

Madras Forest College Magazine.

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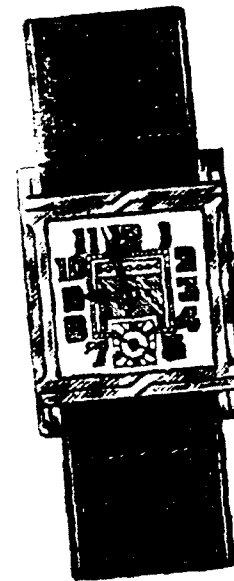
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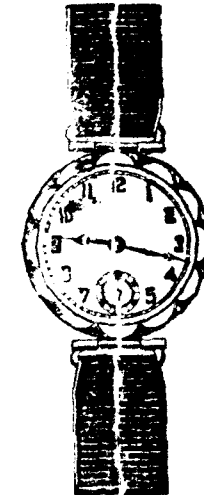
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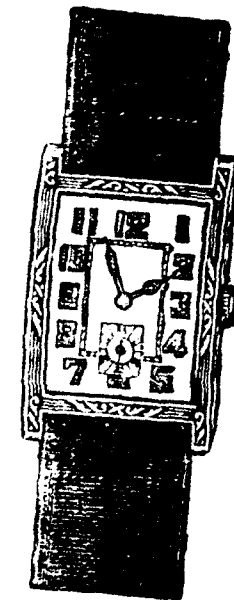
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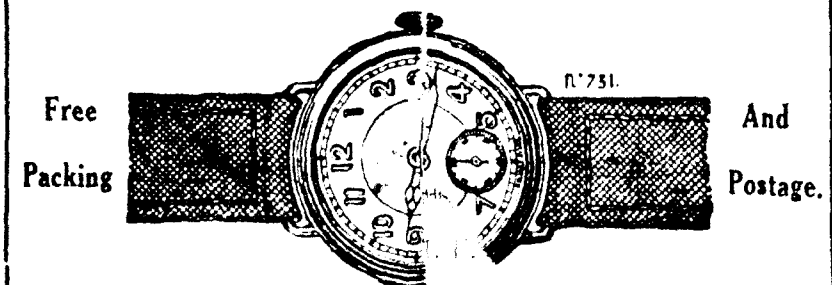
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No. 3.

THE MADRAS Forest College Magazine.



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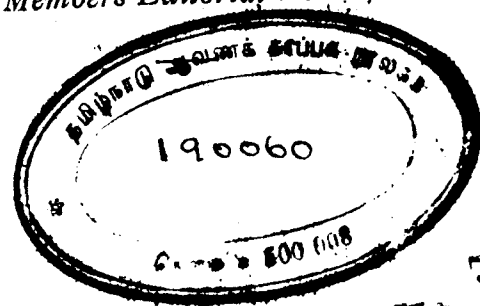
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THE Madras Forest College Magazine.

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Vol. XVI.

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*The managing Committee do not hold themselves
responsible for opinions expressed
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My observations on Sandal. (*Santalum album*).

BY, R. C. PARIKH.

(*Senior Student, Madras Forest College 1930-32 Dn*)

Sandal wood being the most paying tree, every Forest Officer endeavours to introduce it wherever it can grow. An attempt is made here to gather my observations made in the field during my training in the college, especially as regards its regeneration, tending etc.

I. *Distribution.*—(1) *Elevation* :—As regards elevation, Sandal is found growing luxuriently at 1400 feet in Coimbatore, about 3500 feet at Burliar, at 3300' at Mudumalai, and also at 3000 feet in Denkanikota East Range. Also it is found abundantly in Mysore. In my opinion it can grow well from 1400 ft. up to 4000 ft. where I have ever found it thriving best. It is said that richness of wood in oil appears to depend largely on elevation but I had no opportunity to verify this.

(2) *Soil* :—As regards soil, opinions vary, but I have found it thriving best in a loamy and fine gravelly soil with free drainage. I never saw it in heavy timber

forests where rich soils exist, but it is found thriving naturally well in the Denkanikota East Range in high deciduous open type forest, especially composed of thorny species. Amongst thorny bushes in the scrubby jungle and also in green hedges most healthy plants were noticed. Even in rocky areas it was found growing well in the crevices, but owing to one reason or other no big trees were noticed in such places, but it is said that trees grown in such places are richer in oil. In the college area, it is growing fairly luxuriantly on black cotton soil upto 3 ft. depth with Kanker lime underneath.

(3) *Rainfall*.—Where the soil and elevation conditions are favourable it is found thriving in localities with from 22" to 50" of rainfall such as Mudumalai, Coimbatore, Aiyur etc. It can be said that it grows on localities with moderate rainfall.

II. *Habit*.—A lot of difference is found in the green foliage of Sandal trees growing under shade and that without shade. In the college area as well as at Aiyur I have noticed that where the Sandal seedling is found right under the full shade of the host tree, it has leaves larger and dark green in colour and at times with a hard polished surface. While those grown under light shade have a foliage very scanty especially in hot weather and the leaves are longer, and with light green colour nearly yellow. It is also noticed that in open glades the seedlings are dying while in some places with shade on, the plants were invariably healthier. Sandal thus requires shade in early life. It must be a root parasite as it is always found along with other species either naturally grown or artificially introduced, and as I have dug up the roots and seen the haustoria. In the young stage Dhall, & *Jatropha Curcas* cuttings were introduced as host plants in the Mudumalai Range. It is grown successfully

under *Acacia arabica* (babul) and *Cassia siamea*, on the college estate. A number of healthy seedlings were found under the thick shade of *Ficus bengalensis* at Barliar. In the Research area at Denkanikota experiments were carried out to see whether it does as well without a host. I noticed there that in the same place, in a single row with same surroundings plants without hosts were not even half as high as those that were with hosts. Sandal must therefore be a shade hearer in early life, as well as a root parasite.

III. *Inflorescence and fructification*.—I think it has a long flowering and fruiting season. I have seen either flowers or fruits on trees throughout the year. Young trees in the college area also bear fruits and flowers but the seeds from immature trees do not give good results. Especially for sandal regeneration the quality of seeds is the most important thing. Spiked trees do not bear flowers and fruits. Sandal generally begins to flower in the cold season and the fruits ripen in monsoon but at times in the same locality it is found that the flowering season extends upto the months of May and June and the ripening of seeds upto December and January.

IV. *Damages to which Sandal crop is liable*.—
(1) *Grazing*.—It is grazed by cattle and animals. In Denkanikota East Range I saw some areas open to grazing in which many seedlings were seen browsed and top-broken. Especially those which were very free and in the open were found in the above condition owing to the easy access to cattle. Seedlings right under dense Lantana and such other thick bushes were found quite flourishing. It is really good if such natural protection is assured, otherwise easy approach by cattle and animals should be put to an end to by some other means. To

ensure regeneration in wide ranges, the areas should be closed to grazing and in case of small areas they can be protected by fencing.

(2) *Fire*:—It is an agreed fact that Sandal is very sensitive to fire. If the areas are not protected from fire they are burnt and the trees are badly damaged. I had seen a tree in between the fire line which was totally dead and showed no signs of recovery. In the Research Plot at Aiyur I saw many trees dead and very few giving new shoots from some parts only, because the area was burnt for experimental purposes. Moreover it grows in scrubby poor dry deciduous forest chiefly composed of most inflammable material, also it is found mostly in grassy lands which are generally closed to grazing; so, fire protection should be enforced to prevent the trees from being burnt, which generally die after fire incidence and have no hope of recovery.

(3) *Spike disease*:—This is the greatest cause of damage to the sandal crop. When once a tree has got spike it dies within a short time. 'Spike' is a disease to find the cause and remedy for which researches are made and no definite conclusions are arrived at yet towards the direction. But from what I have observed at Burliar and at Aiyur it can be said that the trees are spiked if they show the following symptoms:—(1) Leaves become yellow in colour and get smaller in size. (2) The leaves look as if they are clustered; they also grow narrow and stiff. (3) The internodes become shorter. (4) Generally the spiked branches do not bear flowers and fruits. In short the appearance of the diseased tree is totally changed as compared to a healthy one. The change generally begins from top to bottom. At times healthy as well as diseased shoots are found in one and the same branch. Once a tree gets spike it never gets rid of it and dies within a short time i.e. 2 months to 3 years.

(4) *Insects*:—These are also one of the causes of injury to sandal crop. I had an opportunity to see a tree just dying owing to all the leaves and the young shoots being eaten up by small insects. It is also said that insects might be one of the causes to bring spike to sandal. Where regeneration from seeds is resorted to, rats, white-ants and certain insects eat away the seeds before they germinate, but this can be avoided by treating the seeds.

(5) *Theft*:—The value of sandal renders it more liable to theft than any other wood. A ton of sandal wood costs from Rs. 900 to 1800, thus bulk for bulk it is rather 6 to 7 times more valuable than teak. So theft is also one of the causes of damage to the sandal crop, but this can also be guarded against by efficient management.

