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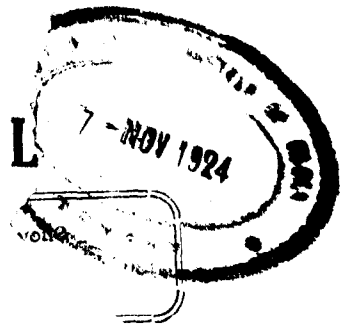
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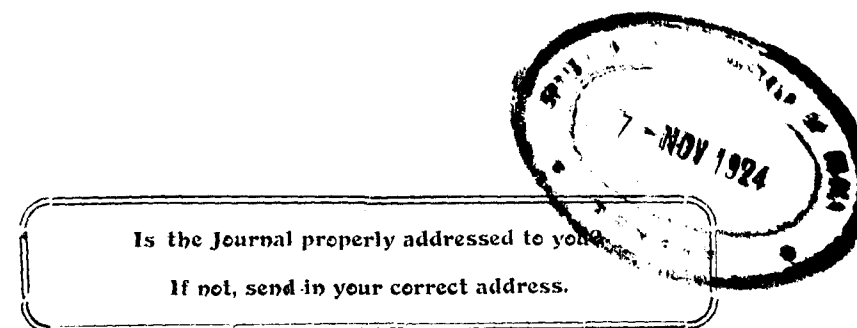
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THE JOURNAL
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Vol. XII.

SEPTEMBER 1924.

No.

A Preliminary Note

ON

"Looseness" (*Gulla*) in wet lands.

Introductory.

In the preparation of land for wet paddy, puddling is the most common practice in the Godavari delta and elsewhere, especially on lands of a heavy nature. But in some places where the soil cracks badly during summer, ploughing is of late being resorted to, as, when water is let into such land, cattle and men sink so deep into it that puddling becomes impracticable. Ploughing, however, is widely known to be uncongenial to wet paddy the soil being said thereby to become 'gulla'—literally 'loose.' The cultivation of such crops as sugarcane, gingelly or cholam, which involve the crowbarred or ploughing of the land is also said to bring in the same result besides exhausting the soil. When a land is thus crowbarred or ploughed frequently to enable such crops to be grown, it is said to become *gulla* of time, so loose as to affect even sugarcane. *Looseness*, however, is said to be favourable to gingelly, pulses, and sunhemp grown in the *paika* season.

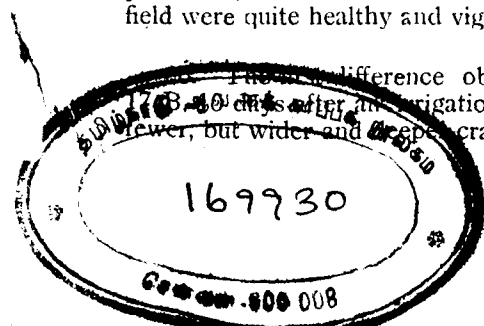
2. Two experiments conducted on the Samalkot agricultural station between the years 1909—10 and 1914—15 confirm the bad effects on paddy attributed to ploughing. On one of them ploughing decreased the yield by 355 lbs. of grain and 543 lbs. of straw per acre when compared with puddling on an average for four years. In the other, a ploughed fallow was compared with an unploughed fallow, both having been followed by puddling at the time of planting. The unploughed fallow gave 686 lbs. of grain per acre more than the ploughed fallow on an average of 4 years, though 295 lbs. less of straw.

3. Recent observations on sugarcane grown once in three years in rotation with paddy indicate that, the condition of the soil may be the chief cause for the death of canes in certain plots, the death having been hitherto attributed to red rot, conveyed chiefly through infected setts. In some fields of this station which consist of two plots one higher than the other the canes persistently died out in the higher plots though both the plots were planted with the same material, at the same time and treated alike. This, several experienced ryots who visited the farm, attributed to the soil in the higher plots having become more 'Gulla'.

What is 'Gulla.'

4. Samples of soil from three plots in one of which sugarcane (Purple Mauritius) was stunted and partly died out in the later stages and in the other two healthy and vigorous, were analysed by the Government Agricultural Chemist, Coimbatore, but the figures obtained showed little or no difference between the good and bad plots, in chemical as well as mechanical analyses.

5. An examination of the soil *in situ* was therefore undertaken. Purple Mauritius was grown on both the higher (B) and lower (A) plots of F 17, only a bund about a yard wide separating the two. The stools in the higher plot however ceased growth in October, and almost died out by the end of January, while those in the lower plot were healthy though not very vigorous in growth. B 208, B 3412 and B 1529 to a certain extent, were similarly affected in the higher plot of (F) 18 while the same varieties in the lower plot of the same field were quite healthy and vigorous.



The difference observed between the soil in 17 A and 17 B 10 days after irrigation in December was that there were fewer, but wider and deeper cracks in the lower plot (A) while there

were numerous but narrower cracks in the higher plot (B). The surface of the soil in the higher plot was quite dry and the top layer came off in flakes $\frac{1}{4}$ " to 1" thick while the soil below was still moist. In some places the surface of this plot was crumbling into small rounded lumps of soil resembling earth in a mole hill. The cracks in the lower plot extended down to about 6" the soil being more or less uniform to this depth. The surface was not so dry as in the higher plot. When dug with a crowbar or a hand-hoe, the soil in this plot came out in clods 5 or 6" deep, whereas, that in the higher plot could never be taken in clods, but crumbled to smaller lumps. Vertical sections in the lower plot showed that the soil was more or less homogeneous to a depth of about 6", only vertical or slanting cracks corresponding to those on the surface interrupting the homogeneity here and there. On the higher plots, there were no such distinct cracks except on the surface and the soil appeared to consist of moist lumps of earth easily separating in all directions along certain lines of cleavage when it was loosened. The soil in the lower plot below a depth of 6" was also similar to this. Sections of soil from a paddy field (F 25) in which no sugarcane or other crop involving ploughing or crowbarring was grown since 1909—10, were also examined and showed that the surface 2 or 3" consisted of a layer of fine very stiff soil, while the soil below was a more or less compact and uniform mass. The surface soil cracked and the cracks were extending into the lower stratum.

10. Some differences in the structure of the soil having thus been found, an attempt was then made to verify the observations made by a 'running water' test devised for the purpose. Four lumps of soil 10 oz each, taken without disturbing their structure from different depths (0—3", 3—6", 6—9" and 9—12") of each of the three plots (F. 25, 17 A and 17 B) were suspended in pieces of wire netting in water running in a masonry channel at a velocity of over a mile per hour, and the time taken for each lump to be washed out by the water noted. Table I gives these figures, which more or less confirm the observations noted above.

