-supporting country.

Many of the soft woods, unsuitable for building purposes and hence little extracted at present, can be utilised in the construction of tea boxes, cigar boxes, and packing cases. This industry holds up a fine prospect to men of enterprise. A very large quantity of soft wood is imported into India year after year for the above purpose; this is something like sending coal to Newcastle. This is due to the lack of interest by the public. Hence it is incumbent upon a true citizen to take to forestry and put a stop to this incongruity.

The importance of the Department is so great that His Excellency, the Governor, has the Forest Portfolio. It is a revenue producing department; it bears a considerable annual revenue. The net surplus revenue for the financial year 1919—20 was about 220

lakhs. The quicker the forests are developed, the greater will be surplus revenue which can be expended on education, sanitation and other departments. Thus the Forest Department is a very useful one. Half a century ago trees were almost worth nothing but now a man with a teak grove has a fortune; thus the value of forests is increasing.

Engineers, chemists and technicists are investigating forestry problems such as the utilisation of wood. Many discoveries have been made and are being made. One of the scientific developments, is the production of ethyl or grain-alcohol from wood, which can be substituted for gasoline. Saw dust is tried to be made into fodder for cattle; artificial silk, ink, acetylene, chloroform, iodoform and celluloid are obtained from wood. Thus a new field is opened in scientific research, investigating forests. The results arrived at in the last decade, indicate that future developments will be extensive. The time may come when wood may be used in a large measure for chemical purposes.

A Forest Ranger is said to be "a Jack of all trades." His course of study makes him know every thing of something and something of every thing. The curriculum of study, comprises of Mathematics, Physics, Chemistry, Geology, Botany, Surveying, and Engineering besides courses in Forestry proper. Thus a student of Forestry is in possession of more useful knowledge of well balanced science course than the student who specialises a particular branch for a number of years. Theories given in the books are translated into practice; "A penny worth of practice is worth a pound of theory". Dignity of labour is best understood in the course. Discipline is the

key-note of success and is the watch-word of every student of Forestry. We learn to command by obedience. A Forester can adopt himself to any walk of life; Forestry is one of the most useful technical studies.

A Forester's life is of a composite nature, it is the life that any enterprising, strong and sturdy man will aspire after. His occupation demands of him a rugged physique and hardihood to bear up all privations. Honest labour and hardship are coupled with leisure. This profession stimulates all-round developments. There is a diversity in work and in place. Most of his days he is out of doors and in beautiful environments. He has office work hand in hand with camp life. He is a very responsible person and the safety of hundreds of acres is entrusted to his care. "Every Forest Officer is the Priest of a true religion." He must deal with cash properly, collect and remit revenue. He has to be very careful in village factions. He in the solitude of the wilderness, works out many sylvicultural problems; these solutions will be useful in the future. He closely sees nature to study its living forces as evinced in the growth of trees and he wields these forces to achieve his ends. He is alive to the economic demands of the people in order to shape the management of the forest to meet the demands. He is a public leader winning the co-operation of the people. He fares better than a lawyer and a teacher and he is a public servant of high merit. The department offers exceptional opportunities for good honest hard working men to better their status. Thus the field is immense, and very interesting in character.

This profession, on account of its varied benefits to the country is so noble that I felt it my duty to enter the College as a private student and take to forestry in earnest.

"FORESTS—THE NATION'S MINE."

The commercial aspects of the soft woods of Madras, with special reference to their suitability for the manufacture of paper pulp.

[The following essay was among those received in response to the generous offer by M.R.Ry. Rao Bahadur T. Numberumal Chetty Garu, M. L. C. of a Prize of Rs. 50 for the best Essay on the above subject. Mr. S. T. Moses, M.A., F.Z.S.,—the writer of the following Essay—won the prize].

LONG before the 2nd century B. C. when the Chinese began making paper from cotton, etc., and the Egyptians from the pith of the Nilq Bulrush this discovery was anticipated by wasps which in making their nests chewed woody fibres and barks of trees decayed or alive and kneaded the resultant into a pastey pulp between the jaws. This pulp when dried is exactly like paper.

The process of pulp making adopted by man is exactly the same as that of the wasp. The materials used are old clothes, rags, old rope, gunnybags, waste of cotton and linen industry, waste of jute mills, sugar-refuse, hemp-waste, cotton stalks, hemp straw grass, reed, wood, woodshavings, wood-chips, sawdust and even waste-paper. Wood, etc., is disintegrated and ground into pulp by a grindstone which works while water is constantly flowing into the mass. This is the mechanical process. Man however has with his knowledge of chemistry discovered a cheaper and more effective method of getting rid of the noncellulose matter by the action of some alkali or acid on the raw materials. The pulp thus obtained is

pure cellulose. Recently a new process of making paper from rubber was discovered and is now nearly a commercial success in England.

The materials available in South India for paper making are of three kinds, grasses, barks, etc., of shrubs and softwoods. For successfully commercialising any industry many factors are essential and in this case the factors are (1) abundance of raw materials best suited for pulp making (2) cheap methods of collecting them and transporting them to the manufacturers (3) continuity of supply (4) supply of cheap fuel in unlimited quantity—1 ton of paper requires according to experts 3 tons of coal or 9 tons of wood—(5) adequate and never failing supply of water fit for pulp making—1 ton of paper requires 50,000 to 1,50,000 gallons of water which should be free from colored and other impurities (6) easy facilities for obtaining the necessary chemicals (7) cheap and efficient labour (8) efficient technical staff and lastly (9) facilities for marketing the finished products. Consideration of these factors should precede spotting the location for a factory. It should be preferably a seaport or a railway station for the easy import of raw materials and the easy disposal of the finished products and a place where the water and fuel difficulty will never arise. But the success or otherwise of the concern depends on the low cost of the raw materials, the selection of the best materials which can yield comparatively at low cost the greatest amount of good pulp, the abundance of such good materials, a guarantee of continuity of their supply and lastly the excellence of the finished product and its being marketed at a high price which would bring in decent profit.

Of grasses available in South India the China grass of Nilgiris, Jamu grass of Kolair lake, Madumalai grass of Wynaad and Ganjam grass are found to produce useful pulp. The paper made from grass is pronounced by the experts as far superior to that from bamboo pulp. Their rarity, the heavy cost of collection and their liability to decay if special precautions in storing them are not taken, preclude them from being commercially exploited. Bamboos have yielded excellent results and are now commercially utilised. So far as the continuity of supply and that at cheap rates are concerned, bamboo is easily the 1st among the raw materials available in South India. The supply can be kept perennial by a judicious cutting of the culms. Only 1 is cut of the 5 present so that the same clump need be approached only once in 5 years. Besides, while preparing pulp culms of all ages and even different species of bamboos can be treated together. Bamboo pulp is the cheapest in the world. But unfortunately in South India the only objection for an extensive use of bamboo in pulp making is the fact of its entering very largely in our life in the country parts by being extensively used for building purposes.

Dendrocalamus strictus the most universally spread of all Indian bamboos is found in deciduous forests and dry regions of South India and *Bambusa arundinacea* is common all over South India. The crop is easily grown and investment in bamboo forests or private areas is safe since by a judicious cutting of culms pulp can be produced without any effect on the capital value of the areas. *Ochlandra*

rheedi is common on the West Coast, while *Ochlandra travancorica* is common on the mountains of Travancore and Tinnevely. These two species of bamboos were used in the Punalur Paper Mills in Travancore to make brown paper. From the above four species in south Malabar only, according to a Scotch firm whose expert made an investigation on the West Coast their annual demand for 200,000 tons of bamboos could be easily met. Three rarer species *Arundinara Wightiana* found in Nilgiris and other South Indian hills, *Oxytenanthra thwaitesii* found in Nilgiris, Western Ghats, and hills of Kurnool, and *Oxytenanthra Bourdillonii* found on the Ghats of Travancore though yielding good pulp cannot be commercially utilised because of their rarity and consequent incontinuity of supply. Many South Indian trees and shrubs yield bark and fibres which can be pounded into pulp fit for paper manufacture. The stems of *Bauhinia Vahlia* a common climber of South India, *Spatholobus Roxburghii* a common gigantic climber found in the forests of Konkan and *Caryopteris floribunda* a large shrub common in the forests of Northern Circars and Deccan are used for pulp-making. Fibres of *Pandanus odoratisimus* common on our coasts are valuable for making paper of good quality. Fibre of plantain cultivated throughout South India is used for making coarse paper. Good paper is got from the fibres of the Deccan hemp, cultivated all over South India and the gigantic "Swallowwort" common in all wastelands. Waste tow from the extensively cultivated sunnhemp is used in paper-making. Cotton stalks are no good as the short fibres are condemned by the paper-experts as unfit. The bark of the Peepul

found more often planted than wild, the banyan common as an avenue tree, species of *Sterculia*, the babul, the Screw tree common in the dry forests of South India, and *Hibiscus tiliaceus* common in the Carnatic and West Coast yields good paper-pulp. Paper from the peepul is used in Burma for the quaint umbrellas used there. Rarer trees whose barks yield a good paper are the Iron wood of Malabar and *Lasiosiphon eriocephalus* found in the Southern and Western forests, and *Grewia asiatica* a tree found all over South India but scattered in its distribution. Prickly pear is common all over South India but the difficulties in the collection and transport and the fact of the percentage of fibre production being low are against its intensive use for paper-pulp manufacture. The China grass of China and Japan used in Europe in the manufacture of paper has been introduced into Madras by the Horticultural Society and into Nilgiris and Wynaad by the Glencock Company. The habitat of the trees which yield softwood useful for pulp making is as follows: *Butea frondosa* is common all over South India being found chiefly in the plains. *Bombax malabaricum* is another common tree abundant especially in hot forests. *Careya arborea* another is abundant in moist forests. *Terminalia belerica* is common in the forests. *Ficus glomerata* is common on the bank of all rivers. *Mallotus philipensis* is another common tree. Two species, *urens* and *colorata* of *Sterculia* and *Melia composita* are also common. The rarer trees are as under:

Anthocephalus cadamba is found wild in South Canara, Malabar, Northern Circars, Cuddapah and Kunrool, *Anogeissus*

latifolia is found in the dry forests of South India while *Ehretia laevis* and *Gmelina arborea* are found in the deciduous forests being absent in dry places. The *Hogplum* and *Sterculia urens* are found sparsely in the dry forests. *Dillenia pentagyna* is found in Northern Circars, Nallamalais and Western Ghats. *Saccopetalum tomentosum* is found in Northern Circars, Deccan and Western Ghats. *Tetrameles nudiflora* is found in the Western Ghats. *Macaranga Roxburghi* and *M. denticula* occur in the Western Ghats. *Odina wodier* is common on the East Coast especially in the dry forests. It besides yielding a soft wood exudes a gum which is invaluable in paper sizing.

Wood pulp all the world over is now the main source of paper, forming nearly 90 per cent of the pulp used in the manufacture. U. S. A. and Canada the two great centres of pulp production have extensive forests where spruce, pine, etc., are abundant. In the anxiety to get all available pulp, the American manufacturers were short sighted and paid no attention to the vital question of the conservancy of the forests till too late. For 15,000 tons of newspaper 1,00,000 acres are necessary and steps are now being taken to increase the acreage and to conserve the forests. However it is feared the irretreivable damage has been done and the pulp business would collapse at any moment there, as 40 years or more are necessary to lapse between two periods of felling. In our Presidency where as shown above many kinds of pulp may be obtained, there need be no doubt about the ready sale of our pulp increase more pulp than what is locally necessary for papers is made. India imports now 1,50,000 tons of pulp and 1,20,000 tons of paper. So there is no fear of our

pulp being surfeited in the markets. From Malabar district alone according to the investigation of a Scotch firm of paper manufacture their annual demand could be met. The common occurrence of many of our softwoods and other sources of pulp all over South India make it easy to get the raw materials. The forests are a perennial source of supply but the consideration is the price. Bamboos according to an expert should not be sold to the factory at more than Rs. 15 per ton if the business is to prosper. Many of the softwoods if purchased say at Madras cost from Rs. 75-150 per ton. The hogplum and Melia costing Rs. 75-100 per ton, Terminalia, Butea and Anthocephalus Rs. 120 to Rs. 150 per ton. The rarer ones, the timber merchants say can be supplied at Rs. 150 per ton if good quantities are ordered. The comparative inaccessibility of our forests and the exorbitant price of the woods because of the absence of cheaper transport facilities are two factors against the success of the pulp industry. The Forest department is doing excellent work in the conservation of the forest capital and so there is no fear of the repetition of the mistake committed in Canada. But the facilities for bringing the timber to the pulp manufacturer must be increased by the extension of roads, tramways, railways etc. Rapid improvements in this direction will enable the pulp makers to get their materials at prices cheap enough to encourage them in this infant industry. Besides the forest resources are the private lands where the soft woods, etc., are obtainable. By judicious cutting with an eye to future prospects these can be made to yield a continuous and sustained supply. Though bamboo because of its cheapness, its comparative abundance and many other

advantages it possesses over other materials suitable for pulp making has a great future before it in revolutionising the paper pulp industry in South India, the softwoods can contribute to the stabilisation of the industry because of their wonderful variety, their abundance in our forests, the conservancy of the forests, and thus the guarantee of a continuous supply when the business is seriously taken up by our industrialists. They need have no fear of failure because the demand for paper the consumption of which has been very tritely said to be the measure of a people's culture is sure to be on the increase as years roll on, not only in India but all over the civilised world.

Development of Bamboos from Natural Seedlings. (*Dendrocalamus strictus*)

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IN 1911 Professor Troup started a very interesting experiment at Kotdwara in the Lansdowne Division of the United Provinces with the object of tracing the development of *Dendrocalamus strictus* natural seedlings up to their exploitable age and at the same time to watch the effect of protection from grazing on these bamboo seedling areas. Extracts from the earlier stages of the experiment were included in Professor Troup's "Silviculture of Indian Trees" but as the experiment was only half finished when the book was written this note has been written up with the object of enlarging on Professor Troup's

observations now that full data are available up to the final stages of the experiment, *i.e.*, the exploitable age of the bamboos

1911. Two plots each about $\frac{1}{4}$ acre in size were laid out on 1st March 1911 on flat ground in open deciduous forest which was known to be heavily grazed. The plots were fenced with barbed wire and thus closed to grazing. The bamboo clumps already existing had recently seeded and the ground was covered with young seedlings of about one year old, both inside and outside the plots. The object of the experiment was to observe the development of these natural seedlings inside the plot as compared with those outside the plot and therefore subjected to grazing and at the same time to note carefully the rate of growth of the seedlings and to observe the method by which they formed clumps and the period which was necessary to form clumps of an exploitable size

1912. — Observations were made annually and in January 1912 there was already a most striking difference between the grazed and protected areas. Outside the plots the ground was grazed nearly bare and bamboo seedlings were sparse and small. Inside the plots there was a thick growth of grass through which bamboo seedlings were coming up everywhere and varying between 18 inches and 2' 6" in height with a few up to 4' where they were growing inside the old clumps. Considerable damage was done by pigs this year and hundreds of young bamboos were rooted right out of the ground.

A few sal seedlings also were observed to be coming up well among the bamboos at this time and had reached a height of about 1

foot in January 1912. They were probably from 1910 seed. Besides the above there was a mass of weeds and young *Millettia auriculata* climbers. The difference between the protected plots and the forest outside which was open to grazing was most striking.

1913. — In January 1913 the plots were covered with a dense growth of young bamboos from 2' to 4' 6" high, most of them thin and whippy with wiry stems. A few of the large ones had culms $\frac{1}{4}$ " in diameter at the base and were fairly stiff and bamboo like. The old bamboo clumps were falling and there was a dense undergrowth of *Cassia Tora* and small *Helicteres Isora*, several young *Kydia calycina*, Sal and other species, and *Millettia auriculata* was rampant everywhere over the old clumps. Outside the plot there was a thick growth of *Cassia Tora* and in spite of heavy grazing young bamboos were to be seen everywhere. The recuperative powers of young bamboo seedlings was strikingly demonstrated this year on the ground outside the plots. In 1912 the ground looked as if not a single seedling would survive the grazing but in 1913 numerous seedlings still persisted. They were badly grazed down and seldom even 1 foot high but they were still alive and plentiful. Where sheltered by the old dead bamboo clumps or bushes they were larger. The whole of this block of forest was fenced against grazing about this time, and the effect of this was most instructive. It is interesting to note that if the fencing had been done two years back there would have been a dense mass of young bamboos probably 3—4 feet in height instead of badly grazed seedlings barely 1 foot high, but it will be seen that this bad start had little or no effect on their subsequent development.

1914.—At the beginning of 1914 the bamboo seedlings inside the experimental plots had reached an average height of about 4 ft with a maximum of 8 ft. in some cases. They were very dense but still rather whippy with thin wirelike stems although a $1\frac{1}{2}$ inch diameter stem was occasionally to be seen. These were in most cases new culms which had sprung from the rhizome of the original seedlings. The damage which had been done by pigs in these plots in 1912 was hardly noticeable in 1914. The sal seedlings of 1910 were seen to be growing well and had reached a height of about 2' 6" and besides these several younger sal seedlings (probably 1912 seed) were observed to be established under the young bamboos.

With regard to the forest outside the plots there was really very little difference to be seen and the recuperative powers of young bamboos and the extraordinary vitality of the rhizomes was again brought strikingly to the notice of the observer. There was a dense mass of bamboo seedlings everywhere and if the fact had not been recorded no one would have suspected that the ground had been heavily grazed only two years previously.

These seedlings averaged about 3 ft. 6 ins. in height and some up to 6 ft. high were observed but except for this slight difference in height growth they were every bit as good as those in the plots.

1915.—By January 1915 the tallest bamboos had attained a height of 17 ft. but the average was about 7 ft. Some stems of 2.8 ins. in diameter were measured but the average was only about 1 inch.

The tallest culm measured, *i.e.*, that of 17 ft. was in reality a new culm which had sprung from the rhizome of a young natural seedling, and was not one of the original seedlings and in fact practically all the large culms were new culms, the seedlings still remaining wiry and grass like and averaging only about 5 ft. in height.

1916.—By the beginning of 1916 the bamboos had begun to form into clumps. These were irregularly scattered over the area and about 7 to 10 ft. apart from one another. The average number of culms per clump was 3 to 5 and the height of the culms was 20—25 ft. with an average girth of about 3 inches. The original seedlings were observed to be gradually dying back and in no case were they seen to be growing up with the new culms. It can be concluded from this that the original seedling's life work is merely to form sufficient rhizome for new culms to spring from and having performed that duty it ceases to develop and is obliterated by the newer and stronger culms.

1917.—By November 1917 there was a dense mass of small clumps averaging 5 culms to a clump with an average mean height of about 16 ft.

From this point the two plots will be shown separately as their rate of growth and development were rather different.

Plot I.	Plot II
Mean height 15 ft.	Mean height 18 ft.
<i>Best clump</i> —height 24 ft., diam. of culms 1.4 in. 7 new culms, 17 old culms.	<i>Best clump</i> —height 26 ft., mean diam. of culms 1.2 in. 6 new culms., 15 old culms.

Total culms 24.

March 1919.—Average number of new culms per clump, 6.

Best clump.—

27 culms. Average height 26 ft. and average breast girth 4.5 inches.

There was no undergrowth in the plots at this period and the sal seedlings which were looking so healthy a few years back had quite disappeared, killed back by the more vigorous bamboos.

The formation of clumps was observed to be developing very slowly.

December 1920.—Average number of new culms per clump, 1.

Best clump.—

33 culms. Maximum height 34 ft. with breast girth of 6 inches.

The absence of new culms was due to the abnormal scarcity of rain in 1920.

Plot I.

March 1922.—Only 2 new culms produced in the whole plot and practically all the old culms are still whippy. This was due to too much over-head shade. The plot was very dark and shady.

Total culms 21.

Average number of new culms per clump, 7.

Best clump.—

31 culms. Average height 26 ft. and average breast girth of culms 3.5 inches.

Average number of new culms per clump, 1.

Best clump.—

39 culms. Maximum height 36 ft. with breast girth of 4 inches.

Plot II.

Exploitable clumps formed.—An average of about 4 new culms per clump with a maximum height of 40 feet, minimum height 34 feet. Girth at breast height from 2 in., to 5.5 inches.

Leaving out Plot I which was subjected to far too much over-head shade the fact was established that it had taken exactly 11 years for these natural seedling bamboos to form clumps of exploitable size. Professor Troup estimated that this species would take 12 or 13 years to reach this stage but these natural clumps, even after the very great shortage of rain in 1920, which affected them considerably, reached an exploitable size in 11 years without attention of any sort beyond protection from grazing. They are now ready for thinning in order to remove the congestion and accelerate the growth of new culms. The largest culms have attained a height of 40 feet with a girth of 5.5 inches and with proper treatment these clumps should continue to increase in size and productiveness for many years to come. With regard to the bamboos outside the plots these are to all intents and purposes the same as those inside and the hardships they endured for the first two years of their life seems to have had very little effect. This is probably due to the fact that although the seedling itself was grazed down the rhizomes continued to develop and when the new culms were formed in the 3rd or 4th year there was probably very little to choose between the rhizomes of the grazed and ungrazed plants. If the area outside the plots had been left open to grazing after the first two years there would probably have been a very different story to tell. The experiment was an interesting and instructive one from start to finish and as a result of the accurate observations made the information which it gives is both useful and reliable.

H. TROTTER I. F. S.

**A note on the experiments made in the Chittoor District with
Atlas A Preservative.**

 ATLAS A Preservative can be procured from Messrs W. Crowder and Co., Ballard Road, Bombay in one and 5 gallon drums at Rs. 12 and Rs. 54 per drum respectively, Ex godown delivery. I have never bought the single gallon drum as it works expensive and the quantity is too small for useful experimental work.

2. As a result of some correspondence I had with Messrs. Crowder, I got them to give me a discount of 5 per cent (to cover distribution charges) because others besides myself had to use the stuff and I promised if it proved successful in the experiments that I was carrying out to influence outsiders e. g. ryots and District Board Engineers to go in for it for the destruction of prickly pear. This 10% came in handy and reduced the cost of a 5 gallon drum to little over Rs. 50/- all charges included.