V. *Nature reproduction*.—(1) *From Seed*:—In Denkanikota East range it is quite good throughout the areas and especially in favourable localities. Lots of seedlings were found under the complete shade of some of the thorny host plants, and trees. Mr. Pigot has remarked that "want of reproduction is due to the spread of Lantana." Certainly the thick bushes of Lantana obstruct it in springing up, but hundreds of healthy seedlings are observed under the heavy thicket of Lantana in very small areas. In a bush of Lantana approximately 8' x 8' which was taken photograph of by the Principal of the College, above 10 seedlings were found growing naturally from seeds and two healthy trees had pushed through the Lantana. Thus many can come up nicely if they get an opportunity to push through. So I think if a slight tending be done at the proper time, the presence of Lantana will be a good thing to assure natural reproduction from seeds. Also fruits of Lantana are eaten by birds and as this species is found in fruit in most part of the year, it

is a good attraction for birds which drop sandal seeds, especially under the shade of shrubs and hedge rows natural reproduction was found distinctly good. Constant fires of course damage a lot in Lantana areas, as these are dried up in the hot weather and become very inflammable. It is said that sandal is very tender to fire damage and areas either naturally or artificially stocked should be protected from fire. This is purely a management question and if areas are well protected from fires Lantana cannot be called a curse to the natural reproduction of sandal. At times it is difficult to enter through the Lantana bushes and tend the crop. In sample plots at Aiyur some strips at certain intervals are cut in certain coupes for some research purposes with the result that one can easily go round such areas and also a sort of tending is assured to the seedlings. I think if this sort of work is adopted in Lantana areas more healthy seedlings will come out and the places will be easily accessible too. From the remarks above made it is clear that natural reproduction of sandal from seeds can be well assured in suitable localities if protection of areas be attended to with timely tending.

(2) *From Coppice*:—As uprootal of trees is introduced everywhere on account of the commercial value of the rootwood no observation was possible towards the direction. Messrs. Cherry and Lushington have remarked that "Sandalwood coppices well where there is much moisture in the soil."

(3) *From Root shoots*:—No observation was possible for this owing to short camps during the training. Messrs. Cherry and Lushington have remarked that "it does produce root suckers which grow into trees," while Mr. Rickett and Colonel Campbell Walker seem to have believed that "the suckers produced do not grow into trees."

VI. *Artificial reproduction.*—(1) *Selection of areas*:—

As sandal wood once introduced in an area, spreads easily it is not necessary to select large tracts for artificial regeneration. Small pieces of land in distinct localities should be tried for regeneration. While selecting the areas attention should be paid to the habit of the plant with reference to soil, configuration of the ground, elevation, rainfall etc. as stated above. In the Mudumalai range on poorer localities 25 acres were regenerated in one year, but they were in distinct places in plots and each plot not bigger than an acre. These areas were also protected from grazing and fire. As it is a root parasite it is always regenerated along with other plants. In the dry deciduous forest of the Mudumalai range an acre was felled and some trees here and there of teak, Terminalias, Anogeissus latifolia, etc. were left standing to serve as host trees of the future. If the areas were to be regenerated with teak, it would have been clearfelled instead. The standing trees also give shade to sandal in the young stage when it needs it most. In the College area Acacia arabica coupes are selected and under the shade of these trees as well as Cassia siamea, and some other species sandal is regenerated artificially. In Aiyur, attempts are made to regenerate sandal in bamboo areas. Jatropa carcus, dhall etc. are generally grown along with sandal to serve as primary hosts, the first one by cuttings and the other by sowing.

(2) *Seeds and the treatment*:—As said above, always good seeds are collected to assure good percentage of success. In Mudumalai range seeds are soaked in kerosine oil to prevent them from being eaten away by white ants and such other insects. Seeds are liable to insect attack especially when they are dibbled in the hot weather early before rain. I had no opportunity to observe whether treated seeds give good results or the

untreated ones. It is good if the seeds are treated in kerosine oil which does not harm them in anyway but secures the safety of the seeds. The seeds can also be treated with red lead.

(3) *Method of sowing*:—(a) *Dibbling*—After working the soil to the depth of 6" seeds are dibbled under *Acacia arabica* 2' to 4' away from the trunk, before the rains begin, and that has given good results in the college area, now stocked with over 2000 sandal trees and seedlings. In the Mudumalai range the selected area was burnt, some existing host trees left standing and the area was for a year with the Ponamdars who took the agriculture crop. In the next year sandal seeds 10 to 12 in number were dibbled 12' x 12' at every stake along with dhal. Dibbling was done in the month of May. After nine months in the month of February we enumerated the area and the results of the enumerations made before, along with our result are as follows:—

On the 11th June germination had taken place at 40 stakes.

On the 14th June germination was found at 76 stakes.

On the 26th June 384 seedlings were found.

On the 3rd July 434 „ „

On the 10th July 718 „ „

On the 23rd July 3440 „ „ [This was approximately 50 P. C. in the total area.]

On 23rd January of the following year we enumerated a portion of the area which was 2.3 acres, in which total number of stakes was 739 out of which total number of stakes with plants was 403. Thus the percentage of success was 55. On 403 stakes the total number of plants enumerated was 517 because 3 and 4 plants were seen at one and the same stake. The majority of the plants were growing very vigorously and very few showed signs of death.

(b) *Dumping*:—In East Denkanikota, seeds are put in dumps. Soil is worked upto the depth of 6". A layer of sand is put on which seeds are dumped close together. These are covered with grass and the dumps are watered. As soon as germination is seen the grass is removed. Dumps are generally made in the nursery or in the forest itself very early in hot weather with the object of raising seedlings for transplanting during rains. I saw very small dumps in the Research areas, where 100 P. C. of germination was noticed.

(c) *Transplanting*:—Seedlings can be grown in nursery and transplanted easily in the forest. In the College area, seedlings are raised in the nursery and transplanted under host trees, which seems to be a good method. As it is a root parasite it is good if sandal seedlings are transplanted along with small host plants or it should be put amidst hosts such as grass, creepers, etc. where it can establish itself soon. In Denkanikotta East range we saw an attempt made to regenerate sandal by putting transplants raised from dumps in bamboo areas. Seeds of host trees such as *Dalbergia latifolia* and *Pongamia glabra* were sown. After eight months we did an enumeration and found that the percentage of success was 50. As far as regeneration is concerned it can be called a success to some extent looking at the healthy nature of the plants. This was an attempt of the department to raise sandal on bamboo areas. Mr. C. C. Wilson while examining us at Nedungayam has remarked that "bamboos are the best host for sandal". But with what I have observed I should like to say something else on the point. I have seen in the college area sandal growing very vigorously with only one or two bamboos as host, thus I think if a solitary bamboo clump stands and sandal raised thereunder might give good

results and bamboo may prove a good host but areas which are generally covered with bamboo forest were devoid of sandal seedlings. Those seedlings which were found thriving in the above area were not directly under bamboos, but were found under other thorny bushes. I enumerated one line 3 chains long in which 13 seedlings were found in place of 66 originally put and those that existed were in places as stated above. Those put under the direct bamboo bushes were all dead even though attempts were made to clear the bamboo growth from the top. Also I had an opportunity to see an area which was totally covered with small dense bamboos, and no sandal seedling or sapling was found, but for bamboos, in my opinion the same locality would have produced 25 to 40 sandal trees, as the adjoining area without bamboos was naturally stocked with sandal trees which were enumerated by us.

(d) *Stump planting*.—I had no opportunity to see sandal being tried in large areas by stump-planting, but with what is observed at Denkanikota it can be said that sandal can be regenerated artificially by adopting the stump-planting method. Stumps are prepared from the root and shoot portion similar to those of teak and other species. One year old sandal can be used for stump-planting; we saw an acre stump-planted which was very flourishing and gave 99 per cent. success (as recorded by the R. O.) It was an area under special treatment and care, to be utilized for Research work. It can definitely be said that even under ordinary circumstances stump-planting of sandal can be successfully carried out. It is curious to know that a 2½ years old plant was made use of in preparing the stump. The girth was 2" and it was cut at about 1 foot above the the root column. It was planted on 19-9-31 and was found growing well in the last week of January '32.

VII. *Tending*.—Even though sufficient protection be given it cannot be said that sandal will come out well especially in the first few years. Seedlings of 1 and 2 years of age are at times found dying due to want of tending or being wrongly tended. Tending becomes the most important operation which requires most attention in sandal areas.

VIII. *Weeding*.—Mr. Ricketts has recommended that "special attention should be paid to the weeding and loosening of the soil round young sandal plants. The clearing of undergrowth round a sandal tree should be prevented generally except where there is a thick canopy all round, otherwise young natural seedlings growing thereunder will die for want of moisture and shade. But weeding out, during the rains, of inferior kinds of trees and thorny plants where they threaten to entirely dominate or suppress sandal seedlings should not be lost sight of".

Colonel Campbell Walker seems to imply that "weeding is unnecessary."

Mr. Lushington has remarked in his article in "The Indian Forester" that "In some of the experimental areas the best results have been obtained by lopping the rank growth of annual weeds at a height of about 1 foot 6 inches, and there is little doubt that seedlings perish by damping off owing to a rank growth of vigorous growing annuals. Any removal of thorny shrubs or shade I should however look upon as most injurious to the life of the plant."

