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No. . 4

THE MADRAS
Forest College Magazine.

451



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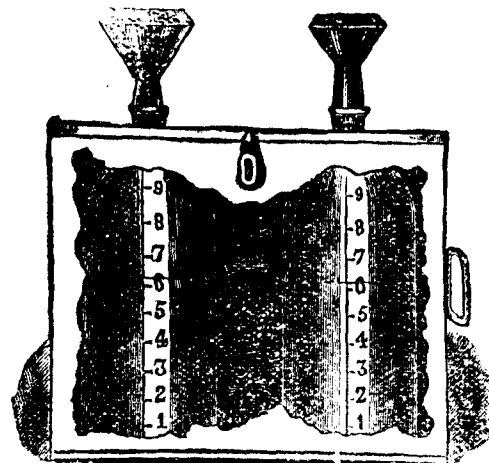
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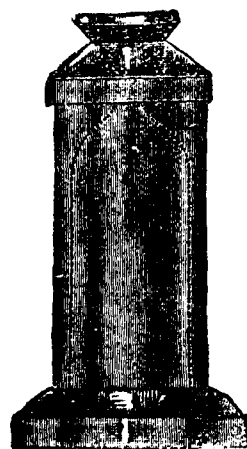
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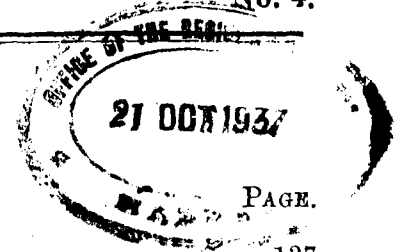
PUBLISHED QUARTERLY.

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THE
Madras Forest College Magazine.
(PUBLISHED QUARTERLY).

Vol. XXI.

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*The Managing Committee do not hold themselves
responsible for opinions expressed
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COLLEGE NOTES.

1. Cricket Matches.

(1) *Forest College, versus Mr. Venku's Coimbatore XI :*
Won by 25 runs :—

On our ground, on Saturday the 27th March, we played the only match of the term against Mr. Venku's eleven. Our last match had been the final of the Y. M. C. A. Cricket Tournament played on the 15th October 1936. As the weather has been hot, we fixed the hours of play from 8 to 11 A. M. and from 3-30 P. M. to 6-30 P. M. — a very agreeable innovation for summer cricket.

The College won the toss, and Abdul Qadir with Koppikar opened our innings, but the latter was soon caught. Bagot joined Qadir and fire-works started. Bagot hit freely all round the wicket, and played a faultless innings of 51 before being l. b.w. to Padmanabhan. Qadir in the meantime was displaying for the first time this season something of his usual form. It was pleasant to watch his individual style of batting. One had fears he would step on his wicket, but it was a good innings of 28 which he made. The others failed except Dileep Singh who made a splendid knock of 38 not out. The innings closed at 10-35 A. M. for 159 runs.

Our opponents commenced their innings at 10-45, and had 45 minutes batting before the lunch interval, and lost 2 wickets. At 3-30 P. M. play was resumed. At one time it looked as if

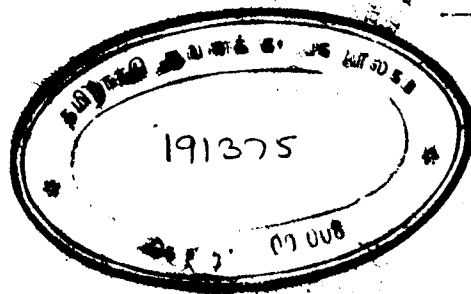
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J.B., d. m 21, 1936

N 37

they would be all out for 80; but Krishnamurthi and Muthu made a good stand, and hit up 82 between them and the innings closed for 134.

The College fielding was smart; three catches were taken by Mr. Khan in the slips, Mr. Longrigg at point, and Umbarji, the wicket-keeper. 6 bowlers were called on, Nadkarni getting 3 wickets, Holkar and Rodrigues 2 each and Dileep, Bagot and Koppikar 1 each. The College is rich in bowling but there was not much sting in it to-day. Umbarji thrice failed to take advantage of stumping. This and our poor bowling I put down to lack of practice. In fact, we do not have time enough this term, seriously to take up Cricket.

SCORE: Forest College.

Md. Abdul Qadir.	28
V. B. Koppikar	4
S. H. Bagot	50
Mr. J. H. Longrigg	2
B. D. Nadkarni	4
Kumar Dileep Singh	
(not out)	38
Mr. R. H. Mitchell	4
Mr. A. A. Khan	7
V. S. Holkar	4
S. R. Umbarje	0
L. H. Rodrigues	8
Extras	10

Total 159

Mr. Venku's XI.

Srinivasan	7
Soori	6
Subramaniam	5
Venku	1
Krishnamurthi	49
Muthu	33
Rajaram	1
Thangavelu	0
Padmanabhan	20
Lakshman	3
Ranganathan	6
Extras	3

Total 134

(2) *Forest College V St. Joseph's College (Coonoor):*
won by 130 runs :—

This game was played on April 18th, on matting on their ground at Wellington. The weather which had been unseasonably wet for many days., proved kind. The boundaries of this ground are short. Three runs are scored for a boundary before or behind the wicket and two on the off side or on side. A hit which clears the boundary counts four, or if a very big hit, it counts six.

Our Captain., Dileep Singh, won the toss and chose to bat. The Principal and Abdul Qadir opened to the bowling of L. Beale and P. Reporter. Runs came steadily until at 23 the first-named was bowled leg stump by a good length off-break from Reporter. Bagot filled the vacancy and at once began scoring rapidly in a beautiful free style. He lost Abdul Qadir at 46 clean bowled by Reporter and was joined by Dileep. There ensued a partnership delightful to watch, with very quick scoring, and some lovely strokes. As he neared his 50, Dileep hit the ball dangerously in the air several times and was the first to go; (127 for 3). Nadkarni followed but failed to settle down. Bagot was top scorer with 64, a fine innings. Holkar, our left-hander made two or three powerful straight drives, including a big hit for 6. Mr. Mitchell hit a fine 6 to square leg straight over the middle of the wind screen of the Principal's motor car, and the car was then moved away to a safe place.

At the luncheon interval during which the teams were most hospitably entertained, the score was 201 for 8 wickets.

The innings closed soon after lunch for 211, Koppikar carrying his bat a careful innings of 15.

P. Reporter was the most successful bowler with 6 wickets for about 12 runs each, and it spoke well for the boy that he stood up to very heavy punishment at times.

St. Joseph's had early disasters, losing 3 wickets before 10 runs were signalled, and at no time did they look like making a stand. They were all out for 81. Nadkarni bowled extremely well making good length balls rise sharply, but without much luck. He bowled 14 overs and got 2 wickets. The batsmen could make nothing of Dileep's fast ball and he took 4 wickets for 10. Koppikar had 2 for 11, Holkar only bowled 3 balls.

As there was still plenty of time, it was decided to give each side 50 minutes batting and see which could knock most runs in that time. Nadkarni unfortunately failed again, but the Principal (who put one on the Pavilion roof) and Holkar put on about 50 and were together at the tea interval. The Forest

College made 88 for 3 in the 50 minutes. St. Joseph's replied with 87 for 6, thus losing this sub-contest by 1 run. Holkar could not find a length and the College dropped 2 or 3 catches, but still it was a plucky partnership by L. Beale (33) and Brother Bergin, the Principal of St. Joseph's (26). A very enjoyable day.

Forest College:—

Mr. J. H. Longrigg	15	retired	25
Abdul Qadir	21	} did not bat	
S. H. Bagot	64		
Kumar Dileep Sinh (Capt)	50		
B. D. Nadkarni	0	...	6
V. R. Holkar	15	retired	24
V. B. Koppikar not out	15	did not bat	
Mr. R. H. Mitchell	8	...	12
Mr. A. A. Khan	6	not out	10
L. H. Rodrigues	6	did not bat	
S. R. Umbarji	2	...	6
Extras	11	Extras	5
Total	211	(3 wkts)	88

Scorer: P. Uttam Singh.
Umpire: D. M. Mannige.

St Joseph's College.

L. Corpl. Bland	0	...	2
Corporal Wragg	14	not out	7
P. Reporter	1	...	4
L. Beale (Capt)	3	...	33
Brother Bergin	20	...	26
Mr. Mc. Cready	0	did not bat	
M. Napier	6	...	3
Labouchardiere	0	did not bat	
Brother Fleming not out	4	not out	1
C. Minchin	0	did not bat	
Brother Kennedy	18	...	0
Extras	10	extras	11
Total	81	(6 wkts)	87

Cricket matches fixed for April 25 and May 2 with Ooty C. C. were cancelled as their ground was unfit owing to rains.

*

*

*

(3) Forest College V. Visitors. On 25th June 1937.

<i>The visitors.</i>	<i>1st innings.</i>		<i>2nd innings.</i>	
	c. Dileep	b. Bagot.	Not out	
A. A. Khan.				37
W. G. Dyson	b. Bagot.		b. Holkar.	9
A. L. Griffith.	c. Wagle b. Nadkarni.		Not out	35
H. P. Ward (Capt)	c. Wagle, b. Bagot.			
J. H. Longrigg	b. Bagot.		c. Rodrigues b. Holkar	11
T. A. Whitehead.	Not out.		c. Holkar. b. Rodrigues.	14
C. C. Wilson.	c. and b. Holkar.			
R. H. Mitchell.	b. Nadkarni.			
J. A. Master	c. Bagot b. Nadkarni.			
A. A. F. Minchin	c. Nadkarni.			
E. S. Dawson.	c. Nadkarni b. Dileep			7
Extras.				
		61		113
			(for 3)	

Forest College.

M. Abdul Qadir	b. Ward.	1
V. B. Koppikar.	b. Wilson.	43
S. H. Bagot.	b. Master.	6
K. Dileepsinh. (Capt)	l. b. w. b. Master	6
B. D. Nadkarni.	c. Wilson. b. —	37
V. S. Holkar.	Not out	63
L. H. Rodrigues.	l. b. w. b. Master	2
S. M. Wagle.	c. Dyson b. Master.	7
P. Indersen	} did not bat.	
S. R. Umbarje		
G. L. C. Amarasekara		
Extras.		16

Total for 7 declared. 181

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This annual fixture completes the College cricket season. On this occasion the visitors were unable to raise a team, so they included 3 members of the staff of the College, but they were no match for the home side. Batting first they were all out for 61, only Mr. T. A. Whitehead who played a very good innings of 26 and was unbeaten, making any resistance. Nadkarni had 4 wickets for 22, Bagot with some very simple deliveries got 4 for 14, Holkar had 1 for 14 and Dileepsingh 1 for 0. The College then proceeded to make 181 for 7 thus winning by 120 runs. Master took 4 wickets for 29 runs.

Batting averages: Season 1936-37.

	Innings.	Runs.	Highest score.	Times not out.	Average.
K. Dileep sinh.	9	432	117	2	61.71
S. H. Bagot.	9	270	64	1	33.75
V. S. Holkar.	9	172	63*	2	24.57
V. B. Koppikar.	9	130	43	2	18.57
A. A. Memon.	4	58	31	1	14.50
Mr. J. H. Longrigg.	4	40	25*	1	13.33
Mr. R. H. Mitchell.	8	104	44	Nil.	13.00
B. D. Nadkarni.	10	116	39	1	12.88
S. R. Umbarje.	6	55	45	1	11.00
S. M. Wagle.	6	52	24	1	10.40
Mr. A. A. Khan.	4	23	10*	1	7.66
M. Abdul Qadir.	8	59	28	Nil.	7.37
L. H. Rodrigues.	7	24	8	Nil.	3.42

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* indicates "not out"

Forest College (batted first).

1st Innings.

S. M. Wagle St. Ward
Mr. A. A. Khan.
Mr. J. H. Longrigg.
V. B. Koppikar.
S. H. Bagot.
L. H. Rodrigues.
V. S. Holkar. (Capt).
A. A. Memon.
S. R. Umbarje.
A. A. Golandaz.
H. I. Shaikh.
Extras.

b. Thangavelu. 1
b. Chokkalingam. 9
b. Thangavelu. 7
h. Thangavelu. 0
1. b. w. b. Thangavelu. 0
1. b. w. b. Krishnamurthi. 17
c. Ward. b. Thangavelu. 16
b. Krishnamurthi. 1
1. b. w. b. Krishnamurthi. 2
Not out. 3
b. Krishnamurthi. 0
Total. 71

2nd Innings.

b. Thangavelu. 6
1. b. w. b. Krishnamurthi. 0
b. Thangavelu. 5
c. Suri b. Krishnamurthi. 5
c. Suri b. Thangavelu. 0
b. Thangavelu. 16
c. Balan b. Krishnamurthi. 1
c. Ward b. Thangavelu. 18
b. Krishnamurthi. 5
b. Krishnamurthi. 9
Not out. 1
Extras. 1
Total. 67

(5) Coimbatore Cricket Club.