3. Orders should be directed to be booked by goods train as otherwise the Railway freight is excessive.

4. On receipt, drums are frequently found to be leaky and I would advise that in such cases the contents be at once transferred to good kerosine oil tins and the drums made use of otherwise; I have conceived the idea of cutting out the tops of such drums, rivetting stout iron handles on the sides and supplying one or more such to each rest house as a water boiler a most useful article for a camping officer to find in a bungalow. Of course leaks are all stopped up with lead solder which is not affected by water. Good drums ought perhaps to fetch

Rs. 2 to 2-8-0 if sold and this would reduce the cost of the poison, but so far I have not tried to sell any.

5. My first experiments with "Atlas" were made in order to assist certain panchayatdars who complained that the area given to them was full of *sægi* (*Pterolobium*) which detracted from its value as a grazing ground. For the idea itself, I am indebted to Mr. Allen, once Extra Dy. Conservator of Forests, Burma—who some years ago wrote a note about this stuff in the Indian Forester, and, the complaint of the Panchayatdars synchronising with the receipt of a catalogue from Messrs. Crowder, made me write off for a five gallon drum; that was in August 1921. Atlas A preservative is not advertised as a tree killer but as a wood preservative but Mr. Allen noted that it not only kills the tree but preserves the wood at the same time; it was however obvious from his note that he could not give proof of this latter assertion.

6. One of my earliest experiments (September 1921) with Atlas was made with a view to testing Mr. Allen's statement and for this purpose I took up a very large tree of *Ailanthus excelsa* in the compound of the Palmaner rest house and very close to the kitchen buildings. This tree and another in the same compound had proved to be a great nuisance for they annually produced a huge crop of wool worms which used to freely find their way into the out-houses and into the bungalow also, much to the discomfort of the occupants. The tree near the kitchen was girdled, but not deeply, and the surface of the girdle liberally painted with pure Atlas in September 1921. The other tree was left in tact. The girdled tree has been examined from time to time, the last examination having been made in September 1922. The first thing

that happened, within a few weeks, was that a dark coloured fungus looking growth made its appearance on the girdled surface; this, in some places was in streaks and in others in patches. Later it was observed that the bark (Ailanthus has a pretty thick bark) was drying up and cracking in the vicinity of the girdle but much more so above than below the girdle. These cracks went on extending upwards and as this continued, pieces of bark broke away and the branchlets dried up. In September 1922, the bark from practically the whole of the bole (about 10 feet) above the girdle had come away, and a good deal from below the girdle also; the cracking of the bark had extended to the branches and in the case of some of the big branches a good deal of the bark has fallen off, the branchlets had all died and fallen away leaving the ends of the branches struggling to throw out small shoots and a few leaves. The whole of the crown has a restricted sickly appearance and it will not now be long I think before every branch loses all its bark and dies entirely. Only two weak looking shoots have made their appearance one a little below the girdle and another closer to the ground; these appeared first to my knowledge about the end of January 1922 and since they have hardly put on any development since, they will probably not come to anything. But whether they do or not is immaterial because my object is merely to test whether the poison has really improved the wood and if so in what direction and to what extent. This cannot now be ascertained but as soon as the tree entirely dies, I intend sending duplicate specimen of wood (one from the poisoned and one from the untouched tree) to specialist for examination. I also intend burying one specimen from each tree in an ant hill.

Experiments made to kill out thorny creepers.

On 29th September 1921 in the Gollapalli panchayat area myself and the Ranger with the help of a forest guard cut blazes around the bases of 47 Pterolobium and 4 Zizyphus cecropia; the blazed surfaces were about six inches long and as near the ground as convenient; these surfaces were then painted with pure atlas. On this we expended a small bottle of the poison, measured to be one-twelfth of a gallon.

The same area was again visited 15th October 1921; the previously attacked trees were examined, in every case the leaves had dried up and were being shed.

Eight coolies were ready on this day and as it was my intention to give the panchayatdars a demonstration they had also turned up. The coolies under the Superintendence of those men were set on to up-root Pterolobium while myself with the Ranger and three coolies undertook the poisoning. The work was timed for 2 hours. We again utilised one twelfth of a gallon of poison and operated upon 53 Pterolobium and Zizyphus bushes, some of which had a basal stem 6 inches in diameter. The coolies in the meantime had done only 24 Pterolobium bushes and naturally they had selected only those which were comparatively small and easily get-at-able. All the 51 stems which we poisoned on the 29th September and the 53 which were done the 15th October were then pegged and numbered.

The same area was again inspected on the 1st December 1921 and as far as it was then possible to tell, every poisoned climber had completely died; a few (three) of the largest were uprooted and it was found that even the roots were quite dead. In the pits from which *Pterolobium* had been uprooted, small shoots were making their appearance from the cut root surfaces.

One final inspection was made on the 10th March 1922 when I found, to begin with, that people had got into the area and felled and removed many of the dead stems; the pegs had also in many cases disappeared. However I was able to find 63 poisoned stems and of these 25 had thrown out shoots from near the base, in *every* case the shoots appeared from below the poisoned surface. In some cases the shoots were vigorous, in others weak and sickly looking. Both big and small stems had thrown out shoots and both big and small were found to have died out completely. It was particularly noticed that most of the stems which had thrown out shoots were in stony, rocky ground where proper barking right round the stem had been a difficult process in consequence of which the poisoning was in all probability incompletely done. On the flat practically every tree had died.

Adding the three dead trees which were uprooted on the 1st December 1921 we get, in this case, complete death in 41 out of 66 items or 62 per cent. of complete success; but I think it is only fair to assume that the percentage of success would have been much higher if I could have found the other trees, for, as stated, people had been in and had cut away the dead stems for fuel and in the absence of the pegs it

was easier to find a stump with shoots than a stump without. However that may be, the only way of trying to get rid of *Pterolobium* apart from the poisoning method is by uprooting it and on the 10th March 1922 I examined all the 24 pits from which the pest had been uprooted and in every case I found more or less vigorous shoots along the sides of the pits. Quite apart therefore from the cheapness and ease of working with Atlas, it is the only way of killing out *Pterolobium*.

In concluding this paragraph I must mention that not a single *Zizyphus* which had been operated upon with poison had thrown up any shoots.

8. Having had considerable experience of working with Atlas preservative and having watched the results of so many experiments made with the poison not only in connection with *Pterolobium* and *Zizyphus* but also with *Lantana* and prickly pear I came to the conclusion that the best results will only be obtained:—

(1). If we work in the hot weather when the sap is low down and the vitality of the plants is at its lowest and (2) if we girdle the trees right low down, if possible even removing the earth from round the base of the tree and then do the girdling. In the case of the experiments referred to in the previous para, the poisoning was done in September and October which are, according to my conclusions, about the worst months in which such work ought to be undertaken and had it not been for the fact that the Madanapalli taluk receives mighty little rain even from the North East monsoon those experiments would

probably have proved a complete failure. It must be remembered that "Atlas" is easily soluble in water, so easily indeed that a gust of moisture laden wind carries the stuff and deposits it on areas not touched by the experiment; this I have found happen in Panapakkam where after spraying several prickly pear plots with it on a damp day a fortnight later I found all the pear for a considerable distance on the leeward side poisoned and looking quite yellow. Not only therefore is it necessary to do the work in the hot weather so as to catch the tree when it is least able to resist but it is also necessary to stick to the hot weather months in order to obviate the likelihood of the poison being dissipated.

9. In order to further test the accuracy of the above conclusions the following further experiment was made.

On 12—7—22, 30 stems of each of the following species were selected in the Panapakkam reserve Chandragiri Range and poisoned over blazed surfaces cut as low down as possible after removing the earth from around the base of the stems for a depth of about 6 inches.

<i>Pterolobium indicum</i>	(Yerra seeki)
<i>Zizyphus oenophia</i>	(Pariki)
<i>Acacia iutisia</i>	(Thella seeki)
<i>Pisonia aculeata</i>	(Konkai)
<i>Capparis sepiaria</i>	(Nalla vopili.)

They were inspected on 23—7—22 and all were found to have wilted. They were again inspected on 4-8-22 and it was found

that the smaller ones appeared quite dead while the others were dying. They were again inspected on 9-9-22 by the Ranger who reported that the following were living but looking very sick.

Nalla vopili.	13.
Pariki.	1.
Thella seeki.	5.
Yerra seeki.	Nil
Konkai.	3.

In all the others neither did the stems show any signs of life nor were there any shoots from the base.

The Ranger adds the following remark.

"Except in the case of Nalla Vopili which even when completely stripped of bark survive I find in the other cases that the cambium layers (sic) are not completely removed owing to deep furrows at the bottom of the stem or to the stem leaning on the ground for some distance."

In the case of this experiment I must mention that there had been practically no rain in this district from July onwards; the season was an exceptionally dry one and this probably accounts for the complete success with *Pterolobium*. It is unfortunate that in the other cases the barking was not properly done, and if the killing out of these thorny pests is to be undertaken anywhere on an extensive scale I would strongly advise as a safeguard against the scamping of work in the above direction, that in every case in which the base of the

plant is furrowed or is recumbent on the ground, that it be insisted upon that the stem be cut across about 6" from the base and the basal portion then barked and the poison painted not only on the barked surface but also on the cut section.

10. In addition to the above experiments the following were poisoned in the Avalakonda reserve on 14th April 1922 adopting the same method

25 Tehkka Seeki.

25 Yerra Seeki.

27 Pariki

8 Merapakandra. (Merapakandara.)

8 Puriti.

These have not been inspected by me properly since then but in June 22 when the other District Forest Officers came round for the Conference we went to this place and the stems that we saw appeared to be quite dead.

11. Summing up the experiments made on thorny climbers the following conclusions and figures of cost are recorded:—

(a). Taking a gallon of poison to cost 10-8-0 at work spot, about one-sixth gallon of poison costing 1-12-0 is required for 100 stems of all sizes.

(b). 8 men in two working hours can do the barking around and painting of 100 stems. Allowing 8 working hours per day and 5 annas per day per man, labour costs 10 annas.

Total cost per 100 stems is 2-8-0.

(c). Pure poison should be used.

(d). Powdered chalk should be added to the poison before use as this on drying will show a white surface and enable one to decide whether a particular tree has been painted or not.

(e). Work should be done on a dry hot day at the beginning of dry season if the best results are to be secured. Quicker and more satisfactory results are obtained from stems out in the open exposed to bright sunlight rather than from those in dense moist jungle.

(f). The bark must be *completely* removed from *all round* the stem for a length of at least six inches and as near the ground as possible. Pure poison should then be painted on all over the barked surface. The nearer the barking is done to the ground the better and where practicable the earth around the base of the stem should be dug away so as to facilitate very low girdling.

(g). In the case of many of these climbers (particularly *Pterolobium*) we frequently get a very short even less than six inches main stem and they are frequently found on stony ground which does not admit of a hole being dug around the base; in such cases and in cases in which the bases of the stems are furrowed it is necessary to cut across the stem 4 or 5 inches above the ground, then bark all round the stem and then apply the poison not only to the *barked surface but also to the cut section*.

The same thing must be done when the lower end of the main stem is lying prone upon the ground.

(h). Provided work is done on a dry day in the hot weather and provided the barking and painting is properly done as described above, cent per cent success can be assured in the cases of all the following climbers.

1. *Pterolobium indicum*.
2. *Zizyphus oenoplia*.
3. *Acacia intsia*.
4. Konkai (telugu).

In case of *Nalla vopili*, however, it appears that we can only expect about 80 to 90% of success.

12. It was a little time after commencing operations on thorny climbers that the idea struck me to try the poison on prickly pear.

The very first thing done was to dab (with a brush) pure poison on very small prickly pear a foot high. Isolated shoots of pear were operated upon and the dabbing was made on the uppermost cladodes. In a week's time the shoots roots and all had become quite rotten and soon after there was nothing left of them. This was in good dry weather at the end of September in Madanapalli.

Noting results on the small pear I dabbed with pure poison several of the cladodes of a huge clump of pear about 7 feet tall. The poison from those cladodes was evidently absorbed by the whole stem and within a fortnight what was an erect bush of pear had become very

like what one might imagine to be the same bush attacked by a severe form of leprosy; all the upright branches had lost their rigidity and were drooping over.

I saw the same bush a couple of months later and there was very little left of it, but from the lower thick portions new shoots had begun to sprout.

In the meantime i. e. on 7th November 1921 one twentieth of an acre (roughly measured) of very dense prickly pear near the Gadanki village was sprayed over with a solution of poison (1 of Atlas to 3 of water). In this case the quantity used was measured and it was found at that strength it would cost about 150 per acre for poison alone.

On 8th November 1921 three batches of prickly pear near the rest house at Panapakkam were sprayed over with poison using 1 to 4, 1 to 5 and 1 to 6 solutions respectively.

On 10th November 1921 four patches in the same locality were sprayed over with solutions of poison made with boiling water using 1 to 3, 1 to 4, 1 to 5 and 1 to 6 respectively.

On 16th November 1921 three patches were sprayed over in the same locality with cold solutions made up 1 to 10, 1 to 15 and 1 to 20 respectively.

NOTE. The spraying was done with an ordinary garden hand spray.

In all the above cases it was noticed that in about 3 to 7 days (varying according to the strength of the solution and the size of the pear) the pear assumed a sickly reddish appearance, which gradually assumed a yellowish tint as decay proceeded.

Observations were made from time to time thereafter but it was exceedingly difficult at each observation to point out to any particular difference between the plots, the sum total of these observations are therefore put down as follows:—

(1). With small prickly pear (under say 2 feet in height) the effect is very much quicker and more thorough than with bigger clumps.

(2). Only the smallest pear is killed out-right by the stronger solutions which however cannot be thought of the financial reasons.

(3). No appreciable difference was noticed between spraying in the morning and spraying in the evening nor between hot and cold solutions.

(4). All prickly pear clumps except those mentioned in (2) above, die down in from 20 to 40 days depending on a large number of factors such as (a) size of the pear (b) dryness of the locality (c) dryness of the atmosphere (d) strength of the solution; after drying down like that there seems to be a short interval and then come a number of new shoots. The size and strength of the pear appear to be the most important determining factors and it is the thick strong clumps which seem to dry least and throw out the new shoots quickest.

13. Other plots were experimented upon with solution varying from 1 to 30 to 1 to 200 and always with similar results. Using a solution of 1 to 200, I have worked out the cost at about Rs. 5 per acre for poison only but we must of course allow for uprooting and burning the pear after it has been poisoned.

I have had considerable experience of prickly pear removal in Central Coimbatore and I invariably found that the greatest difficulty in eradicating this pest was to get to dry sufficiently to secure a burn, and no matter how careful one was, there was enormous wastage of labour because unless the uprooted heaps were continuously being turned and a torch put into them they would begin to grow again and if in the meantime a shower of rain came down it was all up. It is just here that the usefulness of Atlas preservative comes in for it does kill down the stuff to some extent and does cause a fair proportion of the whole bulk to dry up and with this inflammable material available to begin with, burning is considerably facilitated.

Moreover with a considerable proportion of the pear in a dead state uprooting is made a very easy.

It is however most important that the uprooting and burning be done at the correct time, i. e., just after the pest has dried up and before it begins to throw up shoots.

This period varies from 5 weeks to 7 weeks

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Chittoor.

**Why the old period of July to June is preferable
to the present one of April to March in
the working of Timber and fuel-coupes.**

Under the present system of working, our timber and fuel coupes are leased out from the 1st of April each year to the 31st March of next year. Usually the coupes are advertised for sale early in March, and are sold about a month later. In cases where the sale has to be confirmed by a higher authority, the contractor generally begins work by the 1st of May, after executing the necessary agreements, and arranging for his coolies and gumastahs. He works for a month or so, after which the monsoon sets in, and his work of felling and transport is hindered considerably, and in some cases becomes almost impossible. It is not until October or November that work can be resumed.

By this time agricultural works will have commenced, and coolies prefer working in field crops to working in forest felling areas, for, in the former case, not only is their work more conveniently situated, but they are usually paid in grain, and not in money. In a few cases, perhaps, land-owners do pay their labour in cash, but their rates are always in excess of those adopted by the department, or coupe contractors who can ill afford the liberal rates of the land owner. It is therefore not difficult to see the reason why forest work suffers during the season of agricultural activity.

In some places the coolies themselves are petty land-owners, and this state of affairs only tends to increase the labour difficulty.

The harvest closes by February when the contractor, now able to procure the necessary labour, hastens to complete his work by March which marks the expiry of his lease period. It is therefore not surprising that large areas are left unworked annually, while the work which has been done hurriedly is unsatisfactory, and against sylvicultural principles. Penalties and fines are levied for extension of "voidahs" and irregularities. These discourage contractors who are already put to undue expense, owing to the greater portion of their lease period either coinciding with the cultivating season or being rendered impossible for working by the monsoon rains.

Taking a lenient view of the case, and considering the short working period at the disposal of the best contractors, irregularities which have to be rectified not only cause pecuniary loss to the contractor concerned, but also having a detrimental effect on our forests, are not to be wondered at.

By the 1st of April the new coupes are sold, in the majority of the cases, to other contractors and the coolies seizing their opportunity, take advances from both the contractors with the result that control over them is lost, and a contractor is unable to extract better work, for fear that they (the coolies) will run away to the other man's coupe. Thus there arises many difficulties, and it is often impossible to adhere to the prescriptions of the working plan.

Some years ago, coupes were leased out from the 1st of July every year to the 30th June of the succeeding year. Under this

system contractors had sufficient time in that they had a continuous period of four months of non-agricultural activity (from March to June both inclusive) during which coolies and carts are available for felling and transport operations. He could then satisfactorily and without undue rush complete his work within the lease period.

Contractors represent that not only do they lose under the present system—*i. e.*, 1st April to 31st March—but that a re-adoption of the old one would bring about greater competition, and consequently higher bids at the annual sales of timber and fuel coupes.

R. ALAGIRISAMY NAIDU,
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A Visit to Edavanna Rubber Plantations.

General Account: RUBBER is the dried product of the latex found in the cortex of some of the natural orders yielding milky juice viz., Apocynaceae, Urticaceae, Asclepiadaceae & Euphorbiaceae. Chemically it is a hydro carbon (containing hydrogen and carbon) insoluble in alcohol, acids and alkalies but soluble in carbon-disulphide, chloroform, oil of turpentine and some other oils. It is an elastic substance impermeable to water but not impervious to gases.

Para RUBBER of commerce is obtained from the evergreen tree 'Hevea brasiliensis' an exotic from the Amazon Valley.

The earliest introduction of this tree into Southern India was in the year 1879. The blanks in the 1853 Teak Plantations of Nilambur were planted up with twenty eight plants of HEVEA received from Royal Botanic Gardens, Ceylon. As they were not properly looked after, many of them died, but such of them as are surviving, are at the request of some of the planters left standing to die a natural death to see how long the tree is capable of surviving.

The first rubber estate in Southern India was started in 1902 at Thattakad on the banks of the Pereyar river in Travancore. The Edavanna Plantation is one of recent origin. It was planted in 1911 and tapping commenced in 1917. The plantation of 912 acres is divided into eleven plots varying in extent from 50 to 150 acres.

The tree is found to thrive best in localities with a warm and equable temperature ranging from 75 to 95° F. and a well distributed rainfall of 70 to 150 inches. Continuous heavy rains with long intervening periods of drought are unfavourable. A valley well sheltered from strong and dry winds with an elevation not exceeding 2000 feet, neither swampy nor water logged is most suitable. The soil should be a moist porous loam containing a fair percentage of clay and the sub soil well drained but not stiff or clayey.

Raising of Plantation: The existing jungle growth was clear cut and burnt. Seeds of HEVEA obtained from Ceylon were first put down in a nursery and watered twice daily—both morning and evening. The plants were pricked out of the nursery beds after

3 or 4 months and planted 4 to 6 inches apart. Fourteen to fifteen months afterwards, the plants were stumped up to 18 inches above and below ground level and put down in pits $2' \times 2' \times 1\frac{1}{2}'$. The spacing was $20' \times 20'$, that is, about 108 trees to the acre. Stumping and planting costs about Rs 6/- per 100 plants.

Tending: The seedlings were weeded during the early stages of their development. Water and leaves falling on the floor are prevented from being washed down the slopes and are collected by a system of intermittent drains $10' \times 2' \times 1\frac{1}{2}'$ sunk along the contours and 10 feet apart.

The tree sheds its leaves normally once every year, in February, but in Edavanna a second leaf fall occurs during July and this is attributed to an insect attack. The insect pupates in the fruit and causes the drying up of both the foliage shoot and the fruits. The spread of the attack is prevented by removing and burning all dead (i.e. infected) branches, fruits etc., and burying the ashes. The trees are some times pollarded at a height of 10 to 15 feet from the ground to encourage forking as it is supposed that such trees put on more increment in girth than those with a class straight bole, but the formation of too many branches is prevented by pruning. Large branches are not pruned.

The system of pollarding is not resorted to in Edavanna as it is believed that the operation encourages disease and the consequent production of inferior quality latex.

Tapping: Trees 18 inches in girth at 18 inches from the base are ready for tapping. This size is attained in 4—6 years in South India. Younger trees are not tapped as the latex obtained from them is inferior. The latex vessels are essentially long branching structures running vertically down the whole periphery of the stem. They consist of "Coenocytes" and the tubular milky branches do not run into each other. The ingredients are generally water containing various substances either in solution or in suspension. In HEVEA, the latex contains elongated minute rod like or dumb-bell shaped starch grains.

The upward passage of this milky latex is interrupted in tapping, which consists of horizontal cuts into the cortex. In practice, to make the latex flow down easily, slant cuts are indicated. The cuts should not extend for more than half way round the stem so that the injury to the plant may be confined to a minimum.

"Wound response" is the phenomenon underlying the principle of tapping. The first flow of the latex, may be, and as a matter of fact is usually comparatively small; but the wound stimulates a greater yield, and a higher flow of latex in its immediate neighbourhood—generally within the next period of twenty-four hours—results. This peculiar behaviour of the tree viz., 'responding to wounds' is taken advantage of and the following two rules are laid down for tapping HEVEA trees: (1) The cuttings or rather incisions should be successively made at one and the same place and (2) A period of 24 hours should elapse between any two successive cuttings.