I have seen some sample plots in which the area was kept devoid of growth except the existing host trees [scattered] and the sandal seedlings. Those seedlings which were quite free of the undergrowth were looking pale and yellow, while seedlings thriving naturally under

the thicket of heavy bushes were found very healthy as compared to the former, and pushing ahead in spite of the heavy covering round them. The presence of weeds is necessary for sandal, as they serve the purpose of host plants in young age. When looking round the roots of small sandal plants in the college area to ascertain the parasitic nature of the same, it was observed that the roots of small plants were found touching the grass roots on the ground. Because it requires the help of host plants to grow, it is raised artificially along with Dhall and other species. Though it does not require clear weeding yet it does require a sort of tending quite distinct from the removal or uprooting of weeds.

IX. *Pruning*:— Mr. Rickets has recommended this, and also Colonel Campbell Walker prescribed the lopping of double stems and root suckers. Mr. P. M. Lushington has remarked that "the best results in wood are often obtained from irregularly grown wood, double stem trees, and further regarded the production of root shoots as a useful means of regeneration." As I had no opportunity to see this operation being carried out, no definite opinion can be given, but still I should like to remark from the felled trees observed that "trees with single stem give more heart-wood than those with double stems. This applies to trees forked at the bottom i.e. at the height of 6" to 12" from above the ground. No pruning of stems can be recommended in the young stages of the plant as it is very difficult to judge the future of sandal seedlings. I think it is better to grow two distinct trees of sandal at one and the same place side by side and would recommend to prune the branch of a tree if the stem forks at 6" to 12" from above the ground, as this type of forked trees show poor results as regards the production of heartwood."

Thinning:— No necessity of carrying out this operation is observed.

X. *Climber cutting and cleaning*:—This is the only tending operation which should be freely applied in sandal areas. It is a shade bearer in its younger stage, becoming a light demander as it grows older. Tending includes the freeing of the crowns of sandal trees and that of host plants as the case may be, and also cutting down the trees that are interfering with the free development of the sandal. It is difficult to judge at times the amount of tending to be attended to, and also to carry out the operation. Special care should be taken not to endanger the sandal as well as the host. While pruning babul hosts in the college area, the places where we made the cuts were cut clean with saws taking special care not to endanger the bark, and the cut ends were further tarred to avoid insect attacks etc. In case of negligence this may kill the host and hence damage the sandal. Climber cutting should also be paid attention to, because when creepers reach the tops of sandal trees, these bend the trees and thus check the growth. A combined operation of cleaning and climber cutting is carried out at Aiyur in sandal areas having 25 to 30 trees of sandal with an approximate cost of 0-1-6 per acre.

As I have already mentioned, I have tried to record here some of my observations on this most valuable tree in the hope that it will prove of some interest and value.

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The Madras Presidency Olympics

The Madras Presidency Olympic Sports were held on the 29th and 30th of January 1932, by the Madras Olympic Association, on the Madras Cricket Club Ground, Chepauk. The Association had many objects in view for holding these sports, the main of which was to select competitors for the All-India Olympic Competitions. Excluding relay teams, 79 individual competitors took part. It was really noteworthy to see the movements of the Presidency athletes. The heats were held on Friday the 29th, and the finals on the next day. In seven events the competitors broke the Presidency records, and in one event—Six miles race—the All-India Record was broken.

We had entered into the following items:—

- | | | |
|--------------------|------|------------------------|
| (1) Moinuddin Khan | | (1) 120 yards hurdles. |
| | | (2) 100 yards dash. |
| | | (3) 440 yards Race. |
| (2) R. A. Mandke | | (1) 120 yards hurdles. |
| | | (2) 100 yards dash. |
| (3) Ismail Khan | | (1) Half mile race. |
| | | (2) One mile. |

We had to run in heats on 29th for 100 yards, hurdles, and 440 yards race. But the last two races were run on the 30th, as there were few entrants in them. Moinuddin survived all his heats on Friday, Mandke failed to qualify in hurdles but survived his heat in 100 yards. He however failed to qualify in the 100 yards semi-finals.

The next day, in finals, Moinuddin was expected to get some place in his most favourite event—120 yards hurdles, but unluckily he got a fall over the 8th hurdle, up to which he was closely following the 1st man, and so lost the chance. He was also unlucky in 100 yards' and 440 yards' run.

Ismail had to run the Mile race at about 3 p. m. He completed his first three rounds in good speed but was tired for the 4th round, owing to the excessive heat, and thus lost the race. In the half mile he ran with good judgment and was placed 4th. Considering the records of both the events he did good time.

We had of course to face a few difficulties outside the field. In the first place we were not accustomed to the severe heat of Madras and secondly we were not getting our usual diet. These two things had a little adverse effect upon us.

The other difficulty was about the ground. Though the M. C. C. ground is considered the best for Cricket, it is not so for athletics. It is very hard and the spiked shoes do not properly work on it. Runners not using spiked shoes are likely to slip over the turf. Further many items were run rather on different systems. All over the track 3 feet-wide lines were marked and each competitor had to run in his own lane, a system quite new for us.

Now I will touch upon some of the events interesting from our point of view:—

100 yards.—In all the 100 yards' runs, very accurate starts were given. Foul starts were recorded against names of the competitors as the latter were disqualified after three foul starts. We were given sufficient practice in starts and I dare to say our starting was superior to that of the others but we were not so good in our mid run as the other competitors. (Record 10 and 2/5th seconds).

120 yards, Hurdles.—Fixed hurdles were kept. Moinuddin was jumping rather high over the hurdles but the best competitor seemed to have a flight over the hurdles true and close, so that there was the least possible space between the body and the top of the hurdle as they went over. His arm action was also quite good (10 and 2/5th seconds).

Long Jump.—Some of the competitors measured their run by stopping and nearly everybody was good in his jump. The jumps were not so high as they ought to be. Their landing action was quite good. The maximum jump was 21'—7½".

The Mile and Half mile.—These were run as usual. The best competitors seemed to run a well thought-out run. The half mile race was competitive.

6 Mile Race.—This was run on the quarter mile track. The 1st 22 rounds were run with steady and even pace but the last two rounds were much faster.

Every competitor was well equipped and seemed to know exactly what he wished to do.

We are very thankful to the Staff of the College for giving us the unique opportunity to participate in these Sports and to compare our metal with that of others. Our thanks are also due to the Principal, and to Mr. E. S. Dawson, for the interest they have taken in us in connection with these Sports.

THREE COMPETITORS,
(*Madras Forest College*)

Coimbatore Y. M. C. A. Sports. 1932.

These sports were held on Saturday, February 6th, at the Stadium in the Coronation Park. The Stadium was a great improvement on the small track in the Y.M.C.A. compound which was used last year. The heats were held on February 5th and college representatives made their way into all fourteen finals, and were placed first, second, or third in eleven of those finals.

The Forest College won the Institution shield for the second time with 36 points against 23 points of the runners up. This result was earned by team work, and reflects great credit on all college representatives.

Moinuddin Khan, Athletics Captain was second in the Individual shield by only one point. It was hard luck just to miss it as his best race, the 120 yards hurdles, did not appear in the programme.

An innovation in the sports this year which deserves mention was the one mile cycle race, in which we gained first and second places, there being a furlong between the second and third man.

There is plenty of athletic talent among the juniors though at the moment nothing very outstanding, and it is to be hoped that we shall maintain our place and win the Institution shield outright next year.

A. L. GRIFFITH, I.F.S.

EXTRACTS.

I. A Rapidly Developing Softwood Market:

A wood-fibre building board, in which the fibre is mixed with cement, is now being marketed in England, and is described as possessing great possibilities. It is absolutely non-inflammable even though it is composed of 80 per cent. of wood. Virtually the entire contents are wood and Portland cement, and the process of manufacture is so simple as to make it extremely easy of production. Recent developments of this class of product have been rapid, and disintegrated softwood as the main constituent of fireproof building boards is finding a wide use and an increasing demand.

"Treetex" is another of these pulpwood wallboards, a product of Sweden, and now getting an excellent run at home in the building trade. The *Illustrated London News* features it on a special political page which illustrates the manifold uses of this particular fabricated wood board; and explains that the board is made from woodfibre knitted together and immensely strong, which is very rich in dead air-cells, the effect of this being to make it a really wonderful insulating material. Not only does the illustration of this board keep a house warm in winter and cool in summer, but it makes the rooms practically sound-proof and the whole house immune from exterior noise. In such a house, "musical instruments can be loudly played in a room below that in which children are asleep," (Oh, memories of flat-life!) The board can be used both in interior and exterior work. It is finally described by the *Illustrated London News* as "an ideal building material wherever it is desired to deaden sound, maintain a constant temperature, and correct accoustical defects." If these be all true, Sweden, we thank thee!