A. Suri Sastri.
S. R. Thangavelu
B. S. Krishnamurthi
H. P. Ward (Capt).
K. Padmanabhan.
N. Narasimhan.
K. Srinivasan.
C. B. Chokkalingam.
C. V. Balan.
Doraivelu, not out
N. R. Srinivasan
Extras

c. Khan b. Shaikh. 8
c. Longrigg. b. Koppikar. 1
c. Khan. b. Holkar. 13
b. Rodrigues. 7
b. Rodrigues. 0
b. Holkar. c. Wagle. 13
c. Khan. b. Rodrigues. 5
b. Koppikar. 5
1. b. w. b. Koppikar. 0
b. Holkar. 6
Total. 65

Run out. 4
1. b. w. b. Rodrigues. 6
c. Longrigg. b. Rodrigues. 1
c. Bagot. b. Koppikar. 11
b. Rodrigues. 1
not out. 4
run out. 0
c. Khan. b. Koppikar. 9
1. b. w. b. Koppikar. 12
c. Bagot b. Holkar. 5
c. Golandaz b. Koppikar. 3
Extras. 6
Total. 59

Bowling :—

Krishnamurthi took 9 wickets for 46
Thangavelu 10 „ 50

For the College :—

Koppikar took 7 „ 44
Rodrigues 6 „ 33
Holkar 4 „ 17
Shaikh 1 „ 17

The C. C. C. were not at full strength, lacking at least 3 of their regular players and were narrowly beaten by 14 runs. Scoring ruled low and the game was full of interest up to the last ball bowled. Rodrigues was given his colours at the close. He had a very good match with bat and ball. The bowling performance of Messrs. Thangavelu and Krishnamurthi for C.C.C. deserves high praise. They bowled practically unchanged. On our side Mr. A. A. Khan picked up 4 nice catches in the slips; in fact we could easily have lost this match instead of winning it as we did, if the catching had not been pretty good. Still, we ought to have made many more runs.

2. Hockey Matches.

(1) Forest College versus St. Joseph's College, Wellington.
Lost 0-9 :—

This game was played at Wellington on Coronation day, May 12th. 1937. St. Joseph's playing 3 members of their staff were not at full strength, lacking their centre forward, but were in full practice having just played in the Ghulam tournament. On the other hand, the Forest College had had no game for many weeks, being in camp, and were not favoured by the high elevation of the playing ground at 6,000 ft. Despite these handicaps, the Forest College had as much of the play as the home team for the first 35 minutes or so, and were 3 goals down only because of a weak goalie and of Dileep's inability to take his

chances. Otherwise, our side played a very competent game. But in the last quarter of an hour St. Joseph's overran us and put on 6 more goals.

Goal: S. R. Umbarji.
 Backs: S. D. Misra, S. H. Bagot.
 Halves: M. A. Qadir, E. G. DeSouza, S. F. Uppin.
 Forwards: G. L. C. Amarasekara, L. H. Rodrigues,
 K. Dileepsinh, V. S. Holkar and,
 P. K. Patnaik.

* * *

(2) *Forest College v. St. Joseph's College,*
Wellington, 0-3 Lost:—

St. Joseph's came down on a 16 seater bus and made welcome first appearance on our ground.

Tea was served to the teams at 4-15 P. M. and then the visitors were taken on a tour of the Forest Museum, and the Agricultural College. The match began at 5-15 and two twenty fives were played. Throughout St. Joseph's did more of the attacking, but there was no score until the second half was well advanced. In the closing stages they scored 3 times. The game was fought out at a slow pace, which favoured the home team. Indersen played very well in goal, and it was due to him and to the good play of our full backs that the score was kept down to three. St. Joseph's were short of 3 regular players, but all their players are in full practice and in a few days time they enter the Cordite Factory tournament. They found our ground a trifle slow and perhaps that explains why they did not do better. The Forest College played well, considering that the team had no chance to get together in practice.

Teams.

St. Joseph's College:—

Goal: . . D. Rutter.
 Backs . . Bro. Kennedy: P. Reporter.
 Half backs . . H. Rutter, Bro. Fleming, Bro. Burgin
 (Principal)
 Forwards . . M. Labouchardiere, L. Beale, C. Napier,
 Bro. Fitzpatrick, T. Sweeney.

Forest College:—

Goal . . P. Indersen.
 Backs . . S. H. Bagot, E. G. D'Souza.
 Halves . . S. D. Misra, Abdul Qadir, S. F. Uppin.
 Forwards . . V. S. Holkar, L. H. Rodrigues,
 K. Dileep Sinh, P. K. Patnaik,
 A. Olimuthu.

* * *

(3) *Inter-divisional Hockey for the Cowley-Brown Cup, 1937:*
1935-37 Division, versus, 1936-38 Division.
3 goals to 4.

This annual match was played on June 22nd. It was the best game seen in this competition for years. The Chief Conservator made special mention of it in his speech on Prize day. A large and very interested audience saw the Juniors (1936-38 Division) win by 4 goals to 3 after 2 periods of extra time. At the outset the Juniors swarmed everywhere. They were seen to cut straight down the field with fast runs and in 5 minutes they were 2 goals up, shot by V. S. Holkar and L. H. Rodrigues. It was amazing. At this stage Mr. R. H. Mitchell remarked "the Seniors have not warmed up yet" and he proved to be right. These 2 quick goals thoroughly roused the Seniors. Gradually they took a stronger hold on the game.

It was seen that they were neater and knew more about tactics than their lively opponents. Kumar Dileepsinh scored. Then G. Ananthathirthan made the score 2 goals all and so it was at half time. The Seniors were a little unlucky not to lead at half time, but on the other hand it was the faulty tactics of the Juniors backs, keeping the opposing forwards on-side, which gave away 2 goals.

Early in the first half P. K. Patnaik strained a muscle and took no further part in the game. Early in the second half K. Suryanarayana Sastry, goalkeeper, had his chin cut and it had to be stitched and he took no further part in the game. These disasters to the Seniors were decisive, but no one realised it at the time, so level was the play. The second half was a hard ding-dong struggle with both sides playing much better hockey than in the first half and each scored once, the seniors through Dileep, and the Juniors through B. C. Pal. So at full time the scores were level at 3 goals all. Extra time was played, but no goal came. A second lot of extra time was ordered and it was obvious by this time that the Seniors were feeling the strain of 9 men playing 11. They conceded a corner and from the hit a clean "first time" shot by Rodrigues gave the Juniors the match by 4 goals to 3. Well done both sides, it was a grand game! and the Principal was probably right when he said, as the teams walked off, that the losers were the finest team who ever lost the Cowley-Brown cup.

The Juniors had a big burly bustling side and every man played up to his best. The lessons for them which arise from the match are (i) improve your stick work (ii) improve your tactics; you have the makings of a good side!!

Teams: 1935-37 Division.

Goal: K. Suryanarayana Sastri.

Backs: C. C. Monnappa & F. G. De Souza (Capt.)

Halves: S. F. Uppin, M. Abdul Qadir & M. Zainul Aubideen.

Forwards: P. K. Patnaik, B. D. Nadkarni, K. Dileep Sinh, G. Ananthathirthan, G. L. C. Amarasekara.

1936-38 Division.

Goal: P. Indersen.

Backs: M. F. Hussaini, & S. H. Bagot (Capt.)

Halves: 1. A. Fernandez, S. D. Misra, A. A. Golandaz.

Forwards: A. Olimuthu, B. C. Pal, V. S. Holkar, L. H. Rodrigues, & S. M. Wagle.

Umpires: Messrs. A. L. Griffith and A. R. Brand.

* * *

3. Inder-Divisional Football.

Vira Pambhoi Memorial Cup.

1935-37 Division versus 1936-38 Division.

This annual fixture was played on June 15th, and resulted in a win for the Juniors by 2 goals to nil. After 4 minutes A. A. Menon fell heavily and 3 minutes later he again fell heavily and took no further part in the game, having sprained himself. Deprived of their captain in this way it took the Juniors a long time to settle down, but eventually during a scramble in front of the seniors' goal K. V. B. C. Pal scored at close range with a kick which struck the cross bar and bounced down into goal. P. K. Patnaik had gone off with a leg sprain and could not resume, so, for most of the game both sides were playing 10 men. The teams crossed over at half time with the Juniors leading 1-0. In the second half the Juniors were superior but it was not until the very last kick of the game that they scored the second goal in a scramble.

This was a good game, well contested and every player enjoying it. The Juniors won because they all dashed about with more energy and S. H. Bagot broke up all attacking movements of the Seniors. For the losers DeSouza (goal), Amarasekara and Abdul Qadir played well.

1935-37 Division (Seniors)

Goal: E. G. De Souza.
Backs: G. L. C. Amarasekera, S. Sirajuddin.
Half Backs: Md. Zainul Aubideen, R. P. Patnaik.
Md. Abdul Qadir (Captain)
Forwards: P. K. Patnaik, B. D. Nadkarni, Kumar
Dileepsinh, G. Ananthathrithan and
S. N. Venkatrama

1936-38 Division (Juniors)

Goal: A. A. Golandaz
 Backs: S. H. Bagot, A. Olimuthu
 Half Backs: S. Seshagiri Rao naidu, I. E. Fernandez,
 G. M. A. Khuraishy
 Forwards: K. Narayanamurthi, P. Indersen,
 A. A. Memon (Captain) V. S. Holkar
 K. V. B. C. Pa.

4. Award of Colours for 1936-37:

The following colours have been awarded in 1936-37:—

Hockey:—

K. Dileep Sinh, M. Abdul Qadir, G. L. C. Amarasekara
E. G. D'Souza, S. F. Uppin, S. H. Bagot, V. S. Holkar

Cricket:—

K. Dileep Singh, B. D. Nadkarni, Md. Abdul Qadir,
V. S. Holkar, S. H. Bagot, V. B. Koppikar.

Athletics:—

C. C. Monnappa, K. Dileep Sinh.

Tennis:—

P. K. Patnaik, S. Seshagirirao Naidu.

'June week,' Madras Forest College, June 1937.

We began on Monday afternoon, 21st June, with a display of physical training by about forty students. It was excellent. Next morning, a number of officers visited the Emmanur Research garden, beyond Satyamangalam, the excursion having been arranged by Mr. A. L. Griffith, the Provincial Silviculturist. The round trip from the college and back is 100 miles. Tuesday evening saw the inter-divisional hockey match (Cowley-Brown Cup).* The juniors won a really fine and exciting match. The College won easily their annual cricket match *, against the winners, played on Friday, 25th June.

'Prize-day' was on Saturday, the 26th June. The Hon'ble Minister for Development, Rao Bahadur M. C. Raja, presided, after inspecting the usual guard of honour.

Before a large audience, **Mr. J. H. Longrigg**, the Principal, opened the proceedings with the following address :—

Mr. President, ladies and gentlemen,

“ I believe I am right in saying that this is the first time, Sir, that you have been present at the annual Prize Day of this college.

" We much appreciate the fact that you should find time to come among us and to preside over this function, and on behalf of the College, I offer to you, Sir, our sincere thanks.

“Before requesting you, Sir, to distribute the certificates and prizes, there are one or two points as regards the students now at the College, and their attainments, and the Staff, to which I would like to refer.

“The year has been rather uneventful, but I ought certainly to mention that the College has now completed the first 25 years of its existence, having started work in the year 1912. Twenty

* Fully reported elsewhere in this issue of the Magazine.

five years is but a short span in the life of a college, and I am reminded, Sir, that this same year 1937 has seen the centenary of that famous college in Madras which is your own *alma mater*.

"The number of students in the college is forty seven, made up as follows :—

15, from Madras Presidency, 12, from Bombay, 6, from Indian States, 4, each from Ceylon, Nizam's Dominions, & Sind, and two (private students) from Orissa.

"You will notice how widely we recruit.

Staff: "The college suffered a loss when my predecessor Mr. P. W. Davis went on leave last January, after holding the post for $3\frac{1}{2}$ years. Mr. Davis devoted himself whole heartedly to the interests of the college all the time he was here. Unfortunately we have also to lose Mr. Roland Mitchell next month when he takes a well earned period of leave.

Games: "All the Senior students passed the swimming test held in a river in Malabar.

Cricket	...	Won	6	lost	2
Hockey	...	Won	1	lost	4
Football	...	Won	Nil	lost	1, drawn 1.

"We have in the college at the present time some beautiful players of ball games. I will only mention three performances: one was Student Dileep Sinh's score of 117 runs against Coimbatore Cricket Club, another was Student C. C. Monnappa's record shot-put of 29 feet 9 inches, and the third was S. H. Bagot's Javelin throw of 120 ft. 2 inches, a College and Coimbatore District record.

"I come now to the results of the examinations. 21 students sat for the final examinations. Of these, one obtained Honours Certificate, having secured over 80% of the total number of marks during the course, and at the final examin-

ations. 18 students obtained Higher Standard Certificates, and 2 obtained Lower Standard certificates. All the 21 students passed the examination in First Aid, and will receive the certificate of the Saint John's Ambulance Association.

"The class average of marks obtained in the final examination conducted by outside examiners is 65%, and for the whole course is 66%.

"The Junior Division have done satisfactorily. Out of 26 students, 22 have obtained over 60% and of the rest, only one gets just below 50%. G. N. Mansukhani, a student from Sind, gets the Chief Conservator's prize, as the best student of the Junior Division. He gets 76% marks.

"To all departing students I wish very good luck and a successful future. I hope they have enjoyed their time here, and will remember much of what they have learned.