It has been found from experience, that, a tree from which the cortex is pared off $\frac{1}{30}$ of an inch every day is capable of yielding latex which will flow intermittently for a period of six years. The tapping commences at a height of about 2 feet from the ground level and extends to one half the circumference of the tree during any one year. A width of one inch of the cortex is incised in the course of a month, or about 6 inches in the season.

The succeeding year the other half of the stem is similarly operated on. In the third year, therefore, the same side of the tree as was tapped in the first year would be taken up, but the actual incisions would be placed higher up than originally. Generally the incisions should not be facing the direct rays of the sun as the flow of latex would then be less and would coagulate very soon.

The incision, made by a special kind of chisel, is slanting at an angle of 60° to the longitudinal axis of the tree. The latex flows down to the bottom of the cut and is led into a receptacle through a small grooved tin plate. There are several patent wire stands for collecting the latex, but their cost is prohibitive. In Edavanna it is collected in cocoanut shells, propped between a stick and the tree.

Tapping is done early in the morning, as the flow of latex gradually decreases towards noon and its collection becomes more difficult on account of "Sun coagulation." Each cooly can tap 450 trees in a day. He pares off the cortex of the trees allotted to him in his plot—(half a minute per tree being spent over this operation)—and when all the trees have been incised he goes round to collect the latex. For the latter operation he is provided with a tin bucket with the number of the plot marked on it. The actual rubber producing

material from 450 trees is 5 pounds approximately. The coolies are apt sometimes to adulterate the latex with water. This is prevented by testing the specific gravity of the liquid with an instrument known as "the METROLAC."

There is no tapping during the months of February and March and sometimes also during the first half of April. The reason for this is, that not only is there very little latex yielded by the trees during this period of rest (leaf shedding) but also, what little is obtained, is difficult to collect on account of rapid coagulation. On days of heavy rains during June and July very little collection is possible owing to the latex getting mixed up with a large amount of water.

Each cooly employed in the estate is paid an advance of Rs. 10/- and Rs. 1—8—0 per week. To prevent them from squandering their earnings, only such amount as is absolutely required for food and clothes is disbursed to them from time to time, the balance, less the advance, being paid in a lump sum when wages are settled periodically. There are 210 coolies employed for tapping in the Edavanna Rubber Estate.

Preparation of Rubber: The yield of dry rubber is about one pound per tree or 200 lbs. per acre per annum.

Solid RUBBER is prepared by the coagulation of the latex with, generally, Acetic acid. There is one disadvantage in preparing rubber by this method viz., that it is liable to turn out mouldy but this is obviated by preparing the RUBBER in thin sheets, which enable it to dry easily. Corrosive sublimate (Mercury perchloride) is a better preservative and a more efficient curative but it is a very poisonous substance and therefore risky to handle.

The latex that is brought in buckets is first strained by allowing it to pass through a thin perforated tin tray. To this is added water in sufficient quantities to bring it to a uniform consistency of $1\frac{1}{2}$ pound of rubber to the gallon. The diluted latex is then poured into wooden trays $1' \times 1' \times 1'$ arranged in lines one line for each plot. In Edavanna wooden trays are used but as they are difficult to clean, the question of using kerosine oil tin trays instead is under consideration. Next a small quantity of acetic acid, of $1/40$ concentration, is added and wooden partitions $1' \times 1' \times \frac{1}{2}"$ are inserted vertically into the trays to separate the liquid into 6 compartments. In about an hour the solution coagulates into blocks each about $1\frac{1}{2}"$ thick. They are however allowed to remain in the wooden troughs till the next morning when they are taken out for squeezing. They are first of all placed between the circular rollers of a squeezing machine which takes out all the water from the rubber blocks and compresses them into sheets $\frac{1}{4}"$ thick. They are further subjected to a second and third rolling in machines provided with double rollers which not only reduce their thickness further but also impress a diamond pattern on their surface both upper and lower. The rubber sheets are kept immersed in water before and after rolling to make them tough and clean.

The sheets are next subjected to a process of "Smoking." For this they are hung upon wooden stands loosely arranged in a closed room, kept at a temperature of 110°F . The smoking apparatus consists of small closed tins in which a few shells of cocconut are burnt. The smoke is conducted into the smoking room by means of a delivery tube passing through an opening in the tin. The smoking lasts for 4 days and this causes the sheets to turn dark

brown, almost amber in colour when looked through. They are thin removed, brushed and cleaned with a brand of "Monkey Soap."

The drying takes place in a closed room, (the arrangement of which is similar to that of the room described above,) into which hot steam is passed, the temperature being 110°F . This operation lasts for 8 days.

The sheets are then ready for the market. They are grouped into 4 classes viz: Broad light, Broad dark, Narrow light, and Narrow dark and are packed separately in locally made wooden boxes (of *Vateria Indica* or *Bombax Malabaricum*) $2' \times 1\frac{1}{2}' \times 1\frac{1}{4}'$. There are several varieties of patent packing cases, but the local wooden boxes are said to be less costly and more durable. Each of the latter boxes when furnished costs Rs 1-12-6. Each sheet of RUBBER weighs from 10 to 12 oz. and 150 lbs. are contained in one box.

According to the market value there are two grades of RUBBER viz, (1). First class: free from defects, uniform in size and bright amber in colour. (2). Second class: smoky and dark in colour. The superior variety fetches a price of 73 cents per lb in Ceylon, to which place the whole quantity is despatched.

Scrap Rubber. The dried latex left in the shells and that obtained from coagulation on the cuts of the tree after the day's supply has been collected is made use of in preparing "scrap rubber." The material is put into a large tub of water, washed and pounded. This cured stuff fetches a price of 48 cents. per lb.

The estimated annual income from the Edavanna plantation is Rs. 180,000.

This Industry is no doubt a very paying one, but as it, at present, concerns the planter more than the Forester, the Hevea plantation is not being worked by the Department of late.

K. SANKARANARAYANA RAO,

M. F. C. 1921-23 Division.

Village-War Lump Sum Grazing Revenue System.

In the issue of the Madras Forest College Magazine for December 1922, I read an article from the pen of Mr. R. Alagirisami Naidu, Range Officer, Sriharikota, Nellore District, under the above heading. It is therein stated that owing to the semiwild nature of the cattle in the Sriharikota reserved Forest, the Forest Subordinates find it very difficult to collect grazing revenue every year, owing to their inability to impound the cattle, and that the owners taking advantage of this, boldly evade the payment of grazing fees. In answer to this I must state that all cattle owned by the Villagers are not of a semi-wild nature, but only between 100 and 200 (roughly) are such; and the rest, the major portion, are domesticated animals. No grazing fees were ever attempted to be collected for the semi-wild animals in previous years for the obvious reasons that the correct numbers owned by individuals were not ascertainable nor could the owners be pitched upon.

He also mentions in the article that "the question of illicit grazing automatically disappears" as one of the advantages (among others) of the system. I am not sure if this is really the case.

My experience of Sriharikota Range, which I held charge of for over 7 years during different periods between the year 1899 and

1916 is quite otherwise. The semi wild nature of the cattle is due to the primeval system of rearing and breeding Cattle practised by the villagers of the place. Since this system is advantageous to them in more ways than one, they are reluctant to change it. The advantages of the system are:—

1. The feeding costs nothing, since the Cattle graze freely in the reserve.
2. The Cattle take care of themselves, and no grazier is required.
3. The Cattle become healthy and robust as a result of their free lives and the ample fodder supply.
4. Calves are born in quick succession and
5. The bulls fetch higher prices when sold.

When the calves are still young they with the mothers are caught with the aid of dogs and tamed. After the season of milking is over, they are again let loose in the forest after having been branded with some marks for future identification of the ownership. After a few days of freedom these Cattle, though once tamed, again resume their wild nature. The calves inherit this nature from the parents and always run away with their mothers, whenever any human being approaches them, or when they are disturbed in their solitude. They have no partiality towards their owners, as stated in the article: Owner or no owner, the effect is the same and it is an interesting sight to see a herd of these Semi-wild Cattle stampeding in different directions into the thickest portion of the forest. By this system of Cattle rearing, practised by the Villagers, the number of Semi-wild Cattle in the forest is maintained or is on the increase.

Sriharikota reserve, as it is, with sandy loose soil affords no grazing for cattle and in a very few places called "Vagus" (streams), grass attains a length of just a few inches. There is practically no fodder in the reserve and the cattle generally feed on leaves all the year round. The closed coupes are their favourite haunts, since these coupes afford food in abundance in the shape of succulent coppice growth and that within easy reach. The next most frequented resort is the area under felling, and the cattle can often be seen wending their way to feed on leaves of the felled trees. They not only constantly nibble the ends of tender coppice shoots, which stunts the growth, but also trample the young shoots under foot which often results in the destruction of a good crop. There is little doubt that these Semi-wild Cattle are a pest to our forests.

The condition in the agreement under the above System that "the people should pay particular attention that their cattle do not enter the coupes closed to grazing" sounds very well on paper; but in practice, it is probably, a dead letter, whatever may be the exertions made to enforce it, because, these cattle abound in the closed areas, where they get an ample supply of succulent young shoots. The condition that "the Villagers should take an interest in the proper maintenance of the fence round felled areas" will hold good in the case of the domesticated animals but not in the case of Semi-wild Cattle, as the latter jump over these fences very easily and enter the closed areas. I have known Semi-wild Cattle (after they were caught with the aid of dogs and impounded) to jump over solid masonry bound walls 5 feet high and escape into forest.

It will therefore be seen that the illicit grazing does not and will not disappear, as long as this practice of maintaining Semi-wild Cattle is permitted to be continued by the Villagers. If the custom

is allowed to prevail no conditions and no changes of system will put a stop to the illicit grazing.

Catching Semi-wild Cattle with the help of dogs and impounding them (which I have done in large numbers, probably to the largest extent that ever was done by any Ranger, prior to and after me,) was found ineffective, for, as soon as the owners obtained their release from the pound after paying special enhanced rates of pound fees, the cattle were liberated at the gate of the pound itself and allowed to stay back into the forest. Catching these wild animals is almost a special art in Sriharikota, for men and dogs have to be trained for the purpose. It is not every one, that can do it. To catch one animal it takes at least half a day. The animal has to be chased in the sandy soil for hours before it can be approached and when it has become exhausted the dogs catch it and hold it firm, when men cautiously pass a noose round its neck and tie it to the nearest tree. Sometimes it takes one or two days to catch one animal. All this time and exertion spent in catching them, becomes a mere waste, when the Cattle are let loose into the forest again. The shooting of these animals was pronounced to be sacriligious and was not approved. Acquiring the enclosures situated within the reserve would not mend matters, nor has the kancha system been found to be a solution to this difficult problem.

The new method introduced during the current year and known as "The village-war lump sum grazing revenue system" does not, in my opinion bring us any nearer to a satisfactory solution to this question of illicit grazing. The cattle census figures obtained from the Revenue Department is the basis of the system and the system therefore is open to the following objection. (1) The census is taken once in 5 years

and within this long period, great changes occur; (2) The enumeration is made by the village officers of the concerned villages, who take into account only the domesticated animals. It can perhaps be presumed that the illicit grazing regarding the domesticated Cattle in open areas, has disappeared under this system, if the Revenue figures are correct. But this will not actually be the case unless the Villagers are prevented from transferring cattle villages not included under this system, or from making additions from out-side, to the already existing number as enumerated by the Revenue Department. No doubt "the Villagers think that this system is a great improvement on any previous system" because all their machinations escape detection under this system. The Semi-wild Cattle found in the reserve do not find a place in the cattle census account; further it is neither possible to count them nor to state who the owners are. Thus one cannot see how the illicit grazing of Semi-wild Cattle in open areas has disappeared by the introduction of this system and I need not state how impossible it is for any body to say that the illicit grazing has disappeared from the closed areas.

All the methods tried by the Department in previous years to improve the state of affairs in the Sriharikota reserve have proved futile and in view of what has been said above, the present "Lump sum" system may share the same fate. I would therefore suggest a new method, which has hitherto not been tried. My proposal is to exterminate entirely all the Semi-wild Cattle from the reserve. I do not use the word "exterminate" in the sense of killing, but I use it in the sense of removing the Cattle wholesale from the forest. In the first instance I would suggest that the existing practice of allowing the cattle to wander at their will and become wild should be suppressed. The animal once caught must be tamed and stalled. If this is not possible, it must be caught and sent out of the island.

The following rules will have to be observed, should my proposal be brought into operation.

1. As a concession, the Villagers (owners) may be permitted to catch their animals, tame and keep them in their villages, or to take them away to the mainland and dispose of them there. A time limit of 6 months, or even a year, may be fixed for the purpose.

2. After that period, the Department may undertake to catch them with the aid of men and dogs. After recovering the expenditure incurred in catching, the animal will be handed over to the owner, who either tames and stalls it or takes it outside the island for disposal.

3. Before the animal is handed over to the owner, it must be branded with letters "F.D." and a serial number on the body for identification at a future date. If necessary a register should be maintained showing the date, branded number, name of owner with address and place of residence and a short description of the animal. The signature of the owner will have to be obtained against the entry in token of his ownership. This will serve as evidence in the event of further procedure being considered necessary. If the animal is disposed of outside the island, a certificate from the Village Munsiff concerned should be produced giving the name of the person, address etc. to whom it was entrusted or sold and noting the number branded on the animal.

4. When there is no claimant for an animal caught, it becomes the property of Government and the Department will dispose of it. If a Villager belonging to Sriharikota purchases it, he will adhere to the alternatives mentioned above and if the sale cannot be effected locally the Department will send it to the mainland, to be sold. In these instances also certificates from the Village Munsiffs are essential.

5. If, on any account, the owner neglects to abide by condition No. 2. and allows his animal to re-enter the forest he shall be made liable to prosecution and punishment. When the animal is caught by the Department for the second time, it should absolutely become the property of Government, who will dispose of it as stated in condition No. 2.

6. Purchasers of these animals outside the island will have to bind themselves not to allow the animals to wander about the country or to re-enter Sriharikota. The defaulters should be liable to prosecution and punishment.

By adopting this method, the number of semi-wild cattle will gradually decrease and in course of time they will become extinct and the Sriharikota Reserve will be free from this havoc which is at present causing a considerable amount of damage. This strong action is quite essential for the improvement of the reserve. I cannot adequately dilate on the importance of this reserve, which is very valuable, and if efficiently protected will be one of the important sources of fuel supply to the city of Madras for generations to come as it is situated within easy reach of the city and connected to it by an easy route, the Buckingham Canal.

The narration of a legend connected with this forest will not be out of place here. When this forest was under the control of Polayagars, a woman going through the forest from one village to another with butter-milk for sale, broke a few branches of a plant with which to cover the earthen pot to prevent the butter-milk from spilling while walking. This went to the notice of the Polayagar, who, as a punishment, made the woman water the plant with butter-milk daily

till the plant revived. Even in those olden days, the importance of forests was realised and their deterioration guarded against

Unless the semi wild nature of the cattle is improved and gradually suppressed by domestication, or the Cattle sent right away, out of the reach of these forests, the existing systematic illicit grazing in Sriharikota reserve will not disappear and as long as it continues the condition of the forest will not tend to improve but will continue to deteriorate.

C. BALAYYA NAIDU,
Forest Ranger (on leave).

Selection, Felling, cleaning and disposal of Sandalwood in Denkanikota Range.

IN writing this essay, I think I need not give an account of the locality and nature of the Sandal areas in the Denkanikota Range, as these have been fully dealt with in the pages of this Magazine issued in March 1919. I am here trying to explain, to the best of my ability, the manner in which the extraction is carried on, the precautions to be taken in conducting the several operations and the registers maintained, and how they are posted up, until the wood is finally despatched. These points will, I hope, interest such of our readers as have not had the opportunity of dealing with the operations themselves.

Although the scheme described below has been drawn up with particular regard to Denkanikota Range, the principles underlying it are of general application.

The work is carried out strictly in accordance with the provisions of the Working plan prepared by Mr. C. C. Wilson I. F. S., the present Principal of the Madras Forest College. The plan has been in operation since 1917, and under it the whole sandal area is divided into 7 Felling Series of 6 coupes each. There are thus 7 coupes worked annually and the whole area is worked over in 6 years. Dead trees only are extracted from these areas under the system of 'Improvement Fellings.'

Subsequently as the result of the rapid spread of the spike disease in several new sandal areas a second series of felling became necessary. The infected areas are treated simultaneously, new areas being taken up as spike disease shows itself. The operations consist of the entire removal of diseased trees (which is explained in detail further on) and proceed simultaneously with the Improvement Fellings in the event of the spike occurring in the Improvement felling coupe of the year. By this process it is hoped to eradicate the disease. The spike areas under working are (1) Javalagiri Bamboo Block areas I to V (2) Gottinatham spike area (3) the Hojanahatti spike area. Each of these areas is in charge of a Forester who is expected to work through his area within the year. In addition to this staff, there are 7 Foresters each in charge of a Felling Series. There are also 4 Section Officers who are also Foresters, and who not only look after their sections, but are in charge of the Minor Spike areas such as Aiyur, Nelgundi, Noganur, and Thally. In these minor areas, Spike appears on a few trees occasionally and the infected trees are removed then and there.

Enumeration.

In the Felling Series the Foresters on receipt of orders from the D. F. O. begin the enumeration of dead trees about the end of May at the latest.

In Spike areas the enumeration and extraction are carried on throughout the year. The enumeration is begun from one end and is carried on until the whole area is finished.

The details of the enumeration, such as, the date, number, girth at 4 feet from the ground, length (the approximate length of heartwood limit) and the locality of each tree are entered in a printed bound book, known as Form I (a). In remarks column some particulars about the state of the tree are noted. Among such particulars will be found, 'completely dead', 'Fully Spiked', 'Spike just begun', if dead, whether 'fallen down' or 'standing', 'purely heartwooded' (the sapwood having been eaten away by white ants) or 'fallen pieces'. At the close of each week, the Forester submits with his weekly diary, a copy of the sketch of the area showing the portions enumerated, a copy of the list of trees enumerated in the week as per his Form I (a) and a statement of the girth and diameter classes of the trees as prescribed in Appendix II of the sandalwood rules framed by M. R. Ry. Rao Sahab K. R. Venkata-ramana Iyer A. I. F. S. The Range Officer inspects the enumerated areas frequently and satisfies himself that no dead trees have been omitted in the enumeration and that all the diseased trees have been included in the enumeration of Spike areas. In the latter this check is seldom possible, as hitherto unattacked trees show signs of Spike within a period of 20 days. The main object of the Range Officer's inspection is to see, if the Forester has enumerated all the spiked trees at the time of his enumeration. Recent attacks are easily detected.

On completing the enumerations, the Foresters submit in duplicate, copies of their Form I a), a consolidated diameter class statement of all the trees and a full sketch of the area showing the positions of the trees enumerated. On receiving these records, the Range Officer prepares estimates for extraction and eradication and submits them to the District Forest Officer for necessary sanction. In the case of Felling Series, no extraction is begun, until the sanctioned estimate is received, whereas in the case of the Spiked trees, the Range Officer issues orders to begin extraction in anticipation of the District Forest Officers approval, so as to give the disease as little chance as possible.

Extraction.

A trench is dug round both dead and spiked trees at a distance of 2 to 3 feet from the collar of the tree. In the former case all lateral roots are cut clean, so that the trees fall of their own accord. No roots containing a section of heartwood equal in area to the size of a rupee should be left underground. The trees are rough cleaned on the spot and transported to the Forest Depot. The sapwood trees, if any, are also collected and kept in a heap for inspection by the Range Officer. In the latter case—i.e., in the case of the spiked trees, the extraction is rather difficult. A trench of about 3 feet in width to a depth equal to the depth to which the roots have penetrated, is dug round the tree. All roots which are removed during the excavation are carefully collected and heaped up. On the fall of the tree, all branches containing no heartwood, twigs and leaves are cut, and heaped. The trunk branches and roots containing heartwood are then rough cleaned leaving only a thin film of sapwood to protect the heartwood. The rough cleaned wood is transported to the Forest depot and then chips resulting from the rough cleaning are also collected and heaped. These

heaps are there thoroughly burnt as soon as possible. The spike trees and seedlings containing no heartwood have also to be kept for inspection by the Range Officer.

After the rough cleaning is over, the trees should be billeted in such a way so as to allow of easy transport. If the root is big enough it is sawn off at the crown, so that, as little stemwood as possible is taken with it. The object of this is to keep the rootwood separate from the stemwood as the former is more valuable and mixture is therefore undesirable.

The following rules are to be adopted when billeting in the Forest depot. (1) As the price of sandal billets is in proportion to their straightness, the billeting should be done as far as possible at the bends, so as to have the billets as straight as possible.

(2) As a straight billet 3 feet in length is more valued than a straight one 1 foot in length, the billets should be cut in such a way so as to get straight pieces of 3 feet length (3 feet appears to be the maximum required by the market). The length of the pieces immediately after rough cleaning should as far as possible be either 3 feet or a multiple of 3 feet.

(3) The branches should be cut quite flush with the main stem. All pieces are then carefully numbered as per instructions given in the Rules book mentioned above. At the end of each day Form II(a), which gives the list of trees uprooted and the particulars of the trees roughly cleaned and billeted, and Form no 8 which gives the details of the receipts for the day, should be posted.

When felling is in progress, the Range Officer inspects the Coupes as often as possible checks the sapwood trees and puts his initials against each of the trees in the remarks column of Form II (a). When the whole stock of sapwood trees is checked the heap is burnt and the Range Officer certifies in the Forest depot Forms 1 and 9 that the trees shown in columns 1 to 5 in the respective registers have been verified and burnt by him on the particular date in question. The felling should proceed serially and under no circumstances should axes or bill hooks be used for separating branches or roots which contain heart wood, the axe being generally used only in rough cleaning the spiked trees.

When a sufficient quantity of rough cleaned wood is collected the Forester prepares his invoices and despatches the wood to the final cleaning depot at Denkanikota. The following rules should be followed in despatching a consignment:—

(1) Four Copies of the Invoices (*i e* Copies of Form II(a)) are to be prepared and at the end of each copy, an abstract showing the following details should be given:—

(a) the number of the trees covered by the consignment (b) the number of pieces obtained from the roots with their weight (c) the number of pieces obtained in billets and their weight and (d) the quantity of sawdust obtained in billeting. The total weight of the consignment should also be stated.