2. A New Departure in Gramophone Records :

A gramophone record for 3½d ! It seems unbelievable when we are and have been paying such comparatively high prices for our records. However, the discovery of a method of treating resin so that it gives a tremendously hard and long enduring surface to paper even when scratched continuously by a gramophone needle, has made such a revolutionary thing possible. People in America, where this valuable invention was exploited and has been turned to public advantage, can buy their paper records from their local stores, a new one every week, the "Hit of the Week" series, manufactured by the Durium Products Corporation, New York. The first suggestion that springs to the mind when one hears of a paper record is that of flimsiness ; which again suggests "a short life, but a gay one," as per Peeter Doody in "The Arcadians." However, with the ordinary care and respect that one usually gives to a 4/- or 8/- gramophone record, these paper records will last for a long time ; we speak from experience. And what about quality ? Their sound quality, their playing quality, is every bit as good as that of those we are used to. They are truly wonderful, and the great advantage is not only that they are unbreakable, not only that they are as light as a feather, but that hundreds of them can be packed in a negligibly small space. This hard, durable resin surface, which is merely a microscopically thin coating of "durium," has purely a paper (wood-pulp) base, like a thin flexible card. Its main interest to us is that the manufacture of these records demands still further quantities of woodpulp, and forms still another striking example of the fact that woodpulp from soft-wood timber is being more and more utilised in everyday life, and that nobody to-day can see the end of the

variety of requirements to which it is being put. The new records are retailed at 7 cents in American stores at the present time, and are naturally finding a very big public.

—*Timber growers' Quarterly Review.*

3. "A Free Hand in Forest Thinning" :

By C. R. HECK.—During recent years progress in forest management has been especially characterised by the increased attention given to the question of the influence of light in varying degrees on the development of forest stands. HECK's Manual on Free Forest Thinning recently published at Stuttgart gives a very interesting and illuminating account of the radical changes which have taken place, especially in Germany, in current tendencies in forestry from this point of view.

This work, which may be regarded as the finished result of a lifetime's researches, experiments and observations in connection with forest management, frankly declares war against the older view that no interference in the shape of thinning is ever permissible in the main forest stand and is completely opposed to the rules formerly laid down by G. L. HARTIG.

The leading principle in HECK's theory is that every effort should be made to produce in the stands a sufficient number of trees without branches, straight limbed, healthy and of fine quality, because, as he constantly declares "the better the shape of the tree, the stronger its growth".

The term "free thinning" implies that all forms of human intervention which serve for the production of well formed trunks should be considered as admissible.

The objects however of HECK's principle will not be accomplished unless every effort is made to recognise the best formed stems while the trees are quite young,

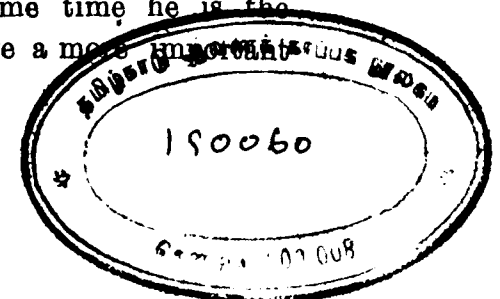
so that suitable treatment may be begun in good time. Lopping should be carried out when the maximum girth of the boughs to be cut does not exceed from 5 to 7 centimetres. All trees, of which the presence is likely to be prejudicial to the growth of the trunks and crown of the permanent elements, should be removed in good time, care being exercised however not to leave any considerable gaps in the leaf canopy and to see that the trunks that are left standing, are properly spaced. At all ages fellings and any other forms of intervention must be carried out with the idea, on which the writer lays constant stress, of "free passage for the strongest." In the struggle for existence, the hereditary aptitude of individual trees is a much more important factor in growth than the results of environment and of working plans. It is precisely for this reason that every encouragement should be given to the vigorous specimens which are bound to survive, so that they may produce fine trunks and crowns, developing qualitatively rather than quantitatively, and thus realise the idea of the "fine forest" which is the true object of the HECK method. The writer has supplemented the crown categories of KRAFT by the addition of seven trunk classes in order to facilitate the constant control of the stronger elements.

In addition he calls attention to the marked difference between free thinning and upper storey thinning, in which the main feature is that the second method, even with its E. degree which is its most important feature, does not begin to give special encouragement to the permanent forest elements till a very late stage and is thus less effective than free thinning.

The writer brings to the support of his theory the results of his lifelong work of research which is described in his book. He draws a comparison between forest

stands regulated for the past 30 years in accordance with free thinning principles and those of similar soils in the neighbourhood managed in accordance with the older methods. He describes the marked differences to be observed as to the number and development of the trees, the advantage being all on the side of free thinning. His experiments and observations deal with the following species, beech, ash, cork oak, spruce and pine, as also with mixed stands of larch, Scots pine and spruce. Regarding the oak he calls attention to the marked difference between the value of the trunks when stripped of branches and of trunks with many branches and knots and shows that fine stems can only be obtained by clearings carried out at as early a stage as possible in young stands. In the case of the ash, having regard to the arrangement of the buds, forked branches should not be allowed and in dealing with Scots pine, the soil and origin of the seeds must always receive attention. Spruce and pine have from the first finer trunks than the other species and it is only necessary occasionally to lop the branches developed in young and not closely growing stands.

Although foresters were interested in the production of fine trunks before the days of HECK, to him is due all the credit for having been the first to recognise the true importance of securing well formed trunks and their superior value. As against the views of the older school he maintains the theory that not only all kinds of trees have their special characteristics but also that all age classes and even all individual trees present particular features which should always be borne in mind, when drawing up forest management schemes and regulations for cultivation methods. At the same time he is the first advocate of the tendency to give a more important



place, as regards the question of thinnings, to true silviculture rather than to quantitative considerations, and is responsible for the present day general tendency to pay closer regard to quality than to numbers.

G. L.

4. Reafforestation in New Zealand :

According to Mr. Alec R. ENTRICAN this country has undertaken afforestation operations on a larger scale than any other country in the world, excepting Japan. Its present rate of planting exceeds 75,000 acres a year. "A forest conscience" has been awakened, and there has been an application of mass production methods to tree nursery practice. Reduced costs of tree planting and active participation of commercial interests in forestation work are among the results.

The forest policy of New Zealand over many years was the "cut, hack and burn" policy, and in less than 80 years about 77 per cent. of the virgin forests on an area of over 40 millions of acres had been cleared. The result was that prices of timber became extremely high and went on increasing rapidly.

To remedy the situation, the Dominion Government instituted after the war the State Forest Service, the primary object of which was to secure the economical use of all forest land whether forested or not, and thereby to ensure to the country a perpetual supply of wood products, while at the same time preventing soil erosion and regulating stream flow.

The Dominion is divided into seven forest conservation regions, each being in charge of a conservator of forests who is responsible for timber sales, fire protection and reafforestation work. Separate branches deal with silvicultural research and experiment stations and with forest products research.

With the exception of a few species, the same timber trees are found generally throughout the islands constituting New Zealand and form forests with sub-tropical characteristics. * * * The Forest Service deals at the present time with over seven and a half millions of acres of State forests, or 60 per cent. of the forested land.

A survey of the timber resources of the forests shewed that only twelve million acres or 18 per cent of the total land area of New Zealand remained under forest, and that of this area only six million acres carried merchantable forests. The annual net increment was only 11.3 cubic feet per acre.

The total annual increment (taking the hard and soft woods together) was 69 million cubic feet, whereas the total wood requirements of the country approximated to some 82 million cubic feet.

To meet the problem of establishing within 50 years a forest capital which would at least meet the country's domestic timber requirements, rapidly growing softwoods were introduced, notably from the Pacific coasts of North America, and in particular, *Pinus radiata*, *Pinus ponderosa*, *P. Laricio*, *Pseudotsuga taxifolia*, *Cupressus Lawsoniana*. The average annual increment of these introduced species is estimated by the Forest Service to be about 250 cubic feet per acre, a remarkably high figure showing the very rapid growth of these trees in New Zealand.

The forestation was begun in 1921, and by the end of the 1929 planting season it was estimated that the State Forest Service plantations would total 250,000 acres. The total area planted by the local authorities of villages or towns probably approaches 20,000 acres.

As regards forestation carried out with private capital, two kinds of organizations have been formed for

the purpose; the first is the joint stock company, in which each share-holder receives a share of the profits according to the amount of capital invested, while the property in the forests is vested in the company. The second type is a private company with a comparatively small capital; the contributors do not however become shareholders, but receive after a given time a certain area of land duly planted according to a prescribed agreement. The interests of the investors are watched over by trustees appointed by themselves, and the lands concerned are conveyed by means of mortgage to the trustees until the time comes for conveyance to the investor.

Out of 16 companies engaged in forestation operations, six only in 1928 belonged to the second category; but although less numerous they carry out the greater part of the afforestation; one company alone, for instance reported that it had already planted an area of 106,202 acres.

R. W.

—*International Review of Agriculture*, Oct. 1931.