11. Lumps from 0—3" and 3—6" of F. 17 A (lower and healthy plot) took considerably more time to be washed out than those from F. 17 B (higher and diseased plot) at the same depths, while lumps for the same depths of F. 25 (Paddy land) took a very much longer time than those from either F. 17 A or 17 B. Lumps from 6—9" of F 17 A as well as B, were very easily washed out. Lumps from the same depth of F 25, however, took a very much longer time. In fact these held out longer than those from any other

TABLE I.

Lump No.	0—3"			3—6"			6—9"			9—12"			Average.			Remarks.
	F. 17 B. (Higher plot.)	F. 17 A. (Lower plot.)	F. 25. (Paddy land.)	F. 17 B. (Higher plot.)	F. 17 A. (Lower plot.)	F. 25. (Paddy land.)	F. 17 B. (Higher plot.)	F. 17 A. (Lower plot.)	F. 25. (Paddy land.)	F. 17 B. (Higher plot.)	F. 17 A. (Lower plot.)	F. 25. (Paddy land.)	F. 17 B. (Higher plot.)	F. 17 A. (Lower plot.)	F. 25. (Paddy land.)	
1	3-25	71-0	175-45	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	Figures for 6-9" in F 17 A and B are averages of 2 tests.
2	1-55	55-0	167-20	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	
3	3-15	50-30	110-15	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	
4	7-30	9-20	258-10	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	H.M.	
Average	4-1	46-28	178-8	3-29	24-7	98-30	0-20	0-55	45-29	10-36	177-48	19-36	4-37	62-20	85-26	

stratum in F 17 B and almost as long as those from the topmost stratum of 17 A. Lumps from 9"—12" of F 25 behaved consistently with those in the strata above. But in the case of F 17 A as well as B, some lumps from this stratum were more resistant than those from the strata above, while some were more easily washed out. There is much more variation in the figures obtained from them, especially from those from F 17 A, which range from 1 hour 17 minutes to 474 hours and 10 minutes

12. The marked differences thus seen in the time taken by lumps from different depths of the three fields may be taken to be fairly significant of the structure of the soil represented by those lumps. The quicker the soil was washed out, when placed in running water, the less compact it might be taken to be and vice versa.

13. That there was a difference in the compactness of the soils of F. 17 A and 17 B, was also confirmed by weighments of equal volumes of soil taken from field in situ, by driving a cylindrical vessel into it. The average weights obtained for 10 samples from each were 26.553 and 28.603 respectively.

14. Though there is a good deal of variation in the figures obtained from samples from the same field, yet, there is a general tendency for samples from F 17 A to weigh more, which indicates its more compact nature.

15. The terms 'gulla' (loose) and 'gatti' (compact) used by ryots in reference to soils thus appear to be quite significant of the structure of the soil.

How does Gulla arise ?

16. Now comes a question, how does 'gulla' arise when a paddy soil which is originally 'gatti', is ploughed or crowbarred, and how did F 17 B become more 'gulla' than F 17 A?

17. A plausible explanation of how 'gulla' is brought about in a paddy land is that when it is crowbarred or ploughed in winter in a dry state, so as to form big clods, as it usually happens in stiff soils and the clods weather, cracks of a varying width are formed, throughout the mass of each clod, which thus becomes an aggregate of a number of smaller lumps, the size and number of which depend upon the extent of weathering. When the field is subsequently irrigated and planted up with sugarcane or paddy, the surface irregularities disappear to a large extent, but the structure of the portions

of clods left undisturbed below the surface, seems to undergo very little change, the small lumps of earth formed by weathering retaining their individuality though probably brought closer together by the swelling of the soil in them after irrigation.

18. When a stiff paddy land is puddled, the soil particles settle down under water and form a homogeneous mass of soil, in which the particles are rather closely packed, the finer particles on the surface and the coarser ones in the lower strata. The soil in a puddled land is thus more compact than that which has been loosened by crowbarring or ploughing, and it is natural that it takes more time to be washed out when placed in running water.

19. Both 17 A (lower plot) and 17 B (higher plot) were crowbarred in 1920 and sugarcane planted, much bigger clods having been formed in B than A owing to its higher situation and proximity to a channel and consequent quicker drying. In that year, sugarcane (Purple Mauritius, B 6450 and to some extent B 3412) was diseased in the higher plot (B) but was healthy in the lower one (A). In 1923 sugarcane was again planted in the same plots, paddy having been raised in them in 1921 and 1922. In 1923 the land was ploughed instead of being crowbarred. In the higher plot again the land was quite dry at the time of ploughing and bigger clods were formed, while in the lower plots the soil was not so dry and the tilth was finer. Purple Mauritius canes grown in the higher plot were, as already stated diseased, and mostly dead by January 1924, while the same variety in the lower plot was healthy, though not very vigorous.

20. Though both the plots thus received the same treatment in 1920 and 1923, the higher plot appears to have become more 'gulla' than the lower, owing to formation of bigger clods in crowbarring in 1920 and ploughing in 1920 and their more thorough weathering. That the soil between 6—9" in the lower plot was more or less as 'gulla' as that at the same depth of the higher plot and was as easily washed out by running water may be attributed to the effects of crowbarring in 1920 still persisting. In both the plots, the soil between 9" and 12" does not appear to have become so 'gulla' as between 6—9". This appears to be due to the weathering not having been so advanced at this depth as it was higher up. The greater irregularity found in the figures for this stratum may be due to differences in the depth of crowbarring and subsequent weathering. The difference found in the degree of 'gulla' between the surface 3" and the next 3" in the same field appears to be due to the surface being trodden down by coolies while wrapping and propping.

21. That the size of the clods formed in crowbarring or ploughing affects the degree of 'gulla' is corroborated by the fact that ryots in some tracts recognise a difference in the effect of ploughing and rowbarring in the preparation of land for sugarcane. In the vicinity of Doddipatla, Tatipaka and Samalkot, where sugarcane was long under cultivation, ryots prefer to plough their sugarcane fields than to crowbar them. The reason for this preference to ploughing is said to be that ploughing does not make the soil so 'gulla' as crowbarring. To verify this belief, an experiment was conducted in season 1922-23 on the Samalkot Agricultural Station with Purple Mauritius cane, and the results were in favour of ploughing as shown in Table II below:—

22. The plot in which the experiment was conducted was a high level plot (F 22B). The growth was good at first in both the ploughed and crowbarred plots but the crop became stunted and sickly by October. The crowbarred plots having been more severely affected than the ploughed ones, (Disease broke in and was more severe in the crowbarred plots,) the result showed a difference in yield in favour of the latter.