(2) An escort usually composed of two Forest guards, should be arranged for in the case of each consignment. The consignment should be loaded into carts in their presence and their signatures, for having received the consignment as shown in the particulars of the abstract, should be obtained in the registers of Form II (a). All sawn

ends of pieces should be hammer marked with the hammer provided for the purpose and a waybill and yellow permit as shown in Form I of the Forest Manual, should be prepared and pinned together with a copy of the invoice. This file with 2 additional copies of the invoice should be handed over to the escorts for delivery to the depot keeper at the Final cleaning Depot. The fourth copy of the invoice together with the duplicate of the way permit should be despatched directly to the District Forest Officer immediately the carts leave the Forest depot. The disposal of the trees is then entered in Form no 9.

The Final cleaning depot consists of two sections:—viz Final cleaning section and Finally cleaned section. Two sets of Forms 8, 9 and 10 are maintained one for each section. In addition the invoice files received from the Forest depots are filed in this depot. On the arrival of the wood from the Forest depot, the escort arranges the trees in serial order as per invoice and fit in all pieces of each tree so as to complete the trees as they stood in the Forest. The invoices are handed over to the Depot keeper who checks the pieces of each tree, their measurements and their weight. The details are written on the back of all the invoices, irregularities if any being noted. The escorts, signature is taken in token of having attended the checking and weighment. The escorts will then be relieved.

One of the invoices received through the escort is despatched to the Forest Depot Keeper through the Range Officer, and one is filed in the Final cleaning depot. The details of receipts are immediately entered in to the Final cleaning section Form no 8.

The Forest depot Keeper, on receipt of the invoice returned through the Range Officer notes the acknowledged weight and other

particulars in his Form no 9 below the original entry showing the despatch of the wood to the Final cleaning depot, and enters it in Form no 8.

The Final cleaning Depot Keeper takes any number of trees (of course serially) which he thinks he can clean in a day, from the consignment received and billets them as follows:—

(1) All roots whether big or small are severed from the trunks. Hollow, knotty or badly shaped roots which are difficult to final clean are split open or their side roots cut and numbered as per instructions in the Rules Book. The trunks also are cut into billets of 3 feet length and less, the billets being kept as clean and as straight as possible. The sawdust produced during billeting is sifted and carefully preserved.

These pieces are given for final cleaning. The disposal of the trees taken for final cleaning is shown in Form no 9 of the Final cleaning Section. After all billets have been finally cleaned, the trees are once again formed with the cleaned billets, the letter representing the Felling series, the number and the portion of the tree are stamped on each piece. For example, the third billet of the second piece of tree no 49 of AIRYR Felling Series will be marked "A49T₃": A represents

the series, 49 the number of the tree, T 2 the second piece of the trunk as billeted in the Forest depot and 3 the third billet of the second piece as billeted in the Final cleaning depot. After stamping, the mid-girth and length of each piece and the weight of Rootwood and Billetwood of each tree separately are recorded in Form III (a) At the same time the lengths of all the trunk pieces put together should be compared with the lengths given in the invoice and if there is an appreciable difference it should be explained in the remarks column of Form III (a).

At the end of each day, the shavings and chips obtained should be sorted out and weighed. The weights recorded in Form III (a) (*i. e.* the weights of the finally cleaned wood) are then totalled. The total number of pieces should also be worked out. An abstract showing the number of trees taken for cleaning, the number and weight of root pieces, the number and weight of billets and the weight of chips and sawdust obtained is then prepared. The total of all the weights is then obtained and to it is added the weight of sapwood chips and other impurities obtained in cleaning. This sum total should be compared with the weight of roughwood taken. The difference will always be a deficit which will be shown as such when the totals of Forms II (a) and III (a) are tallied. The results of each days final cleaning should be entered immediately as receipts in the Form no 8 of the Finally cleaned Section in the respective pages allotted for each class. These results are also entered in the remarks column of Form 9 of the Final cleaning section against the entry of disposal as the "result of Conversion." In this manner the final cleaning of all disposals in the Finally cleaned section can be watched.

After weighing the pieces for recording in Form III (a) all the pieces are hammermarked on their sawn sections and stocked in the depot.

Generally the capacity of a waggon on the narrow gauge section of the South Indian Railway in which the finally cleaned wood is transported to Tirupattur Sale depot is about 8 tons, and the maximum number of waggon loads that can be despatched safely in a consignment is only two. Hence when about 16 tons of cleaned wood are collected, arrangements are made for transporting the wood. The traffic superintendent of the Podanur Section is addressed in the matter

and two waggons are supplied on the specified date both at Kelamangalam Railway Station where the wood is loaded and also at Morappur Junction where the wood is to be transhipped from the narrow to the Broad gauge section. Two days before the date on which the waggons are applied for the whole stock is taken out in the presence of the Range Officer and the escort usually a Forester, 2 Forest guards and a watcher. The roots and billets are then classified as big and small ones, the pieces in each class are counted and weighed. They are then packed in gunnies, all pieces containing hammer marks at both ends separately, and all pieces (small ones) having no hammer marks at either or one end separately. In the latter case the bags are sealed in the presence of the Range Officer. The chips and sawdust are also filled into gunnies, packed and the bags sealed.

Originally the cleaned wood was classified before despatch into 18 classes as shown in the Rules Book. But as the Depot Keeper at Tirupattur was never satisfied with our classification and always differed, a reclassification became necessary for almost every consignment. To avoid this extra trouble and expense, the system of classification at the consigning depot was definitely abolished.

After packing and before the consignment is despatched, 5 copies of invoice in printed forms (as per Appendix XIV of the Rules Book) are prepared and the signature of the escorts and of the depot keeper are obtained. The invoices are then countersigned by the Range Officer, after he has compared them with the figures obtained during reweighment and separately recorded by him. The bags are then loaded in carts and a yellow permit is prepared in triplicate. The triplicate copy of this permit and 3 copies of the invoice are given to the Forester in charge of the consignment one copy of the invoice with the duplicate of the way permit is despatched to the District Forest Officer

and the last copy of the invoice with the counterfoil of the way permit is filed in the depot.

The quantity despatched is entered into the final cleaning Section Form No. 9 and the deficit between the weight shown in Form III (a) and the weight obtained in reweighment is brought to Form No. 8 under "Deficit account".

The escort accompanys the consignment to Tirupattur, where they hand it over to the Sale Depot keeper and get his acknowledgment. The wood is then classified into 18 classes by the Sale Depot Keeper at Tirupattur and stacked.

In about the month of December each year the annual sale takes place in the presence of the Conservator.

On receipt of the invoice having the acknowledgment of receipt at Tirupattur Sale Depot, the deficit obtained is brought to account in Form No. 8 of the Finally cleaned Section of the consigning depot.

The sapwood chips are kept safe until the District Forest Officer camps at Denkanikota when he weighs and burns the whole lot, certifying at the same time in Form No. 8 that the sapwood was burnt under his supervision after the necessary check.

At the end of the month, a copy of Form III (a) of the trees cleaned during the month, the third copy of the invoice received from the Forest Depot and the acknowledged copy of the invoice received from Tirupattur should be submitted to the District Forest Officer with the month's Form 10 return.

The Marathon Race 1923.

—:o:—

This Race is one of the important events during the College year, in which both the Divisions take part. It is generally held during the combined camp of the Division. This year there was no opportunity for a joint camp and so the race was run at Head quarters.

The race this year came off on the 21st February. Students manifested great zeal and keenness in the contest and speculated on the possible winner.

The course covered distance of 6 miles and 1 furlong. The whole distance lay around the College Estate along the Cowley Brown Road starting in front of the Hostel Block No. 1 along the Thadagam Road, Lodge Road and Mettupalayam Road and back again thus two complete laps had to be made finishing in front of the principal's Bangalow in the 3rd round. The course was along the open road, devoid of ups and downs, yet it was by no means easy as it lay on a hard metalled road.

The start for the race was given by the principal at 7-30 A.M. Mr. Krishnan and Mr. A. R. Grand rode to their respective obligatory points to issue chits to the competitors. The winning post was watched by Messrs C. C. Wilson, G. C. Robinson and W. C. Hart.

The prize winners in order were:—

- (1) Madhavan Nair (Senior Division) Time 38 min. 0 sec.
- (2) Patras Kandir ,, ,, 39 ,, 30 ,,
- (3) N. S. Ayyanna ,, ,, 40 ,, 25 ,,
- (4) Divulveva of the (Junior Division) ,, 43 ,, 30 ,,

The one striking feature of this race is, that all the winners are from the Senior Division and this is in a great measure due to the improvement in their physique as a result of training received in the Madras Forest College during these past 18 months and more. This fact is doubly proved when we see the Senior Division won Inter-division cup by 104 points to 276. It will not be out of place to mention here that the present Senior Division lost the cup last year to their Seniors, and let us hope that the same may be in store for our present juniors.

Snap-shots were taken as the winners approached the goal. The arrival of the last man was watched for with much excitement as the first runner.

The Principal and Mrs. Wilson entertained the students with light refreshments and a cool drink of limejuice which every one fully appreciated and felt thankful for, after a hard run.

Mr. G. C. Robinson, the Vice-President, in a few words congratulated the winners and Mrs. Wilson kindly gave away the prizes. The first prize was a silver cup presented by K. Rama Raja Mannarghat Moopil Nair, for the first time and it was won by P. Madhavan Nair, the winner of many Athletic Honours during this year. The second and third men were given good prizes and the challenge cup was taken for the Senior Division by K. Sankara Narayana Rao.

With three cheers to Mr. and Mrs. Wilson, this delightful function came to a close.

21-2-23 } S. DORARAJA,
Coimbatore } Athletic Secretary,
Madras Forest College.

Miscellanea.

I. A Mimicking Plant.

A correspondent wires from Coimbatore under date December 5: A pumpkin plant in the country house of Mr T. Krishna Chetty, cotton prince in Ramanathapuram, which is in the outskirts of this town, is an object of considerable curiosity and attraction to thousands of people from every part of the district. A slender branch of this plant has, by a strange freak * of nature, abruptly taken the shape and size of a tolerably big serpent and flattened at the end to represent a five headed cobra with its hoods drawn up. Underneath the five hoods and heads are tiny flowers representing the tongues put out. People say that there is some religious significance in this strange phenomenon, but no one is able to say what it is. The superstitious among them say it is nothing short of Sesha Avathar. Daily Puja is performed at the spot with milk and camphor. The stream of visitors who go to see this sight reminds one of devotees going to a place of pilgrimage.—Extracted from "The Hindu" dated 7-12-22. S. Rangasamy.

PRICKLY PEARS

Power Alcohol Production.

The "Times Trade Supplement" writes:—During the period of fuel scarcity which began during the war and lasted for some time after hostilities ceased much attention was devoted to the problem of finding substitutes for coal and mineral oil. Power alcohol distilled

* (This is a case of "fasciation" Ed.)

from vegetable products was regarded hopefully as a possible solution and the British Fuel Research Board made elaborate investigations as to available sources of raw material suitable for use as a base for the manufacture of power alcohol. The Board's conclusions were somewhat pessimistic, and with the return of normal conditions resulting in ample supplies of coal and oil fuel the need for an efficient substitute became less urgent. Yet, as farsighted men realise, the crisis has been postponed rather than permanently removed, and, in view of the steady progress towards exhaustion of the world's mineral fuel supplies the search for a non-exhaustible source of energy is a matter which we cannot afford to abandon. It was thought at one time that cultivated crops such as potatoes and maize could be used successfully as raw material for the distillation of fuel alcohol. Expert examination showed, however, that there were apparent insuperable economic difficulties owing to the cost of land, labour, and transport. Further, although alcohol fuels derived from maize have been put on the market in South Africa, it is very doubtful whether their production from this base can be regarded as a commercially profitable operation, in view of the fact that maize and its by-products have a higher value as food-stuffs than that of the fuel which can be derived from this source. These considerations resulted in the general conclusion that it is only in the tropics, where there is a profuse and rapidly replaced growth of self-propagated vegetation, that the production of fuel alcohol on a scale commensurate with the eventual needs of the world, is a practical possibility. The fact that the type of power alcohol known as Natalite is being successfully manufactured from the molasses which are a by-product of sugar factories must be regarded as an exception to the general conclusion that cultivated crops cannot be considered as economically possible raw materials for power alcohol production. The supply of molasses, even if the total sugar crop of the

world is taken into account would, however, provide only a fraction of the power alcohol that will be needed when the world's petroleum sources begin to fail.

In these circumstances great interest attaches itself to the article from our Bloemfontein Correspondent South Africa is entitled to the credit for the invention and commercial utilization of Natalite, and it would seem that the Union has to be congratulated on a further and perhaps still more important step in the same direction. Some 2,000,000 acres of land in South Africa are infested with prickly pear, a vegetable pest which not only renders land on which it has obtained a footing useless for all other purposes, but spreads with great rapidity. There is reason to believe that an Orange Free State farmer has succeeded in turning the prickly pear to commercial account by utilising it as a base for power alcohol production. It is claimed that the motor spirit obtained from this source is at least equal to the highest grades of imported petrol, and trials are reported to have been very satisfactory. An annual production of 350,000,000 gallons, which would be nearly thirty times the present consumption of motor spirit by the Union is estimated as possible, and is stated that the new spirit could be retailed at 2sh. per gallon. Further developments will be watched with deep interest, particularly in Australia, where something like 22,000,000 acres in Queensland and New South Wales are infested with prickly pear which spreads at the rate of 40,000,000 acres a year. Much time and money have been expended in the Commonwealth in the endeavour to find a satisfactory method of eradicating this pest and if it is shown by South African experience that it can be successfully used for power alcohol production Australians will doubtless hasten to follow suit. A point to which our correspondent draws attention is the opportunity presented to British motor engineers to design a special type of high-compression

internal combustion engine for use with pure alcohol. He holds out the inducement that the British firm which produces such an engine will have a fair prospect of recapturing the markets of South Africa, Australia, and India at a stroke, for the reason that all the existing American cars, which now dominate these markets are designed for use with petrol, of which the price is too high to permit any rapid expansion of the use of motor-cars. British motor manufactures will, therefore, be well advised to keep themselves fully informed as to development in this direction:—

Contributions to the Gass Forest Museum.

Serial No.	Contribution.	Contributor.
1.	One long panel of <i>Cullenia excelsa</i>	} Captain H. A. Irwin, M.C., Forest Exploitation Officer.
2.	Six short panels, Eight bark samples, Eight twigs, and Seven seedlings of evergreen species	
3.	One long panel and two blocks of <i>Michelia champaca</i> .	} F. R. Madan Esq., I. F. S., District Forest Officer South Mangalore.
4.	Three panels of <i>Chickrassia tabularis</i> .	
5.	Sample of green dammar	} M. R. Ry. B. S. Ramasami Ayyar Range Officer, Kollegal.
		} Mr. B. R. Salisbury Range Officer Kodamady.
		} C. Napier Esq., Castlecroft Estate Valparai

6. Eleven (rough) specimens of 3-ply wood made in the New Malabar Timber yards and Saw mills Ltd. Kallai } Bracebrookes Esq.,
7. Thirteen short panels, Thirteen bark pieces, Five Seedlings and Four fruits } M. R. Ry- K. Ragavan Range Officer Kannothe
8. Two bark samples of *Michelia* *Chempaca* } M. R. Ry. M. Rama Rao
Kini Range Office.
Kollegal.

Additions to the Madras Forest College Library.

1. Memoirs of the Indian Museum Vol. V. Fauna of the Chilka Lake, No. 10, Aug. 1922.
2. Report of the Forest Department (Western Australia) for the year ending 30th June 1922.
3. Flora of the Nilghiri and Pulney Hill tops—by, P. F. Fyson M. A., F. L. S., Vols I, II, and III.
4. Census of India, 1921 Vol. XIII Madras Parts I to III.
5. A manual of Indian Timbers (Revised edition)—by J. S. Gamble, M. A., C. I. E., F. R. S., F. L. S.
6. Administration report of His Exalted Highness, the Nizam's dominions, for the year 1330 Fasli (6-10-1920 to 5-10-21)
7. Forest Administration of the Central Provinces for the year 1920—21.

8. Annual return of statistics relating to Forest Administration in British India for the year 1920—21.
9. Report on Forest administration in the Andamans for the year 1920—21.
10. The Indian Forest Records Vol. IX, Part III — by, M. Gopu Rao and J. L. Simonsen.
11. Memoirs of the Indian Museum, Vol. VII No. 4.
12. Administration report of the Forest Department of the Madras Presidency for the year ending 31-3-22 (1921—22)
13. Forest bulletin No. 49, 1922,...Note on Thingan—by, Rodger O. B. E., F. L. S.
14. Forest bulletin No 50, 1922 Note on Gurjan—by, W. A. Robertson I. F. S.
15. Report on Public Instruction in the Madras Presidency for 1920—21 Vols. I & II.
16. Sample plot calculations—by, S. Howard B. A., I. F. S.
17. Progress report of the Imperial Forest College, Dehra Dun for the year 1921—22.
18. Methods of preparing volume and money yield tables for teak woods etc., from data collected in the Nilambur Teak Plantations—by, R. S. Bourne Esq M. A., I. F. S. (1916-19)
19. Twenty nine copies of the "Indian Scientific Agriculturist", — presented by, Mr. B. R. Salisbury.

* * * * *

The Principal, Madras Forest College acknowledges with thanks receipt of the following donations, promised by ex-students of the Collage and paid during December 1922 to February 1923.

<i>Name of ex-student.</i>	<i>Amount Paid.</i>
M. R. Ry. C. S. Ramanatha Ayyar	Rs. 5 14 0
„ M. R. Doraisami Ayyar	Rs. 3 0 0
Md. Gulam Dastagir Sahib	Rs. 9 0 0
Mr. S. A. Dawson	Rs. 11 0 0
Md. S. V. Sigbatullahi Sahib	Rs. 5 0 0

* * * * *

Statement showing amount promised and still due by ex-students of the Madras Forest College, towards the Students' Club:—

	Rs.	A.	P.
M. R. Ry. C. S. Ramanatha Ayyar	5	0	0
Md. S. V. Sigbatullahi Sahib	5	0	0
M. R. Ry. W. Balakrishna Mudaliar	10	0	0
R. E. Lemos Esq., E. A. C.	50	0	0

THE Madras Forest College Magazine.

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PUBLISHED QUARTERLY.

Vol. VII.

JUNE 1923.

[No. 4.]

*Course of Lectures on
Forestry*

Delivered at the Agricultural College, Coimbatore.

(By C. E. C. Fischer Esq., I. F. S.,)

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Lecture 1.

INDIRECT UTILITIES OF FORESTS.

The utilities of forests fall naturally into two classes: Direct
Utility. and Indirect.

The former, which includes the supply of forest produce and the production of wealth directly through the exploitation of forests, we will leave for the present, to consider first the indirect

benefits, which concern more nearly an audience of agriculturists. By indirect benefits are understood the effects of forests on temperature and on moisture, their mechanical results, their influence on sanitation and finally their value from the aesthetic standpoint.

It requires no extended experience or great effort of imagination

Temperature. ion to realise that tree-growth has a moderating influence on temperature. Animals know it and seek shelter from the scorching sun in the shade cast by the crowns of trees. This moderating effect of a single tree is greatly increased when several trees are grouped together and, of course, very much more so in a large assembly such as a forest; for there, not only are the direct rays of the sun cut off, but also the radiated heat from the surroundings.

"Forests act as a frigorific; they multiply, by the expansion of their branches, the surfaces which are cooled by irradiation".

It is obvious that this shelter is afforded not only to the air beneath the crowns but also to the soil below. It must be quite clear that the atmosphere as well as the soil must be much cooler during the hours of sunlight inside the forest than without. Should any of you dispute this fact, I will ask him to test the point by walking from here to Bolampatti after this lecture, barefooted, and thereafter let him confess that he was thankful when he reached the shelter of the forest shade. This

**Forest air
and soil
cooler by day.**

cooling is of course one of the results aimed at in the planting of avenues and topes. It must also be remembered that the hotter and drier the locality the greater the contrast within and without the forest and the greater the benefit obtained from the shelter afforded.

Now the effect of the forest on temperature is not invariably in the direction of reducing the heat. During the night the temperature outside the forest falls rapidly after the decline of the sun and its setting, not only because the heat rays are withdrawn but owing to radiation from the heated soil into the cooler air. Inside the forest, however, the heat has been maintained at a lower degree owing to the shelter of the canopy (that is to say the layer formed by the crowns of all the trees), and it falls more slowly because the same agency greatly impedes radiation. We may take it, therefore, that inside the forest the temperature of both the air and the soil, is, as a rule, lower than outside it during the hours of sunshine and higher at night. In short, the effect of the forest is to moderate the extremes of temperature.

This moderating effect is communicated to a greater or lesser extent, according to circumstances, to the surroundings of the forest, more especially in the direction away from the prevailing wind. This effect has been proved by actual temperature records from observations made at numerous experimental stations

**Moderating effect
communicated to
surroundings**

1. "Man and Nature" by, G. P. Marsh, p. 160.

Further, I may extract the following illustration from a

work entitled "Man and Nature"¹: "To supply the extraordinary demand for Italian iron occasioned by the exclusion of English iron in the time of Napoleon I, the furnaces of the valley of Bergamo were stimulated to great activity. The ordinary production of charcoal not sufficing to feed the furnaces and the forges, the woods were felled, the copses cut before their time, and the whole economy of the forest was deranged. At Pizzatorre there was such a devastation of the woods, and consequently such an increased severity of the climate, that maize no longer ripened. An association, formed for the purpose, effected the restoration of the forests, and maize flourishes again in the fields of Pizzatorre".

As hinted above, the moderating influence is not solely due to the shade of the canopy of foliage, but also to the obstacle opposed by the trees to air currents—a subject we will recur to when we come to consider the mechanical rôle of the forest. Further, a cooling effect during the hours of sunshine is caused by the transpiration of the leaves.