5. Development of Forestry in British Empire :

Sir Alexander Rodger, Chairman of the Department of Forestry, Section K (Botany) of the British Association, gave a short review, on September 25, of the inception and development of forestry in the Empire during the last hundred years. He said that although forestry has, in some European countries, been long regarded as an important part of scientific knowledge, the forest sense and the importance of forestry have only recently begun to come to the fore in Great Britain. With few exceptions forestry was little understood throughout the Empire before the beginning of the present century. Sir Alexander quoted extracts from various

recent forest reports, which showed that, until comparatively recently, the neglect and failure to apply the most elementary principles of forest management have led to direful results. The last twenty to thirty years have seen a realisation of the immense value of the forests of the Empire, depleted as many of them are. Since 1900, and even more since the War, the value of the forests has been continually impressed upon governments by imperial and other conferences. Technical instruction has of recent years made strides, especially in Great Britain, where forest officers are trained for many parts of the Empire, and forest research in India, Canada, Australia and Great Britain has attained an importance never before recognised for it. The skilled use of exotics also has turned out to be of the greatest importance in Australia, New Zealand, India, and elsewhere.

—*Nature*, Nov. 14, 1931.

6 Paper Making :

The digestion of grasses and bamboo for Paper-making.

The rapid expansion in the demand for paper and for newsprint consequent on the spread of education, as well as the habit of wrapping everything up in several coverings of paper or cardboard, is a fact which, besides its special significance as an index of progress, causes concern to those who have to find new raw materials for the paper-maker. Commencing in the period of intellectual revival after the Napoleonic wars, when the consumption of paper per head in Great Britain was only an ounce or so per annum, the demand has continued until today it has been estimated at more than 70 lb. a head.

In America the consumption is still greater, and the world's annual requirements are in excess of twenty million tons. The English Education Act of 1870 is said

to have multiplied consumption by ten within ten years. Little wonder that the demand has outstripped the supplies of raw materials, at first of rags and then of cereal straws first introduced in 1860. Esparto came to the rescue in 1860, but the economic radius of its collection was reached thirty years ago, and the production since has been very regular. Wood pulp first appeared about 1866—70 and has held the field until now, during a period in which a large part of the world's timber resources has been cut, so that to-day great anxiety is expressed for future supplies. The annual cut in the United States is four times the annual growth; in Canada only some twenty-five percent of the original forest wealth is left. Obviously, if the expansion in demand continues, as it will, for cellulose has become a raw product of so many other industries, in particular artificial silk, which has almost unlimited potentialities, new sources of supply will have to be found.

It is obvious that trees are too slow growing to maintain supplies; some pulp wood is a forty years' crop; twenty-five to thirty years is required in Canada to bring a spruce tree to pulp wood size, though in the south with the loblolly pine it is now said to be possible to grow pulp wood in ten years.

The future obviously lies with the grasses, particularly the bamboo, if once satisfactory pulp can be obtained from it. In the past, troubles were experienced in the digestion and bleaching of bamboo cellulose, mostly because the work had been carried out empirically with the scientific assistance of the chemist, and it is largely owing to the systematic work of Mr. Raitt that these difficulties have been overcome.

For twenty-five years, in part assisted by the Government of India, Mr. Raitt has made an exhaustive and

scientific study of the subject, with the result that the problem of the utilisation of the bamboo has been largely solved. Culms of all ages, including the nodes, can be digested, mixed together, with a soda consumption of 16 per cent on the weight of bamboo, and a bleaching powder use of 8 per cent on the pulp at a pressure of 30 lb. of steam, the process only taking 5 hours. A yield of 45 per cent of unbleached and 42 per cent of bleached pulp is obtained by this process.

The book under review is a complete epitome of the subject based on Mr. Raitt's own practical experience; it deals with the analysis, the digestion in the autoclave, and the practical problems arising out of the treatment in large scale operations, and contains an attractive account of the occurrence and growth of the bamboo. A section devoted to the microscopic features is illustrated with twenty plates.

The world's total standing crop of bamboo is enormous. In Burma alone an annual crop of 150 million tons is talked of, much of which could be easily exploited commercially, so that if suitable pulp really can be made from it, a supply which is inexhaustible can be obtained from materials which have no value for any other purpose.—E. F. ARMSTRONG.

—*Nature*, Dec. 5, 1931.

7. New Game Reserves in South Africa:

By Prof: H. B. Fantham.

The conservation of the natural fauna of a country is a matter of considerable importance. With the advance of agriculture and industrial development, the animals of South Africa, as in other parts of the world, have been in danger of extinction. In fact within the last hundred years, six of its unique species have become extinct in

the Cape Province, and many other species are in danger of extinction.

The South African Government has not been unmindful of the interest and value of its fauna, and a number of large and important game reserves have been established. Recently, on July 3, the Government of the Union of South Africa proclaimed three new game reserves, the constitution of which had been approved by Parliament on May 8.

The largest of these new reserves is termed the Kalahari Gemsbok National Park, about 1,800,000 acres (some 3000 square miles) in extent. It is an arid area, situated in the Kalahari thorn country. The elevation is 2000-4000 ft. The vegetation consists mainly of thorn bush (species of *Acacia*), thorn-trees such as the cameeldoorn (*Acacia giraffæ*), which is the most characteristic tree of the region, and sparsely spaced tufts of desert grasses. The rivers are frequently dry sandy beds, which flow after rain, but water can always be obtained by sinking shallow wells. This reserve shelters a number of vertebrates, which feed on succulents and xerophytic vegetation, on which they thrive. These include the graceful and handsome gemsbok (*Oryx gazella gazella*), the red hartebeest, the blue wildebeest, and the springbok. The gemsbok was formerly widely distributed in Southern Africa, but now has become relatively rare and even extinct in many parts of the country. They flourish in the Kalahari wastes, where they roam in herds and feed on succulent roots and underground stems dug out by their hoofs. Under protection in the new reserve they should increase in numbers. In addition to the antelopes mentioned, the kudu occurs in the reserve, klipspringer are said to be present, and wild ostrich are known.

The second reserve is the Addo Elephants National Park. It comprises an area of more than 11,000 acres, well covered with dense scrub and bush. Portions of the Union Forest Reserve and of a number of farms have been combined to form this game reserve, where the now small herd of the southern geographical race or sub-species of the African elephant can live and propagate. Abundance of *Acacia*, succulent *Portulacaria*, aloes, and other succulents provide ample food. A few years ago the Government was obliged to reduce the herd greatly, as they invaded neighbouring farms and did considerable damage. The presence of good watering places in the new reserve, it is hoped, will prevent further damage to cultivated lands by these interesting small elephants. Cape buffalo, which were almost exterminated by rinderpest, still survive in the Addo reserve, and kudu and bushbuck occur in herds. A similar race of elephants occurs in the Knysna reserve, comprising the finest indigenous forests in the Union, and in both the Knysna and the Addo wild pig are abundant, accompanying the elephants and feeding on their droppings, thus aiding in the dispersal of the seeds of trees.

The third reserve is styled the Bontebok National Park, some 1700 acres in extent, and will be a sanctuary for the rarest of the South African antelopes, the bontebok (*Damaliscus pygargus*). For many years this small but most beautiful and richly coloured antelope has been confined to a few farms in this area and has been preserved through the efforts of a few individuals. Formerly it was widely distributed along the coastal strip, and without the active interests of the animal lovers already mentioned it would, without doubt, have become extinct. It is highly important that the

bontebok, the only indigenous large mammal of the south-west Cape, should be given a permanent refuge.

From my friend, Dr. E. Warren, Director of the Natal Museum, I learn that the mountain zebra at Cradock are still not adequately protected. These animals are more beautiful than Burchell's zebra, and have adapted themselves to mountain life and bleak stony wastes. It has been suggested by Sir Lionel Phillips that they should be established in a reserve at Bain's Kloof, and, for the sake of posterity, it is to be hoped that a mountain zebra reserve will be proclaimed in the near future.

—*Nature*, Dec. 12, 1931.

8. Preservation of the Australian Flora and Fauna :

Recently both governments and people have shown an increasing desire to try to save the disappearing animals and plants. This has been evidenced by the passing of the Wild Flowers Preservation Act both in New South Wales and Victoria, and by the extension of the Wyperfeld (Mallee) National Park in Victoria. Other proposed reservations are under consideration.

The Wyperfeld Park, situated about three hundred miles north of Melbourne, now covers thirty-six square miles of country and is one of the most interesting places on an interesting earth. The rainfall is very small, but the Park is traversed by the bed of the ancient Wimmera River, which in geological times flowed into a huge gulf of the sea in the north. The river now runs through the Park about once in ten years and then disappears in the sand north of the Park, but the water remains in the water-holes for three or four years before it evaporates. During the wet period, aquatic birds abound. Water is obtained in the dry period by wells and is used by the birds and animals. Along the bed of the river, red-gum

(Eucalyptus) grows profusely. Away from the river there is the usual semi-desert Mallee country. The birds nest in the red-gums, but apparently feed mainly in the outside country.

The Park is the home of the parrot and cockatoo family, which is increasing in numbers. It also contains emu and some of the black-faced Mallee kangaroo. Its profound interest is the way in which forms of life have survived and thrived in comparatively rainless conditions. The adaptation is remarkable.