"I thank you again, sir, for so kindly consenting to preside to-day, and I ask you to present the certificates and prizes:-

The President then distributed the certificates and prizes in the following order of rank :—

Higher Standard with Honours :—

1. B. D. Nadkarni. (Bombay.)

Higher Standard Certificates :—

2. N. P. Choksi. (Bombay.)

3. S. F. Uppin. do.

4. A. G. W. De'Silva. (Ceylon.)

5. S. V. Venkatramanan. (Madras.)

6. G. L. C. Amarasekara. (Ceylon.)

7. C. K. Chaubal. (Bombay.)

8. D. M. Mannige. do

9. W. N. Ramachandani. (Bombay.)

10. K. Surayanarayana Sastry. (Madras.)

11. Muhammad Abdul Kader. (Hyderabad.)

12. Kumar Dileep Sinh. (Kathiawar State.)
13. E. G. De Souza. (Bombay.)
14. G. Ananthathirthan. (Madras.)
15. S. Sirajuddin. do
16. C. C. Monnappa. do
17. S. N. Venkatraman. do
18. M. M. Shaik. (Bombay.)
19. P. K. Patnaik. (Private.)

Lower Standard Certificates:—

20. R. P. Patnaik. (Private).
21. Muhammed Zainul Aubideen. (Hyderabad.)

List of Prize Winners etc.

S. No.	Name of Prize.	Name of Student who obtained it	Nature of Prize.
1.	Gold Medal for the Senior student on marks.	B.D. Nadkarni.	Gold medal.
2.	Silver Medal for Honours.	B.D. Nadkarni.	Silver Medal.
3.	'Campbel - Walker' Prize for the best student in Forestry (in final examination).	B.D. Nadkarni.	(1) Books. viz., <i>Silviculture of Indian trees</i> . by R. S. Troup; 1 set of 3 Volumes. (2) 100 feet steel tape in leather case.
4.	'Lodge' prize for Engineering.	N. P. Choksi.	(1) Rosewood Coffee tray inlaid with figures. (2) Carved Kashmir Walnut wood box.
5.	'Brazier' Prize for the student likely to make the best out door Ranger.	S. F. Uppin.	8 - day Chromium plated metal clock.

6. Madras Conservators' Prize for Survey and Drawing (in final Examination). D.M. Mannige. Wrist watch Rolex make "Tudor" Model.
7. Madras Conservators' Prize for Botany (in final Examination). B.D. Nadkarni. Gold mounted fountain pen and pencil in case (Watermans).
8. Madras Conservators' Prize for Range Administration (In final Examination). G. L. C. Coleman quicklite lantern. Amarasekara.
9. Chief Conservator's Prize for the best Junior Student. G. N. Mansukhani. Field glasses in leather case.
10. 'Indian Forester' Prize for essay. (i) Prize Rs. 30/- cash. I. P. S. Sivaramakrishnan, M. R. H. Bolampatti.
(ii) Prize Rs. 20/- cash. II. S. V. Venkataraman Senion Division.
11. Chief Conservator's Prize for an essay on Natural History. A.G.W. D'Silva. Book. "The Jungle in sunlight and shadow" by Champion.
12. "Richmond Cup" to the student obtaining the greatest number of points in the more important events at the College Sports. C.C. Monnappa. (Replica already given in October 36. Challenge cup given now).

13. "Pentland Shield" for the S. H. Bagot. Miniature Shield.
all-round Athlete.
14. "Fischer Cup" for Tennis. P. K. Patnaik. Cup.
Medal for Runner up B.D. Nadkarni. Medal.
15. Tennis Doubles. V. S. Holkar. Medals.
G. M. A.
Khuraishy.
16. "Mannarghat M o o p i l (1) C. C. Mon- Cup.
Nayar Cup" for Cross nappa.
Country race. (2) S.F. Uppin. Medal.
(Marathon: 7 miles.)
17. Aggregate cup for ditto. Junior Divi- Challenge cup.
sion (A. A.
Golandaz).
18. "Cowley Brown Cup" Challenge cup.
for Inter - divisional Junior division
Hockey. (S. H. Bagot
Captain)
19. Swimming Medal N. P. Choksi. Silver medal.
(140 yards Race).
20. "Vira Pambhoi Football Junior Division Challenge Cup.
Cup." (S. H. Bagot
Captain.)
21. Winner of the best essay in 1st prize: S. V. Rs. 15/- (cash)
Madras Forest College Venkatraman
Magazine, for the year (Senior student)
1936—37. 2nd prize: Mr. Rs. 10/- (Cash)
A. Yagna-
sawmi, B. A.,
M.R.H. Forest
Ranger, Polur.

After distributing the prizes and certificates, the President addressed the gathering as follows :—

"I am grateful to you, Mr. Whitehead, for the honour you have done me by your kind invitation to preside at this interesting function, and the opportunity you have thus afforded me for gaining some knowledge of the Forest College and its working. You were perfectly right, Mr. Principal, when you said that this in the first time I am present at the Annual Prize Day of the College. In fact ever since I became a Minister I have been looking forward for an occasion to visit Coimbatore, and to see for myself the fountain springs of the very many activities of the Agricultural and Forest Departments. Though Madras happens to be the provincial capital, the pivotal centre and capital for these two departments of Government is undoubtedly Coimbatore, as the fountain springs, as I said of these two departments, viz., the Agricultural College and Research Institute and the Forest College, are situated here. I am therefore very happy to be here today in the Forest college, and to meet the College staff and the students.

"I congratulate the College on its having completed the first 25 years of its existence. I also congratulate it on its splendid achievements during those 25 years. I understand that it has so far sent out to the Forests of India and Ceylon nearly 600 men trained in the profession of Forestry. The forests of the southern and the peninsular India, for which the College has been catering in the past — the forests of Bombay, Central Provinces, Bihar and Orissa, Hyderabad, Mysore, Travancore, Cochin and the Central Indian States, where these 600 men must be or have been working — will now be bearing testimony to the valuable training imparted in this institution, and this itself is a record on which the College can look back with legitimate pride.

"With such a record to its credit, it is a matter for great regret that its future should have been coming up for review at such rapid intervals during the past ten years. I find that its future

was in fact hanging in the balance from the time the economic depression which we have just passed through began to make itself felt. It was thought in some quarters that the number of young men trained in the institution every year hardly justified the expenditure incurred on it. But it is unfortunate that the critics have not realised the importance of the institution for our own presidency. Our forests are a national asset. To conserve them, to preserve them, to develop them and to exploit them we want trained men. It is true that there is one other College but that is in far off Dehra Dun. The practical training afforded in the forests in or near Dehra Dun is under climatic conditions widely different from those existing in Southern India, and what is more important, it is essential that our future Rangers should draw their experience from our own rich varied forests. Once these essentials are grasped, I don't suppose that the continuance of the college will be seriously objected to. But I must say that the future of the institution is again under consideration. You may, however, rest assured that I shall strenuously endeavour to see that this Institution is continued, and, what is more, that the question of its closure is not reopened for another ten years.

"Now coming to the event of the day, I warmly congratulate the young men who have done well at the games. I also congratulate those who have come out successful in the final examinations, and those to whom I have first had the pleasure of distributing prizes. The Principal and staff deserve the cordial gratitude of the students as well as of Government for their difficult task, well performed, of turning out in a short space of 24 months, these young men who are obviously capable of carrying on the high traditions of their service.

"Just a word more to the students leaving the College this year. You are going out with the world, and to the forests at that. I wish you every success. I have no doubt that you will always keep before you the traditions of your service. Your important duty in the coming years will be not only administration of forests as you have been taught in the institution you

are leaving, but also the task of teaching the ryot that the forests are ultimately intended for his own benefit, for the benefit of his agricultural operations, for the benefit of his own cattle, and for the benefit of the country at large.

"It only remains for me to thank the Principal and staff for their hospitality and to say how much I appreciate it."

Mr. T. A. Whitehead, the Chief Conservator of Forests,
then made the following speech:—

"Mr. President, Principal of the Forest College, ladies and gentlemen,

"We all join the Principal in his welcome to you, sir. We are very pleased at your presence here today, and thank you for doing us the honour of presiding at our annual function. The quarter of a century which this College has now to its credit seems insignificant as opposed to the century just completed by your own College, sir; but this very fact, we are glad to note, has created a feeling of something young requiring care and special protection.

"At this first prize distribution since the departure of the late Principal on leave, I should like to express my great appreciation of Mr. Davis's work here, at the Forest College. We miss both Mr. and Mrs. Davis here today, but they both needed a well earned rest, and we hope that they are enjoying their leave at home.

"My wife and I are very grateful for the time and thought put in by those members of the Forest Service and their wives and others who have worked to make the days we are spending together here at the College, and this annual garden party, a success. We have been unfortunate in that several of us have been laid low with illness this time, but I am very glad to say that the majority are now better. It put a greater strain upon others who already had enough to attend to, but as usual, that greater strain was taken with that loyalty which makes us proud to be members of our service,

"The final examinations have shown that the standard has been maintained, and it is quite evident that the students have benefited greatly by their course of training at the College. We have seen them at work and at play, and are satisfied that they have great possibilities in them for doing good work as Rangers. The physical drill display was exceptionally good; and the hockey match was one of the most interesting witnessed at the College. The spirit in which the hockey match was played was particularly pleasing. It was a very close, hard-fought game pervaded by a spirit of friendliness and enjoyment throughout and displaying vigour and manliness. This satisfactory result is largely due to the personal influence of the Principal and the staff in recognition of which the Board of Visitors wish to express their appreciation. Several of the officers of the Department have willingly undertaken to act as examiners for the final examinations just held in the College. They have cheerfully done this onerous work in addition to their normal duties, and the excellent way in which they have done it is very satisfactory.

"Students, in wishing you health and happiness in your future work let me congratulate you on having chosen a career which above all others brings you nearest to nature, and which is therefore the best. The forest and all it contains will be your special trust and in order to derive the greatest benefit, interest and pleasure from it, it is advisable for you to acquire a hobby which takes you into the forest and which constantly draws you to it. There is no dearth of such hobbies from which you may choose. You may be interested in flowers, or leaves, or timber, or fungi or insects or animals, or soils, or rocks, or fossils etc.

If any of these interest you you should have no difficulty in developing a hobby. You could, for example, develop a most absorbing hobby by the mere detailed observation of the lives of the wild animals and birds. Wild animals must of necessity be their own physicians: they seek out plants or soils to cure themselves of certain ills or wounds. In observing them you may possibly stumble upon a most effective cure for an illness. Insects, too, are of great interest. Ants and bees, for example, are the most amazing creatures, and each well worth intensive

study. Shikar is a hobby which a great many young forest officers have, and although the shooting of wild animals, and particularly those which are a danger to life and property, will of course continue, I should not be a bit surprised if the camera did not largely replace the rifle in years to come. It is far more difficult to obtain a good photograph, or a movie picture, of wild animals than it is to shoot them with modern rifles; and the more difficult may become the more popular apart altogether from its more lasting pleasure.

"Perhaps one of the most important matters of the near future will be the attempted solution of the vast grazing problem of India. How vast that problem is can be best illustrated by the one huge figure — 300,000,000. India supports no less than 300,000,000 head of cattle, and the provision of sufficient suitable fodder for so large a number of cattle is now exercising the best brains in India.

"The Reserved Forests will, of course, play a part in supplying some of the fodder, but the problem cannot be wholly solved within the forests, by the provision of grazing, as is popularly supposed. Actually the total number of cattle which do and can graze in the Reserved Forests is comparatively small, because by far the greater number live too far away from the forests to be able to graze in them. Take, for instance, the five great grazing Provinces of India — the Punjab, the United Provinces, the Central Provinces, Bombay and Madras. Out of the total of some 97,000,000 head of cattle, only some 8½ million graze in the forests.

"It is mainly outside the forest that we must look for relief, in, for example, the unreserved and waste lands. This is to be investigated by experts, but in the meantime if some of you take up grasses as a hobby, who knows what you may not discover, what vast problems you may not help to solve.

"But from your own experience of the forest you will know how large the field is from which you may choose a hobby, and that field is ever increasing as our knowledge of the forest expands. The rapidity with which this knowledge is expanding

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was well illustrated not long ago by the Chairman of the Empire Forestry Association. At its 14th annual general meeting in emphasising that there is a progressive spirit manifest in forestry throughout the Empire he said:—

“And it is well that it is so, for though the forests of the Empire have produced and are producing enormous wealth for the benefit of mankind, that wealth is perhaps only a fraction of what the forests may produce in the future as a result of scientific investigation. We are familiar with wood as the raw material from which paper and artificial silk are made, but it is somewhat staggering to learn that grease, proteins, and carbohydrates can be obtained from it, and thus all the elements required for the food of men and animals; that one acre of woodland can grow as much foodstuffs as an acre of arable land, and that crystallised glucose is cheaper to produce than the same quantity of beet sugar and as cheap as cane, at any rate in countries where wood is abundant. We are told, too, of the possibilities of manufacturing wool and cotton from wood and thus producing new kinds of cloth.”

“By this you will see that the diversity of interests to be derived directly or indirectly from the forest are almost unlimited and hence the choice of a suitable hobby should not be of any great difficulty. So get to know your forest well, but in doing so, remember also that in addition to performing your technical duties, you will be expected to exercise the personal influence of men trained as you have been trained, in the countryside affected by your Range. Retain direct and sympathetic touch with the ryot, and deal justly by him and honestly by your duty.”