Correlated with the above phenomena, and partly arising out of them, is the influence of forests on humidity. We may first briefly recapitulate the conditions that lead to atmospheric humidity and its precipitation in the form of dew and rain.

We know that dry air readily absorbs moisture from any water it may come into contact with. This absorption goes on up to a certain degree of saturation beyond

**Formation
of rain.**

1. "Man and Nature" pages 151 & 152. Quoted from a report by G. Rosa in 1861.

which no more can be taken up. Further we know that hot air can hold more water vapour than cold air. It follows, therefore, that saturated air—that is to say air containing the maximum quantity of water possible for its particular temperature—must part with some of its water contents on cooling. It cannot retain the water it was able to hold at a higher temperature and the surplus either settles in the shape of dew or falls as rain. Now let us see the application of these facts in connection with the forest. You are all familiar with the phenomenon of transpiration in plants, that is to say the evaporatin through the stomata of the leaves of the water taken up from the soil by the roots. Evaporation invariably has a cooling effect and so there is a considerable amount of cooling going on

**Refrigeration
of the atmos-
phere in and
over the forest.**

about the crowns of transpiring trees. A column of cooler air above the forest is thus formed. You will readily perceive that a hot wind arriving in and over a transpiring forest meets with a cooler atmosphere and thereby has its own temperature suddenly lowered. Whether this cooling will result in precipitation will depend, of course, on the degree of cooling and the degree of saturation—in short on whether the wind was surcharged with moisture or not.

The converse happens when a wind having passed over a forest reaches a bare and warmer tract. While passing over the forest the wind has been cooled. If then not saturated it will take up the transpired water vapour up to the point of saturation proper to its temperature. On reaching the warmer tract its temperature rises and its capacity for holding

**Heating effect
of bare land.**

vapour is simultaneously increased, and even if saturated before it now is capable of taking up further moisture. I have myself more than once witnessed both alternatives, that is to say precipitation following on the wind reaching the forest and the diminution of the relative humidity when leaving the forest. You may wonder how the latter is detected, but you can all witness it as a frequent phenomenon in the Balampatti valley. You can see dense clouds rolling over the crest of the hills from the west after passing over the ever-green forests of the Siruvani valley and the Iyamalais, only to melt away on reaching the warmer and drier, as well as more thinly clad slopes on this side.

So many varying factors, chiefly topographical are at work in the production of rain, that the precise influence of the forests in the matter is obscured and the precise degree in which it participates cannot be fixed with any certainty. It is but fair to state that many deny that forests cause any increase of rain. As the outcome of considerable enquiry in this direction by the Government of India, Dr. Walker, Director General of Observations, came to the conclusion that the influence exerted by forests on rainfall in India did not exceed 5%.

On the other hand, competent authorities hold the opposite view. Clavé,¹ a French authority, wrote:—“In the island of St. Helena, where the wooded surface has considerably extended within

a few years, it has been observed that the rain has increased in the same proportion. It is now in quantity double what it was during the residence of Napoleon. In Egypt recent plantations have caused rains, which hitherto were almost unknown”.

Marsh sums up the question as follows: ² “The effect of the forests on precipitation, then, is not entirely free from doubt, and we cannot positively affirm that the total annual quantity of rain is diminished or increased by the destruction of the woods, though both theoretical considerations and the balance of testimony strongly favour the opinion that more rain falls in wooded than in open countries. One important conclusion, at least, upon the meteorological influence of forests is certain and indisputed; the proposition, namely, that within their own limits and near their own borders they maintain a more uniform degree of humidity in the atmosphere than is observed in cleared grounds. Scarcely less can it be questioned that they promote the frequency of showers, and, if they do not augment the amount of precipitation, they equalise its distribution through the different seasons”. It may be, and often is, claimed that the true reason for the greater degree of humidity in and in the vicinity of woods is that the forest is the outcome of the heavier rainfall and in no way its cause; but this theory does not account for all the facts and the truth is that the two phenomena are interacting. Undoubtedly, luxuriant vegetation will not exist without considerable moisture, but, on the other hand, tree

**Correlation of
forests and
humidity.**

**Do forests
increase
rainfall?**

1. Clavé “Etudes sur l'économie forestière”. see “Man and Nature” p. 184.

2. “Man and Nature” p. 196.

growth beyond doubt increases the local humidity and retains it.

Deserts formed by deforestation. The reduction of countries to a desertic condition owing to the destruction of its tree growth has been apparent in many localities. The present desert of Sind was a forest country and fertile tract at the time of the invasion of Alexander the Great. There is evidence in the Maha Bharata and the Ramayana that now woodless and almost waterless tracts of India formerly were verdant with forest and blessed with perennial streams.

Asia Minor In Asia Minor, now a treeless desert with an exceedingly scanty and precarious water supply, and where rainfall is a comparatively rare occurrence, there are ruins of old irrigation works and traces that show that tree growth once was at least fairly abundant. Trees, and with them water, have disappeared.

Tripoli. Formerly the sands of Tripoli were shaded and fixed by abundant vegetation. Great cities nestled among fertile fields. The fine forests that retained the waters and regulated their flow into permanent rivers were laid waste, however; the trees have disappeared and the whole plain has become sterile. Now only desert-framed ruins testify to the former prosperity, and the present wretched remnants of population find an insufficient sustenance in a few impoverished fields of alfalfa and barley.

Ascension. Converse examples are not wanting as indeed we have already learnt. Sixty years ago Ascension Island was a burning rock. Plantations have been made which now

arrest and form the clouds and the resulting rain and humidity has given rise to an abundant growth of grass which supports large herds of cattle.

Instances could be multiplied, but it will suffice for our present purposes to quote an Indian example, that of the Bellary District, from the pages of Mr. Ribbentrop's book "Forestry in British India." Major General Fisher, R. E., an old resident of Bellary and Ramandrug supplies the most interesting information in the following note:— "I arrived in the Bellary District in June 1856 and visited the Ramandrug at once; the hills were then covered with good strong jungle; there was always a heavy cloud during the night resting on the hills and for the greater part of the day rain fell during the south-west monsoon constantly and frequently; during the north-east monsoon it was much lighter; in the month of March, April and May, the mango showers were unusually very heavy and accompanied with much thunder and lighting. The average rainfall we calculated was then 45 inches in the year; all the springs about the hills ran abundantly throughout the year, and the Narihulla, the main feeder of the Daroji tank, with all its tributaries, had water running in them all thorough the year. The climate of the Drug during the monsoon and the cold weather was quite cold enough to make fires very necessary, although its elevation is not more than 3,300 feet above sea level. The water supply was most abundant during the whole of the hot weather, and

the tank was almost always full, surplusing very largely during the south-west monsoon.

These observations refer to the years 1856 up to 1864 inclusive, when I left the Bellary District and did not visit the Drug again till January 1879. I found everything changed; the jungle had been almost entirely destroyed; the rainfall is most precarious, and certainly not so much as 24 inches in the year 'the tank has not filled for the last three years, and is generally 10 or 12 feet below full tank level; the springs are almost always dry dribbling only at the best; the climate is so changed that in the cold weather it is hardly necessary to shut the doors and windows; except for the high wind and slight mists of the south-west monsoon, it would not be necessary to close the house at all. The main feeder of the Daroji tank dries up altogether by the end of February and all its tributaries have no water in them.

Quoting again from the same book we have the experience of a member of the Civil service in the same District:—

“Mr. Macartney, the Agent of the Sandur State in the Bellary District, also maintains that the rainfall in the last ten years has become lighter and more irregular with the increased destruction of forests by wood cutters and charcoal burners and the indiscriminate grazing of cattle, sheep and goats. Mr. Macartney speaks from an experience extending over 22 years,

1. The average nowadays is barely over 20 inches.

and supports his observations by the following facts:—“In the first decade of my residence here, the tank near my house used to be regularly filled every year and to be running over for several weeks at a time. Latterly, though it has accumulated an immense amount of silt, and is now consequently of diminished capacity, it rarely fills. The same remarks apply equally to the Ramandryg taluk and to that of Singankeni.

Here we have these very considerable and injurious changes in the humidity of a whole large tract in the short space of 10 to 15 years.

This effect on the actual amount of water falling on the country side is intimately correlated with another rôle of the Forest—a mechanical one—that of the retention and storage of water. As agriculturists you will not need for me to point out the immense importance of this faculty, more especially in a land like India, so dependent on agriculture and where over the major portion, the rainfall, often scanty, occurs in well marked seasons with intervals of drought.

This part of our subject calls for a close scrutiny. Everywhere, inevitably, the surface of the land is sloping, though gradients and direction of slopes vary. The sloping is either in one defined direction of towards one or more centres of depression. In the latter case a lake is formed and the accumulated water is lost to agriculture in the immediate vicinity without the application of lifting power.

In the former the surface water finds its way more or less rapidly to the main water courses and thence eventually to the sea.

Consider now what happens where there are no forests and little or no vegetation. The parched soil, ever exposed to the direct rays of the sun, causes no cooling of the atmosphere and, consequently, the conditions are generally adverse to condensation and precipitation, as we have already seen. Further, the ground is either baked to a hard crust or covered with a layer of desiccated dust. In either case, when rain does occur the water is unable to soak into the soil; the whole fall runs off more or less rapidly, according as the gradient is more or less steep, and reaches the lake or river below. As soon as the sun shines again enormous evaporation takes place, since there is no screen to intervene between the water and the sun, and the water vapour is not again precipitated for a long period.

When we turn to areas in every way similar but protected by a canopy of tree crowns and by other vegetation, what a very different sequence of events we discover! Here, as already explained, the conditions are infinitely more favourable for the inducement of rainfall. The rain drops fall on the foliage and thence a portion drip on to the undergrowth and soil beneath. Another portion run from leaf to leaf, along the twigs & branches, and down the stems reaching the soil eventually, but after an interval. A small portion remain on the leaves and branches and

**Run off of
water on bare
soils.**

**Rain falling
on Forest
Land.**

lurk in crannies to be reevaporated into the atmosphere thus helping to restore conditions favourable to further precipitation.

The major portion that has reached the ground usually finds a loose permeable surface soil, which has not been baked hard owing to the protective canopy and soil covering and into which a considerable portion sinks readily, following the lines of the rootlets.

There is also, as a rule, a soil carpet, consisting of the humus of decomposed debris of leaves, twigs, fruit etc., with the still undecomposed dead leaves and twigs on top, which are capable of absorbing almost twice their own weight of water. In favourable situations, besides the undergrowth of brushwood and herbs, there will be a carpet of moss or other cryptogamic growth, all tending to form a retaining sponge and a shield against rapid evaporation. Only a small proportion of the rain that has reached the floor of the forest is permitted to flow off at once over the surface.

Careful experiments conducted in Bavaria by the distinguished Forester Ebermeyer, showed that only 2% of the fall of rain in the open percolated to a depth of 2 feet into the soil, whereas inside the forest 60% of the fall found its way to that depth.

The portion of the rainfall that has percolated into the soil and has been retained in the soil covering is parted with but slowly. That retained in the soil covering is partly re-evaporated; last passes downwards into the soil and part down

**Soaking into
Forest Soil.**

**The soil carpet
a sponge and
preventor
of evaporation.**

**Subsequent
percolation.**

the slope inside the soil cover. Of the portion that sinks into the soil, either at once or gradually from the soil cover, a large portion is, of course, taken up by the roots of the vegetation and is transpired by the leaves, keeping, as we have seen, the forest atmosphere fresh and moist. The rest gradually percolates down the slopes to feed springs and streams, which are thus regularised in their flow. It follows, therefore that water courses issuing from forest-clad slopes are *rarely torrential*, but are either perennial or at least contain water for a considerable period of the year.

In the one case we have the torrent descending from the bare slopes, a sudden spate, a furious rush of water and in a few hours a dry torrent bed till the next fall of rain; in the other case issuing from the forest a steady flowing stream, its flood rising after heavy rain and subsiding slowly; rarely a danger and rarely if ever absent. Can there be the slightest doubt as to which condition is preferable from every human standpoint?

Here in Coimbatore we have not far to seek to find an example. Contrast the perennial Noyil that issues from the Bolampatti valley and fills our tanks with the Sangapurpallam from the Tadagam valley that crosses the Satiamangalam road just north of the Jail and which is dry except for a few hours after a heavy fall of rain. I can tell you from personal observation and enquiry that all the wells in the Tadagam valley are 100 feet deep or more; whereas in the Bolampatti valley

there is an ample supply of water within a few feet of the surface. There are no wet lands in the Tadagam valley but there is a considerable extent of valuable wet cultivation in the sister valley. Yet the two valleys are separated only by a ridge of hills. The one, however, is far better clad with forests than the other. You will readily perceive the vast importance of such facts in connection with irrigation and the water supply generally.

Sir Ray Lankaster¹ has summed up the matter in masterly style as follows: "It is, however, in cutting down and burning forests of large trees that man has done the most harm to himself and other living occupants of many regions of the earth's surface. We can trace these evil results from more recent examples back into the remote past. The water supply of the town of Plymouth was ensured by Drake, who brought water in a channel from Dartmoor. But the cutting down the trees has now rendered the great wet sponge of the Dartmoor region, from which the water was drawn all the year, no longer a sponge. It no longer "holds" the water of the rainfall, but in consequence of the removal of the forest and the digging of ditches the water quickly runs off the moor, and subsequently the whole countryside suffers from drought. This sort of thing has occurred wherever man has been sufficiently civilised and enterprising to commit the folly of destroying forests. Forests have an immense effect on climate, causing humidity of both

1. "Science from an easy chair", 2nd series, p. 370.

the air and the soil, and give rise to moderate and persistent instead of torrential streams. Spain has been irretrievably injured by the cutting down of her forests in the course of a few hundred years. The same thing is going on, to a disastrous extent, in parts of the United States. Whole provinces of the Thibetan borders of China have been converted into uninhabitable sandy deserts, where centuries ago were fertile and well-watered pastures supplying rich cities, in consequence of the reckless destruction of forests. In fact, whether it is due to man's improvident destruction or to natural climatic changes, it appears that the formation of "desert" is due in the first place to the destruction of forests, the consequent formation of a barren, sandy area, and the subsequent spreading of what we may call the "disease" or "desert ulcer" by the blowing of the fatally exposed sand and the gradual extension, owing to the action of the sand itself, of the area of destroyed vegetation. Sand deserts are not, as used to be supposed, sea bottoms from which the water has retreated, but areas of destruction of vegetation often (though not always), both in Central Asia and in North Africa (Egypt etc.), started by the deliberate destruction of forest by man, who has either by artificial drainage starved the forests, or by the simple use of the axe and fire cleared it away."

We are, in this country, but too familiar with the disastrous results of floods. I may mention one of which I had personal experience. In 1896, as the immediate consequence of abnormal rainfall around the sources of the Kistna River in the Western Ghats of the Bombay Presidency, that river

came down in unprecedented flood. Great anxiety was felt by those in charge of the large dam at Bezvada and the whole of the canal system from there to the coastal taluks. Fortunately the anicut and canal works stood firm.

Though the larger disaster, which would have ensued had the head works given way, was avoided, nevertheless, the river overflowed its banks and some 500 square miles of land between Bezvada and the sea were submerged, causing heavy loss in material and serious injury to the agrarian interest. Thanks mainly to the fact that the villages in the tract are almost invariably situated on rising ground, the loss of human life was small. Now in this striking instance, the flood would have been entirely suppressed, or at least kept within very moderate limits had the catchment area been satisfactorily clothed with vegetation.

Another serious mishap due to flood is that known as the Mangapatnam disaster, when owing to a railway bridge near that town having been washed away by floods, the Bombay main train was hurled into the swollen waters, resulting in the loss of a number of human lives.

On the other side I may again quote from Mr. Ribbentrop:—
 "The beneficial effect of forests properly protected was however, very marked in the following case. In 1878 a road was built from Ellichpur in Berar into the heart

Flood
prevented and
bridges saved
by forests.

Melghat, of the Melghat forests, which had been protected against fire for ten years, and had consequently become in most parts completely stocked with a heavy layer of old leaves and grass on the ground. The road runs partly through the forest thus protected and partly through the open or unreserved forests, where no protection had been attempted, and the Executive Engineer who constructed the road wrote as follows regarding the effect of protection upon floods in that part of the country:—"During the late heavy rain, viz. 4 inches in 24 hours in the beginning of June 1897, I had four bridges in construction in the Bairagarh Reserve on the Ellichpur-Pili road. The foundations of these bridges were not finished and I expected much damage to them by the early rain. Much to my surprise I found that when the rain was finished none of the *nalas* over which these bridges are being constructed had been in flood, and no damage had been done to the foundations. In the unreserved forests, between Sirasban and Ellichpur, all the *nalas* had been in flood, and I attribute the escape of the foundations of the bridges in the reserve to the rain having been absorbed by the old fallen leaves and grass thus showing the protective power of forests to bridges in preventing sudden heavy floods". The difference between the two areas was that the reserved forests were protected against fire whereas the unreserved forests were not so protected.

We may also cite a recent example from the United States of America from the pages of the periodical "American Forestry".¹ The

1. "American Forestry". "Southern floods and their forestry lessons,". August 1916.

Blue ridge.
U. S. A.

article in question describes floods caused by heavy rain on "Blue Ridge" in Western North Carolina in July 1915. The floods washed away a number of bridges and homesteads and covered fields with boulders and sand. Numerous land slides occurred on the slopes. The whole occurrence is ascribed to want of protection against fire, as a result of which the woods had disappeared. The article adds: "Had fire protection, extending through a period of 2 or 3 decades, restored the spongy soil cover to these high slopes, which is so characteristic of northern spruce forests, the furious rush of water into the streams would have been retarded and the flow distributed".

Similarly forests have a beneficial effect on springs, which have been known to disappear with clearing of the forests in which they took their source and to reappear with the re-establishment of the forest, as the following instances will demonstrate.

In "Man and Nature"² the author writes: "I remember one case where a small mountain spring, which disappeared soon after the clearing of the ground where it rose, was recovered by simply allowing the bushes and young trees to grow up on a rocky knoll, not more than half an acre in extent, immediately above it, and has since continued to flow uninterruptedly". Again Hummel writes:³ "The influence of

Heilbronn.

forests on springs is strikingly shown by an instance near Heilbronn. The woods on the hills surrounding the town

2. "Man and Nature" by G. P. Marsh. p. 197.

3. do do p. 207.

are cut in regular succession every twentieth year. As the annual cuttings approach a certain point, the springs yield less water, some of them none at all; but as the young growth shoots up, they flow more and more freely, and at length bubble up again in all their original abundance".

This faculty of the forest of storing water and parting with it slowly, thus obviating floods, contributes also towards protection in

another important direction—the protection of the soil against Erosion. Where the soil is bare there is no check to the rapid run off of surface water, and the eroding effect of heavy rainfall is immense. Every little trickle carries minute particles of soil, as these trickles converge and join and swell into runnels, then into streamlets and finally into torrents, heavier and heavier particles and larger and larger quantities of soil, and presently stones and boulders, are swept down to the lower level to be deposited in order of size and weight when a change of slope reduces the rapidity of the flow. For otherwise is it in the case of slopes protected by forest growth. Here not only is the rapid flow-off checked, first by the trees and by the soil covering, as we have already learnt, but the net work of roots, large and small, interlacing throughout the upper layers of the soil, firmly holds and fixes it, and prevents all but the very slightest wash.

This has been well exemplified by the famous traveller and scientist von Humboldt, who wrote; "By felling the trees which

1. "Humboldt's Travels" Chap. XVI.

cover the tops and the sides of the mountains, men in every climate prepare at once two calamities for future generations, want of fuel and scarcity of water. Trees, by the nature of their perspiration, and the radiation of their leaves in the sky without clouds surround themselves with an atmosphere constantly cold and misty. They affect the copiousness of the springs, not, as was long believed by a peculiar attraction for the vapours diffused through the air, but because, by sheltering the direct action of the sun, they diminish the evaporation of water produced by rain. When forests are destroyed, as they are everywhere in America by the European planters, with imprudent precipitancy, the springs are entirely dried up, or become less abundant. The beds of the rivers, remaining dry during a part of the year, are converted into torrents whenever great rains fall on the heights. As the sward and moss disappear with the brushwood from the sides of the mountains, the waters falling in rain are no longer impeded in their course; and instead of slowly augmenting the level of the rivers by progressive filtration, they furrow, during heavy showers, the sides of the hills, bearing down the loosened soil, and forming sudden and destructive inundations. Hence it results, that the clearing of forests, the want of permanent springs, and the existence of torrents, are three phenomena closely connected together."

Another example from a totally different part of the world, namely China, may be noted here. A diplomatic officer, Mr. R. F. Johnston, serving in the Province of Shantung writes: 2.

2. "Lion and Dragon in Northern China" R. F. Johnston p. 16 and 17.

"Like the greater part of North China, Shantung is liable to floods and droughts; and local famines are not uncommon. The unequal distribution of the rainfall is no doubt partly the result of the almost total absence of forest. Forestation is and always has been a totally neglected art in China, and the wanton manner in which the timber has been wasted and destroyed without any serious attempt at replacement is one of the most serious blots on Chinese administration, as well as one of the chief causes of the poverty of the people. If North China is to be saved from becoming a desert (for the arable land in certain districts is undoubtedly diminishing in quantity every year) it will become urgently necessary for the Government to undertake forestation on a large scale and to spend money liberally in protecting the young forests from the cupidity of the ignorant peasants."

Erosion of a mild type is not entirely an evil. If the progress **Fertilising Silt.** is very slow, it may go on indefinitely without serious harm as the loss is replaced in time. I refer here, of course, to the conveyance of silt in small quantities from the mountains to the fields

Nile. below. As you know the great fertility of the Nile valley is due to the silt brought down by that river and deposited over the fields along its lower course, which are inundated at certain seasons.

Similarly, we know of the transport of silt down the Kaveri **Kaveri.** (now much impeded by the new dam in Mysore) which was so beneficial to land in the Tanjore District. In these cases, when the stream issues from a catchment area well covered with vegetation, the amount of silt torn from the slopes is comparatively small and is made

good by the formation of fresh soil by the several agencies at work on the higher levels.