Owing to the cultivation of the Mallee, the Leipoa or Mallee hen, popularly known as the Lowan, has practically been driven to seek refuge in the Park, and on a recent visit at least three of the nest mounds were found. There may have been many more, but they are not easy to find in the mallee scrub, as there is no indication of their presence until one walks on to them.

Since the Park has been declared a National Reservation and has been patrolled, birds and animals have increased in numbers. Perhaps one of the most important features of the change is that the people living in the district have begun to take a pride and an interest in this unique portion of the globe.

—*Nature*, Dec. 19, 1931.

9. International Union of the Institutes of Forestry Research :

Congress of Nancy (France) 4-11 Sept. 1932.

General Organisation.—According to the decisions of the Congress of Stockholm in 1929 and to the deliberation of the permanent Committee, the next Congress of the International Union of the Institutes for forestry Research will take place at Nancy (France) from the 4th to the 11th of September 1932. There will be some excursions, before, during and after the Congress with the

object of allowing its members to study on the spot the principal types of French forests and their methods of treatment. The following persons are invited to the Congress: (1) The representatives of the government; (2) All the members of Forest Research Stations who belong to or who desire to belong to the Union in 1932 (each Station can be represented by as many members as desired); (3) Any persons connected with forestry who are on the list as members of the Union.

The Congress properly so called.

The Congress will be divided into 6 sections; (1) Forest Ecology and Sylviculture; (2) Forest-utilisation; (3) Tropical and Mediterranean forest problems; (4) Reafforestation and prevention of erosion in the mountains; (5) Pedological and Climatological Forestry; (6) Protection of the forests divided into 3 sub-divisions; (a) Fire protection; (b) Physiological and cryptogamic diseases of forest trees; (c) Forest entomology.

As the V International Congress of Entomology will take place in Paris during the first fortnight of July 1932, the section of Forest-Entomology of the Congress of the Research-Stations will meet at Nancy in the second fortnight of the same month, in order to allow forest entomologists to be present to both Congress. Forest entomology surveys over France will immediately follow the meeting at Nancy. A special notice will soon be sent on this subject by Prof. HUBAULT, Chief of the entomological section of the French Research Station. According to the established custom, discussions will be led in German, English and French. From the subjects treated, the different sections or sub-sections will meet simultaneously or successively so as to allow the members of the Congress to follow the work of several sections. According to principle, the congressmen are entirely free to

choose the subject of their communication, without reserve provided it deals with questions about forestry or its connections. The classification into one or the other section will be decided by the French committee of organisation. However the following subjects will be specially discussed, and it is therefore necessary that the members of the Congress should study them beforehand. The President of the Union particularly insists upon the point that written reports should be sent by the different institutes on the following subjects: (1) Detailed study of the methods of forestry research (installation of the places of experiments, measurements, wood-mensuration, etc.....) (2) Organisation of the gathering and control of forest seeds; (3) Pedological nomenclature.

(1) *Excursions*.—A survey of about ten days will be arranged *before the Congress*; its subject will be to give a general view of the principal forest regions of France. (2) *During the Congress* one or two excursions will be made in the immediate vicinity of Nancy. (3) *After the Congress*—Three voyages of about a week each will be organised at the same time in order to allow the members of the Congress to study more particularly a certain district or special types of the forests according to their own preference.

P. H. GUINIER,

President of the International Union.

10. The Tanning Value of *Anogeissus latifolia* leaves.

In a previous number of this BULLETIN (1929, 27, 452) a report was published on the results of investigation of three samples of leaves of *Anogeissus latifolia* collected in Madras. The leaves had been prepared by the

customary method of drying in the shade. As, however, difficulties had been experienced in the past in shade-drying large quantities of the leaves, the Imperial Institute suggested that it would be desirable to determine the quality of leaves prepared by drying in the sun. In response to this suggestion three samples of sun-dried *Anogeissus latifolia* leaves were forwarded by the Deputy Forest Utilisation Officer, Chempauk, Madras, in May 1930.

The samples were as follows:—(a) "*Pale green tender leaves*."—Thin dried leaves, up to $1\frac{1}{2}$ in. in length and from $\frac{3}{8}$ to $1\frac{1}{4}$ in. broad. The colour varied from pale green to reddish-brown. The majority of the leaves were broken, and a fair proportion of stalk was present. The material generally resembled Sample A of shade-dried *A. latifolia*, which was dealt with in the previous report, but the latter was free from stalk and the leaves were larger. (b) "*Large green tender leaves*."—Pale green leaves, from 1 to $2\frac{1}{2}$ in. in length and $\frac{3}{8}$ to $1\frac{1}{4}$ in. in breadth. The sample was in clean condition and almost free from stalk. The material was similar to that of the shade-dried Sample B previously examined, but the leaves were paler and slightly smaller. (c) "*Very young leaves and top-shoots*."—Small broken leaves and stalks, brownish-green to dark reddish-brown in colour. The few unbroken leaves present measured $\frac{1}{2}$ to $\frac{3}{4}$ in. in length, and $\frac{1}{4}$ to $\frac{3}{8}$ in. in width. The sample resembled the shade-dried "Dhawa Sumac" described in the earlier report, but contained less stalk.

The samples were examined with the following results, which are shown in comparison with those obtained for the shade-dried materials previously reported on:

	Sun-dried samples.			Shade-dried samples.		
	A Small leaves	B Large leaves.	C "Dhawa Sumac" (young leaves and stalks).	A Small leaves.	B Large leaves.	C "Dhawa Sumac" (young leaves and stalks).
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Moisture ...	11.8	11.5	12.7	12.8	12.3	14.0
Insoluble matter ...	42.9	53.9	37.0	44.3	44.5	33.7
Extractive matter (non-tans) ...	17.1	15.1	15.2	10.0	11.0	13.8
Tannin ...	28.2	19.5	35.1	32.9	32.2	38.5
Ash ...	3.7	4.6	4.0	4.4	3.9	4.0

—*Bulletin of the Imperial Institute*, July 1931.

11. International Congress of Timber and Sylviculture.—

The Congress International du Bois et de la Sylviculture was held in Paris from July 1 to 5, 1931, under the auspices of the International Colonial Exhibition (1931). The principal objects of the Congress were to bring together persons interested in forest protection and the production and consumption of timber; to consider the economic, technical, industrial and commercial questions involved, with a view to international agreements and standardisation; as well as measures best adapted to the conservation and improvement of forests, the restoration of denuded areas and the utilisation of vacant land; and to discover better methods of handling woods and of utilising forest products.

The Congress was organised in four Groups dealing respectively with the following subjects: *Group I*, Tropical and Sub-Tropical Woods; *Group II*, Sylviculture, Forest Management, Forest Economics and Legislation; *Group III*, the Timber Trade and Industry, and International Relations; *Group IV*, Technical Education.

Of the resolutions approved by the Congress for submission to the appropriate authorities, those adopted at the instance of Group I included recommendations concerning (1) measures for the exploration, protection and improvement of forests, the preparation of "forest floras," and the technical study of tropical woods; (2) regulations affecting the exploitation of timber and improved methods of timber production; (3) improvement of the accommodation and handling of timber stocks at the ports and on board ship; (4) standardised nomenclature of tropical and subtropical woods, and the need for the maintenance by importers of stocks of approved colonial timbers; (5) research into the industrial utilisation of timbers. These resolutions included two proposed by J. Burt Davy (Oxford) relating, respectively, to the need for the creation of forest reserves on the watersheds in tropical Africa, and the publication of an international list of tropical and subtropical trees.

—*Bulletin of the Imperial Institute*, Oct. 1931.

12. Mysore Sandal oil factories :

The Mysore Forest Department supplied 1,414 tons of sandalwood to the sandal oil factories during the year ending 30th June 1931, as against 2,271 tons during the previous year. The sales effected during the year amounted to 155,905 lbs. as against 194,226 lbs during 1929-30. The fall in the sales was due to the continued slackness in the demand for luxury articles. The sand-oil factory at Bangalore was closed down from 1st January 1931, and all distillation work concentrated in the Mysore factory.

—*Extract from Mysore Administration
report for 1930-31.*

13. "Pinus insignis" pulp excellent :

According to Mr. Brookes, chairman of Directors of the Australian Paper & Pulp Co. Ltd., *Pinus insignis* is eminently suited for certain types of pulp, and makes an excellent kraft pulp. Where it has been tried in Australia, it has been found to be almost as good as the best kraft pulp than can be obtained from Sweden.

—*N. Z. Herald* 5-9-31.

14. Fireproof wood a fact :

Henry Klein, of Elmhurst, Lond Island, has succeeded in producing a wood that is fire-proof. Not only does it refuse to burn but it also refuses to allow heat to get through, so that a raging fire out-side a room would not affect the temperature of the room for at least an hour.

Smoke is the cause of most panics in large fires and smoke cannot penetrate this chemically treated wood. Mr. Klein has been experimenting for years to produce such a wood and states that he has evolved the process by taking advantage of the natural heat resisting qualities of wood.

—*Canadian Woodlands Review*, July, 1930.

15. The following is a copy of an application for a guard's post addressed to the District Forest officer. Madara :

"I humbly request your Honour to be kind enough to provide me with an employment in you forest range in Guard post at any range under you custody.