The gathering was then entertained at a tea party given by the Chief Conservator, Board of Visitors, Principal and staff of the College.

Music was provided by radio gramophone. Later, the Minister was escorted round the Gass Forest Museum, before leaving for Salem.

1. Wood a reasonable Material :

It does not misconduct itself without good cause — the importance of moisture content.

The Department of Scientific and Industrial Research arranged a series of lectures in connection with its exhibition, “Science and Building,” recently held at the Building Centre in New Bond Street, London. One of the lectures was by Mr. R. A. G. Knight, B.Sc., A. M. I. Mech. E., of the Forest Products Research Laboratory, who spoke upon the moisture content of timber and its importance. Mr. Knight, in dealing with moisture content, aimed at presenting a picture of the whys and wherefores of the behaviour of timber in service. Sometimes, he said, this behaviour seems highly unsatisfactory, and this was frequently attributed to some mysterious properties of wood itself.

Misdemeanours Due to Moisture.

“The truth is, however,” he added, “that timber is quite a reasonable material, and it does not misconduct itself without good cause. The majority of its misdemeanours are due to moisture—sometimes moisture in its palpable form, but more often as that ever present as invisible vapour in the atmosphere.”

The prime importance of moisture in timber was its effect on size. If timber lost moisture it would shrink: if it gained, swelling would take place. Hence, if they controlled the amount of moisture in the wood, they automatically controlled its size, and the preparation of wood for service was principally a matter of adjustment of the moisture content. It should be remembered, however, that moisture content *on its own account* was not generally of great importance, and that it was a measure serving only to indicate the likelihood of dimensional stability of the timber in service.

Moisture content was defined as an amount in a piece of wood expressed as a percentage of the dry wood substance, and could be simply determined by drying a previously weighed sample of the timber in an oven until all the moisture was removed, weighing again, and then using the two figures as indicated by the lecturer.

If timber was stored in air of a given temperature and humidity, it would attain and maintain a definite moisture content. If the temperature remained constant and the humidity

increased, the moisture content of the wood would rise; and if the temperature was elevated under conditions of fixed humidity, the moisture content would fall, both processes being reversible.

As between one species and another, slight differences in equilibrium values were found, but, in general, these were small. Under every-day conditions, of course, neither the temperature nor the humidity remained constant. The fluctuations of humidity were particularly wild, and could occur with surprising rapidity. Fortunately, the response of the timber to such hygrometric changes was relatively slow, but it was ever tending to attain its equilibrium conditions.

Although very seldom in complete and steady equilibrium with the humidity of the moment, the moisture content assumed was equivalent to the average temperature and humidity over a sensible period. In other words, the moisture content of, say, a sideboard or some similar mass of timber, might well remain without appreciable change over a period such as a week, in spite of the humidity fluctuations above and below the mean figure.

As between one season of the year and another, however, or even between one month and the next, the variations in average hygrometric conditions were appreciable, and to these slow and cyclical changes timber invariably responded.

In any particular environment — be it an office, a bedroom, or a wooden garage or garden shed—it was possible to find the maximum, minimum and average moisture contents that obtained throughout the year, and experiments had shown that, although the figures for one year might differ somewhat from those of the next, they would not depart greatly from the mean determined over a lengthy period.

As between one part of the country and another it was to be expected that the average moisture contents in similar environments would vary somewhat, and tests had been conducted to ascertain the extent of such differences. Reckoned as fluctuations about the average values of all the series of tests, the differences in mean moisture content did not greatly exceed 1 per cent.

Mr. Knight said his object in going into this detail was to demonstrate that, in spite of climatic variations, in spite of the effects of individual tastes in heating, ventilation, and other factors that entered into conditions making for personal comfort, the mean or average moisture content in a particular class of environment could be regarded as a reasonably fixed quantity.

As regards the yearly cyclical oscillations above and below the mean, these too were fairly constant, and for interior situations ranged only from ± 1 per cent to ± 2 per cent.

Extensive study had enabled the Laboratory to prepare a chart showing average conditions in a number of environments. This chart might also be regarded as a seasoning specification, for the best practice was to dry their timber to the moisture content appropriate to the situation in which it would be used. This, of course, applied mostly to high-class joinery and decorative work; for the rougher uses of timber much more tolerance was permissible.

It would be of interest to see what happened when wood was used in some environment for which it had been incorrectly seasoned. "Suppose we are using panels 12in. wide in a living-room. We know that the average moisture content in such a place is 12 per cent., and that fluctuations will occur throughout the year. If, however, the panels have been dried to 12 per cent. prior to installation, they will merely oscillate in size about the mean dimension.

"Suppose such a panel had been initially seasoned only to 18 per cent. moisture content; it will, of course, dry to 12 per cent. *in situ*. In consequence, shrinkage will occur, and instead of the size fluctuating about a mean of 12in., working will take place round a width of approximately 11in.

The Strength Consideration.

Points the lecturer particularly stressed were:—

(1) For any type of environment there is an optimum average moisture content, and, in most cases, the Laboratory's long experiments enable this figure to be closely foretold.

(2) If timber is dried to this moisture content before it is installed, the user will avoid the occurrence of any real shrinkage.

Moisture content (concluded the lecturer) also affected other properties of timber besides size or shrinkage. As wood became drier, it became lighter in weight, less liable, or even immune to fungal attack. Of great importance was the increase in strength. Broadly speaking, this property remained constant until a moisture content of about 25 per cent. was attained, and from that point increased rapidly. At 10 per cent, for example, the resistance to crushing was approximately twice that when the moisture content was 25 per cent.

2. Erosion in the Punjab :

A Conference held at Simla recently affords evidence that the importance of the erosion question in the outer Punjab Hills is now receiving serious attention. It was presided over by Sir Herbert Emerson, the other members consisting of the revenue member, the financial commissioner for development, three commissioners of divisions, two deputy commissioners, a representative of the Finance Department, a chief engineer of irrigation, the chief conservator of forests, the conservator of the Eastern Circle and the forest research officer. The assembly of so influential a body shows the importance now attached to this problem by Government. Yet the problem is not a new one. For the last four decades it has been discussed, and men with wide vision have, years ago, foretold the inevitable waste and ruin which would result if the population were allowed to carry on certain practices, including the almost unrestricted pasturage of flocks, more especially goats. The Governments of the day turned a deaf ear. To-day the position has to be faced. Apart from the loss of valuable agricultural land resulting from serious erosion in the hills, part of the water supplies upon which the great network of canals in the Punjab plains depend will be jeopardized unless the extending erosion in the outer hills can be stayed. In several regions of the British Empire this problem of erosion on the large scale and the man-made desert are probably two of the most complicated and most important of the administrative and economic matters facing several Governments.

— Nature 27-3-37

3. Indian Science Congress, Hyderabad ; 1937 :

India's Climax Vegetation.

Mr. H. G. Champion's address before the Section of Botany, Indian Science Congress Hyderabad, directed attention to the neglect of the forest and the tree by the Indian botanical investigator, a neglect that is the more surprising in view of the fact that some twenty-five per cent of Indian land is under forest, and that the natural climax vegetation for the greater part of the land surface is probably forest.

Mr. Champion pointed out that the direct application of transpiration data from European observations to Indian conditions without verification "is positively dangerous"; yet the comparison of forests with other types of soil cover and their study in relation to the water economy of the land surface represent problems of great importance to India.

Similarly the lac industry, the supplies of valuable gums, dammars, resins, etc., could benefit by studies of tree physiology, while Mr. Champion's own studies upon the 'spiral grain' of the Chir pine have given an indication of the significance that genetic studies may yet have for Indian forestry.

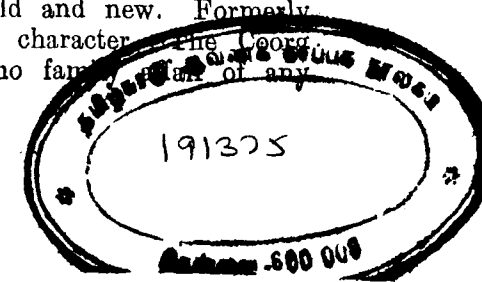
Ethnology of the Coorgs.

In his presidential address to the Section of Anthropology, Dr. Dewan Bahadur L. K. Ananthakrishna Iyer presented "An Ethnographical Study of the Coorgs". Inscriptions throw little light on the early history of the Coorgs, but from historical evidence it is conjectured that they were not without racial admixture from a remote period. There has been also a great deal of culture contact between the Coorgs and the people of Malabar, Canara and the Tamil districts. Their language is a mixture of Dravidian languages. In physical traits their mountain habitat has differentiated them from the people of the plains. In their economic life they are first hunters and fishermen, and then agriculturists.

Agriculture, which is of the rudest kind, is similar to that carried on in other parts of India. It has been transmitted unchanged for ages. The industry of the people of the highlands is confined exclusively to the cultivation of rice. Though agricultural implements are few and rude, enough has been produced from ancient times to meet home consumption and to export to Malabar. Where possible the valleys have been formed into flat terraces for cultivation.

The agricultural year opens about the middle of April, when ploughing begins with the first shower. This is a ceremonial observance, in the course of which the ancestors, the river deity and the presiding deity of the division of the district are invoked, and prayers are offered to Siva. Before the completion of the transplanting of the largest field, an open space ten feet wide is left the whole length to provide the race ground for the Coorg sport.

Food supply is plentiful. The Coorgs rear sheep and goats, and the chief article of their diet is rice. Hospitality is proverbial. The houses are situated close to the paddy fields, and resemble the Nayar houses. The approaches to the old Coorg house mark the design of fortification, pointing back to the old days of general feuds. Their dress and ornaments are peculiar. Their marriage customs are a medley of old and new. Formerly marriage festivities had a communal character. The Coorg family is joint and patriarchal, and no family of any



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importance may be undertaken without the knowledge of the senior member. The senior female member is the queen of the household. Public morality is controlled by a council of elders. The Coorgs are animists, having ancestor and demon worship; but they show evidence of the influence of outside beliefs. Of late they have begun to worship the Hindu deities.

— *Nature*. 10—4—37.

4. Wood Films :

It has been said that the average cinema-goer wants to be amused or taken out of himself, and not to be instructed or called upon to use his intellect. Thus it is that "interest" or "educational" films are not shown to any great extent. But many persons would rather see a good travel film than a bad one of the usual type, and the timber trade offers possibilities for an instructional film of the best kind. A life history of a tree, from its infancy, through its felling, transport across the sea, down to its final form as furniture facing, matches, or what not, would surely be of interest to every one, as it would combine foreign scenery, the ever fascinating ocean, and wonderful machinery at home. If it were felt that a little human interest was required, these incidents could be strung the thread of a simple plot dealing with the hero and his adventures. If any "love interest" were included it is to be hoped that it would not take the form of the hero discovering in some tropical forest a milk-white maiden whose complexion has resolutely resisted the effects of a broiling sun which would certainly have to bronze the hero to the degree requisite for feminine approval. Perhaps the film could start with a "close-up" of the heroine selling matches in the street, owing to the heartless foreclosure of the usual mortgage on the family estates; the film could then "flash back" to the tree and the operations which finally ended in those very matches. The hero would then fall in love at first sight with the maiden, but buy some of her matches, strike one and — make another.

— *Wood*, Feb. 1937.

5. Indian plants reputed as fish-poisons :

Among the species listed by Messrs. M. B. Raizada and B. S. Varma, (Chemical Branch, Forest Research Institute, Dehra Dun,) as fish poison plants, the following are of interest to those of the Madras Presidency :—

<i>Arbizzia procera</i> , Benth	...	...	...	(Bark).
<i>Antiaris toxicaria</i> , Lesch	...	...	...	(Milky juice).
<i>Balanites roxburghii</i> , Planch	...	...	...	(Bark juice).

<i>Barringtonia acutangula</i> , Gaertn	...	...	...	(Bark & root).
<i>Bassia latifolia</i> , Roxb	...	...	...	(Residual cake, after extraction of oil from seeds).
<i>Casearia graveolens</i> , Dalz	...	...	...	(Fruit).
<i>Cleistanthus collinus</i> , Benth	...	...	...	(Bark).
<i>Corypha umbraculifera</i> , Linn	...	...	...	(Fruit).
<i>Diospyros montana</i> , Roxb	...	...	...	(Fruit).
<i>Dolichandrone falcata</i> , Seem	...	...	...	(Bark).
<i>Entada scandens</i> , Benth	...	...	...	(Seed).
<i>Euphorbia tirucalli</i> , Linn	...	...	...	(Milky juice).
<i>Fleuggea leucopyrus</i> , Wight	...	...	...	(Bark & leaves).
<i>F. microcarpa</i> , Blume	...	...	...	Do.
<i>Hydnocarpus wightiana</i> , Bl.	...	...	...	(Fruit).
<i>Maesa indica</i> , Wall	...	...	...	(Leaves & bark).
<i>Mundulea suberosa</i> , Benth	...	...	...	(Bark, seed, root).
<i>Nerium odorum</i> , Sol	...	...	...	(Bark & root).
<i>Ougenia delbergioides</i> , Benth	...	...	...	(Bark).
<i>Pithecolobium bigeminum</i> , W & A	...	...	...	(Leaves, bark, seeds).
<i>Pongamia glabra</i> , Vent	...	...	...	(Seeds & root).
<i>Randia dumetorum</i> , Lamk	...	...	...	(Root & fruit).
<i>Sapindus trifolius</i> , Linn	...	...	...	(Fruit & root-bark).
<i>Tinospora cordifolia</i> , Miers	...	...	...	(Bark).
<i>Walsura piscida</i> , Roxb	...	...	...	(Bark & fruit-pulp).