Where the slopes are steep and not well protected by vegetation, however, the flow is rapid and erosion is considerable. **Denudation.** Ruin must follow in course of time. If the formation of new soil cannot keep pace with the removal of the old, sooner or later the whole of the amount available will be washed away and the underlying rock laid bare; when this stage is reached it is practically impossible to restore a better condition. So long as a fair quantity of soil remains forest can be induced to grow and under its shelter the soil is retained and fresh soil accumulates.

With a heavy rush of water over bare soil not only is the available fertile silt removed far too rapidly, but infertile **Final loss of silt and deposit of gravel and boulders.** gravel and shingle also is swept down and deposited on the fields close to the foot of the slope. It is quite common to find fields near denuded slopes injured in this way. It was precisely on this account that not many years ago I recommended the reservation and protection of a block of hills—the Mambetta Reserve—in the Kollegal Taluk. I had been convinced of the necessity for protection by a view of a large stones carried down the slopes which lay thick on abandoned fields which, obviously, had been under cultivation but a few years earlier. I have little doubt that most if not all of you have witnessed similar conditions.

—To be Continued.

**A Key to the identification of some shola (Evergreen) trees of
Karianshola, Mt. Stuart, South Coimbatore.**

—:x:—

Based on Blaze Characteristics.

These notes were drawn up during my recent tour in Mt. Stuart Range with the Forest College students. My object in compiling them was to enable me to identify the trees mentioned in the list the next time I went up to Mt. Stuart. I venture to send them for publication in the hope that students visiting these forests in future years would be able, with the help of this key, to identify some of the trees in this extremely interesting forest tract.

I am thankful to the Herbarium keeper of the Agricultural College for kindly identifying some of the specimens I sent to him. This must have been no easy task considering that my specimens consisted merely of a few leaves. I could get no flowers or fruits for the greater majority of specimens because, for one thing, it was not the season for flowers and fruits when I went up the Anamalais and, for another, the trees were too huge and lofty to take specimens from.

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KEY

A. Bark with Sap.

- (a) Watery sap
- (b) Milky sap
 - (1) Stringy bark
 - (2) Brittle bark
- (c) Coloured sap
 - (1) Caustic
 - (2) Non-caustic

B. Bark without sap

- (a) No odour
 - (1) Stringy Bark
 - (2) Brittle bark
- (b) With a distinct odour
 - (1) Foetid
 - (2) Pleasant

1

A (a). Bark with watery sap

Calophyllum tomentosum: Vern. *Poon*.

- Outer Bark:** Reddish brown, with long reticulate deep cracks; not flaking: $\frac{4}{3}$ " thick; hard;
- Blaze:** Red with white streaks.
- Bole:** Cylindrical; long:

2

Murraya Koenigii: Vern. *Karu Veppu*,

- Outer Bark:** Dark reddish brown; smooth with faint longitudinal line: $\frac{1}{3}$ " thick;

- Blaze:** Flesh red with beautiful streaks of white giving a marble veined appearance,
- Bole:** Small, fairly straight.

3

Elaeodendron glaucum: Vern: *Thoranaipoo*.

- Outer bark:** Grey; smooth with greenish grey patches, brittle;
- Blaze:** Flesh red; sweet watery sap oozes from cut;
- Bole:** Huge, straight, cylindrical, buttressed and sometimes shallow fluted base.

4

Acronychia laurifolia: Vern: *Anaikurimaram*.

- Outer bark:** Brownish grey fairly smooth (no exfoliation) $\frac{1}{6}$ " thick; Brittle.
- Blaze:** Flesh red; a little watery sap exudes: wood inside blaze yellowish
- Bole:** Small and fairly straight leaves approximate at end of branches and unifoliate.

5

A (b). Bark with milky sap.

Artocarpus integrifolia.

- Outer bark:** Dark brown, rough, with branchlets and excrescences along trunk.
- Blaze:** A layer of orange red inner bark is exposed on cutting: Sticky viscid milk appears.
- Bole:** Crooked, not cylindrical.

Artocarpus Lakoocha: Vern. *Pak pattai maram.*

Outer bark: Reddish or purplish brown; Smooth except for shallow narrow pits and small warty excrescence. Bark $\frac{3}{4}$ " thick.

Blaze: A beautiful light, brownish pink streaked with white lines: very milky,

Bole: Cylindrical, long and Straight.

A (b) (I). Bark with milky Sap: Stringy bark.

Exoecaria oppositifolia: Vern. *Pala cheeru.*

Outer bark: Grey; smoth; stringy $\frac{1}{6}$ " thick.

Blaze: Reddish; very milky.

Bole. Medium sized; not straight.

Vern. *Pala maram.*

Outer bark: Grey; rough but not flaking: $\frac{1}{3}$ " thick.

Blaze: Cream coloured; profusely milky. A fibrous inner bark present.

Bole: Straight, cylindrical, medium size.

Vern. *Vella Chembili.*

Outer bark: Dark grey with green blotches: smooth; $\frac{1}{3}$ " thick.

Blaze: Cream coloured; milk not very profuse.

Bole: Medium sized; fairly straight; buttressed at foot.

Aglaia Barberii: Vern. *Scubili.*

Outer Bark: Reddish grey; smooth $\frac{1}{6}$ " thick no flakes; slightly stringy.

Blaze: Reddish under outer bark and whitish under neath; scanty milky juice present.

Bole: Straight, cylindrical, somewhat knobby; generally buttressed in **big** trees.

A (b) (2). Bark with milky Sap: Brittle bark.

Chrysophyllum Roxburghii: Vern. *Nuli Pala,*

Outer bark: Very dark greenish or brownish grey: Bark $\frac{1}{4}$ " thick with faint reticulation; slightly stringy.

Blaze: Dirty white; milk scanty; a layer of reddish bark under outer stem

Bole: Big, straight; fairly cylindrical.

Semecarpus anacardium: Vern. *Cheeran,*

Outer Bark: Grey with horizontal lines $\frac{1}{3}$ " thick: brittle.

Blaze: A dirty pink; Sap dirty white.

Alstonia Scholaris: Vern. *Palai.*

Outer bark: Grey with small lenticel-like protuberence $\frac{1}{3}$ " thick.

Blaze: Light dirty yellow; spongy-bark copiously milky.

Bolc: Straight but not generally cylindrical, section being irregular

14

Mimusops Roxburghiana: Vern. *Palai*.

Outer bark: Brownish grey with long shallow longitudinal cracks 1" apart; bark $\frac{1}{4}$ " thick.

Blaze: Pink streaked with brown broken white bands $\frac{3}{4}$ " apart; profusely milky; an inner white bark also present.

Bole: Big, cylindric and straight.

15

A (c) (1). Bark with Coloured Sap : Caustic.

Nothopegia Colebrookiana: Vern. *Karappu Cheerm*.

Outer Bark: Smooth, Dark grey greenish punctured and exuding blackish juice from the cracked surface, $\frac{1}{10}$ " thick.

Blaze: Pinkish brown streaked with white; wood inside white; a black layer of gum collects on edge of blaze after a day.

Bole: Of medium size somewhat crooked.

16

A (c) (2). Bark with Coloured Sap : Non-caustic.

Bischofia Javanica: Vern. *Neerthandi*.

Outer Bark: Dark brown: thin flakes sticking out on trunk surface $\frac{1}{4}$ " thick.

Blaze: Beautiful dark pink streaked with white lines: bright red gum oozes.

Bole: Attains very big size.

17

Macaranga Roxburghii: Vern. *Pokki*,

Outer bark: Grey, pale, $\frac{1}{3}$ " thick, brittle, lenticellate: light crimson gum exudes.

Blaze: Dark red (claret red)

Bole: Cylindric; sometimes shallowly fluted at base.

18

Mesua ferrea: Vern. *Irumbu maran*.

Outer bark: Brown, very much like Hopea, with irregular scales 2" to 3" long peeling off, not fibrous; inner bark white; $\frac{1}{3}$ " thick.

Blaze: A beautiful pink streaked with white: a yellowish gum exudes after a time from blaze.

Bole: Cylindrical and long; buttressed in big trees.

19

Mangifera indica: Vern: *Kattumangai*.

Outer Bark: Brown with long reticulate cracks; bark $\frac{3}{4}$ " to 1" thick.

Blaze: Yellow: a pink and sometimes a milky gum exudes.

Bole: Straight, long and cylindrical

<i>Myristicalarifolia</i>	Vern. <i>Pallai Kava</i> .
Outer bark:	Greenish grey with irregular adherent scales.
Blaze:	Exudes a red juice.
Bole:	Cylindrical, straight with plank buttresses

<i>Canarium Strictum</i> :	Vern. <i>Kungilam</i> .
Outer bark	Light grey with irregular scales sticking out, bottom end free, full of minute brownish warty growth. Bark $\frac{1}{4}$ " to $\frac{1}{3}$ ", brittle or slightly stringy.
Blaze:	Pale Pinkish brown; a black dammar exudes from cuts after a time.
Bole:	Huge; cylindric.

E. K. KRISHNAN, E. A. C.

[NOTE:—The second instalment of this most valuable Key, dealing with trees, the bark of which has no sap, will follow in our next issue.]—Ed.

A Note on the Distillation of *Cinnamomum* Oil.

—:X:—

Cinnamomum oil is extracted from the leaves of *Cinnamomum Tamala*, commonly known as "*Dalchini*". It is a viscid light fluid and has a peculiar odour; when pure it is pale brown in colour but the crude oil is yellowish. It is very volatile.

It forms an excellent medicine and is an infallible cure in cases of Rheumatism, sprains and wounds. Its value as a medicinal oil and an ingredient for perfumes is much recognized in Arabia Persia and other countries in the near East, to which large quantities are annually exported from India.

Cinnamomum Tamala grows to a moderate size and is generally met with in damp ravines up to a height of 6000 ft. There are five different varieties of the species which are locally known as "Tej", "Kaduva", "Pikka" "Mitta" and "Jambuka", but it is only the leaves of the first two varieties that are used in the distillation of Cinnamon oil. The leaves of all five varieties are strongly aromatic and the local names above indicate their respective taste and smell, which facilitate identification. The leaves of the several varieties vary in size but they are all either alternate or opposite, ovate, oblong, acute or acuminate with three prominent basal nerves. Some of them are rigidly coriaceous and can be reduced to powder by mere squeezing.

The centre of this important industry is the little district of South Kanara and the adjoining province of Mysore. In South Kanara the oil is manufactured in its crude form, a detailed description of which is given below:-

The distillery consists of a small shed the internal dimensions of which are usually about 25 feet by 16 feet. The sheds are temporary and the walls are constructed of ordinary grass strengthened with bamboo reepers. Each shed holds five stills.

The still proper consists of a large round clay pot which serves as a boiler and has a capacity of about 6 gallons with a circumference of nearly six feet at the bilge and a depth of about $2\frac{1}{4}$ to $2\frac{1}{2}$ feet. The mouth of the boiler when in use, is covered with a small earthen-ware pot, of one to one and a half gallon capacity, having a small hole about 2" diameter, in its side through which passes a bent bamboo delivery tube, 4 to 5 feet long, for the conduction of vapour. The mouth of the covering pot is placed up-side down on the boiler pot and having the same diameter (as the boiler) acts as a lid. The free end of the delivery tube dips into an empty copper pot or receiver (of about 3 gallons capacity) and with a mouth just wide enough to admit the delivery tube. This condenser is immersed in a large porous vessel containing cold water, and of a shape similar to that of the boiler, but its mouth is much wider being approximately three feet in diameter. The copper receiver is held in position, and

prevented from rising in the water by means of horizontal bars passing over it and secured at their ends by crooked pegs driven into the ground.

The boilers usually 5 to a shed, are arranged side by side over a furnace. Water is poured into each to a depth of about ten inches and heated to boiling point, when half a head load of Cinnamon leaves is emptied into each boiler, which is then covered with the smaller pot and the whole apparatus fitted air tight by suitably plastering the joints with wet clay. The steam issuing from boiling water absorbs the oil given off from the leaves. The vapour of steam and oil is led through the delivery tube into the condenser where it is condensed, and the oil being lighter than water floats at the top and is separated from the water by decanting. The water remaining in the condenser, after decantation, is used again for a fresh boil.

One boil lasts from eight to twelve hours. One head load of leaves yields from 18 to 24 tolas of good oil. The total quantity of oil obtained during the working season October to April is about twelve maunds per distillery of 5 stills.

The firewood required for the distillation for one working season is marked out by the Forest Department from the unclassified trees situated in the unreserves near the distillery. The contractor is not permitted to sell or otherwise dispose of the firewood except as fuel for the stills.

The oil is extracted both from the leaves and the bark, but in South Canara, only the leaves are utilized in the distillation process. Tender leaves from fairly mature trees are used, as they are supposed to yield a larger percentage of oil than older leaves or leaves from young trees.

Usually four men are employed to collect the leaves and firewood, and one man to look after the fire and collect the oil thus making a gang of 5 coolies per distillery. The total annual cost of working a distillery of five stills is about Rs. 350.

A seer of good oil costs from 1-0-0 to 1-4-0, and a total annual income from a distillery of five stills is nearly Rs. 600. It will therefore be seen that this is a very paying concern, and by it, the Forest Department realises a considerable amount of revenue every year. The method of distillation detailed above is no doubt a very wasteful one, but with improved apparatus, such as is employed for Eucalyptus on the Nilgiris, and investigations as to a suitable mode of refining the crude oil, cinnamon oil, would undoubtedly, find place among the more prominent minor forest products.

K. SHANKARANARAYANA RAO.

The Village-war lump sum grazing System.

On page 216 and following of the March issue of the Forest College Magazine, Mr. Balayya Nayadu criticises this system as applied in the Shriharikota forests and states that he is not sure of the correctness of the contention expressed in a previous article on the subject that through its agency "the question of illicit grazing automatically disappears." It is difficult to understand the cause of his doubt. What is illicit grazing? Surely it is the trespass of cattle other than those premitted by the owner of the land. Under the system referred to on payment of a fixed lump sum *all* the cattle of the villagers are permitted to graze. It follows, therefore, that cattle can be grazing illicitly only if they belong to villagers who have not entered into the contract and have not paid the lump sum agreed upon. All the villagers affected have come into the contract and so it would only be if they brought in 'foreign' cattle as their own that they would be grazing illicitly. As Mr. Balayya Nayadu must know, this is very unlikely in the peculiar circumstances of the locality, Shriharikota being more or less cut off from all other settled tracts. In any case such fraud is practically inseparable from any system of licensed grazing and is certainly a far more probable factor in the method he advocates.

I may add that the proposal he makes has already been suggested (possibly by himself when he was in charge of the Range)

and was rejected as impracticable. For one thing it would necessitate new legislation which is not in the least likely to be approved.

'The proof of the pudding is in the eating' and the following statement shows that Government has not suffered any loss of revenue by the adoption of the system. It must be stated first that the grazing fee prior to the adoption of the new system was Re. 1 per cow unit whereas under the system it is calculated at 8 annas, so that even if the census minimises the number of cattle there is still a definite gain.

Source of revenue.	1919-20	1920-21	1921-22	1922-23	Rs.
	Rs.	Rs.	Rs.	Under lump system	
Grazing fees Com-	1106	981	890	1788	
pounding fees etc.,	380	134	618	nil.	
Total.	1486	1115	1508	1788	

Thus the revenue is greater and the Forest Department has been spared the worry of impoundings (a most troublesome matter as has been shown when semi-wild cattle are concerned) and prosecutions with all their formalities as also the task of issuing permits. On the other hand, the people are saved all worry with regard to permits, impoundings and prosecutions.

C. FISCHER.

" Discuss the present Campaign against the Forest Department. Is it a true reflection of public feeling ?"

—:X:—

Fourth essay for the Indian Forester Prize for Past Students for 1922 (By, Mr. L J. Taylor, R. O. Ambasamudram.)

HE Forest Department has always been a bone of contention between the Government and the people. Numerous Campaigns of varying intensities have been directed against it, with the result that the Government, always willing to please, have met many of the reasonable demands by allowing numerous concessions to the people, who instead of being satisfied, are like Oliver Twist always clamouring for more.

In the past, these demands for concessions were made almost purely by the people themselves, the facility for doing so being afforded at the annual Jamabandi, presided over by the Collector or his assistant. These deputations, the Government had not much difficulty in dealing with. Where the requests were reasonable, they were acceded to, otherwise it was explained to the people, why their requests were unreasonable, and there the matter ended, for, the ryot, though possessed of a certain amount of shrewdness, is also amenable to reason.

With the advance of civilisation, however, the education of a fair proportion of the mass has opened their eyes to the fact that there are better men outside their own sphere of life to take up their

cause and push further the campaign against the forest department. Things have come to such a pass at the present moment that the grievences of the people against the department is now a common and rather a frequent subject for debate at the legislative Council meetings.

What then, is there so wrong in department that there should be such a clamour against it and its methods of working? Any sane-minded person who interests himself to make an intelligent study of the internal working of the department would come to the conclusion that there is nothing whatever wrong and that the lines on which we are working are the only possible lines, by which we can insure our forests being worked in the interests and welfare of the people.

Government have repeatedly dinned it into the ears of the people, both through its representatives, and more recently through its Publicity Bureau that the forests belong to the people and that they are merely holding it in trust, for them. This however is being met by deaf ears, for the people are not having any. If the forests belong to us they say, give them to us, and we shall look after them. What would happen, if Government were to grant their request?

Most of my readers have probably worked in districts, where large tracts of unreserve, adjoin reserved Forest. A comparison of the two would portray exactly what would happen to the latter. If they were in the hands of the people the comparison is so vivid and

striking, that any man with a grain of common sense could by merely looking at the two, tell why Government takes the trouble of constituting Reserves.

In the one there rises before you a more or less bare hill dotted here and there with a few misshapen pollards and coarse shrubs, an abundant out crop of rocks and boulders and not an ounce of moisture anywhere, or if any a trace of what flows out from the reserve beyond. All this is visible without our making a minute inspection of the area.

Now let us turn to the other. What one sees is a canopy of green everywhere and nothing else. Let us go a bit further and enter the reserve. The first thing that strikes you is a moderation of temperature, next you observe that the soil is covered with humus, and as we wander on we find what is so markedly absent in the unreserve, that in many of the streams there is a certain amount of water flowing, water, which helps to preserve the level in the wells and springs below, which are the chief sources of irrigation to the ryots' fields. How many I wonder if any of our agitating critics if they may be called so, for, a critic is supposed to know everything about the subject he criticises, pauses to consider all these points, before he ventures to talk about them, and put forth his demands before so learned an assembly as the legislative council! None I

am-sure, for if they did, the demands would not be made or if they were, they would be much more moderate.

Before generalising any more on this point, let us put forth categorically, what the people actually want and what they are continually agitating for. Their demands are mainly these:-

- (1) Permission to remove manure leaves from the reserve.
- (2) Permission to brouse goats in the reserve.

Government's sanction to disafforest all reserves bordering on cultivation.

Summed up, this more or less means, to give them the control of our reserved forests. I shall now proceed to deal with each one of their three demands in order.

1. The question of government's allowing the removal of manure leaves from reserved forest was raised by a member of the council in 1920. In an interview granted to the member by the Honourable Mr. Cox chief conservator of Forests, the latter very plainly stated that this could not be allowed and gave his reasons for saying so.

No forest officer or for the matter of that any one professing a knowledge of forestry could approve of this hideous method of mutilating tree growth. Agricultural research has shown that it will pay the ryot to raise his own leaf manure and government have been

trying to impress this fact upon them, but for some reason or the other, whether through obstinacy or laziness, they are diffident about doing so. My picture of the unreserve depicted above is mainly the result of this unrestricted hacking for manure leaves, and goat browsing and the request of the people to allow this is not only unreasonable but unjustifiable since it has been shown to them that it will be cheaper for them to raise their own leaf manure than to get it from the forests.

2. No one who knows the habits of these destructive animals will wonder at the government's attitude in excluding them from all reserved forests. They eat every available thing they come across, and there are instances where they have been known to eat even that most obnoxious weed—prickly pear. Unless the government wish to destroy their forests these animals will always be excluded from them.

3. The question of disafforesting areas for cultivation has received the attention of government, and an order has been passed on this point, more or less to the effect that this will be done as far as possible compatible with the interests of the department. This I believe has already been given effect to in some districts. From this it will be seen that on this point, the people have no grounds at all for complaint.

To sum up then it is seen that the people have very little justification for their so-called grievances, for, what is being done by

the department is done only to safe-guard their own interests, and the welfare of the country.

Apart from this 'Guerilla' warfare which is being directed off and on, against it, the department is up against a much more serious menace in the opposing of its financial schemes by the legislative council. That this opposition should be met with at a stage when the department is just awakening to the realisation of its natural resources in the shape of timber from hitherto unexplored forest is regrettable and that it is unjustifiable is evident from the fact, that the department has hardly had a chance of showing what it can do in the matter of making the country a self-producing and self-supporting one regarding its timber supply that can do so, there is very little doubt for our forests contain woods, just as good as that imported from elsewhere and once they are made known, we shall have very little difficulty in disposing of them in the market.

Let the council then, help us to launch our schemes. It may be that the initial expense will be great but the return if slow is certain to be sure.

"EX TEMPORE."

The Forest Ranger—A Sketch.

—:x:—

The Forest Ranger is the steel frame of the Forest Service, on whom, so to say, the whole administrative fabric of the Department rests. His life is not a bed of roses. It is the hardest of all hard lives. His work lies mostly in remote places far away from habitations and is both arduous and responsible, though at times pleasant. His duties demand large powers of endurance and tenacity of purpose and it is for this reason sportsmen are preferred for the post, as these qualities are cultivated in their games and sports. He has many difficulties to contend with in his daily duties, is subjected to privations, and last but not least is liable to contract malaria, the harmful effects of which are too well known. With all this his life is the finest life any robust and adventurous individual could desire, for, in it work and hardship are intermingled with pleasure and freedom, which are enhanced by a variety of work in beautiful, out-door, pure and open-air environments mostly in clear and bright sunshine.