23. There is thus some difference in the effects of crowbarring and ploughing and this may reasonably be attributed, as already suggested, to the soil in the crowbarred plots having become more 'gulla' owing to the largeness of the clods formed, and loosened by cracking under the former method. Even when the land is ploughed a certain number of clods are no doubt formed, but as the ploughing is repeated several times, a large number of these are pulverised, so that when the land is irrigated, the loose soil thus formed again settles down into a somewhat compact mass. The soil in a ploughed soil is, moreover, not loosened so deep as in a crowbarred land.

24. In this connection it may not be out of place to note that while the ryots in the Godavari delta prefer to plough their paddy lands which cannot be puddled, as shortly as possible before letting in water and planting, the ryots in the Yeleru tract prefer to plough them earlier. The soils in the latter tract are lighter, and by ploughing earlier, the ryots say, the clods weather and by the time water is let in for planting a finer tilth is produced, and that the soil consolidates itself better than when the land is ploughed shortly before water is let in for planting. Of course, the land in the Yeleru tract never breaks up into such huge clods as in the Godavari delta. In the delta, on the other hand a finer tilth is said to be obtained when the land is ploughed in the 'tholakari' than when ploughed earlier, as the surface soil weathers and crumbles to a fine soil during summer,

Table II.

No. of plot.	Area in cents.	Crowbarred.				Ploughed.				Remarks.
		No. of canes.	Weight of			No. of canes.	Weight of			
			canes.	juice.	lb.		canes.	juice.	lb.	
1	2.4	392	855	567	101	415	1311	819	149	
2	2.4	299	1008	600	105	375	1196	705	134	
3	2.4	375	994	548	102	435	1446	844	161	
4	2.4	401	1309	709	137	490	1485	871	171	
Av.	2.4	367	1042	606	111	429	1360	807	154	
Av. Per acre	...	15281	43396	28375	4635	17860	56646	33740	6406	

especially, if the land had been ploughed for the previous paddy crop instead of being puddled. In fact, some soils crumble so fine in summer, that the land can be ploughed before any rain is at all received. Some lands are not at all ploughed and are planted straight away after letting in water. In some extremely 'gulla' soils even sugarcane is thus planted without any previous cultivation of the land.

How does 'Gulla' affect paddy and sugarcane?

25. Admitting that crowbarring or ploughing brings in a state known as 'gulla' the next question is, 'how does this condition affect paddy and sugarcane.' In the case of paddy it may be argued that drainage is too free in the 'gulla' soil and that this prevents the formation of a satisfactory surface film of algae which are said to play a very important part in the supply of oxygen to the roots of the paddy plant grown under swamp conditions. It may not be out of place in this connection to quote a paragraph from a memoir on 'Gases on swamp rice soils' by Dr. Harrison and Subramania Aiyer (Part I. P. 102). "Dry soils of a heavy nature" they write, "do not yield the maximum crops of paddy at once, when converted into wet land. Usually the yields of the first few years are exceedingly poor and it is only after several years have elapsed, that such land is looked upon as even fair swamp paddy soil. In the first few years after paddy cultivation is initiated on land previously under dry cultivation, the main change taking place is a sorting of particles tending to accumulate in the sub-soil and vice versa. Afterwards this action is diminished and the main effect of cultivation is the breaking down of the soil particles, thus producing a heavier soil as years go on. Thus in these new soils the rate of drainage is continuously tending to diminish and it is not until this rate permits the formation of a surface film that the maximum yields are obtained".

26. A wet land when ploughed dry or crowbarred may be presumed to have a soil more or less resembling that of a dry land and the same factors affecting the growth of a paddy crop in a dry land newly brought under cultivation may be said to act in the case of a wet land ploughed or crowbarred. But whether there is actually a free drainage in such soils, is, however, a matter for careful study. A widely prevalent practice pertaining to irrigation of paddy lands in the tract commanded by the Yeleru river, indicates that a paddy land when ploughed instead of puddled, tends to become more water-logged. Lands ploughed are allowed to dry up after every irrigation before water is let in again, or else the crop is said to suffer. In the case of puddled lands the crop is found to do well when water is always kept in the field.

The fact that pulses sown shortly before the harvest of paddy in the standing crop are found to do better on land ploughed in a dry condition before the paddy crop is planted, than on puddled land also indicates that the ploughed land retains moisture better. When ploughing is resorted to for a long number of years the soil is sometimes known to attain a condition known as 'Ubha' in which the soil is moist even at the surface for a long time after the paddy crop is harvested, so that it is found impossible to sow sunnhemp or pulses in such soils. It is thus doubtful if the ploughed land is actually better drained than a puddled one, other conditions being the same, and if the surface film theory applies to these conditions.

27. In the case of sugarcane, of course, the 'surface film' theory has no place, as this crop is not grown under swamp conditions. It was observed that the crop on a 'gulla' soil did as well as or even better than that on a 'gatti' soil till the end of August or September, after which the growth of the crop on the 'gulla' soil was retarded and ceased completely by November, signs of disease meanwhile appearing and becoming more and more pronounced, while the crop on the 'gatti' soil continued to grow till January or February. An examination of the root-system in the 'Gulla' soil revealed that the roots which before the rainy season extended to a considerable depth, were mostly dead by December, only a shallow surface root-system being left. This may be attributed to the water-logging brought about by heavy rains and a lowering of temperature. The root system of stools in a 'Gatti' soil on the other hand was deep even after the rains and much larger, though even in this it was not so deep as before the rains, a net work of surface roots having taken the place of the older and deeper roots. Stubbs in his treatise on sugarcane, Vol. I Page 144, in warning cultivators against the dangers of injudicious sub-soiling, writes:- "Upon our alluvial soils where drainage is of such prime importance and in our climate of heavy summer falls, sub-soiling must be practiced with judgment and skill, else injury to soil and crops may result. It is safer and perhaps better to precede the cane crop with deep tap-rooted legumes planted, and let them do the sub-soiling."

28. There is thus fair reason to believe, that the defect in a 'gulla' soil may be its proneness to get more water-logged after the heavy rains, than a 'gatti' soil, on account of its having been more deeply stirred and having more thoroughly weathered, thus becoming more spongy. An attempt has been made to confirm this view by determining the moisture contents of the two soils immediately after and a week after an irrigation, three-pound samples having been taken from different depths and dried in the sun. The results noted

Table III.