— *Indian Forester*, April 1937.

6. *Eucalyptus saligna*, and *E. pilularis* :

"Of the larger undertakings (of the Division of Forestry, Union of South Africa), should be mentioned the supply of *Eucalyptus saligna* for 2,000 chairs in the Pretoria City Hall, and the supply of 5,500 sq. ft. of *Eucalyptus pilularis*, strip flooring for the Pretoria Police Barracks. These are the first large scale uses of these woods for such purposes, and there is reason to believe that they will give satisfaction.

— *Annual Report of the Division of Forestry*

for the year ended 31—3—36.

7. The Imperial Forestry Institute. Oxford :

The future policy of the Imperial Forestry Institute, Oxford, is set out in its twelfth annual report — the first issued since the new scheme of management was introduced. Briefly, it is proposed "to develop the Institute as a centre for the study of world

forestry in relation to Empire forest problems and as a forum for the interchange of professional knowledge amongst foresters from all parts of the Empire, rather than as a place of instruction *ex cathedra*". Every opportunity is to be taken of maintaining a closer liaison with the services concerned. It is hoped that ultimately it may be possible for forest officers from different parts of the Empire to be seconded to the Institute for the purpose of giving instruction.

In the meantime, it is proposed to make the fullest use of the fund of knowledge and experience brought to the Institute by the constant stream of forest officers and research personnel who visit it for refresher courses or other purposes, by drawing upon it systematically and placing the results on record. The staff of the Institute will not only act as *rapporteurs* of experience brought to the Institute, but also study and analyse the various techniques of utilization, silviculture, land conservation and improvement, and their reasons for success or failure, in the light of the fundamental sciences applicable to them. They will carry out research, especially team research, by which plant physiology, soil science, ecology, systematic botany and other sciences may be applied to the solution of complex problems. It is considered axiomatic that the teaching given should be based on research carried out by the staff.

In order that the staff may be better fitted to carry out the role assigned to them, it is essential that they should have some first-hand knowledge of forest conditions in the Empire at large, and opportunities of establishing contact with other workers overseas. It is hoped that it will be feasible, ultimately, to arrange for members of the staff to make tours of some length, during which the duties of the member of the staff on tour will be carried out by a *locum tenens* from some other part of the Empire. Meanwhile, as a beginning, financial provision has been made for one of the senior members of the staff to undertake such a tour.

The fullest development of the Institute as a centre for the diffusion of knowledge by personal contact, implies not only the interchange of knowledge between the permanent staff and visiting officers of experience, but also between the students themselves. One important suggestion from this point of view has been put forward to the Colonial Office, namely, that the year's course at the Institute taken by probationers before taking up their posts in the services to which they are appointed, should be postponed until they have completed an apprentice tour of, say, two years. Their experience, though limited, would enable

them to appreciate more fully the problems they have to face than can be expected from any student without experience of tropical conditions. They would be in a position to concentrate on these problems, compare notes with their fellow students from other territories, and refer difficulties to the Institute's staff and to more experienced officers undergoing refresher courses.

Whilst the dissemination of knowledge by personal contact will form such an important feature of the activities of the Institute, it will also, so far as its financial resources permit, act as a clearing house for information on world forestry available in documentary form. As a beginning, the practice of scanning all incoming forestry literature and indexing important contributions has been resumed in a modified form, involving the use of the 'Flury' international decimal classification and the issue, to the services, in multigraphed form, of a *Current Monthly Report*. There is some hope that an Imperial Forestry Bureau may be set up under the Imperial Agricultural Bureau scheme, and attached to the Institute.

With regard to the subjects to be included in the curriculum of the Institute, it is intended to provide more teaching of economics, as the basis of forest utilization and management, and of ecology, plant physiology and soil science as fundamental to the study of silviculture, not only on the productive side, but also in the widening field of the protective and reclamatory influences of vegetation. The main object, on the teaching side, is to make the initial training and refresher courses more useful to serving forest officers.

Points in the report which may raise questions in the minds of scientific foresters, are the tendencies to emphasize economics as against silviculture, and to minimize the importance of the study of European forestry as part of the training of a forest officer. It is proposed to hold the study tour of the present year in Finland, on the ground that the highly specialized forms of forestry of Germany, France and Switzerland, seen in the usual study tours, have little application to average conditions overseas. Though, in a literal sense, this contention is true, the forestry of these countries provides the finest examples available of the adjustment of forestry practice to local conditions, and the field in which the ecological, economic and sociological foundations of forestry have been most fully worked out. Students in British forestry schools probably receive sufficient grounding in European forestry, but those officers whose training has been outside Europe should be given an opportunity of making a first-hand acquaintance with the finest examples. Finland is an excellent

field for the special study of the economics of exploitation in conditions which are analogous to those of parts of the Empire in some respects, but even more remote in others (climate, number of species, etc.).

The practice of arranging special tours for individuals wishing to study particular aspects of forestry is an important feature of the Institute's work, and it is recognized that it is desirable to extend them into the nearer tropics and even the United States of America on occasion. The advisability of making the Scandinavian countries the venue of ordinary instructional tours is more doubtful.

The policy outlined in the report should commend itself to the forest services of the British Empire, and it is to be hoped that the financial and other support, necessary to implement it fully, will be forthcoming.

— *Nature* 1—5—1937

8. The Nesting of Hornbills.

With great success, R. E. Moreau has employed natives to record over long periods the feeding times of East African hornbills, and by co-operative observation he has been able to keep one nest under observation for a total of 400 hours in four successive seasons. The results present the first tolerably complete account of one of the most curious of nesting habits, and reveal unexpected differences between the three species which were studied (*J. E. Africa and Uganda Nat. Hist Soc.*, 13, 1; 1936). For example, the sealing up of the nesting hole in the case of *Bycanistes cristatus* was done by the female, which used mud pellets elaborated in the gullet of the male and disgorged by him, whereas in *Lophoceros deckeni* the material used was collected without help from the male and consisted of insect casts and rotten wood. In the former case the male disgorged up to 42 pellets at a visit, and during a day 235 pellets in 15 visits. The daily load involves the impregnation of some 33 cubic inches of dry mud with saliva, a very considerable call upon the secretory powers of the salivary glands. The female *Bycanistes* remained sealed up in the nest for 108 days, and during that period the male made about 1,600 visits with food, carrying about 24,000 fruits. A new observation of very great interest is that in both *Lophoceros deckeni* and *L. melanoleucos* when the female issued from the nesting hole, the young, then about three weeks old, and unable to fly, at once replaced the plaster at the mouth of the opening, without any help from the parents.

— *Nature*, 1—5—1937.

Forest Research in Madras.

I. Experimental Silviculture.

The most important results obtained during the year are probably :—

- (i) The successful control of the spike disease of sandal over large areas in the case of new outbreaks provided that they are reported and antispikes measures adopted without delay.
- (ii) Confirmation of the transmission by insects of the spike disease of sandal and demonstration of the fact that the disease thus induced under controlled conditions can be further transmitted by grafting (as is the case with natural spike).
- (iii) The successful control of *Lantana* at a reasonable cost by chemical spraying. A spray has been evolved which while killing out the *Lantana* does not usually affect other species growing among it.
- (iv) The successful underplanting of dense *Lantana* with *Bambusa*. The bamboo has grown right up through the *Lantana* without any attention and is killing out the pest.
- (v) The successful transport of teak stumps to distant places. Stumps have been sent journeys of 1,000 miles taking up to 14 days and in the majority of cases after 2 years the plants resulting from these stumps have been as good as and better than those from local stumps in spite of the fact that they were growing in localities climatically very different from that in which they were raised in the nursery.
- (vi) Demonstration of the benefits of soil working in the regeneration of dry fuel forest. Soil working resulted in 3 times as many seedlings surviving the hot weather.
- (vii) Confirmation by large scale experiments that in mixed deciduous forest of good quality, the beneficial effects (if any) of forking as a weeding method in teak plantations compared with *mamooty* scraping were in no way commensurate with the extra cost of forking.

- (viii) Further confirmation of the smallness of the risks run in premonsoon stump planting of teak in our better teak districts even in a year abnormally lacking in early rains. This has also been confirmed by large scale district work, the averaged results of which were within 2 per cent. of those obtained in small scale experiments.

II. Natural Regeneration.

By Seed.

Experiments showed that clearing undergrowth under mother trees of *Swietenia macrophylla* in an attempt to produce profuse regeneration is definitely harmful. Similar experiments with *Mesua ferrea*, *Calophyllum elatum* and *Hopea parviflora* showed that the treatment had produced no beneficial but no harmful effects. Opening of the canopy over young regeneration was very beneficial in the case of *Hopea parviflora* but produced no noticeable effect on *Mesua ferrea*. Complete removal of the canopy over *Swietenia macrophylla* regeneration 5' to 6' high produced a very beneficial effect and in the 2nd year since the treatment was applied there has been no increase in insect attack as was feared might be the case. Partial canopy removal over dense regeneration of *Pterocarpus santalinus* about 3" to 6" high produced a very beneficial effect.

By Coppice.

Experiments in the dry fuel forests of Chittoor and the *Eucalyptus* plantations of the Nilgiris both showed that the ordinary operation of coppicing causes a mortality of approximately 5 per cent. of the stools and that the trimming of the stools was definitely harmful in dry forests.

III. Seed.

Seed pretreatment:—Routine pretreatment tests were done with 13 species. Treatment with boiling water improved the germinative capacity of *Acacia auriculiformis* and *Acacia cyanophylla* but was harmful for nearly all other species tried. Soaking in cold water was beneficial with *Calophyllum elatum*, *Gluta travancorica*, *Pterocarpus santalinus* and *Xylia xylocarpa*, being very marked in the case of the *Pterocarpus*. Concentrated sulphuric acid hastened and greatly improved the germination of *Cassia fistula* and *Cassia marginata*, while fermenting improved that of *Acacia auriculiformis*, *Acacia leucophloea* and greatly improved that of *Terminalia chebula*.

IV. Nursery Work.

In hot dry fuel areas shaded nursery beds gave generally a higher germinative capacity with nearly all species tried, but in subsequent development and survival individual species exhibited different light requirements.

Experiments in evergreen nurseries on sheltering and shading in the case of species that suffer from the very heavy rain of the South-West monsoon and the hot sun which follows it showed that *Hopea parviflora* and *Cederela toona* are indifferent to shade treatment, that *Artocarpus hirsuta* greatly benefits by the shelter but is indifferent to its extent and that *Dysoxylum malabaricum* needs a little shade but will not stand much.

Work on different nursery methods for raising teak stumps indicates that the best outturn of good stumps is obtained by sowing seed at the rate of 20 to 30 lbs. per standard 40' x 4' bed and doing no pricking out of seedlings at all. A bed of this size in this way will produce after 1 year sufficient stumps of the right size to establish fully 1 acre of plantation at a 6' x 6' espacement and still leave a slight margin of safety.

V. Artificial Regeneration.

Mixed deciduous timber forests.

The stocking of felling gaps in mixed deciduous forest with teak is now extensively carried out and presents no difficulties in the initial stages. There is however some cause for apprehension in certain areas where climbers and *Lantana* are particularly aggressive, that the plants may be swamped by invasive growth in later years after tending has ceased. Experiments have been started to watch the fate of such gaps.

Comparison of sowing, transplanting and stump planting:—Previous years' results were confirmed and showed that for teak, *Dalbergia latifolia*, *Pterocarpus marsupium*, *Terminalia crenulata* and *Artocarpus hirsuta*, stump planting is the best of the 3 methods, while for *Xylia xylocarpa* direct sowing is to be preferred. *Pterocarpus dalbergioides* and *Swietenia macrophylla* however both do best from transplanting.

Optimum season for stump planting.—Experiments were repeated with 5 species and confirmed previous years' results. Last year was the second consecutive bad year for early rains and in many places premonsoon showers were absent. In spite

of this, however, premonsoon planting gave very fair results with a best date of April 15th to May 15th varying with the different species. The effect of the poor year was much more noticeable in the smaller height growth of teak than with other species. Teak stumps tended to sprout much later and the best date for species other than teak was about a fortnight later than usual.

Stump planting.—Effect of diameter of stumps.—Teak stumps of 0.4" to 0.8" diameter at the thickest part gave the best results, though stumps of 0.3" to 0.4" diam. are definitely "usable" in the event of shortage of the larger stumps though they do not give as good results.

In the case of *Dalbergia latifolia*, 0.2" to 0.6" diameter is the best range. For *Pterocarpus marsupium* results indicate that the larger stumps from 0.3" to 0.8" diameter (or even bigger) give the best results. For *Terminalia crenulata* 0.4" to 0.8" diameter appear best and for *Artocarpus hirsuta* those of 0.4" to 0.6" diameter.