The structres of my body as follows :—

I am 5½ ft. long and the circumstances of my body is 33 inches and I am 27 years old."

Swimming Competitions at Nedungayam.

On the 16th of December 1931 a well arranged programme of swimming Water Polo etc. was gone through, lasting for about 50 minutes, starting from the 'Medal race' and ending in 'Water-polo'. The chief feature of this year's programme was the introduction of races in which competitors could only use a certain kind of stroke.

The Medal race (About 150 yds.).—At exactly 5 P.M. the 'Medal race' started from the lower rock, near the middle pier of the new bridge. Students Moinuddin, J. M. Singh, K. C. Raj, H. P. Sanap, T. K. Bhagwat, V. C. Yellamalai and R. C. Parikh took part in the competition. H. P. Sanap (Bombay) finished the race within 2 minutes (Last year's record being 2 minutes 50 seconds) with his stylish 'Trudgen-crawl' 'Trudgen' strokes at intervals. Then came Moinuddin after one minute, followed by K. C. Raj and V. C. Yelamalli after 10 and 15 seconds respectively. All the competitors completed the course.

The beginners' race (Distance about 40 yds.).—Students B.T. Biniwale, V.N. Sharangapani, A.N. Mahakud M. A. Naik and Z. Ariel were the competitors for this race. M. A. Naik had the good luck to reach the destination first with his 'broken' over-arm strokes. Second was V. N. Sharangapani who came with left hand 'side strokes'. Z. Ariel and Mahakud also finished the course. Biniwale being unable to complete the race, got on the bamboo raft which was kept in readiness to rescue the swimmers if need be. It was really interesting to see the beginners' swimming race and how they struggled with the distance.

'Back Swimming Race (Distance about 50 yds.)—The competition between M. Alikhan and H. P. Sanap

in this race, was keen. From the beginning to the end of the race, they were nearly touching each other and student Alikhan was declared to be the first.

Then followed the *breast-stroke swimming competition (Distance 50 yds.)*:—Moinuddin finished the race first, with his well-worked breast strokes. Mahamood Raj, and Bhagwat came serially afterwards.

Then came the interesting and exciting event of the day, viz. the game of 'Water-polo'. Two teams were framed and the game was played 5 minutes.

Mr. C. C. Wilson, Conservator of Forests, Working Plans Circle, Mr. R. S. Browne, District Forest Officer, Nilambur, Mrs. Browne, and Mrs. Wrench graced the occasion by their presence. The Principal acted as judge, and the Second Senior Instructor as starter.

—A SWIMMER.

**List of books etc. added to the Madras Forest College
Library since August 1931 to end of January 1932.**

1. Annual Forest Administration Report of the Bombay Presidency including Sind, for 1929-30. Parts I and II.
2. Progress Report on Forest Administration in the North West Frontier Provinces, for the year ending 31-3-1930.
3. Madras Agricultural Department Year Book. 1926, 1927, 1929.
4. Progress report of the Imperial Forest College, Dehra Dun, for 1929-30.
5. The Indian Forest Records. Chemistry Series. Vol. 16. Part II.
6. Ditto Entomology Series. Vol. 16 Part III.
7. Annual Progress report on Forest Administration in the Provinces of Bihar and Orissa for 1929-30.
8. Burma Forest Bulletin No. 19. Botanical Series. No. 1.
9. Flora Siamensis Enumeration; a list of the plants known from Siam. Vol. I. Part IV.
10. Report on Public Instruction in the Madras Presidency for 1929-30. Vol. I and II.
11. Fauna of British India Series — Coleoptera — Staphylinidae Vol. II.
12. Ditto. Cestoda Vol. II. By T. Southwell.
13. Burma Forest Bulletin No. 23. A note on Burmese Lagerstroemias. By C. E. Parkinson, D. C. F.
14. The digestion of Grasses and bamboos, for paper making. By W. Raitt.
15. Ceylon Forest Administration Report for 1930.
16. Residential Buildings suited to India. By R. S. Deshpande.
17. Notes on Building construction, By K. N. Ayyangar.
18. Do. on Building materials, By do.
19. Madras Civil Medical Code. IV Edition Vol. II. 1931.
20. Fauna of British India Series. Reptilia and Amphibia. Vol. I Loricata, Testudines. By M. A. Smith.
21. The Indian Lac Association for Research. A practical Manual of lac cultivation By C. M. Glover.
22. Flora of the Presidency of Madras. Part IX. (Gamble) By C. E. C. Fischer.
23. Annual report of Working Plans, Silviculture and Entomology in Burma. For the year 1930-31.
24. Forestry Commission. Bulletin No. 12. Forest Gardens.
25. Road making and Road using. By T. Salkield.
26. Indian Year Book, 1931.
27. Manual of Statutory Rules and orders. (As corrected upto 1-10-1930).

Departmental Notifications.

16—11—31. The following promotions of Rangers are ordered. Though the vacancy is a permanent one, it is now filled on a temporary basis with reference to G. O. No. 810 Public (services) dated 5—8—1931.

With effect from 31st July 1931 vice Ranger S. Chidambara Ayyar, Fifth grade, deceased.

1. M.R.Ry. A. Muthukrishnan, from Fifth grade sub-protem to Fifth grade (temporary). 2. M.R.Ry. M. Subba Rao, from Sixth grade permanent to Fifth grade sub-pro-tem. 3. Mr. Abdul Khalak Sheriff, from Sixth grade sub-pro-tem to Sixth grade (temporary). 4. M.R.Ry. M. S. Krishnaswami Ayyar, from Seventh grade permanent to Sixth grade sub-pro-tem. 5. M.R.Ry. S. Narayanaswami Ayyar, from Seventh grade sub-pro-tem to Sixth grade (temporary). 6. Mr. A. Arogyaswami Pillai, from Seventh grade temporary to Seventh grade sub-pro-tem. 7. Mr. V. N. Leapingwell, Supernumerary Ranger to Seventh grade (temporary).

23—12—31. *From 31—7—1931 to 30—9—1931 in the temporary vacancy caused by the reduction of Ranger A. Bhavayya from the Fifth to the Sixth Grade :—*

M.R.Ry. K. Jayarama Ayyar, from Sixth grade permanent to Fifth grade sub-protem.

24—12—31. *From 31st July 1931 to 31st August 1931 in the temporary vacancy caused by the reduction of Ranger, B. Krishna Rao, from the Sixth to the Seventh grade :—*

M.R.Ry. M. M. Mandanna from Seventh grade permanent to Sixth grade sub-protem.

First Circle.

20—11—31. M.R.Ry. P. Gopalakrishna Rao, Forester, M.R.H. and Ag. Ranger Seventh grade, will continue to act as Ranger Seventh grade for 4 months from 22—10—1931 vice Ranger P. Doraiswami Ayyar granted extension of leave. 2. Mr. Abdul Razack, Forester M. R. H. and Ag. Ranger Seventh grade, will continue to act as Ranger Seventh grade for 15 days more from 9—11—1931 vice Ranger C. G. Krishna granted extension of leave.

14—12—31. M.R.Ry. P. Dhananjayarao, Ranger Third grade S.P.T. is permitted to affix the Christmas and New year holidays of 1931—32 to the two months leave granted in this office S. O. No. 73 of 31 dated 28—10—31. 2. On return from leave he is posted back to Golugonda Agency Range, Vizagapatam Division.

15—12—31. Mr. Abdul Razak, Forester M. R. H. and Ag. Ranger Seventh grade in charge of Chandragiri Range, Parlakimidi Maliahs will continue to act as Ranger Seventh grade from 24—11—31, vice Ranger K. R. Krishna Ayyar on leave.

19—12—31. 1. M.R.Ry. D. Krishnaswamiah, Ranger Sixth grade from Udayagiri Range to the charge of Cherla Range (Upper Godavari).

2. M.R.Ry. N. Chakrapani Ayyangar, Ranger Sixth grade, from Cherla range to the charge of Udayagiri Range (Nellore District).
- 23—12—31. M. R. Ry. T. Balaramaswami Naidu, Ranger Sixth grade, Balliguda, Ganjam Division granted leave on average pay for 2 months from 5—11—31.
- 23—12—31. M. R. Ry. T. Balaramaswami Naidu, Ranger Sixth grade on expiry of leave on 4—1—1932, posted to charge of Berhampur Range. Ganjam Division in relief of Ranger, M. Subbarao. 2. M.R.Ry. M. Subbarao, Ranger Fifth grade S.P.T. on relief by No. 1 posted for special duty under D. F. O., Lower Godavari for 3 months or until further orders.
- 10—1—32. M.R.Ry. A. Neeladri Rao, acting Ranger Seventh grade. Balliguda Ganjam Division will continue to act as Ranger Seventh grade from 5—1—32 until further orders vice Ranger Chenchurama Naidu on leave.
- 23—1—32. On expiry of the leave granted to him (1—2—1932) M.R.Ry. A. Subrahmanyam, Ranger Seventh grade, posted to Narasapatam Range, Vizagapatam District. 2. On relief by No. 1 Mr. C. S. King, Ranger Second grade, granted leave on average pay for 3 months.
- 23—1—32. The leave on average pay on medical certificate for 4 months granted to M. R. Ry. B. Chenchurama Naidu, Ranger, Third grade is extended by 4 months.