No. of Sample.	Gulla Soil. (F. 17 B).					Gatti Soil. (F. 17 A).					REMARKS.
	0"—3"	3"—6"	6"—9"	9"—12"	Oz.	0"—3"	3"—6"	6"—9"	9"—12"	Oz.	
1	35.50	32.50	34.00	34.00	35.50	35.50	35.00	35.50	36.50	36.50	Samples taken immediately after an irrigation.
2	34.75	32.75	32.75	35.00	35.25	34.50	34.50	33.25	30.50	30.50	
3	35.25	34.50	33.00	34.00	35.75	34.25	34.25	33.50	40.25	40.25	
4	35.00	33.75	34.00	35.50	35.50	34.25	34.25	34.00	35.00	35.00	
Average.	35.13	33.38	33.44	34.38	35.50	34.50	34.63	35.56			Samples taken a week after an irrigation.
Average moisture lost.	12.87	14.62	14.56	13.62	12.50	13.50	13.37	12.44			
1	37.00	30.00	35.75	36.00	38.50	36.25	37.00	37.00	37.00	37.00	
2	36.75	35.50	36.25	36.50	40.00	36.50	36.00	36.00	36.00	36.00	
3	35.50	33.50	36.25	35.50	35.50	35.50	36.00	36.00	36.50	36.50	
4	36.50	33.50	35.50	35.75	35.50	35.50	36.25	36.25	36.50	36.50	
Average.	36.44	33.13	35.90	35.90	37.13	35.31	36.31	36.44			
Average moisture lost.	11.56	14.87	12.10	12.10	10.87	12.69	11.69	11.56			

N. B.—All samples were weighed after drying in the sun.

in Table III though not quite consistent in all cases, confirm in general, the view expressed above. The quantity of water lost by drying in the sun was taken to roughly represent the moisture content of the sample.

29. Judging from the averages of the figures, the soil from each stratum of the 'gulla' land contained more water than that from the corresponding stratum of the 'gatti' soil both in the case of samples taken immediately after and one week after an irrigation, though the 'gulla' land is about 9" higher than the 'gatti' one and had better facilities for drainage. The differences however, are not large, but the toleration point for the varieties of canes that are usually diseased when planted in a 'gulla' soil may be between these narrow limits. The moisture content in the different strata appears to have a close relation to the extent of 'gulla' as indicated by the time taken to be washed out by the lumps from each stratum, in the 'running' water test. In the case of samples taken one week after an irrigation, however, those from 3-6" showed a higher moisture content than those from 6-9",—a result contrary to expectations, and requiring verification.

G. Jogiraju.

EXTRACTS.

KANNAMBADI AGREEMENT.

The Government of Madras have issued the following press communique regarding the Mysore-Madras agreement:—

On the 18th February last, an agreement was executed on behalf of the Government of Madras and the Mysore Durbar which finally settled the longstanding dispute relating to the utilisation of waters of the river Cauvery in Madras and Mysore respectively. This agreement has just been ratified by the Right Hon'ble the Secretary of State.

HISTORY OF THE NEGOTIATIONS.

The history of this dispute is well-known. In 1913 the question was referred to arbitration, but the award given in 1914 was of a nature which the Government of Madras were unable to accept. They

therefore appealed to the Secretary of State who thereupon suspended the award. Negotiations between the Government of Madras and the Mysore Durbar were then commenced with a view to an equitable and friendly settlement of the points at issue. The principal objection in the interests of this presidency to the award of 1914 lay in the fact that although the award provided in terms of gauge readings at Cauvery Dam (Upper Anicut), for supplies, which were assumed by the arbitrator to represent the established rights of Madras in regard to the existing irrigation in the Cauvery Delta, it afforded inadequate protection to Madras in respect of surplus waters of the river and of the future extensions of irrigation. These negotiations were conducted on behalf of Madras by the Chief Engineer for irrigation, Mr. W. J. Howley. Sir Thomas Ward, Inspector-General of Irrigation, was consulted from time to time and visited this presidency in this connection.

From the date of the award further gaugings of the supply available in the river in each month of the year and of the discharges represented by the gauge readings at the Cauvery dam were continuously maintained and registered and on the basis of the calculations based on more exact data which thus became available, the first stage in the settlement was reached. In 1921 when after very careful and prolonged study of the later results by the late Col. Morin, who was then the Chief Engineer for Irrigation, and Mr. F. E. Morgan, Assistant Chief Engineer for Irrigation, the first step in the final settlement was taken in July 1921, when rules limiting impounding in the Krishnarajasagara Reservoir in Mysore, minimum gauge readings to be maintained at the Cauvery dam and the limitation of extension of the irrigated area in Mysore were agreed to by both sides. During the course of subsequent negotiations, however, the Mysore Durbar claimed the right to prohibit any further extension of irrigation under the river Cauvery or its tributaries in Madras, whether by improvement of duty or otherwise, to prohibit the construction of any reservoir or any tributary of the Cauvery in Madras territory, and to limit the executive capacity of the Madras Cauvery reservoir at Metur to 82,000 M. C. ft. This Government was unable to accept these restrictions, which would have seriously affected the irrigation facilities in Madras for 50 years at least and further negotiations took place. The matter was discussed at meetings which took place in Mysore and Ootacamund during June and July 1922 between the member then in charge of the Irrigation portfolio, Sir K. Srinivasa Iyengar, and the Dewan of Mysore. No conclusions were, however, arrived at. Subsequently several tentative draft agreements were framed and in April 1923, a further discussion took place at Bangalore

between Sir Charles Todhunter and the Hon'ble Mr. C.P. Ramaswami Iyer and the Dewan of Mysore at which were present Mr. Narasimha Iyengar, Under Secretary to the Government of Madras, Irrigation and Mr. Cadambi, Special Officer, Krishnarajasagara works and in June 1923 the Hon'ble Mr. C. P. Ramaswami Iyer discussed matters in Simla, with the Government of India. In September and November 1923, further conferences were held in Bangalore and Madras between Mr. A. V. Ramalinga Iyer, Chief Engineer, assisted by Mr. Narasimha Iyengar, Under Secretary, and the Mysore engineers. During this period the assistance of Mr. Gebbie, Consulting Engineer to the Government of India, was obtained and he attended the September conference. The Mysore authorities, however, found themselves unable to modify their claims already referred to; and this position was maintained unaltered until February last, when, at the final meeting between the representatives in Bangalore at which Mr. Gebbie, Consulting Engineer to the Government of India, was present, an amicable agreement was arrived at.

1921 AGREEMENT CONFIRMED.

Under this agreement, which was executed on the 18th February, the terms of the Agreement of July 21 were confirmed. The limit of effective capacity of the proposed Madras reservoir was raised to 93,500 M. C. ft., the right to construct new irrigation works on the tributaries of the Cauvery in Madras was preserved and also the right of the Government of Madras to extend irrigation.

During the course of those prolonged negotiations, this Government, in addition to the opinions of their own professional advisers, have had the advantage of the advice and assistance of the Government of India irrigation experts, and further before the final settlement was effected, they also consulted Mr. W. J. Howley, whose high professional qualifications and long experience were of the greatest value.

DELTA INTERESTS AND RIGHTS.