Stump planting—effect of length of root. *Teak.*—Repetition of previous years' work confirms the indication that there is practically no difference in results from stumps of different root lengths within the range 4" to 10".

Stump planting—effect of cooly variation. *Teak.*—Experiments were done in which stumps were planted tightly by expert planting coolies, intentionally loose, nipped at the top with the base loose in the crowbar hole, and by a blacksmith and a farmer who were given no instructions at all. There was no appreciable difference at all in the results of these treatments in percentage of survivals or in mean height growth.

Storage of stumps. *Teak.*—Experiments showed that stumps can be successfully stored for two weeks before planting even in an abnormally bad year.

Transport of stumps. *Teak.*—Stumps were successfully transported over distances up to 1,000 miles taking up to 14 days for the journey and after 2 years were giving as good as and better results than local stumps.

Stump planting in swampy areas. *Terminalia crenulata* and *Pterocarpus marsupium* were successfully stump planted in a swampy area where mound regeneration work had failed for some years.

Casualty replacements in 2nd year teak plantations.—Further experiments to watch the fate of casualties replaced with stumps in the 2nd year of teak plantations were started.

Results so far indicate that few of these replacements survive and it is doubtful if they ever take their place in the main crop.

Effect of taungya (ponam) crops on teak plantations.—An experiment was continued in which it was attempted to counteract the retarding effect of a *taungya* crop in the 1st year of a teak plantation by growing cover crops such as sunn hemp (*Crotalaria juncea*) and boga (*Tephrosia candida*) in the 2nd year. In general these cover crops appeared to produce no marked improvement in the retarded teak. This retarding effect of the *taungya* crop can however be greatly minimized by early planting the teak.

Dry Fuel Forests.

Artificial regeneration of dry fuel forests by the 'rab' method is being done on a larger scale each year in almost all divisions where this type of forest occurs and results are getting more and more encouraging as the technique improves.

In general, results indicate that (1) artificial regeneration by any method is best done at the beginning of the North-East monsoon except in especially good years or when watering is possible. (2) With most species the best method of regeneration is sowing in a good year but transplanting in a bad year. When seed is plentiful and repeated sowing can be done, good results can be obtained under almost any weather conditions. (3) Stump planting is not a suitable method for most species in this type of forest. (4) The following species have given excellent results:—*Cassia siamea*, *Albizia lebbek*, *Azadirachta indica*, *Dolichandrone crispera*, *Acacia sundra*, *Albizia odoratissima*, *Pterocarpus santalinus*, *Albizia amara*, *Wrightia tinctoria*, *Zizyphus jujuba*, *Pithecolobium dulce*, *Acacia ferruginea*, *Prosopis juliflora* and *Tamarindus indica*.

A good burn coupled with soil preparation is essential for this work.

Soil working during the 1st year is very beneficial. It has been shown to give an increased height growth and also it enables backward plants to survive the hot weather.

Stump planting of *Santalum album* has given a large measure of success.

VI. Afforestation.

Experiments to examine the possibility of re-afforesting some of the important catchment areas of the Nilgiris were continued. Much better results were obtained this year with

transplants and stumps of these species that can be regenerated by these methods. Results so far show that for nurse species Broom, *Cassia tomentosa*, *Rubus moluccanus*, and *Hypericum mysorense* and for tree species *Acacia melanoxylon*, *Acacia dealbata*, *Mahonia leschenaultii*, *Hakea saligna*, *Eugenia arnottiana* and *Cupressus macrocarpa* all show promise.

In addition to the above, on stream banks and swamp edges *Salix alba* var. *carulea*, *Salix tetrasperma*, and *Salix babylonica* have all been established and appear to be doing well.

VII. Tending, Thinning, Cleaning, etc.

Weeding practice.—Large scale experiments were done in continuation of the many small scale experiments carried out in recent years. These large scale experiments conclusively confirmed previous years' results that the slightly beneficial effect (if any) of forking as opposed to *mamooty* scraping as a weeding method in the 1st year of a teak plantation in our better teak areas is in no way commensurate with the extra cost of forking. The saving by *mamooty* weeding instead of forking is approximately Rs. 3 to 5 per acre each time the operation is done and when this is totalled for the main teak district of the presidency it is an annual saving of a very considerable sum of money.

Effect of burning and cutting back a teak plantation in the 2nd year.—Experiments in this subject were repeated and confirmed previous years' results that cutting back with burning gives slightly better results than cutting back without burning but neither of these treatments are as good as the control. The indications are that plantations should not be treated in this way but if cutting back becomes essential due to some calamity it is better to burn before doing the operation.

Effect of a cover crop of Leucæna glauca on a teak plantation.—An experiment in this subject showed that the teak height growth was apparently increased by the absence of the cover crop. Immediately after measurements were taken the plot was visited by bison and the *Leucæna* browsed right down to the ground level. It remains to be seen whether the improvement in the teak is maintained in the 2nd year.

VIII. Underplanting.

(a) *Teak plantations.*—Experiments so far show that teak plantations can be successfully underplanted with *Bambusa arundinacea*, *Cephalostachyum pergracile* and *Hopea parviflora*. *Swietenia macrophylla* and *Cedrela toona* although established are continually browsed,

(b) *Evergreen rain forests.*—The general results of experiments of last year in underplanting in evergreen rain forest show that:— (1) Top canopy cover gives the best results. (2) Burning before regeneration produces no beneficial results. (3) For most species transplanting is the best method of regeneration. (4) Stump planting is not a suitable method for most evergreens (with the exception of *Cedrela toona*, *Chikrassia tabularis* and *Artocarpus hirsuta*). (5) Weeding is worthwhile as it gives a slight gain in height growth and survival percentage. (6) Pitting for planting is also similarly worth while although the effects of pitting do not show markedly until the 2nd year when the roots have got bigger. (7) For most species, July or early August appear to be the best months for transplanting or perhaps rather earlier for areas of light rainfall 60"—80" and rather later for areas of heavy South West monsoon rainfall 120"—250". (8) For most species the best size of transplants to use is from 8" to 1' high. Larger transplants occasionally do well but suffer heavy casualties and are not definitely established for several years. In the case of large transplants of *Cedrela toona* and *Swietenia macrophylla* insect attack is much more serious than with small plants. (9) There is little difference in results between nursery and natural forest transplants. (10) Basketing has proved very successful with *Dipterocarpus indicus*. (11) *Cedrela toona* has been successfully regenerated by cuttings. (12) Repulsive smears do not decrease the browsing incidence.

XI. Miscellaneous.

Spike Disease Research.—The following are the chief results of the year's investigations:— (1) Confirmation of the transmission of spike by insects has been definitely established in mass infection cages. (2) The night fauna appears to be generally responsible for transmission but indications are that the day fauna cannot be totally ignored. (3) The infective seasons are chiefly March to May and August to October. (4) The general classification of insects through which transmission was established indicate that the insect vector is probably of one of the families *Jassidae*, *Pentatomidae* and *Fulgoridae*. Group and specific transmission experiments are in progress. (5) Experiments were carried out to find the chief food plants of the main suspects. (6) The susceptibility or resistance of an area to the diseases appears to be greatly influenced by the ecological make up of the area. (7) Further evidence was obtained that new outbreaks often occur in close proximity to diseased field crops. (8) Artificial infection by grafting and natural infection

in the field are comparable. (9) Anti-spike measures in the case of new outbreaks have been successfully applied. In none of the areas treated has there been any recrudescence of disease so far.

Periodicity of height growth.—Weekly measurements showed that the period of rest with most species in most centres started in November-December and ended towards the end of April.

Lantana eradication.—Experiments in the suppression of *Lantana* by underplanting it with *Bambusa arundinacea* continue to look very promising.

A sodium chlorate spray has been evolved which while successfully killing out the *Lantana* at a reasonable cost does not usually affect other species growing in the *Lantana*.

Climber poisoning.—Experiments were continued and show that most of the common species of climbers can be successfully eradicated by an arsenical poison at a reasonable cost.

— *Forest Research in India, 1935--36.*

10. Deterioration of Paper :

Technical Bulletin No. 541, November 1936 of the United States Department of Agriculture, Washington, D. C., deals with the "Deterioration of Book and Record Papers" It appears to be the general opinion of librarians that much of the paper of books and records on their shelves, especially that made since about 1860, is not sufficiently durable. This conclusion applies especially in the case of books and papers subject to frequent handling. Thirtyeight samples of paper taken from old books, magazines and court records, ranging in age from 19 to 169 years, were examined. The results seem to indicate that paper actually absorbs from the air harmful quantities of acidic sulphur compounds with which the air is generally polluted. The absorption is greater in the portions of the leaves more fully exposed to the atmosphere, and this is one reason why the leaves of old books become more brittle near the outside edges. Seven samples of commercial bond and ledger papers, made in 1914 and 1915, were tested after storing under normal conditions for eighteen years. They were examined after five years and again after eighteen years storage. After eighteen years, the folding endurance of these papers had decreased 23-93 per cent and the bursting strength 0-18 per cent. In general, papers with the higher acidity, as indicated by the pH of their water extract, suffered the greatest deterioration. The results are indicative that a water extract with a pH of less than 5 is a major factor in the deterioration of even best classes of paper.

— *Nature, 22-5-37,*

11. The Timbers of India and Burma :

It need occasion no surprise that the number of Indian timbers is so large when we realise that they are found over an area 30 deg. of latitude by 38 deg. of longitude, and that the trees grow at all elevations between sea level and 14,000 ft., under the most diverse conditions of temperature, rainfall, and soil. Professor Troup, in the Introduction to his *Silviculture of Indian Trees*, says; "It is not easy to determine within definite limits the climate necessary to produce different types of woodland...Brandis says that in India really successful forests occur only where the rainfall is 40 inches and over...The chief climatic woodland formations in India are either tropical or temperate, the latter owing their existence primarily to elevation."

It is rather remarkable that valuable timber trees are rarely found growing in pure woods in India, except over comparatively small areas in the Himalayas and in the sal forests of Upper India. In the best teak forests of Burma teak is only 10 to 20 per cent. of the crop, and there is usually a heavy undergrowth of bamboos.

Broadly speaking, timber merchants in India and Burma may be said to depend principally on three important species—teak, deodar, and sal, and out of these three only teak is of any importance for export. The outstanding fact is that these timbers are proof against white ants and can be used for railway sleepers, bridges, and buildings without danger. Deodar and sal are in constant demand for railway sleepers and buildings and for railway wagons, and the available supply can usually be absorbed in India. Sal rarely grows to a large size, but its great durability ensures a constant demand.

Getting the Logs from the Forest.

Deodar is often brought down to required sizes, and to this day sleepers are carried on men's shoulders down the Himalayan slopes to the floating streams. Sal is usually extracted by tramway or bullock cart, and teak comes out by water in the log from the finest teak forests, which lie in Burma. Teak is "ringed" or "girdled" in Burma and must stand for two or three years before it is felled. It has then seasoned and dried so much that it will float and can be brought out at small expense. It is, unfortunately, not possible to use this "girdling" for many other good woods in Burma because they would be ruined by insects during the drying period. Elephants are used to drag the logs from stump to the floating streams.

Attempts have been made to introduce American methods of logging in Madras, Burma, and the Andaman Islands, but the small percentage of marketable timber in many of the forests and the slump of a few years ago have prevented them being successful.

Teak was used in the "Queen Mary" to the extent of 1,000 tons. The price of this splendid wood was falling in this country until recently, and this is very much to be desired, because there is probably plenty of timber available from Burma, and the price appears to have been kept at a high level too long.

A good departure is the import of teak fence-posts, which can, of course, be made from teak of poor quality and small size. It is of the greatest importance to make use of this material, because the quantity of large fine old timber that can be extracted has been steadily diminishing for a long time, and the firms who have the leases of the forests will probably depend more and more on making a profit out of smaller timber.

Increasing the Uses of Teak.

The reasons for the very large timber being exhausted are that most of it was over-mature and that it occurred scattered over immense areas of forest in many parts of Burma, where it had to be searched for. It is reasonable to look forward to an increasing use of teak in this country for many purposes, such as garden buildings, garden seats, laboratory fittings, floors, dressers, sinks, etc., and it is to be hoped that a demand of this nature may make up, to some extent, for the decrease of the use of teak in shipbuilding.

The Andaman Islands, the only important forest area under the Government of India, as distinct from local governments, produces, among others, two unique timbers: Andaman padauk, whose brilliant colour and other good qualities at one time found it a ready market, and white chuglam, or Indian silver greywood—the latter name referring to the figured wood, which has been much used for panelling in public buildings in London, in the Piccadilly Tube, and in L.M.S. railway carriages. Other timbers which are well worth the attention of timber merchants are haldu, axlewood, poon, East Indian satinwood, Andaman marblewood, gumhar, thingan, pyinma, tavoy wood, Burma sal, and black chuglam.

Approved Trade Names.

Trade names as at present approved have been published as a reprint from the Handbook of the Empire Forestry Association, Grand Buildings, Trafalgar Square.

In conclusion, there are two important points to be mentioned. The first is, can a buyer rely on supplies? In answering this question it must be acknowledged that there are a good many difficulties in India, Burma, and the Andamans. Some of the large stands are very remote, the timbers are often very heavy, and accurate information as to the contents of the forests is not always available. Further, the climate of these countries is very bad for timber, and the labour is not skilled in keeping it in good order, though quite good at conversion and transport. It is, therefore, often difficult to bring the timber to a port and ship it in good condition; but the establishment of seasoning kilns has of recent years made considerable progress.