The work of the Ranger compels him to remain the whole day, from dawn to dusk, in the forest, inspecting works or making long marches. It is certainly an arduous task and compared with that of a few worthy compeers of his appears all the more arduous. The work of a Tahsildar in the administration, of a Police inspector in patrolling rural areas for the protection of person and property and for the detection of

crime, of an Inspector of Salt and Abkari in checking marked trees for toddy-drawing and in patrolling for the prevention of illicit distillation, all pale into insignificance when compared with the varied nature and heavy responsibility of the work of a Forest Ranger.

The Ranger's responsibilities are numerous. He is entrusted with the protection and management of several hundreds of square miles of valueable forest. In these days, even properties, under lock and key, are not safe and have to be protected by armed Police; the Forest Ranger is held responsible for property which is open and accessible on all sides and at all times, and which consist of the daily necessities, of one kind or another required by the population in the neighbourhood. This trust he endeavours to fulfill to the best of his ability. He is also responsible for large amounts of money advanced to him every month for the disbursement of the pay and travelling allowance of his subordinates and for correct payment for all works carried out in this Range. His responsibilities consist also in safe guarding Government money at Head Quarters and in Camps, in maintaining harmonious relations with the ryot population and in securing their co-operation, in the working and improvement of forests, in enforcing discipline among his sub-ordinates and the execution of works in his Range, in carrying out his duties in many other ways, and last but not least in office work and keeping accounts. The Office work is no doubt a bugbear, especially after a day's hard out-door work; yet it has to be done every day, otherwise arrears would accumulate.

I have stated above that the life of a Ranger is fraught with pleasure and fatigue. He feels pleasure in performing his varied and manifold duties consisting of the protection of forest, preventing illicit fellings and grazing, detection of offences, execution of works such as road-making, construction of buildings, sinking wells, fire-tracing, demarcation, survey, in extracting fuel timber and bamboos and in carrying out other small items of work too numerous to mention; and he feels fatigue in performing long journeys on horse back, in climbing hills and mountains, in walking along rugged paths in penetrating dense forests, and in covering long distances in partrolling.

The Ranger must possess, or at least must cultivate, the power of observation. This is, by some, described as developing the 'forest eye'. This art as it may well be called is quite essential for much depends on the observations a ranger makes. He may go about the Forest for days and months but no purpose would be served unless he is able to detect at a glance defects to be remedied and mistakes to be set right.

The remuneration a ranger gets is in no way adequate to the exposure, danger, hard work and responsibilities with which his life is fraught. In conclusion I may state that the career of the Forest Ranger is one that ranks high in the careers of self-sacrifice for the advancement of the country.

"ONE IN HARNESS"

"A man-eating tiger bagged"

—: x:—

ON account of the Agency trouble (Fituri) I was unable to go to my Division, Upper Godavari, until 18th of December instead of the middle of October as usual.

Christmas-week was spent by me in delightful tiger-and panther-country and, though I was not lucky in so much as getting a tiger kill, I bagged two full-grown male panthers—one on the 28th of December at 3/30 P. M., which taped 6'-8½" and the second four days later at 7/30 P. M., which measured 6'-11": both were shot over buffalo kills, which had been tied up by me for tiger. About the middle of January I received a letter from the Conservator informing me that he would tour in my Division from about the 8th of February, so I had to change my programme and return to my head-quarters. En route I camped for a few days at Murmur—the favourite haunt of a man-eater—and narrowly missed getting him or he me? (on 28-1-1923.) I shall here relate exactly what occurred:—

I had made an early start on the morning of the 28th and after inspecting portions of one of the reserves came out of the forest on to a reserve line, which also served as a cart-track, and found the pugmarks of what seemed a very large tiger, which I concluded must have passed there during the early hours of the morning. My shikari peon, the Murmur village Koya head-man and "Nimrod" and a

Forest-guard were with me and the two latter informed me that these were the pugs of the noted Murmur man-eater. I naturally asked them how they knew. Whereupon the head-man with a broad grin and much scratching of the head replied that he could identify the pugs as well as the "Doragaru's" (gentleman's) face, for hadn't he often seen the man-eater and hadn't he often noted the Pug-marks when he and his men had to trace out and recover the body of some poor unfortunate of his village, who had been carried off by the man-eater! I was still very sceptical about it since the cart-track and the pugs were leading in the direction of my camp, I thought I would see where the tiger had gone to: it must have been about 10/30 A. M. now. After walking for about a quarter of a mile along the cart-track I heard some rustling—the forest was getting dry and there was a fair amount of dry leaves on the ground—about thirty yards in the jungle on my right and thinking it was spotted-deer instructed my peon and the others to work round and try and drive them on to the cart-track towards me. They carried out this manœuvre quite smartly, but the deer were smarter and gave me the slip by breaking through: I must have spent about ten minutes over this little diversion and handing over my rifle—a .355 Mauser—to the peon started along the cart-track once more; I leading. I must have covered half-a-mile when on turning a bend in the track I suddenly saw the tiger lying down on the shady side of the cart-track, about 40 yards off. He saw me at the same moment and was off in a bound and,

by the time I grabbed hold of my rifle and turned round, all I saw of him was his hind-quarters and tail. By Jove, he was quick! and though I ran along the cart-track towards him I did not even get a further glimpse of him, as the jungle here was thick, low scrub. Following him was futile and, when a squirrel started its cry of alarm about two hundred yards further in, I knew he was nowhere near. Needless to say, I was absolutely fed up to think how easily the tiger had escaped me and cursed myself for not keeping a sharper look-out, my peon for a lazy lout for failing to tie up a buffalo somewhere in this neighbourhood the previous evening and the tiger for an arrant coward! When I got back to camp I had no appetite for breakfast and so both my boy and cook caught it also. However in the evening, when in cooler frame of mind, I consoled myself with the well-known dictum that "everything happens for the best".

Between the above date and till I met the Conservator on the 10th of February nothing more exciting occurred than that of my bagging a four horned antelope and the little beast, though badly hit, did not drop till he had gone something like two-hundred yards. I shot him with the .355 mauser and I then, in a way, felt glad that "Mr. Stripes" did prove such an arrant Coward!

On the 18th the Conservator and I arrived at Tatilanka camp about noon, and while chatting Mr. Barry's boy came rushing in greatly excited and informed us that a cooly had just brought a message that a tiger had carried off a man, about half-an-hour ago,

quite close to the forest bungalow. This was too much for me so after a hasty meal I got hold of my heavy rifle - a .471 D.B.-H.V.- and four cartridges and prepared to start. Outside the bungalow there was a gathering of fully sixty Koya bamboo-felling coolies, who had struck work as soon as they heard that one of their fellow-coolies had been carried off by the man-eater and in their midst was the bamboo contractor trying his best to appease them. I soon got hold of the leader and asked him what he wanted and he said that all of them would be very thankful if I found out the dead body and recovered it for them: this I promised to do at once and with that they quieted down. At last—it must have been about quarter past one—I set out with my shikari peon and the Koya, who was also felling bamboos alongside of the man who was carried off by the tiger, and told the rest to follow later on. It was extremely hot and after walking for some twenty minutes I turned round and asked the koya how much further it was to the place; as usual he replied—"oh-very close, just near such and such a stream". From experience I knew what his "very close" meant and settled myself down for another half-an-hour's trudge and I was not wrong either. However, at last we reached the place where the man had been carried off, which must have been fully three miles from the bungalow towards Murmur, and the next thing was to find the body. This I set out to do immediately and for the first fifty yards or so it was very difficult indeed, as there was know trace of blood or signs of the body having been dragged. My peon was quite clever at tracking and kept on the

right track by taking advantage of a bent twig or a disturbed leaf, which to an untrained eye would have passed unnoticed. It was hot and exciting work and the thick, young bamboo growth made it all the more difficult. After going about fifty yards we came across the first drop of blood and thereafter it was quite easy to follow up; and another fifty yards farther there was a pool of blood where, no doubt, the tiger had dropped the body for the first time. Soon afterwards the trail led across a small sandy stream and the peon here drew my attention to the huge pug-marks and remarked that this tiger was undoubtedly the same one we saw near Murmur lying by the side of the cart-track at 11 A. M. and I could not help agreeing with him. A fifty yards further there was a large dry stream about twenty-five feet wide and the tiger had dragged the body across this and cleared the further bank—about 3 feet high—in one bound, not allowing the man's body to touch the ground anywhere! we came across the body under young bamboo-growth, about thirty yards from the stream, and on examination found that one thigh had been partly eaten and, no doubt the tiger was still feeding when he was disturbed on hearing us approach. I now suggested to the Koya to return and bring some more men, but he did not like the idea of going back alone and so I had to send the peon with him, while I kept watch. The peon returned some fifteen minutes later with about thirty men and I asked them what they wished me to do next and like sporting fellows said in one voice that I should sit up for the tiger and assured me that the brute would turn up by six o'clock. So picking out the nearest tree

I had a rough "machan" erected and swarmed up to my hard perch and started my vigil from about 3/15 P. M., after telling the rest to go away, with instructions to talk loudly as they went and they did talk loudly, too! I really thought they would drive away any animal—man-eater or no man-eater within a radius of two miles! After quarter-of-an-hour, when everything had quieted down and I was conjecturing in which direction the tiger would approach, I thought I heard the rustling of dry leaves some forty yards behind me, but I did not give it much attention thinking it was either pea-or jungle-fowl. Ten minutes later there was a further rustling—much closer and more to my left this time—and I felt certain that the tiger was on the move. A few minutes later there was no doubt about it, for I made out his soft tread and deep breathing—up to now I could see nothing of the beast, but I soon caught sight of him coming sneaking along. Eventually, when he was about thirty yards from the kill and about the same distance from me, he gave me an excellent standing half-broad-side shot, which I did not fail to take advantage of, and drawing a bead on to his shoulder, fired. At the shot he was thrown back on to his haunches, but in a twinkling bounded forward in a mad rush straight towards my tree and after travelling about 20 feet toppled over and started kicking about. I was taking no risks, so I let him have the second barrel in the centre of his chest and with that he stopped struggling. From the moment he was first hit to the time he gave up the ghost not a growl or a moan did he give out.

After about fifteen minutes' lusty shouting I was able to get my peon and the coolies to me and then I had to convince them for about five minutes that the tiger was quite dead before they ventured to come and help me down the tree.

My first shot was beautifully in the centre of the shoulder and would have sufficed—but who can tell? Years ago in a beat I had shot a wild-boar with a "paradox" at fairly close range right in the neck; of course, the fellow went down as if struck by lightning and I walked up to the beast, which was still struggling, and thinking he would not move again turned and went back to my shooting-stool 20 yards away, and, lo behold! when I turned to look for my pig he had disappeared!! I could not believe my eyes and I never saw that pig again, though I followed him for miles and miles.

While half the men were busy preparing a bamboo stretcher on which to carry the tiger to camp, the remainder were heaping up dry bamboos and brush-wood over the deceased koya, for they told me that they never take the body back to their village in such cases, but burn it on the spot where it was found. Well, I did not like to interfere with their custom and allowed them to do so, after first instructing them to clear the jungle of combustible material right round the pyre, and by the time I made a move for camp the deceased koya's remains were going up in smoke.

I reached the bungalow about 4/30 just as Mr. Barry was having tea and after his congratulations I told him the story over two much-needed cups of tea. The tiger was carried in about three-quarters of an hour later and I measured him at once and give the following measurements, as they may interest:

Length from tip of nose to tip of tail 9'-3½"; girth of left and right fore-arms 18"; girth behind shoulder 47"; girth of neck 28"; height 39". I had no means of weighing the tiger, but I don't think I will be far wrong if I put down his weight somewhere in the neighbourhood of 450 pounds. The tiger had enormous front paws and the pads measured 5¼ inches each way. He was in the pink of condition, beautifully marked and most powerfully built: his top right canine tooth was broken off in half and I guess this used to give him many a bad tooth-ache, which may possibly account for his restlessness and taking to killing men. Beyond this there was no other defect traceable in him, but his clavicles were quite small and thin, and half an inch at the thinner ends of each clavicle seemed to be separate from and just joined on to the remaining portion by cartilage. In none of the other tigers shot by me were the clavicles in two parts and I think the "floating-bones" of this man-eater quite out of the ordinary. I estimated the age of the tiger to be 23 years, but Messrs Van Ingen & Van Ingen, Mysore, to whom I sent the skin and skull for mounting, write as follows:—"The animal must be about 18 years old as the teeth are very solid and the gums have receded a good deal".

Before I could start with the skinning, the koya ladies of Tatilanka village requested me to allow them to dance around the tiger, but when they wanted me—the slayer—to stand in the middle while they danced, I absolutely refused to concede to that part of their request and told them to finish their dance by the time I had had my tub; but they were still hard at it when I came back and I had to drive them away, as there was not much time before the light failed. In fact, the rough skinning and pegging were completed only about 10 P. M., by lamp-light, and the lips, ears and pads had to be finished off the next morning.

About 8/30 P. M., after dinner, there was a good deal of weeping and on inquiry I learnt that the deceased koya's wife and five children had arrived. The wail of the mourners was uncomfortably close to the bungalow and, as I felt like bed at about 10/30, I sent a peon to tell the widow not to cry—but I regretted the step the next minute, for the crying increased and looked as if it would keep on in that pitch till morning! So I sent for the woman and told her that there was no use of her crying any more—her man was killed and I had avenged his death by shooting the tiger! but my words were like oil to fuel and I was really in a dilemma as to how best to get rid of this noisy crowd. At last in desperation I told the woman I intended giving her and the children fifty rupees—my words acted like magic and I was able to get into bed soon afterwards and have a good sleep; but I did not dream of man-eating tigers! The villagers and bamboo contractor were greatly pleased and relieved

that I had destroyed their dreaded enemy and the latter gave all his bamboo-felling coolies a feast the next day.

This article will not be complete without the information of the number of persons killed by the man-eater and an amusing, but authentic, anecdote to give the reader an idea of the beast's daringness.

The man-eater first made his presence felt some three years ago and from my inquiries I gathered that he killed about eighteen persons, five in one village alone. The Divisional Officer, however, informed me that inquests were held only over the bodies of some six persons; but this large difference can be easily accounted for by the fact that the bodies of a good number of victims were not found and a number of cases of persons killed in the interior away from and police out station were not reported. Now for the anecdote, which was also told me by the Divisional officer. A couple of years ago the inspector of Police was cycling along the D. P. W. road from Murmur to Kunavaram early one morning and while going along merrily he thought he heard some animal galloping behind him and turning round saw, to his horror, that it was a tiger! The Inspector was at this critical moment at the foot of a slight rise in the road and when he attempted to increase his speed the chain of his cycle snapped. Of course, there was nothing else for him to do but throw down his cycle and run as fast as he could and shin up the nearest tree and

this he must have done in record time and his performance all the more creditable, for I am told he was rather a stout man! However, he had done the tiger in the eye and he was none the worse for his experience when he was helped down by some villagers, who were attracted by his shouting, half-an-hour later.

Now, while the reader is either envying my luck or musing over what I have written, I shall take the opportunity of making him my bow.

ROLAND MITCHELL

District Forest Officer.

Upper Godavari.

The Bamboo Experiments

OF
"JAVADIS"

Introduction:-

The correct method of extracting bamboos has for long been an unsolved problem, and various experiments in this direction are now in progress. The future working of our bamboo forests, in Southern India at any rate, depends largely upon the results of these experiments. The "JAVADIS" have been selected as the field of operations, as these hill forests present conditions ideal for the conduct of the experiments. The experiments are carried out only in connection with *Dendrocalamus strictus*.

Objects of the Experiments:—

(a) Under the existing system of working bamboo forests, a few mature culms together with all culms below two years in age, are to be left evenly distributed throughout the clump, while all the other culms may be removed; but this rule is unsound in that we have not yet determined the degree of thinning which is most suitable for our bamboo crops. In order therefore to ascertain the correct degree of thinning, or in other words to express this degree as a percentage, mechanical thinnings are being carried out experimentally. The percentages adopted are two, namely,

(1) 50% of culms over one rains old being removed.

(2) 100% of culms over one rains old being removed, (this latter amounts to clear felling).

(b) A second object of these experiments, is to ascertain a suitable rotation. Periods of 2, 3 & 4 years are being tried. A longer rotation has not been adopted as a congested condition of the clumps, is bound to result.

(c) Having considered the two objects detailed above the question now arises as to whether the culms left in the clump need necessarily remain evenly distributed. We all know that this even distribution is difficult to enforce, the ordinary contractor's coolie being very prone to fell the prescribed number of culms either from one side entirely or all along the outside of the clump. The third experiment may therefore be summarized as follows:—

It is necessary that the remaining culms in a clump should be evenly distributed throughout the clump. With this object in view fellings are conducted so that

- (1) remaining culms are evenly distributed and (2) the desired or prescribed percentage of culms are removed from one side of the clump only.

(d) If all culms over one rains old are removed in the felling (vide the 100% referred to in the first object of the experiments) working would not be difficult, for the felling would then amount to a clear felling except for the one year old culms in the clump. This would undoubtedly prove the most satisfactory solution from the point of view of simplicity of working, but it remains to be seen as to whether this method is silviculturally sound. In order to arrive at a definite decision on this point, the clear felling or 100% method is combined with a longer rotation varying between 2, 3 and 4 years.

Incidentally these experiments also aim at recording features exhibited by culms of various ages so that with a knowledge of such points, even an ignorant cooly can at a glance, determine with a sufficient degree of accuracy, the age of the various culms in a clump. If this object is achieved, the removal of unauthorized culms, during the felling, should disappear.

Area & Situation of the plot under experiments:—

The plot is 2.26 acres in extent and was selected by the District Forest Officer in 1917 and a thorough cleaning involving removal of dead and mutilated culms was carried out in the same year. The

plot is situated in the specially protected block of Sandal Coupe ii of "KOMATIUR" Series and lies about $1\frac{1}{2}$ miles south of "KOMATIUR" Rest House. The plot being laid out in the specially protected block of a sandal coupe, the likelihood of interference by bamboo contractors, injury through grazing and danger from fire are minimised.

General Description of the Plot with reference to Soil, Climate and Nature of Growth:—

The plot is on slightly sloping ground having a North-Westerly aspect. The altitude is 2340 feet above Mean Sea Level. The area supports an almost pure crop of *Dendrocalamus strictus*. The few clumps of *Bambusa arundinacea* which existed were eradicated and removed when the plot was originally cleaned in 1917. The shrubs and trees which were originally growing in the area, and which were interfering with development of the *Dendrocalamus strictus* were also cut or lopped sufficiently to render them harmless.

The soil is rich loam and the climate is mild with an average rainfall of 39 inches. The conditions prevailing in the experimental plot, appear to be typical of the "JAVADIS" generally.

Boundary of the Plot:—

The boundaries are as far as possible natural, and where natural features do not exist the boundary is marked by a line cleared to a width of 10 feet. On either side of this cleared line, a trench, one foot deep and two feet wide is cut, so that the lines are clearly and permanently demarcated.

Identification of Clumps:—

The plot was surveyed and the position of each individual clump was recorded. Each clump was serially numbered. A small square tin plate bearing the number of the clump is suspended to one of the clumps by copper wire.

The Grouping of clumps for the several experiments:—

In selecting and grouping clumps for any particular experiment, an average representation of growth has been aimed at, that is to say clumps which have the same proportion of mature and immature culms, have been grouped together under the 10 different experiments described below. The total number of clumps in all the groups, was 343 but at present there are only 237 clumps under experiment as this number was considered sufficient. The remaining clumps have been abandoned.

General Scheme:—

To attain the objects defined above ten experiments are being conducted in the area and these will continue for a period of eight years. Briefly stated the ten experiments are,

1. Cutting 100% culms over 1 rain old on 2 year rotation
2. " " 3 year "
3. " " 4 year "
4. Cutting 50% culms over 1 rain old *on one side* on 2 year rotation
5. " " 3 year "
6. " " 4 year "

7. Cutting 50% culms over 1 rain old *evenly distributed* on

2 years rotation

8. " " 3 years "

9. " " 4 years "

10. Marking some of the culms for recording observations and ascertaining the longevity of the culms.

In groups (1) to (9) above, the fellings are made in January at varying intervals of 2, 3 & 4 years representing the rotation, tentatively adopted. In group or experiment No. (10) no fellings are made but observations regarding the longevity of culms are recorded annually in January. The recording of these observations is dealt with further on.

Conventional Signs. adopted for the differentiation of the culms of Different Ages under the various groups:—

Culms produced prior to 1917, which may include culms of any age, are indicated by a white band painted round the culm at 4 feet above ground level and these will, within a few years, be eliminated by the fellings that are to be carried out from time to time. Culms which have appeared subsequent to 1917, or which are likely to appear during the progress of the experiment. are marked so as to permit of observations being made on the rate of reproduction and general development of culms of various ages. The following colours are adopted for banding the culms:—

1917 culms are marked with white enamel.

1918	"	"	red	"
1919	"	"	black	"
1920	"	"	blue	"
1921	"	"	brown	"
1922	"	"	yellow	"

The peeling off of the colour due to the smoothness of the culm is prevented by scraping the latter and obtaining a roughened surface at the height at which the enamel band is painted. The girth is measured over this band. Marking is generally done along with fellings when the young culms will be conspicuously seen.

General rules for the conduct of the fellings and recording of results:—

(a) Immediately after a felling all the refuse bamboos, creepers etc., are removed from the area. This is necessary as an accumulation of debris will in time hamper one's movements and observations, besides being an incentive to fire.

(b) Culms are cut as close as possible to the first node above ground, care being taken that unnecessary damage by splitting may not result. The cut should be horizontal.

(c) All fellings are repeated according to the rotation and as far as possible in the month of January and on the same date as that on which the first experimental fellings were done.

(d) In recording measurements of culms, whether felled or standing, the girth is measured at four feet from the ground. If the

banding of culms with the various colours, is correctly done at four feet from the ground the band will indicate the place at which the girth measurements are to be taken.

(e) Recording of observations regarding the condition of each culm should be done under the following heads:—

(i) Culms leaning or erect, (ii) healthy or not, (iii) injured or uninjured, (iv) growth normal or otherwise, (v) new shoots switchy or normal in size, and (vi) any other point worthy of mention.

(f) Culms of the latest rains are not cut under any circumstances.

