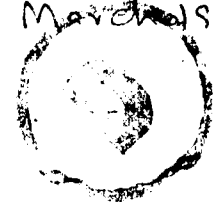


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1. The Prize will be awarded in July this year.
2. The Prize will be in the form of a Medal and will be awarded to the member of the Union who submits the best account, of original research or enquiry, carried out by him on any agricultural subject.
3. The subject-matter shall not exceed in length twelve foolscap pages type-written on one side.
4. Intending competitors should notify the Secretary of the Madras Agricultural Students' Union not later than the 1st June the subject of the paper which they propose to submit and the paper should be sent in so as to reach the Secretary, Madras Agricultural Students, Union not later than the 15th June 1927, with a covering letter showing full name and address of the sender. The author's name should not be shown on the paper which should be entered under a *nom-de-plume*.
5. Four type written copies of the essays should be sent in.
6. The name of the successful competitor will be announced and the prize awarded at the time of the Conference.
7. The Union reserves to itself the right of publishing all or any of the papers.
8. All references in the paper to published books, reports or papers by other workers must be acknowledged.
9. Papers submitted will become the property of the Union.

Any further particulars may be obtained from the Secretary, Madras Agricultural Students' Union, Lawley Rd. P. O. Coimbatore.

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Vol. XV]

MARCH 1927.

[No. 3.

DURATOIN OF SOME PADDY VARIETIES.

G. JOGIRAJU,

Farm Manager, Samalkota.

By 'duration,' is meant the period of time taken by a variety to ripen off, calculated from the date of sowing. While it is a fixed varietal character for a given set of conditions in a particular locality, it may vary considerably when these are altered. Any comparison of paddy varieties or strains as regards this character, therefore, involves their being sown on the same day and grown under identical conditions.

In 1925 the writer had an opportunity on the Samalkota experimental station, to grow, side by side, in small strips, and determine the duration of a large number of varieties most of which were collected by him and his colleagues on the station during their tours of enquiry or while on leave. The seed of all the varieties was sown in the seed bed on the 18th June and the seedlings transplanted in lines in small strips in a very uniform field. The season was normal and all the varieties had a fair chance to grow. Table I gives the duration, in days, of 145 varieties or types found in them.

TABLE I.

(1) *Very early* (130 days or less).—Khorla, 104; Molokumbhu and Atalokhibu, 109 each; Swarnanalu, 114; Bobbili Budama and Lamba, 116 each; Lodhralu, 117; Aravadamsamba, 119; Saththikalu, 121; Nagisalu and Nallaaralu (Dalwa), 122 each; Hemasannalu 123; Kokkaradhanyan, 125; Burma I and Kondakuranti, 127 each; Puna-a Atragada, 128; Basangi-27, Mechoro and Bota mokodo, 130 each.

Early (131 to 145 days).—Lodhvari, Basangi-33 and Basangi-75, 131 each; Garika-sannavari I and Borigi, 132 each; Basangi-55, Basangi-61 and Yerrabakkalu, 133 each; Kevito chompu, 136; Bodamoli and Konna, 137 each; Chevito chompu, 138; Peddakanneralu, Basangi-23, 139 each; Basangi-24, 140; Muthubayyahunda, 141; Alwar-Sannalu and Basangi 29, 142 each; Basangi-46, Kalahandisannalu and Sunkisannalu, 143 each; Basangi-90, Basangi-26, Drohanapugada, Chinnamundabolalo and Mundlavari, 144 each; Pientu, Vavilapadusannalu and Basangi-21, 145 each.