As regards the future, we must recognise that, as in other parts of the world, the same large stocks of fine old timber will never be available again; but there are ample stocks of smaller trees, and the plantations which have been made in increasing numbers since 1840 have already produced much timber.

The other question is, what measures are the owners of the forests taking to improve them and to assist in marketing the timber? The Government of India have established the largest Forest Research Institute in the world. One branch of this deals with every possible method of producing the finest timber in the forests. The largest branch of the Institute deals with utilisation and marketing, comprising the service of information and propagands, timber testing, seasoning, wood preservation, woodworking and veneers, and wood structure. The results of all investigations are published at once and are available to the public. The representative of the Government of India for marketing and all information in England is Timber Adviser to the High Commissioner for India, India House, Aldwych, W.C2.

— *Timber Trades Journal* 12-5-37.

12. Wood-pulp and the Future :

It is safe to state that during no similar period since the first commercial production of wood-pulp in the middle of the last century has our knowledge of the subject advanced so rapidly as during the past three years. A number of entirely

different influences have contributed to this activity. In the first place, one of the benefits associated with slump conditions is the time (and in the case of far-seeing concerns, the stimulation) it provides for research work; and secondly, there has been an increasing demand for rags for paper-making, which has resulted in a shortage, and consequently, rising prices in this market. To this may be added the growing use of certain classes of wood-pulp for rayon manufacture, the present position being that this industry now absorbs ten per cent of the world production of wood-pulp; in some quarters there is even a scare of a shortage of pulp for paper-making in the future.

These various influences are all apparent in the advances referred to. Prolonged research has for example resulted in the production of 'alpha pulps'; The method of production is usually a modified sulphite 'cook', followed by chlorination, extraction with alkali and careful washing.

In comparison with ordinary wood-pulps, alpha pulps have some interesting properties. In the first place, highly absorbent papers may be made from them, and they are therefore very suitable for the manufacture of paper towels and handkerchiefs for facial tissues, etc., Papers made from such pulps also lend themselves readily to impregnation with rubber latex and similar materials, and as a result of subsequent processing they can then be converted into leather substitute. There is already a wide market for products of this kind in the manufacture of handbags, fancy goods, bookbindings, shoe linings, etc., where effect is more important than durability. Furthermore, since alpha-cellulose represents the nearest approach to true cellulose obtainable on the manufacturing scale, it is not surprising that advantage has been taken of the inherent strength of the fibre to use it in the production of certain classes of strong papers. Special mention may be made of papers the tearing-strength of which is important, because in such cases fibre length is of special significance. The use of alpha-pulps in this connexion, however, calls for special care, because alpha-pulps do not respond in the same way as other wood-pulps to the development of strength characteristics by 'beating'. Moreover, as resistance to tear is obtained only by sacrificing other forms of strength, for example, bursting strength, it is usual to add only a relatively small proportion of the alpha-pulp, and, so far as possible, to beat it separately.

Recent work has shown that the permanence of paper, that is, its resistance to the effects of normal ageing, depends as much on the purity of the cellulose present as on the origin of the fibre, and although the traditional preference for rag is still

strong, it is now recognized that a paper made from a carefully prepared wood-pulp can last longer than an inferior rag paper. The difficulty of devising a really reliable accelerated ageing test is probably the biggest obstacle to the demonstration of the relative merits of these fibres. Apart from these questions, however, the fact that the alpha and similar pulps contain such a high proportion of alpha cellulose is an obvious argument in favour of their use in 'permanent' papers. This course has so far been justified by such accelerated-ageing tests as exist; provision, however, has also been made for natural ageing tests, the conclusion of which must be left in the hands of the next generation.

The advances in the technique of bleaching wood-pulps which have been a feature of recent years have also resulted in the production of some interesting types of pulp. These are based on the treatment of the pulp with the bleaching agents in several stages instead of in one only. Chlorine, either as gas or in the form of an emulsion in water, is used in the first stage. This procedure serves to chlorinate the lignins and other undesirable substances in the raw wood, the resulting compounds being soluble in alkali; removal of these in this way is therefore the second stage. Up to this point, there is no real improvement in the colour of the pulp, but the bleaching proper may now be carried out, hypochlorite being the reagent used. This again may be operated in one, two, or even three stages.

The principal advantage of this method of bleaching is that the colour may be improved without undue detriment to strength, but the elimination of a good deal of the dirt and troublesome resinous matters in wood and an economy in bleaching costs are further benefits which are not to be ignored. Pulps made by the sulphite process provide some of the best-known examples of the advantage of multi-stage bleaching, but of great interest also are bleached kraft pulps of high strength and good colour, as these have become available only relatively recently.

The exploitation of new sources of wood at once raises the general question of the conservation of timber supplies and, in particular, the matter of re-afforestation. One respect in which certain of the Scandinavian countries have set an example which might well be followed more closely elsewhere is the organization of the pulp-mill in close relationship to the saw-mill, with the object of eliminating waste. In this connection, it was stated a few years back by the U. S. Forest Service that every year about

six million cords of sound wood suitable in size for pulping processes were wasted in the course of logging operations. This statement refers to one of the richest timber regions in the world, namely, the strip of Pacific coastline between Oregon and Alaska. Here the western hemlock, which is very suitable for the production of sulphite wood-pulp, occurs in close association with an important timber tree, namely Douglas fir, and there are now possibilities that the latter might be amenable to treatment by the sulphate process.

In the case of southern pine, a relatively short time of growth—at the most eighteen years—is required in order to obtain a tree of suitable size for pulping, so that in this instance the problem of re-afforestation should be simplified, at any rate from the economic point of view.

A final word seems desirable on the subject of possible rivals to wood pulp. These are not lacking, and many indeed (such as straw) precede it historically. Each year brings a host of suggestions which the paper-maker assiduously tests, and frequently finds to be satisfactory from a purely technical point of view. The objection is nearly always the cost of transport, because the fibres usually grow in remote parts of the earth where the cost of harvesting and bringing to the nearest port is prohibitive. The rapidly advancing price of wood-pulp is, however, focusing attention on the results of trials which have been 'filed' for many years. Esparto is of course an old-established rival to wood-pulp and one which enjoys the advantage of being a printing fibre *par excellence*, although it is too soft to be used alone where strength is at all important. At the same time, any decrease in the difference in price between wood and esparto must tend to increase the demand for the latter.

Another fibre which may assume more importance in the future is bamboo. It may be safely stated that the main technical difficulties associated with this fibre have now been overcome, and it is firmly established in India; Sabai grass, which produces a paper having similar characteristics, is also increasingly in evidence in papers from this source. Both types of paper are similar to those made from esparto, and give good printing results. To come nearer home, straw is a source of pulp which is encountered frequently in Continental papers, and particularly in those from agricultural countries such as Holland. Its use in recent years has been on the decline, but as this has been due mainly to the cheapness of wood-pulp, the removal of this competition should mark the revival of straw.

Unlike esparto and bamboo, straw imparts a hardness and rattle of paper and has a good colour; it is therefore more suitable for writing than for printings. Although there is, and presumably always will be, plentiful supplies for pulping, the processing of it for use in fine papers will, however, be controlled to a great extent by the demands on the raw material made by the straw-board industry. Danubian reed (*Phragmites communis*) is also available in large quantities in the Danube valley, and a similar reed grows in the marshy districts of Norfolk. Many investigations into their paper-making properties have already been carried out both privately and in conjunction with the Ministry of Agriculture, and it was concluded that if it were not for the low yield the reeds might prove competitive with certain classes of wood-pulp; here again, therefore, rising prices may reverse the situation. Similar considerations apply to New Zealand flax (*Phormium tenax*) and hemp stalks. The former is perhaps in a different strength category from wood-pulp, as its strength makes it more comparable with rags, but the latter is of considerable importance to countries such as Italy where some 400,000 tons of stalk are available per annum; this is sufficient to render this particular country self-supporting from the pulp point of view. Here again, however, the rayon industry may claim a share of the new material.

Finally, the possibility of a paper pulp famine in the distant future is extremely remote, as even if wood-pulp supplies fail—an unlikely probability—human ingenuity will soon provide a substitute. On the other hand, the immediate future may be a period of difficulty which will last until the gap between past and future conditions is bridged, so that there is every prospect that the rapid advances in the technology of the subject will continue.

— *Nature*, 22-5-37.

Notifications relating to Rangers.

Waltair Circle.

- 6—5—37. Mr. A. S. Kaunds, to Lakkavaram Range, Godavari Upper Division, in relief of Mr. Ahmed Sheriff.
- 15—5—37. Mr. S. M. Ansur Ali, to Sathiavedu Range, Nellore division from 1—5—1937 afternoon, *vice*, Ranger V. Rangachari granted leave.
- 20—5—37. Mr. Ch. Ramamurthi, Palakonda Range, to Gudem Agency Range, Vizagapatam division in relief of Mr. K. Subbanna, Trained Forester IV Grade reported sick.
- 25—5—37. Mr. Abdul Razack, to Lakkavaram Range, Godavari Upper division in relief of Mr. Sheriff, granted leave. 2. Mr. V. Rangachari, Nellore division to Udayagiri Range Nellore division. 3. Mr. K. A. Muddayya, to be on special duty on relief by No. 2. 4. Mr. A. S. Kaunds, extension of leave for 2 months from 26—5—1937.
- 29—5—37. Mr. V. Rangachari, on return from leave to Sathiavedu Range, Nellore division. 2. Mr. S. M. Ansur Ali, Ranger VII Grade, leave on average pay for one month.
- 29—5—37. Mr. Krishnaswamiah, Repalle Range, Guntur division leave for one month from 11—6—1937. 2. Mr. M. B. Madappa, Trained Forester I Grade, to charge of Repalle Range, Guntur division on expiry of his leave on 11—6—1937.
- 5—6—37. S. M. Ansur Ali, Ranger VII Grade, on return from leave to Godavari lower division and will remain attached there for the present.
- 16—6—37. Mr. Abdul Razack, extension of leave for 2 months from 14—6—1937 in continuation of the leave granted. 2. S. M. Ansur Ali, on return from leave on 22—6—1937 to Lakkavaram Range, Godavari upper division, in relief of Mr. Ahmed Sheriff.
- 2—7—37. Mr. M. S. Eswara Iyer, to Peddapur Range, Godavari lower division.
- 2—7—37. C. T. Trivengadam, Bezwada Range Guntur division leave for 4 months from 8—6—37 in continuation of the leave granted. 2. On return from leave on 14—7—37, Mr. D. Krishnaswamiah, to Bezwada Range, *vice* No. 1. 3. Until relief by No. 2 Mr. K. V. Lakshmikanta Rao, Forester III grade will continue to hold charge of Bezwada Range.
- 5—7—37. Mr. C. S. Sivagnanam, Trained Forester, III Grade, on return from leave on 9—7—1937 to Nugur Range, Godavari upper division as a temporary measure. 3. Until relief by No. 2. Mr. A. Subrahmanyam, Pulusumamidi Range,

Godavari upper division to hold additional charge of Lakkavaram Range, in relief of Mr. Ahmed Sheriff, Trained Forester III grade granted leave.

Bellary Circle.

- 23—4—37. 1. Mr. Mohammad Ansar Badsha, Range Officer, Dornal will take additional charge of the Markapur Range. 2. On relief by No. 1 Mr. Sankaran, Range Officer, Markapur will take charge of the Ganjivaripally Range. 3. On relief by No. 2 Mr. Devanayagam Naidu will relieve No. 1 of the additional charge of Markapur Range.
- 20—5—37. Mr. S. Sankaran, Range Officer, Markapur Range Kurnool East division is transferred to the charge of Ganjivaripalli Range of the same division. 2. Mr. G. Devanayagam Naidu Range Officer, Ganjivaripalli Range of Kurnool East Division is transferred to the charge of Markapur Range of the same division.
- 17—6—37. Mr. Md. Ansar Badsha reposted to the charge of Dornal Range Kurnool East division as acting Ranger VII grade. 2. Mr. T. Balaramaswami Naidu, Ranger VI grade, Dornal Range, to Sivapuram Range.
- 17—6—37. Mr. M. Umapathy Mudaliar, on the expiry of the 10 month's leave from 3—9—36 to Ganjivaripalli Range of Kurnool East division in relief Mr. G. Devanayagam Naidu.
- 24—6—37. Mr. H. Thammayya, Balapalli Range, Cuddapah South division leave for 4 months from date of relief. 2. Mr. D. V. Nagarathnam, to Balapalli Range, Cuddapah South division in relief of No. 1 granted leave. 3. Mr. S. Ramachandra Ayyar, to Vontimitta Range. 4. Mr. Y. Subramaniam Naidu, Porumamilla Range, Cuddapah North division leave for three months from date of relief by No. 5. 5. Mr. B. M. Bopayya, trained Forester and acting Ranger in charge of Vontimitta Range, Cuddapah North division, on relief by No. 3, to charge of Porumamilla Range.
- 3—7—37. Mr. T. M. Krishnamachari, Vempalli Range, Cuddapah North division leave for 3 months from 2—6—27.
- 3—7—37. Mr. Vyasulu, Yerragondapalem Range, Kurnool East division leave from 4—4—37 to 3—7—37. Mr. M. S. Subbayya, Trained Forester II grade will continue to be in charge of Yerragondapalem Range, *vice* No. (1) granted leave.
- 13—7—37. Mr. S. Ramachandra Iyer leave for one month from date of relief in the V. T. School. 2. The three months' leave granted to Mr. Y. Subramanyam Naidu and transfer of Mr. B. M. Bopayya will take effect after Mr. S. Ramachandra Iyer returns from his leave and rejoins duty in Vontimitta Range.