Second Circle

- 10—11—31. M.R.Ry., H. Thammayya Ranger Third grade Sidhout Range Cuddapah North Division granted leave on medical certificate for 4 months from date of relief by No. 2. 2. M. R. Ry. B. Gulab Singh M. R. H. on special duty in Gundlabrahmeswaram Range Kurnool West Division posted to Sidhout Range, vice No. 1. (This cancels his posting to Chitvel Range and also the transfers of Rangers S. M. Krishnaswami Ayyar and S. Sankaran).
- 1—12—31. M.R.Ry., K. R. Viswanatha Ayyar Ranger Third grade, Kurnool South Division, granted extension of leave on medical certificate on half average pay for 4 months from 23-11-1931 in continuation of the leave already granted for 3 months from 23-8-31.
- 4—12—31. M. R. Ry., I. Subrahmanyam Nayudu M. R. H. posted to officiate as special duty Ranger, Kurnool South Division, with effect from 23rd November 1931. He will draw the pay of the last grade Ranger from that date as long as he is on special duty in Kurnool South Division or until further orders.
- 18—12—31. M. R. Ry., Y. Subrahmanyam Nayudu, special duty Ranger, Kurnool South Division posted to Perumamilla Range, Cuddapah North Division.
2. M. R. Ry., N. Rajagopal Chetty Ranger, Seventh grade Porumamilla Range granted leave on medical certificate on average pay for 2½ months from the date of relief by No. 1.

- 18—12—31. Mr. S. M. Ansur Ali, Forester, Kurnool West Division posted as special duty Ranger in Kurnool South Division to lay out and survey Coupes in Chelama Range with headquarters at Chelama.
- 31—12—31. M. R. Ry., K. R. Viswanatha Ayyar Ranger Third grade Kurnool South Division granted extension of leave preparatory to retirement for 3 months and 9 days on half average pay from 23-3-1932 in continuation of leave already granted for 4 months from 23-11-31.
- 11—1—32. M. R. Ry. K. S. Ramiah Ranger Fourth grade (Sub protem) in charge of Dhone Range, Kurnool West Division granted leave on average pay for 4 months from 30-1-1932 or date of relief. 2. M. R. Ry., T. K. Ramaswami Ayyar Ranger II grade (Kurnool South Division) on expiry of his leave (29-1-1932) posted to charge of Dhone Range.
- 16—1—32. M. R. Ry., K. R. Viswanatha Ayyar Ranger III grade Kurnool South Division granted extension of leave (preparatory to retirement) for 7 months and 13 days on half average pay from 23-3-1932.

Fourth Circle.

- 18—12—31. M. R. Ry., K. P. Chathu Nayar, Ranger Fourth grade, Central Salem Division is on return from leave posted to Tiruvannamalai Range, Vellore division, in relief of T. N. Vedantaramanujam, Trained Forester.
- 18—12—31. M. R. Ry., P. A. Krishnaswami Mudaliar, Ranger IV grade, Vellore division, granted extension of leave on medical certificate for three months on half average pay in continuation of the leave granted to him.
- 22—12—31. Mr. T. N. Vedantaramanujam, Trained Forester, in charge of Tiruvannamalai Range on relief by M. R. Ry. K. P. Chathu Nayar, Ranger Fourth grade, will remain in the Vellore division on special duty.
- 29—12—31. M.R.Ry., C. Karunakara Menon, Range Fourth grade, Anchetti, granted leave on average pay on medical certificate for 3 months from date of relief (subject to eligibility).
2. M.R.Ry., M. Pakkyanathan, Ranger, Denkanikota West will be in additional charge of the Anchetti range until further notice Vice No. 1.
- 4—1—32. M. R. Ry., T. N. Vedantaramanujam, Trained Forester, Vellore division and posted to the charge of Anchetti Range.
- 24—1—32. M. R. Ry., T. E. Varadachari, Ranger Third grade, granted further extension of leave for 2 months.

Fifth Circle.

- 13—11—31. M. R. Ry., P. Ramaswamy Ayyar, Ranger Fifth grade, Pollachi Range, granted leave on average pay for 3 months with effect from the date of relief.
- 23—11—31. M. R. Ry., S. Sundaravaradachari, Ranger Third grade, on expiry of his leave, to Pollachi Range. This cancels his previous posting to Kannikatty Range, Tinnevely District.

2. R. Rama Ayyar, Ag. Ranger Seventh Grade, will, on relief, remain attached to the South Coimbatore Division for employment as Ag. Ranger in charge of Ulandi Range if and when it is found necessary to relieve Ranger Mr. Coates.

23—12—32. (1) M. R. Ry., T. Kondathu Goundan, Ranger Fifth grade, on expiry of his leave is posted to charge of Kollegal Range. (2) Mr. A. B. Fenn, Ranger Fifth grade, on relief by No. (1) is granted leave on medical certificate for 3 months.

23—12—31. A. Sitharama Sarma M. R. H. Forester is posted to charge of Pollachi Range, South Coimbatore Division. (2) M. R. Ry. S. Sundaravaradachari, Ranger Third grade, North Coimbatore will rejoin duty in Ulandi Range South Coimbatore Division as Range Officer of that Range on the expiry of his present leave or any extension thereof. His posting to Pollachi is cancelled.

13—1—32. M. R. Ry., C. S. Ramanathan, Ranger Third Grade, attached to Tunacaduvu Range, South Coimbatore division, granted leave on average pay for 3 months from the date of relief.

Sixth Circle.

2—1—31. 1. M. R. Ry., K. R. Krishnan Nair, Ranger Second grade, on return from leave on 11th January 1932, posted to Shankaranarayana Range. 2. On relief by No. 1, M. R. Ry. M. N. Raman Pillai, Ranger Third grade in charge of Shankaranarayana Range, granted leave on average pay without medical certificate for 2 months and 21 days.

3—12—31. M. R. Ry. T. G. Sankaran Nair, Ranger Fourth grade on the expiry of the leave posted to South Mangalore Division.

16—12—31. 1. M. R. Ry. J. S. Rowland, Ranger Third grade, Coonoor Range, to Bolampatty Range, Palghat division. 2. M. R. Ry., R. Alagiriswamy Naidu, Ranger Third grade in charge of Bolampatty Range, to Coonoor Range. 3. M. R. Ry., T. D. Ponniah, Ranger Fourth grade in charge of Ootacamund Range, will relieve No. 1 and hold charge of Coonoor Range in addition to his own until No. 2 joins duty and discharge the current duties.

20—12—31. M. R. Ry. N. Gopalan Nair, Ranger First grade, in charge of the Sultan's Battery Range, Wynaad division, granted leave on average pay without medical certificate for 4 months from 15th January 1932.

2. M. R. Ry. C. Sankunni, Ranger I grade, doing special duty in Chedleth Range, posted to charge of Sultan's Battery Range, Wynaad division (Vice No. 1).

25—12—31. Mr. Khan Sahib K. Kunthiroyan Sahib, Ranger I grade sub-protem in charge of Amarampalam Range, Nilambur division granted leave on average pay for one month and six days from 15th January 1932.

2. M. R. Ry. M. M. Mandanna, Ranger VIII grade, doing special duty in the division posted to charge of Amarampalam Range, (vice No. 1).

Indian Forester Prize, 1932 for past students.

The subject of essay is

"DISCUSS THE FUTURE OF INDIAN SOFT WOODS."

A prize valued about Rs. 25 will be awarded for the best essay for past students.

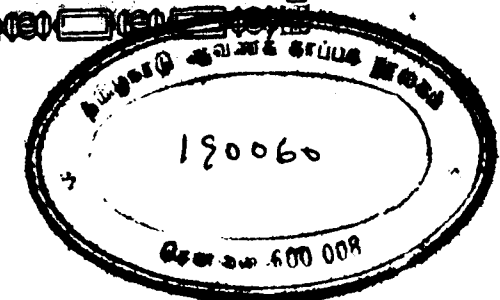
No award will be made unless a satisfactory standard is reached. The essay should be clearly written or typed on one side of the paper only and should not exceed 2000 words. It should be submitted to reach the Principal in May 1932. Essays received later will not be considered. The essay must be the unaided work of the competitor.

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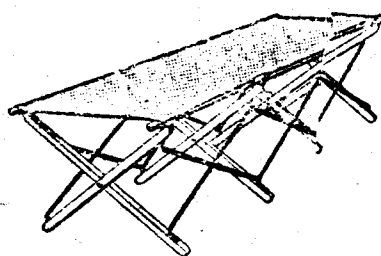


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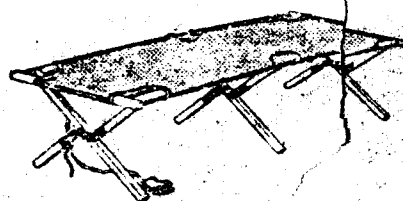
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