(g) In experiment no. 10, where the object is to ascertain the age at which a culm usually dies, those culms which are singled out for this observation, have in addition to the band at four feet from ground, two more bands above it, with a space of one inch between each of the three bands. These culms should on no account be felled until they are completely dead, when the fact should be carefully recorded.

(h) Culms selected for experiment no. (10), are healthy, erect and free from injury of any kind and not more than two such culms of every rain are left in any clump included under any of the other experiments.

Results of Experiments:—

We inspected some clumps under experiments (1) to (9) and counted the number of new shoots in each clump. The result of our observations is given below in tabular form:—

Details of Experiments.	No. of 1922 culms per clump taken on an average		
	2 year rotation	3 year rotation	4 year rotation
A. Cutting 100% of culms over 1 rain old	3.00	4.40	2.50
B. Cutting 50% of culms on one side of the clump over 1 rain old	4.75	7.40	5.75
C. Cutting 50% of culms evenly distributed over 1 rain old	4.80	5.75	7.43

The girths of a number of the 1922 culms were taken and on comparing these with last year's record, (that is culms of 1921) it was found that culms worked under system C above on a four year rotation, are putting on more girth increment than any of others. Further from the statement above we see that the number of culms one rain old, gradually increases in this system as the rotation passes from 2 to 4 years. Under the second system the maximum number of new culms is observed in the 3 year rotation; whereas in the 4th year the number falls appreciably, thereby indicating that the cutting entirely from one side eventually impairs the vegetative

vigour of the rhizomes. There seems little doubt that experiment C yields the maximum number of culms per clump and as the culms are evenly distributed, and not congested there is sufficient space for their full development; under this system the four year rotation gives the best results.

The longevity of the culms cannot be ascertained at present. At the end of the period of experiments namely 8 years, sufficient useful data should have been collected, and we should then be able to hold definite views on the subject.

Conclusion:—

The experiments are unique in their character in that they are the first of the kind in South India and upon their results depends the future treatment of our extensive bamboo areas. Besides being of silvicultural interest, they will prove extremely useful commercially, for, of the many possible Indian Forest Industries of the future the manufacture of paper pulp from bamboos ranks amongst the foremost. A great deal, both silviculturally and commercially, therefore depends on the success of the experiments.

S. DORARAJA,

1921—23 Division,

M. F. C.

Birds and Sylviculture.

—:x:—

Although it is hard to realise the immense amount of help rendered to sylviculture by the denizens of the feathered world, most of us feel in a vague way indebted to these, our friends, for promoting the regeneration of several of our most valuable timber trees.

The absence of any organised study of our birds accounts for this vagueness, practically all ornithologists not being sufficiently interested in Forestry to study that branch of bird life pertaining to it or to calculate the good effects of birds on forest economies.

Birds, true enough, may not be welcomed by the Horticulturist, but to the Forester they are undoubtedly a blessing. Perhaps the Horticulturist too would welcome them if he stopped to consider their usefulness rather than dwell on the harm which they are supposed to do. To the casual observer it may appear that birds are unimportant from a Forestry point of view but a small degree of closer observation will show that birds do play an important part in:

- (a) The dissemination of seed.
- (b) The destruction of harmful insects.

Let us first consider the dissemination of seed. The chief agents at work in this connection are

- (a) Wind.
- (b) Water.
- (c) Animals.
- (d) Birds.

Wind undoubtedly plays an important part in the dissemination of seed, but the amount of good it can do is limited, as most seeds are not light enough to be borne on the wind for any distance.

Water theoretically does a great amount of seed dispersal [or collection!] but in localities where the rainfall is under 60 or 80" per annum, it does not count at all.

Animals too in their turn help in seed disposal by carrying prickly or spiny seeds in their coats and subsequently dropping them elsewhere.

Bearing in mind the fact that with the exception of the Darwinian ancestors of the future human race and others whose arboreal habits render them more helpful, most animals are only tall enough to gather the seeds of noxious weeds on their coats: their efforts in this direction cannot, therefore be computed to be of sylvicultural utility

Birds in comparison with the more advertised wind and water carry on their good work quite unobtrusively, though effectively.

The ordinary crow to mention a familiar instance, who with his thieving habits is a perfect nuisance to the thrifty and careful housewife, is a blessing to the forester. He will lift a mango seed which neither wind nor ordinary water will move and deposit it several hundred feet away to germinate and grow.

A little thought will show that most of our birds do similar good work.

Now, regarding the destruction of dangerous insects, which so to say, laugh at man's futile efforts to combat them, and destroy countless thousands of cubic feet of timber annually in the forests of the world, birds and animals are the only friends man possesses in the wide world.

What silviculture owes to-day to birds will never be fully known. Perhaps some future figure juggler will tell us that the number of seeds annually disseminated by birds, will, if piled end to end reach the sun; or that the number of cubic feet of timber annually saved by (birds), from destruction will satisfy the timber demands of the whole terrestrial globe and that of Mars put together! However we may rest assured the debt is indeed great!

K. P. RAJALINGAM

M. F. C. 1922—24 .

Division.

Idiosyncrasies of Sandal in 'Spike' areas.

With the few observations I have made in the Sandal areas of the Denkanikota and Dharmapuri Ranges and also with the little knowledge I have gained in "Spike" areas, I would like to put before the readers of this Magazine a few points relating to the peculiar characteristics exhibited by Sandal in "Spike" areas. I have read through the several reports of the "Spike" investigation officers at Denkanikota and, in the course of this essay, I have in places quoted sentences from their reports in support of my statements.

Normally sandal leaves measure $1\frac{1}{2}$ inches to $2\frac{1}{2}$ inches long by $\frac{5}{9}$ of an inch to $1\frac{1}{4}$ of an inch broad, and they are opposite, but by actual observation, I have found leaves measuring 1 inch to 5 inches in length by $\frac{1}{2}$ inch to 3 inches in breadth. The small leaves are usually found on trees growing on dry soils. For example, almost all trees in the Woddapatti Reserve of the Dharmapuri Range are small while those growing in the Guthiroyan and Marandahalli Reserves of the same Range and in the Noganur and Aiyur Reserves of the Denkanikota Range have bigger leaves. It is also stated that the leaves of trees in the Royakota observation area measured $5\frac{1}{2}$ inches to 6 inches in length by 3 inches to $3\frac{1}{2}$ inches broad but in this particular instance, the long leaves are attributed to "a variety of spike". The other instance of long leaves mentioned above may be the beginning of "Spike", but I am unable to assert this as a fact, for as far as I know, "Spike" has not yet appeared on the areas in question.

The first and most striking abnormality exhibited by trees in "Spike" areas, is the arrangement of the leaves, which, on certain trees in "Spike" areas, instead of being opposite are alternate or in tufts, usually occurring in threes. Mr. T. N. Hearsey in his observations, records, that the leaves of certain trees in "Spiked" areas commonly occur in threes, and also in many cases single trees exhibit all four forms; namely, alternate, opposite, distichous and verticillate. In one particular case (Tree No. 9 of Hanumantharoyangudi observation area) five new branchlets appeared in a branch and all five branchlets bore leaves in tufts

of three. In several cases even seedlings developed leaves in verticels of threes. Secondly "Spike" generally reduces the size of the leaves. This I have observed in "Spike" areas and in areas liable to be attacked by "Spike". Mr. Hearsay attributes the abnormality to "Spike", and states "In localities where "Spike" is present, the infected areas show their abnormality very conspicuously and it is a fair inference that the virus may be producing the abnormality". He further states. "It may be attributed to the attack by a bug belonging to the *Icerya* species in particular and possibly by other species. In both cases, a rapid activity in growth and mal-formation of buds takes place and the leaves and branchlets which are formed develop into verticels of threes and sometimes fours. The internodes are abnormally lengthened making the young growing shoots appear lanky and over grown".

Thirdly, the leaves are thick, very brittle and break when folded. This phenomenon is seen on all the affected trees. On examination of a tree in the Aiyur observation area, Mr. Hearsay records "I found it quite healthy and normal in May 1916. In June and July 1916, a large number of grey bugs (*Monopnebus*) about 250 in number were placed on it. A month after, the tree developed curious, crinkled and twisted leaves. These leaves became thickened in August 1916 and have remained thickened for 9 months." This crinkled and thickened appearance persists until the tree actually dies.

Fourthly the shedding of leaves is also curious and unnatural. If we shake a slightly infected tree, we will find that a large number of

healthy green leaves fall to the ground. If such a shedding of leaves were natural, it would be confined to a certain season of the year. This is not so and I know for a fact that shedding of leaves in "Spiked-areas" continues throughout the year. Immediately the leaves fall a new flush appears but they also soon become unhealthy and thickened. This sort of rotation continues until the whole tree becomes leafless and dies.

Lastly, in healthy trees the flowers are brownish purple in colour, perianth campanulate limb of four valvate triangular segments. In infected trees the perianth is 3 to 5 lobed and the pedicels are rather long. The colour varies from purple to pale green and in consequence appear very like leaves. Mr. Hearsay's observations on this point are as follows:- "My attention was drawn to a tree that I had bugged in August 1916 in my garden at Vellore. The tree developed very curious flowers in November 1916. The chief point was that the ordinarily minute deciduous bracts were conspicuously lengthened and persisted for an unusual length of time. This happened only on a few branchlets. On others the flowers were quite normal. These (presumably the abnormal ones) were shown to the Conservator personally and specimens were sent to Doctor L. C. Coleman of the Agricultural College, Bangalore, who pronounced that the flowers were abnormal but there was no indication to show what the cause was. In another case the tree was found with very conspicuous abnormal flowers, when

the bracts were quite $\frac{1}{4}$ " in length and there was further abnormal branching in the flower buds. Specimens of these were sent to the Principal Madras Forest College, and Doctor L. C. Coleman. Both admitted the abnormality, but could not account for it. The latter could find no starch deposits in the cells, to indicate the presence of "Spike."

It is the opinion of some people that "Spike" trees do not produce flowers and fruits. But I have seen in the Hojanahatti Spike area, where I was working, several trees yielding fruits and flowers and the only difference between these fruits and flowers and normal ones is the abnormality discussed above. Further the seed collected from a "Spiked" tree is capable of germination and it would be interesting to see if such seeds eventually develop into healthy plants.

S. RANGASWAMI,
M. F. C. 1922-24 Dn.

Athletics

An interesting Hockey Match was played on the evening of Thursday, March 1st, between the Forest College Eleven and Stanes' High School Eleven, on the grounds of the latter.

Soon after the start, the game developed into a very fast one both goals being hotly attacked in succession; but no party could score. The Forest college team bungled over several chances. Towards the

end of the first half, the home team, by a splendid and dashing combination of their Forwards, broke through the Foresters' defence and secured the first goal.

In the second half, the Forest College Forwards pulled themselves together and kept the ball for long intervals in the opponents' half pressing upon them but were not successful in their efforts. A few minutes prior to the closing of the game, Hadi Hussain, the Captain of the Forest team by a brilliant dash and very clever stick work scored for his team; thus he drew level. The home team did everything they could to add to their score, but their efforts were of no avail. Thus ended one of the fastest games we have seen in Coimbatore, both teams scoring 1 goal each.

S. DORARAJA,
Athletic Secretary.

Since the issue of our last No. the following students have been awarded their Colours:

Madhavan Nair	} For Athletics.
Bushanam	
Mumtaz Hussain	} For Hockey
Patras Kandir	
S. Sankaran	
L. N. Tiwari	
Abdul Azizkhan	
Prithichand	

Abdul Aziz Khan (*to be Vice Captain*),
 Hadi Hussain
 Mumtaz Hussain
 Madhavan Nair
 Rajalingam
 Rahamtulla Khan

} Foot ball.

A. R. B.

Miscellanea

"The importance of our Forests"

—:N:—

(*Extracted from the 'Australian Forestry Journal' for Dec. 1922.*)

Few people realise how closely forests and national welfare are related, or the extent to which the productions of the Forest enter into every day life. Evelyn in his "Silva", states: "It is certain that all arts and artisans must fail, and cease if there be no timber and wood in a nation;" and in the history of civilization there are numerous instances of the decay of such, following upon the destruction of the Forests. An American writer has tersely enunciated that wood as a commodity enters into every phase of life from the cradle to the coffin, and is just as essential to human existence as bread. In natural phenomena Forests are the universal providers of human needs, and the main source of the raw material which enables civilization to progress. It is almost impossible to mention any industry which is not directly or indirectly dependent upon timber production, and if the Earth was devoid of Forests, Agriculture Art, Education, Manufacture, Transport, Construction, Inven-

tion, Comfort, and even Health would be affected, for wood and its by-products are fundamentally necessary in the furtherance of each. Even in the defence of life and liberty Forests play their part, for it is now admitted that the Allied Nations could not have won the great war had it not been for the tactical importance of and the material so freely given and obtained from the splendid Forests of France. Quite apart from their economic value Forests constitute an appreciable factor in the mellowing of climate and temperature; in the conservation and regulation of water-flow; and in the distribution of rainfall in which directions they exercise a material benefit to both human health and soil production. As sanctuaries and breeding grounds for birds and game they also do much in upholding the balance of Nature, because predatory animals are inimical to the increase of vermin, and feathered life constitute so large a check on the spread of insect pests. From the beginning of existence they have fostered human life and to the end they will remain the mainstay of civilization.

P. SITHAPATHI AYYAR

R. O. Chitteri.

Spike Disease of Sandal

—:N:—

"In the annual report for 1917-18, the Forest Botanist drew attention to a line of inquiry which seemed to promise good results. There is a frequent connection between spike, both in *Zizyphus* and

Sandal and the wide-spread death of twigs caused by weak parasitic Fungi and it is possible that spike is caused by a very dilute solution of an enzyme excreted by these fungi which may only be able to enter the main water and sap currents in the plant when the damage is unusually severe or prolonged, when the plant has been weakened by other factors or under other special conditions. Such a hypothesis would harmonize with practically all the theories which have as yet been advanced regarding this disease, and it has received considerable support from the recent work of Mr. W. B. Brierley or *Botrytis Cinerea* in England. While on leave in England recently, the Forest Botanist discussed this question with one of the leading mycologists at home who expressed the opinion that "a careful study of the enzymic relations of common tree fungi would, I think, be invaluable and might give the key to the whole problem." With the early addition of a Mycologist and a Biological Chemist to the staff of the Forest Research Institute it is hoped that this line of research will now be energetically developed."

Extract from "The Progress Report" of Forest Research work in India for the year 1920-21.

Seasoning Timber.

Powellizing is a process of rapidly seasoning, preserving and strengthening timber, and, where required, of protecting it against white ants. It consists briefly of heating timber in a strong

solution of molasses or carbohydrates in such a way that the sap remaining in the timber after felling is drawn out and replaced by the more concentrated solution or stronger prepared sap. This is presented to the timber under circumstances inducing the wood fibres from the surface to the core, to absorb the carbo-hydrates to their full capacity within a day, instead of their occupying as in air seasoning perhaps five to ten or more years to slowly absorb the carbo-hydrates of the weak natural sap remaining in the tree when felled. When required for protection against white ants a small quantity of arsenic is dissolved in the hot solution and is carried along with it into the wood.

—*Extracted from "The Indian Review" from Sep. 1922.*

K. SANKARANARAYANA RAO.

Employing Rubber in paper-making.

Extract from "The Industry Magazine" dated May 1922.

"The inventor of a new process of applying rubber latex to paper making, claims that as a result of adding the latex to the pulp, the finished paper is strengthened to a remarkable degree, will not crack on folding, and becomes more pleasant to the touch. It is also found that the rubber has no deleterious effect upon the colour, or whiteness of the finished paper, while, as regards the saving of time in its preparation, the addition of the latex reduces the necessary "beating" of the

pulp very considerably. Another advantage is that the paper, by the addition of rubber is made water proof, and the inventor points out that this opens up a large field of possibilities in commercial enterprise; adds also the fact that by applying the rubber to a very strong fibre such as manila hemp, jute, etc., products can be made on the paper-making machine to take the place of leather for many purposes. Such water-proof and imitation leather products will readily lend themselves to artistic design and manipulation. The inventor states that practical commercial experiments have shown that the labour costs, etc., of the addition of rubber latex are negligible, and that the development of the process on a big commercial scale ought to actually lessen the production costs very considerably."

S. RANGASWAMY,

Junior Student M. F. C.

The lease of trees for the making of *cutch* is a source of considerable revenue in the North Mangalore Forest Division, on the West Coast of the Madras Presidency. It was, rather naturally, believed that the tree so utilised is *Acacia Catechu*, Willd.

On the issue of Part III of Mr. Gamble's Flora of the presidency of Madras, however, it was observed that the Ganjam District on the East Coast is the only locality in the presidency given for that species. Through the courtesy of the District Forest Officer, North Mangalore (Mr. G. S. Lasrado), flowering and fruiting specimens of the

Acacia which is the source of the Mangalore *cutch* were sent to Mr. Gamble for opinion and the species has been found to be *Acacia Sundra*, D. C. As it is generally believed that the Mangalore *cutch* is the product of the true *A. Catechu*, it is perhaps advisable that this correction should be made known.

I would like to take this opportunity to point out that Mr. Gamble has split the combination hitherto known as *Terminalia tomentosa*, W. & A. into 3 separate species, *Terminalia tomentosa* W. & A. *T. crenulata*, Roth and *T. coriacea*, W. & A. (for details see pp. 463 and 465, Part III, Flora of the Presidency of Madras).

Foresters have frequently been struck with the apparent difference between the individual trees of the alleged *T. tomentosa* occurring in widely separated tracts, the recognition of specific distinction is, therefore, of some importance, especially as it seems probable that the botanical differences are accompanied by considerable differences in the timbers.

C. E. C. FISCHER, I. F. S.

—Extracted from "The Indian Forester" for Feb. 1923
(by kind permission of the Author).

"The People's Friend"—A Review.

This is a high class Anglo-Vernacular weekly Journal. Such a paper was a long felt want in Coimbatore. It provides useful information to suit all tastes and fancies. Its entomological section is particularly instructive and the subjects treated—Rat-fleas, mosquitos, Bed

bugs & the like,—are matters of much interest. With the low subscription of Rs. 6 per annum it should be easily procurable by every household. We wish it every success and have no hesitation in thinking that it will be a popular daily ere long.

Assistant Editor.

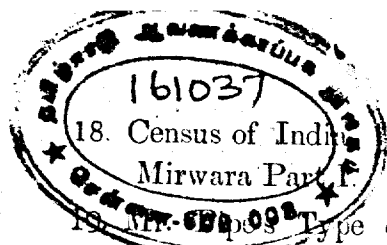
Contributions to the Cass Forest Museum.

Serial No.	Contribution.	Contributor.
1.	Eighteen bark samples, Ten seedlings, and sixteen twigs of evergreen species.	F. D. Ardagh Esq, I. F. S.
2.	Three models of trained elephants, dragging timber.	
3.	Fifty six photographs of timber trees.	The District Forest Officer, Nilambur.
4.	One panel of <i>Eugenia Gardneri</i> , Three bark pieces and Two twigs.	The Imperial Sylviculturist, Dehra Dun.
5.	A pair of Elephant tusks weighing 87 lbs.	Mr. L. J. Taylor, Range Officer, Kannikatty.
6.	Two hundred mounted botanical specimens.	Captain W. G. Dyson, M. C., I. F. S.

Additions to the Madras Forest College Library.

1.	The Botany of Behar and Orrissa Part IV Gamopetalae	-By, H. H. Haines C. I. E., F. C. H. F. L. S.
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- Proceedings of the 8th. Indians Science Congress.
- Records of the Indian Museum Vol. XXII Part IX No 23, & 24.
- Burma Forest Bulletin, No 7. Report on the Bee-hole borer investigation — By, J. M. D. Mackenzie Esq.
- Journal of the Oxford University Forest Society, Michaelmas term, 1922.
- Field service pocket book, 1913.
- A contribution to the Ecology of Upper Gangetic plain. By, Winfield Dudgeon.
- Journal of the Empire Forestry association, London, 1922.
- A glossary of technical terms used in Forestry practice By, S. L. Kessel. B. sc.
- Key to Natural orders—By, Franz Thoner.
- Life history & eradication of Bracken (*Pteris aquilina*) By, Gordon B. sc.
- Timbers in use on the Kolar Gold Field—Some notes on their use—By, H. M. A. Cooke, 1918.
- Working plan for the Sambalpur Forest Division Behar and Orissa—By, J. W. Nicholson, B. A.
- Annual report on Working plans, and Sylviculture in Burma for 1921-22.
- Progress report of forest administration in the Punjab for 1921-22.
- Annual report of forest administration in Ajmere Mirwara for the year 1921-22.
- Annual progress report on forest administration in Behar and Orissa for 1921-22.



18. Census of India, 1921, Vol. XXIV Rajputana and Ajmere
Mirwara Part I.
19. Mr. C. B. P. 098 Type designs and notes on buildings, bridges,
culverts, drains, roads etc.
20. Report on Forest administration in the Andamans for the year
1921-22.
21. Forest Bulletin No. 51 of 1922. An investigation of certain
factors concerning the Resin-tapping industry in *Pinus longi*
folia. By, H. G. Champion, I. F. S.
22. Forest Bulletin No. 48 of 22 re note on *Kindal* or *Hongal*
(*Terminalia paniculate* W & A.) By, R. S. Pearson, C. I. E.
I. F. S., F. L. S.
23. Forest Bulletin No. 52. Classification of Thinnings.
24. Fauna of Chilka lake. No II April 1923.
25. Report on public Instruction in the Madras Presidency for
1921-22, and for the quinquennium 1916-17 to 1921-22 Vols. I & II
26. Burma Forest Bulletin. No. 8, 'Sylvicultural series-No. 7.
Note on the growth of Teak and Teak plantations in Arakan.
By. W. S. Powell Esq.
- * * * * *

Statement showing amount promised and still due by ex-students
of the Madras Forest College, towards
the Students' Club.

	Rs.	A.	P.
M. R. Ry. C. S. Ramanatha Ayyar	5	0	0
Md. S. V. Sigbatullahi Sahib	5	0	0
M. R. Ry. W. Balakrishna Mudaliar	10	0	0
R. E. Lemos Esq., E. A. C.	50	0	0

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N16-7