A most important factor in the case was the effect of any agreement which might be arrived at on the existing interests and rights in the Cauvery delta, including French territory. These interests were necessarily regarded as a first charge on any arrangement that might be made. The various representations made by the Tanjore Mirasdaris and other interested parties were most carefully studied and considered. The advantages which will accrue to this

area in the effect of the proposed storage reservoir in affording a regular and reliable supply, independent of seasonal conditions, cannot be over-estimated while pending the completion of the reservoirs the area is fully safeguarded by the limitation of the permissible storage in Mysore, which was also definitely pressed for as necessary to safeguard the rights of Tanjore and Trichinopoly ryots so as to allow of further extension.

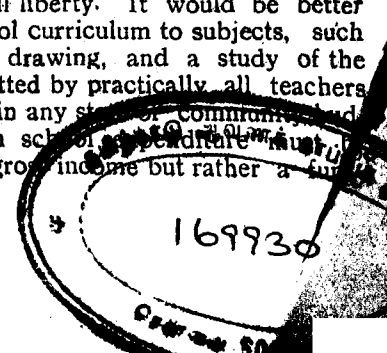
WATER POWER AT MEKADATU.

This Government have further agreed with the Mysore Durbar that Mysore shall utilise the water power available at Mekadatu for the development of electric power, subject to the right of Madras to purchase the power from this source, if required, at a concession rate. In view of the very large sources of power, which are available in this presidency, it is doubtful whether the power from Mekadatu will be required.

The agreement is a most satisfactory termination of this prolonged dispute, as while it affords complete protection of the existing irrigation, it also enables the Madras Government to proceed with their reservoir at Metur as soon as the Secretary of State has sanctioned the project and to effect considerable extension of the irrigated area.

"*The Rising Cost of Education*" formed the subject of a much discussed report published in 1922 by the president of the Carnegie Foundation for the Advancement of Teaching. In his annual report for 1922-23 he returns to this theme and, while admitting that a progressive increase in the cost of a sincere, intelligent, and fruitful school system is necessary and desirable, he attributes much of the increase during the past two decades in the cost of education to the addition to the curriculum of a great number of subjects and activities under conditions involving the neglect of the disciplinary side of education and the sacrifice of sincerity and thoroughness. He quotes with approval Dr. A. T. Hadley's definition of a liberal education as an education which fits one for the exercise of liberty, civil and political, and the corollary that if breadth is purchased at the expense of self-reliance, as is too commonly the case, the education is an illiberal one—an actual detriment to the exercise of civil liberty. It would be better as well as cheaper to restrict the school curriculum to subjects, such as English, elementary mathematics, drawing, and a study of the Govt. of the country, which are admitted by practically all teachers to be necessary. He points out that in any system of compulsory education, the margin of income upon which school expenditure is based, is not a direct function of the gross income but rather a function of the

J. S. M. 21, 1913
N 24



tion of the income that remains after the primary wants of mankind have been met, and the taxes, enormously increased in the last decade, to meet governmental fixed costs, have been taken out.

(*Nature* 21—6—1924)

Preserving Power of Sugar.

Dr. John McLean Thompson, Professor of Botany at the University of Liverpool, in a letter to the West India Committee dated 13th, writes: "During a recent examination of the herbarium collections of Aublet which resulted from his famous expedition to the West Indies and Guiana it was found that many of his plants collected during the years 1780-1784 had been preserved in what is apparently a sugar, and dried before mounting. The preservation has been so perfect that I have been enabled to employ portions of Aublet's plants for the most minute histological study with results which compare favourably with those obtained from modern plants preserved in spirit or formaline. The matter is one of very great interest from the point of view of the preservation of plant tissues. There is, of course, no possibility of employment of other than cane sugar by Aublet and I should be most interested to trace the method employed."

M. Fuscé Aublet was the author of a work entitled "Les Plantes de la Guiane Française" published in 1725. But he also wrote on the flora of the West Indies generally at the end of the eighteenth century. At the period in question the Sugar produced in the West Indies was Muscovado, and clayed sugar—sugar percolated by means of a layer of clay with the object of refining it—but the committee have sent Professor Thompson samples of every kind of cane sugar produced in the West Indies with the object of facilitating an experiment which Dr. Thompson proposes to carry out. The results will be awaited with much interest.

The preservative qualities of cane sugar have been recognised for many generations. Dr. Moseley, in his treatise, records that the king of Sardinia used sugar as a chief food and that when after death the monarch's body was opened all the viscera were found to be perfectly sound, and when similarly the great Duke of Beaufort, who died about a hundred years ago at the age of 70, was opened, his viscera were found in the same manner as perfect as in a person of 20 with his teeth white and firm. He had for forty years before his death used a pound of sugar daily in his wine, chocolate and sweetmeats".

Dr. Fredric Slayer went further, declaring that his grandfather was "strong and cheerful in his 82nd at which time his hair changed somewhat dark, his old teeth came out pushed away by young ones until he had a new set of teeth complete. He lived free from pain and sickness until his 100th year".

It was the same Dr. Slayer who found that the use of sugar was a specific against drunkenness, a friend of his who was much addicted to red wine having found that when he dissolved sugar in it, he was never sick nor inflamed nor fuddled with wine. Adds the Dr., "I made use of sugar myself in red wine and found the like good effect, that it prevents heating my blood or giving my head any disturbance, if I drink a larger potion than ordinary." "*West India Committee Circular*".

(*The Australian Sugar Journal*, July 4, 1924.)

K. K. R.

Retting of Coconut Coir. Although the preparation, spinning and weaving of Coconut Coir is an important industry in Malabar and Travancore, the biochemistry of fibre extraction has not been studied till very recently. Dr. Marsden has studied the problem in detail and has published his results in a recent Bulletin of the Indian Institute of Science, Bangalore.

He has shown that retting is due to bacteria invariably present in the coconut husk irrespective of the locality from which the nuts are obtained in South India. During retting, the water undergoes a number of changes becoming brown during the first few days on account of dissolving the colouring matter in the husk. In the course of the next fortnight, the colour disappears while bacterial growth gradually develops and the odour of sulphuretted hydrogen becomes apparent. The flow of water should be so regulated that the bacterial flora is not washed away, but just the waste and the gaseous products are removed.

Colour variations in the Coir are due to the presence of soluble tannins which are converted by oxidation into red insoluble substances. To avoid this, the husks should be transferred into retting water immediately after husking.

(*Journal of the Indian Institute of Science* Vol. 7 Part VII.)

B. V.

GLEANINGS.