Salem Circle.

- 20—4—37. Mr. S. A. Dawson, Palmaner Range, leave for 4 months from date of relief.
- 20—4—37. Mr. M. V. Ganesan, Salem South division on return from leave on 26-4-1937, to Turaiyur Range. 2. Mr. A. Yagnaswami, Trained Forester on relief by No. 1, transferred to Vellore East division and appointed to act as Ranger last grade and posted to charge of Polur Range, *vice* Mr. B. S. Ramaswami Ayyar granted leave.
- 1—5—37. Consequent on the return to duty of M. V. Ganesan from leave on the afternoon of 26-4-1937, the following officiating promotion of Trained Foresters are ordered:—
1. Mr. C. S. Ekambaram, Trained Forester II grade and acting Ranger last grade will continue to act as Ranger last grade in the vacancy caused by the death of Ranger M. Pakiyannathan with effect from 27-3-1937. 2. M. M. Ponnappa, Trained Forester V grade and acting Ranger last grade will continue to act as Ranger last grade *vice* Ranger Mr. B. S. Ramaswami Ayyar granted leave (with effect from 27-4-1937). 3. Mr. A. Yagnaswami, Trained Forester V grade posted to Polur Range, Vellore East division, to act as Ranger last grade *vice* Ranger S. A. Dawson granted leave.
- 5—5—37. Mr. T. K. Parthasarathi Ayyangar, to Tiruvannamalai Range, 2. Mr. R. Manickam Pillai, Odugathur Range to hold additional charge of Vellore Range until further orders.
- 6—5—37. Mr. Syed Yabia Sahib, to Valapadi Range, 2. Mr. R. Thangavelu Pillai, to Palmaner Range of Chittoor division. He should relieve Mr. V. Narayanaswami Ayyar, Range Officer, Gudiyattam at present in additional charge.
- 16—5—37. Mr. T. R. Rajagopalan, to the charge of Vellore East division, to relieve Mr. R. Manickam Pillai, Range officer, Odugathur, in additional charge. 2. This cancels his posting Tiruvannamalai Range.
- 22—5—37. Mr. A. Yagnaswami, Trained Forester V grade of Polur Range, Vellore East division promoted to act as Ranger *vice* Ranger B. V. Vaideeswara Ayyar granted leave, with effect from 19-5-1937 or until further orders.
- 13—5—37. Mr. C. B. Ekambaram, Trained Forester II grade and Acting Ranger last grade in charge of Rasipur Range, Salem South division, will continue to act as Ranger last grade *vice* Ranger B. S. Ramaswami Ayyar granted leave with effect from 27-4-1937. 2. Mr. M. M. Ponnappa, Trained Forester V grade, will act as Ranger last grade with effect from 28-4-1937 *vice* Ranger S. A. Dawson granted leave. 3. Mr. A. Yagnaswami, Trained Forester V grade in charge of Polur Range, Vellore East division,

will be considered to be Forester in charge of the Range with enhanced fixed travelling allowance of Rs. 13-2-0 with effect from 5-5-1937 or until further orders. The arrangements ordered in this office Service Order No. 26 of 1937, are hereby cancelled.

- 26—5—37. Mr. B. Ghulam Dastagiri Sahib, Alangayam Range, leave for 2 months with effect from 1-7-1937. 2. Mr. T. R. Vijayaraghavan, Trained Forester V grade Salem North division, to charge of Alangayam Range with enhanced fixed travelling allowance of Rs. 13-2-0, for Range charge, *vice* No. 1 on leave or until further orders.
- 1—7—37. Mr. P. A. Krishnaswami Mudaliar, Tirupattur Sandalwood depot, leave for six months with effect from date of relief. 2. Mr. B. V. Vaideeswara Ayyar, Vellore East division, on return from leave on 13-7-1937, to Denkanikota West Range, 3. Mr. M. P. Halasyanatha Ayyar, Denkanikota West Range, to sandalwood depot *vice* No. 1.
- 2—7—37. Mr. K. S. Ramiah, Santhavasal Range, Vellore East division, to Shevaroy's North Range, Salem Central division. 2. Mr. J. S. Vedanayagam, Shevaroy's North Range, on relief by No. 1 to Santhavasal Range.

Coimbatore Circle.

- 10—4—37. Mr. T. D. Ponniah, to Srivilliputtur Range, Tinnevely division. To join forthwith and take charge of the Range from Mr. S. Nagalingam Pillai, Range Officer, Kuttalam, in additional charge.
- 15—4—37. Consequent on the posting of Mr. K. G. Monnappa, to Kodaikanal Range, Mr. M. Gopalswami Naidu on relief to Ulandi Range. 2. On relief by Mr. M. Gopalaswami Naidu Mr. T. R. Rajagopalan Ranger VII grade (Temporary) will proceed to join his appointment in Salem Circle.
- 15—4—37. Mr. A. Sitarama Sarma of Talamalai Range stands transferred to the Working Plan Circle and posted for work in the No. IV Working Plan Division (Kurnool) Kurnool. As soon as it is known as to where the Ranger should join in the Working Plan Division he may be immediately relieved by the Ranger Officer, Satyamangalam Range who will be in additional charge of Talamalai Range as a temporary measure.
- 26—4—37. Mr. T. Kondathu Gounder Palani Range, leave for 4 months from 15-5-1937 or date of relief. 2. He is permitted to draw conveyance allowance of Rs. 15/- a month during the period of his leave.
- 18—5—37. Mr. A. M. Srinivasan, to Coimbatore North division for service according to District Forest Officer's convenience.

- 21—5—37. Mr. S. Venkatarama Ayyar Ranger VI grade. on expiry leave to Bhavani Range.
- 21—5—37. The following officiating promotions of trained Foresters to the last grade of Ranger are ordered.—
1. Mr. V. Panchapakesa Ayyar, from 9-1-1937, *vice* Ranger C. Thiruvengadam Pillai on leave. 2. Mr. Pichai Pillai, to continue to officiate as Ranger, last grade, from 17-4-1937, *vice* Ranger C. Thiruvengadam Pillai on leave.
- 22—5—37. Mr. A. M. Srinivasan, to Talamalai Range. He should take over from Mr. K. Venkataramana Rao, Range Officer, Satyamangalam and relieve him of the additional charge.
- 22—5—37. Mr. P. Ramaswamy Ayyar, Ranger fifth grade Bhavani Range. Coimbatore North division leave for 4 months and 4 days from 20-4-37 to 23-8-37.
- 6—7—37. Mr. B. Kunders, M. R. H. Forester second grade promoted to act as Ranger fifth grade (new scale) from date of this order and posted to lac duty in Cumbum Range Madura Division.
- 8—7—37. Mr. W. Vores M R H. Forester fifth grade of Kollegal division promoted to act as Ranger fifth grade (new scale) and posted as 2nd Assistant, Tunacadavu Range of Coimbatore South division. The promotion will take effect from date of his assumption of duties as 2nd Assistant in Tunacadavu Range. 2. Mr. Govinda Menon M. R. H. Forester fifth grade of Coimbatore North division promoted to act as Ranger fifth grade (new scale) from date of joining and posted to Palni Range in relief Ranger Mr. T. Kondathu Goundar granted leave.

Ootacamund Circle.

- 20—4—37. Mr. J. D. Theodore, to Chedleth Range, Wynaad division, as Assistant Range Officer 2. Mr. M. D'Souza, Trained Forester and Acting Ranger (Asst. Ranger Officer, Chedleth) to Begur Range as Assistant Range Officer.
- 20—4—37. Mr. J. S. Rowland, Begur Range, leave for four months from date of relief, Mr. R. Ry. K. Karunakaran Nambiar, on return from leave on 10th June 1937, to Begur Range, Wynaad division, in relief of No. (1).
- 7—5—37. Mr. A. Mohomed Akbar, Kannothe Range, Wynaad Division, leave for 3 months from date of relief.
- 15—5—37. Mr. G. Rama Rao, leave for 3 months and 15 days from 5-4-1937 i. e., from date of relief from Parlakimedi division. 2. On expiry of the leave, he will take charge of Shankaranarayana Range, Mangalore North division.

- 23—5—37. Mr. Marcel D'Souza, Trained Forester and Acting Ranger, to Kannothe Range. Wynaad division, from 13th May 1937 *vice* Mr. A. Mohammed Akbar granted leave.
- 31—5—37. Mr. S. Sankaran, to Kannothe Range, Wynaad division. 2. Mr. Marcel D'Souza, Trained Forester and Acting Ranger in charge of Kannothe Range, on relief by No. (1) will go back to Begur Range as Assistant Range Officer.
- 24—5—37. Mr. S. Sankaran to the Ootacamund Circle, the Nilgiris. 2. Mr. M. P. Subbaya, on relief by No. 1, to Bolampatti Range, in relief of Mr. K. Dooma Shetty granted leave.
- 27—6—37. Mr. T. P. Gownder, special duty Palghat division, temporarily posted to Bolampatty Range, *vice* Mr. Dhooma Shetty granted leave, till relieved by Mr. M. P. Subbaya. 2. On relief he is to report himself to the District Forest Officer, Nilambur for special duty.
- 10—7—37. Mahamad Akbar Sahib, on expiry of his leave on 13-8-1937, to Mangalore Range, to relieve Ranger, Rama Rao Kini applied for leave. 2. Mr. T. Perumal Gounder, to Shankaranarayana Range, Mangalore North division. This cancels his posting to Nilambur division. 3. On relief by No. (2), C. J. Muthanna, Trained Forester and acting Ranger, VI grade, to Mannarghat Range, to relieve Ranger Mr. M. M. Mandanna applied for leave.
- 15—7—37. Mr. K. Dhooma Shetty, leave for 4 months from 27th June '37.

Corrigenda.

Page.	Para.	Line.	
139	3	2	Insert 'for' after 'bat'.
140	...	8	For 15 read 13.
141	...	12	For 'C. Nadkarni' read 'b. Nadkarni'

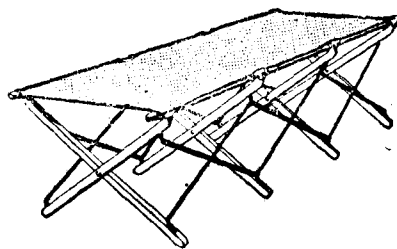
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13, d, 10-20, 11, 12.

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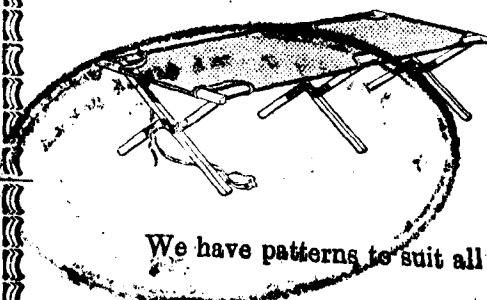
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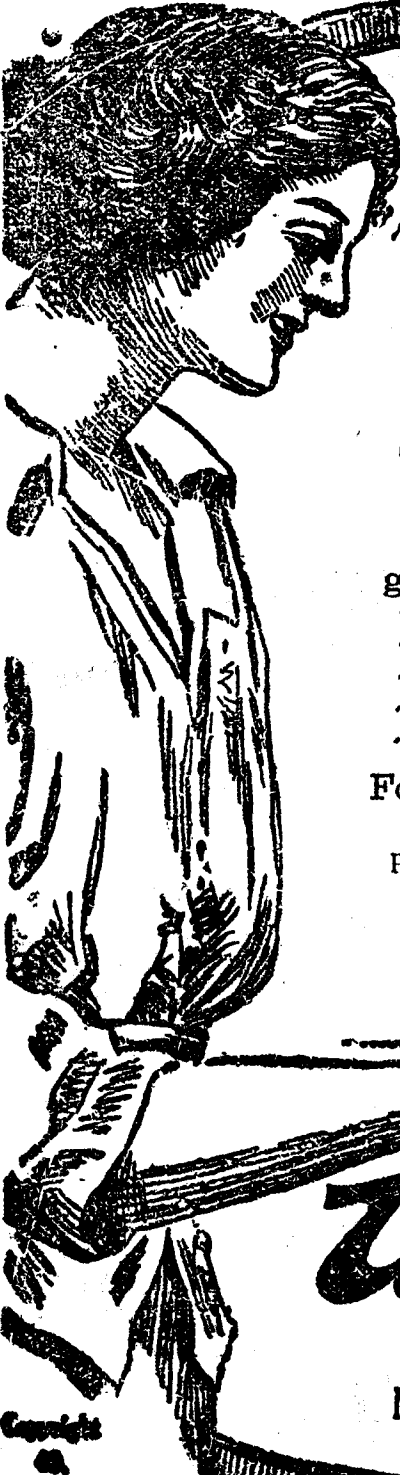
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