Lodging in cereals. Garber and Olson summarise, in the following terms, an account of their study undertaken at the Minnesota Agricultural Station to determine the relation of some morphological characters to lodging in cereals.—

Extreme varieties for lodging in wheat, oats, and barley, were selected for this study, and measurements were also made of Minnesota No. 2 winter rye, which stands up better than the other cereals. A study was made of the correlation between lodging behaviour and average size of culm, average number of bundles, average area of sclerenchyma, thickness of culm-wall, length of lignified cells, and thickness of lignified cell-wall. None of the above-mentioned characters except thickness of cell-wall seems closely related to lodging. Both the early and the medium oat strains examined showed a distinct correlation between thickness of lignified cell-walls and lodging. In general, lodging in cereals is dependent on so many factors of unequal value in the different sorts that no one factor seems to be correlated closely enough with lodging to be of much value as a selection index. Among the different strains of oats and barley, the average number of vascular bundles was found to be correlated with the average diameter of culms.

G. N. R.

Deep versus shallow ploughing.

M. C. Sewell of Kansas, after an extensive review of the literature on Tillage, concludes that, in general, the prevailing theories advocating *deep ploughing frequent cultivation* are not founded upon explanatory evidence. He states:

Ploughing deeper than 7 inches has not generally resulted in an increase of crop yields.

Shallow ploughing may produce as great yields as deeper ploughing, but the depth less than 7 inches which is best for economic production has not been determined.

The question of frequency of ploughing has not been answered, but it seems possible by proper rotation of crops to lessen the number of ploughings.

Cultivation may be necessary only to kill weeds and keep the soil in a receptive condition to absorb rainfall. Thus it is practical, except on very heavy soils, to reduce the amount of cultivation where the guiding ploughing policy is that of thorough cultivation in order to maintain a soil mulch.

G. N. R.

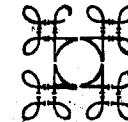
Effects of wounds on weight of Potatoes: Butler working at the New Hampshire Agricultural Experiment Station, U. S. A. notes that care should be exercised not to cut or bruise potatoes unnecessarily, as not only is their market value much reduced, but the loss in weight is much more rapid than in uninjured tubers. He estimates the loss due to a slight wound at more than 2 per cent and infers that larger losses will follow rough handling. He warns against unnecessary bruises as tubers are more sensitive to injuries than would be anticipated from their general solidity.

G. N. R.

Cotton improvement in South Africa..... The Chairman stated that the Rustenburg cotton seed station was being extended with the intention to grow more pure seed; a seed station was also being established in the Barberton area. Arrangements had been made whereby the British Cotton Growing Corporation would help this industry, and the Cotton Division would be augmented by four or five experts, viz., an organizing officer (Mr. Milligan), a breeder (Mr. Parnell), an entomologist, a soil chemist, and probably also a pathologist, who would carry out specific cotton work.

(*Journal of the Department of Agriculture, Union of South Africa.*)

Vol IX, No. 3, September 1924.



Statement of Agricultural commodities carried by rail in Great Britain;

(Thousands omitted.)	1923.	1922.	1921
Milk	282,280	276,504	256,090
Wheat	1,305	1,386	1,561
Barley	1,086	871	1,092
Oats	565	570	648
Other grain	1,777	1,639	1,813
Flour, Bran, other offals..	2,748	2,576	2,614
Oil cakes & cattlefoods...	1,200	1,373	1,518
Hay & Straw	980	764	680
Potatoes	2,014	2,038	2,111
Other Vegetables	712	582	617

The above figures relate to goods carried by freight train except milk carried by special trains.

Rates on milk varied from 1.44 d. to 1.39 d per gallon

"	Wheat, barely oats	10 s. to 10-6 d "	ton
"	Other grain, flour	11 s. 6 d.	" "
"	Hay and straw	13 s.	" "
"	Oilcakes	14 s.	" "
"	Potatoes	20 s. to 13 s.	" "

These rates are only 50 per cent above prewar level.

A comparison of Indian or Madras rates would be instructive and profitable.

From the Farmer and Stock-breeder—31st March 24.
A. U. M

STUDENTS' CORNER.

Tours :

Students of B. Sc., II went on a short tour to Kollegal in the early part of the month to study silk-rearing and the cultivation of the mulberry.

Students of B. Sc., I were taken on a five days' tour to Madras as in previous years to acquaint themselves with the various forms of animal life in the Aquarium, the Madras Museum, the Zoo, and Ennore Biological Station.

The Final year class of the University course were on tour for a fortnight in the latter part of the month visiting Repal'y, Vizianagaram, Anakapalli, Samalkota, Rajahmundry, Tenali and villages in their neighbourhood.

Games Section Activities during 1st term.

The season opened with interesting foot-ball matches. In the match played on 1st August the officers having an exceptionally good team had an easy win over the students, winning by two goals to nil. In connection with the peace-week celebrations, a mixed team was sent to play with the Govt. College in which it had a narrow defeat by one goal. On the 11th September a combined team of officers and students played a match against the Foresters, in which though our team proved to be by far stronger, the match ended in a draw. The match was, however, keenly watched by a large number of spectators and particular mention has to be made of Mr. Sivan's enthusiastic and energetic directions and encouragement.

Hockey. In the first match played on 10th August with the officers the students sustained a defeat by three goals. On the 19th August, the Foresters were invited to play a friendly match. The game was very well contested, and our forwards pressed well, but failed to convert all the chances they got. Though our defence seemed to be rather weak, yet the match, as expected, ended in our favour.

Cricket. In connection with the Y. M. C. A. Tournament, in all, three matches were played. In the first, with the Forest College, our team sustained a clear innings defeat. In the second match with the Govt. College, however, we had an easy win by an innings and 79 runs as the former sent in a very poor team. The third match played on 6th September was one similar to the first as our team narrowly escaped an innings defeat at the hands of the Podanur Railway Club team. Even though the opposition

renowned fast bowler was absent, our team unluckily could not get into proper form, the top scores being 10 and 11 respectively in these two innings.

Students' Club meetings. 28-7-24. Inaugural address by M.R.Ry. Diwan Bahadur W. L. Venkataramayya Garu, B. A., B. L., Retired District and Sessions Judge. *President.* M. R. Ry. C. Tadulinga Mudaliar Avl., Govt. Lecturing Botanist.

15-8-24. Debate-'Agriculture as an occupation for the educated'—

Opened by Mr. S. G. Katchapeswaran and opposed by Mr. B. S. Suryanarayana, B. A., B. Sc., III Students. *President* Rao Sahib M. R. Ramaswami Sivan Avl., B. A., D.A.,

1-3-24. Debate—"Whether Foreign Implements and Machinery are necessary for Indian Agriculture".

Opened by Mr. P. A. Venkateswaran, B. A., (paper read by B. Varadachari of B. Sc., II) opposed by Mr. S. V. Doraiswami, B. A., (B. Sc., Class III student.) *President.* M.R.Ry. C. Sundararamayyar Avl., B. A.

ESTATE NEWS.

The Late Mr. Newland. The whole estate was sorry to learn of the untimely death of Mr. F. T. T. Newland who left the department on proportionate pension only a few months ago. Residents will always hold him in grateful remembrance for the successful water scheme he introduced into the estate. The College Flag was at half-mast on the day the sad news reached the estate.

Visitors. Dr. W. H. Harrison, Officiating Agricultural Adviser to the Government of India, Mr. J. N. Mukherji, Officiating Imperial Agricultural Chemist, Mr. G. R. Hilson, Officiating Secretary to the Indian Central Cotton Committee and Mr. Keshwala, Mycological Section, Pusa.

Mr. Lakshman Rao. Mr. T. Lakshman Rao returned to India after two years' work in the laboratory of the Imperial College of Science and Technology, South Kensington under the guidance of the celebrated Chemist, Prof. Thorpe.

Religious Exposition. Bramhasri Rama Bhagavathar of Palghat spent a few days expounding portions of Ganesha Puranam in connection with the celebration of Ganapathi festival.

CORRESPONDENCE.

Editor,
M. A. S. U. Journal.

Sir,

I herewith send an extract from Mr. Parnell's letter addressed to me from South Africa. If you think it worth while, you may have this published in our Journal, as it may interest so many here who knew him well.

Yours truly,
K. RAMIAH.

Dear Ramiah,

I landed in Cape Town on 5th August and have been travelling all the time since, looking at the Cotton growing districts with Mr. Milligan.

It is a wonderful country but would be better with more rainfall. Everyone is keen on growing Cotton and there is sure to be large expansion in the districts that are suitable. The climate is excellent and, I must say, a very pleasant change from India. It is hot in the cotton areas in summer but much less so than Coimbatore and the nights are always cool.

My station will be Barberton in the East Transvaal about 150 miles due west of Delagoa Bay. I have not been there yet but it is said to be a very nice place and pretty. It is 3,000 feet elevation on the eastern side of Drakensberg Mountains.

We have about a month's touring in North and East Transvaal, Natal and Zululand and then settle down at Barberton and get ready for putting in a crop.

I hope to be able to get a suitable house at Barberton and in that case my wife and children will come out to join me at once.

I saw our show at Wembley and it was as good as could be expected. It is such an enormous exhibition and there is so much to see that anyone might go there every day for weeks and not see it!

I told several people who are interested in breeding work to have a look at it.

Please give my kind regards to everybody at Coimbatore.

Yours sincerely,
(Sd). F. R. PARNE

DEPARTMENTAL NOTIFICATIONS.

Appointments, transfers, etc.-

1. Mr. C. Ramaswami, to be Probationary Assistant Director of Agriculture, IV Circle, St. Thomas Mount.
2. Mr. K. Gopalakrishna Raju, Assistant Director of Agriculture, VI Circle to be Asst. Director of Agriculture, Live stock, with headquarters at Coimbatore.
3. Mr. S. Subrahmanya Ayyar, Agri. Demonstrator, Bapatla, to be Farm Office Manager, Central farm.
4. Mr. K. K. Raghavan, Agri. Demonstrator VII Circle transfer to Central Farm.
5. Mr. S. M. Kalyanarama Ayyar, B. Sc., (Ag.), Cotton Specialist's section transfer to Nandyal Agriculture Station for cotton selection work.
6. Mr. S. Kuppuswami Ayyangar, Upper Subordinate V grade, IV Circle, deputed as Agri. Instructor in the Borstal Institution, Tanjore, on the expiry of the leave on 7-8-1924.
7. Mr. M. A. Balakrishnayyar, Farm Manager, Sugarcane Breeding Station temporarily transferred to V Circle as Agri. Demonstrator.
8. Mr. T. V. Srinivasacharlu, Asst Farm Manager, Livestock, transferred to V Circle.
9. Mr. P. M. Appaswami Pillai, Asst. Agricultural Demonstrator, V Circle transferred to Livestock section.
10. Mr. S. Viravarada Raju, Lower Subordinate, VIII Circle, promoted as Upper Subordinate V grade, on probation with effect from 1-9-24 as per G. O. No. Mis. 1519, Development, Dated the 27th August 1924.
11. Mr. M. Sanyasi Raju, L. Ag., appointed to officiate as Asst. to the Govt. Lecturing Chemist in the V grade vice Mr. H. Shiva Rao on leave or until further orders.
12. Mr. V. Kumaraswami appointed to officiate as Asst. Agricultural Demonstrator in the IV Circle.
13. Messrs. C. Krishnan and E. Athiyutan Nayar, appointed lower subordinate V grade in the VII Circle.
14. V. Ramachandra Ayyar, Agri. Demonstrator, III Circle transferred to II Circle.
15. A. M. Ramunni Kidavu, Asst. Farm Manager, transferred from Planting districts to VIII circle.
16. Mr. P. V. Subba Rao, temporary lower subordinate, Live-Stock, to be on probation with effect from 4-12-23.

Leave.-

1. Mr. R. D. Anstead, Director of Agriculture, leave on average pay for eight months from 20-3-25 or date of relief.
2. Mr. G. R. Hilson, privilege leave for one month and 15 days and leave on average pay for 6 months and 15 days in continuation from date of relief as officiating Secretary, Indian Central Cotton Committee.
3. Mr. Samuel Jobitha Raj, Assistant in Economic Botany leave on average pay for 3 weeks from 16-10-'24.
4. Mr. O. Jagannadha Rao, Assistant to the Cotton Specialist, leave for 15 days from 30-9-'24.
5. Mr. K. Raghava Acharya, Agricultural Demonstrator, IV Circle, extension of leave on average pay for one week.
6. Mr. S. Kuppuswami Ayyangar, Agricultural Demonstrator, IV Circle, extension of leave on medical certificate by one week on half average pay.
7. Mr. V. T. Subbayya Mudaliar, Agricultural Demonstrator, VI Circle, extension of leave for one month on medical certificate.
8. Mr. V. T. Subbayya Mudaliar, VI Circle, leave on half average pay on the 20th September with permission to avail the 21st.
9. Mr. Dhanakoti Raju, Farm Manager, II Circle, leave on average pay for three months granted extended by 10 days.
10. Mr. E. K. Nambiyar, Farm Manager, Kasaragod, leave on average pay on medical certificate for one month from 15-9-'24 with permission to affix the compensation leave already granted from 9th to 14th (Easter Holidays).
11. Mr. M. Raman, Farm Manager, Central Farm, leave on average pay for three months on medical certificate from 18-7-'24.
12. Mr. K. Avadainayagam Pillai, Agri. Demonstrator, leave on average pay for 2½ months already granted extended by two weeks.
13. Mr. G. J. Balraj, Asst. Agri. Demonstrator, VI Circle, leave on average pay for 15 days from 20-9-24.
14. Mr. D. S. Subramanya Ayyar, Asst. Agri. Demonstrator, VIII Circle, leave on average pay on medical certificate for one month from after-noon 4-10-24.
15. Mr. M. J. Sadasiva Reddi, Asst. Agri. Demonstrator, IV Circle, leave on average pay on medical certificate for three months and nine days from 3-8-24 and leave without allowances for 21 days in continuation.
16. Mr. M. Ramunni Kidavu, Farm Manager, VIII Circle, leave for months already granted from 6th June 1924 is extended by another two months on medical certificate.

Editorial Notes.

A Jubilee for Agricultural Education in Madras:-

Agricultural Education on modern lines was introduced into Madras in 1876 when the Saidapet College of Agriculture was started under the inspiration of the very sympathetic Governor, Lord Tweeddale and has passed through several changes during the past five decades. It is time that we took stock of the existing situation and reviewed the achievements of this long period before making proposals for a further instalment of advance on safe lines. Hardly had 30 years passed before the College started at Saidapet was abolished and the present one at Coimbatore opened. Coimbatore is singularly free from such handicaps as Saidapet had to work under, which were, firstly, the unsuitability of its location, secondly its subordination to the Department of Education, and lastly the absence of any provision for extended research upon the results alone thereof the effective impressment of agricultural education in its last analysis rests. A right valuation of the effect of these defects enabled Coimbatore to start under better auspices. Now that fifty years would be complete by October 1925 since the inauguration of Agricultural education, we consider it would be appropriate if steps were taken to celebrate the Jubilee of Fifty Years of Agricultural Education next year. Happily gentlemen like Messrs Benson, Keess, Mollison, Dr. Leather, Dr. Subrahmanyaiyar, Sir Murray Hammick, and Sir F. A. Nicholson who gave a helping hand in tending the babe are still with us. Expressions of good will from them as well as from others like Messrs Castle Stuart, Chadwick, Couchman and Coventry who were connected with it in the later days will be heartily welcomed on the occasion of the celebration. We hope the innumerable pupils that have passed through the portals of the Saidapet and Coimbatore Colleges and have spread over all provinces still cherish a happy memory of their *alma mater* and will surely make the celebration of it, should it be decided on, a splendid success, Saidapet Agricultural College having been the first of its kind to be established in India.

The Indian Economic Association:-

Our readers are aware that the Indian Science Congress which is been modelled on the British Association has been going from place to place every year and holding its annual sessions in the different provinces of India. This year it meets in Benares between

16.
Crob.

12th to 17th January 1925. We understand that the Indian Economic Association which holds its annual conferences also meets in Benares under the auspices of the Benares University on January 4th to 7th. It may interest our readers to know that the British Association has for obvious reasons embraced under its wings 'Economics' also, and allotted a separate place to it. Would it not add to efficiency and tend to the more rapid advance of the sciences concerned if a similar recognition were made in India too, seeing that the methods adopted in the study of Indian economic problems are no less scientific than those that fall within the purview of the Indian Science Congress. For, who would deny an honoured place amongst the galaxy of lovers of science to such students of Finance, as Ranade, Gokhale, Clinton Dawkins, and Sir Fleetwood Wilson.

The subjects selected for discussion at the conference are announced to be the following:—

- (1) Indian Tax system, Central, Provincial and local.
- (2) The taxable capacity of India.
- (3) Central and Provincial Financial relations.
- (4) Industrial Finance.

(5) Creation of an Indian mercantile marine. And the President is no less illustrious a personage than the Honourable Mr. Lalubhai Samaldas, one of the merchant princes of India and a shrewd financier of Bombay.

The Madras Forest College Magazine.

We regret the decision of the authorities concerned "to publish the Madras Forest College Magazine half-yearly, from September 1924 instead of quarterly, as no outside contributions are being received in spite of the annual prize offered for the best original article by a contributor of the Ranger class." It is very difficult for technical publications in India to enjoy a long lease of life unless the management can be assured of a free flow of contributions and the steady and enthusiastic support of the reading public and in this case the number of readers is bound to be necessarily very small and the support therefore amounts to little. It is unfortunate that contributions should be expected mostly from the class of ranger. It would, in our humble opinion, conduce to the longevity of the journal and to its popularity if the superior officers also took more interest and contributed to the journal thus making it

widely known as an authoritative medium of desirable communication between an impersonal Government and a usually not well-informed Public.

A New Agricultural Journal :—

We welcome into the ranks of agricultural journalism a new quarterly, viz., Old Boys' Magazine, Agricultural College, Cawnpore. The second quarterly issue is out. It contains very useful articles. The magazine is trilingual primarily to suit English, Urdu and Hindi readers in the United Provinces of Agra and Oudh. Emanating as it does from Cawnpore, one of the earliest established agricultural stations in India, this magazine is bound to make its influence felt far beyond the limits of the United Provinces. From the very low rate of subscription which has been fixed at Rs. 2 per annum, we should think it will find a place in almost every village in the United Provinces.

As a rule, man's a fool,
When it is hot, he wants it cool;
When it is cool, he wants it hot;
Always wanting what is not.

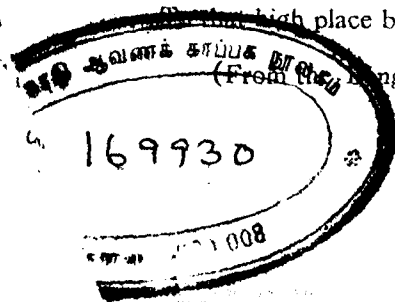
(*The Louisiana Planter*, May 17th, 1924).

THE ROOT.

The tree-top cries,—“You're petty folk,
Behold, in me, the great”.
The root says, laughing, “Brother good,
It may be as you state.
You're drunk with pride because you rise
Above all else you see;
My pride is this, that you've been raised
To that high place by me”.

(From the Bengali of Rabindra Nath Tagore.)

From “*The Youngmen of India*.”



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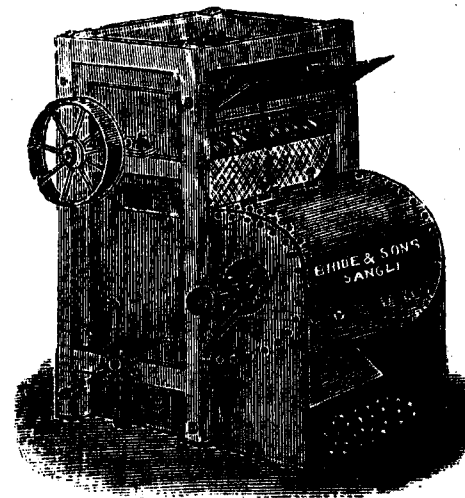
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To Let.

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