Medium (146 to 160 days).—Dhanyarasulu, 146; Radhaprayaga and Boddhamani, 147 each; Sunnapuvulu and Swarnamuthialu, 148 each; Tobarasulu and Bobbiganti, 149 each; Palagummasari, Tellaradhaprayaga, Chulakanamahipali, Punasakonamani 2, 151 each; Kosakaddilu, Gudarisanannalu, Kakerikalu 1 and Punasakonamani 1, 152 each; Palagummasari, and Vankalu, 153 each; Puna-a Akkallu, Bosoponko, Nallakonamani and Gudakutta-154 each; Sannabayyahunda, Puna-a Akkullu 2, Puna-a Akkullu 3 and Puna-akkallu 9-155 each; Vasavavallu and Burma 2-156 each; Dasaradhulu, Bangaruthigalu, Bayyahunda, Puna-a Akkullu 23, Ratnachudi 5, and Kanakasompu 4-157 days each; Puna-a Akkullu 5, and Sanna Akkullu-158 each; Burma 1, Ratnachudi 7, Turpu Sanna Akkullu 3-159 each; Palagummasari 4, G. E. B 24, Bangaruthigalu 2 and Kanakaratanalu-160 each.

Late (160 to 175 days).—G. E. B. 1803, Sannabayyahunda (Ganjam) and Kanakasompu 14-161 each; Navakotisannalu 4 and 6, Co. 1, Krishnakatakalu 3, Basangi 14, Palabaluguthulu, Chippuru-bayyahunda, Nagunnah (Ganjam), Koyyisompu, Balaramabhogam, Vellai Sirumani, Gummasari, Sannabayyahunda, Raja-

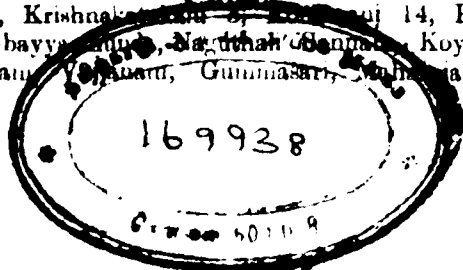
ratnalu, Gunupuram Sannalu, Bangaruthigalu 3, Kosisompu, Kanakasompu 9 and Ratnachudi (Ganjam)-162 each; Mahipali and Ratnachudi 13-163 each; Pravaga, Bikkirisannalu, Ratnachudi 9, and Burma 3-164 days; Krishnakatakalu 1, Konamani 15 and 16, and Ratnachudi 10-165 each; Paniala and Navakoti Sannalu 5-166 each; Harisanker-167; Navakoti Sannalu 3-168; Baital Fakir and Ratnachudi 15 and 11-169 each; Kanakasompu 7 and Pedda Akkullu-170 each; Burma 4-174.

Very late (over 175 days).—Korungusamba, Kothamallisamba, and Vellai Sirumani-189 each; Kattasambalai-190 days; Masipachanani, Red Sirumani, Ramagarudamsamba, Pishanani-192 each; Molakolakulu-193; Muthusamba, and Sannavari-194 each.

From the table it will be seen that Khorla, a variety from the Jaipur Agency, had the shortest duration (104 days) while Sannavari from Nellore and Muthusamba from Tanjore had the longest (194 days). For convenience, varieties ripening in 130 days or less are termed 'very early', those taking 131 to 145 days 'early,' those taking 146-160 days 'medium,' those taking 161-175 days 'late' and those taking over 175 days 'very late.'

Duration is one of the chief characters which govern the choice of varieties by the cultivator. In the main or first crop (Sarava) season, very early or early varieties are usually preferred in localities where the crop is dependent entirely on rain or small rainfed tanks or streams, which supply water early in the season but fail to do so latterly. They are also sometimes chosen for being grown in very rich soils such as these receiving the drainage from an adjacent village where a late variety is liable to grow too rank and lodge before earing. In some cases, a very early variety is grown with a view to follow it up by a late one, soon after the harvest of the former. An early variety is also preferred as a first crop in double cropped lands, since the second or 'dalwa' crop usually comes up better after such, on account of the soil weathering for a longer time in the interval'. Sometimes, the

* The second crop is usually planted up in the beginning of February, whatever the date of harvest of the previous first crop may be, as when planted earlier it does not establish well.



raising of a pulse or green manure crop (green or black gram or sunnhemp) in the interval is also rendered possible. The pulse crop, moreover, usually comes up better after an early paddy crop than after a late one. An early variety is also usually preferred on lands where sugarcane or gingelly are intended to be grown in the 'paira' season (January onwards), the preparation of the land being thereby facilitated. In the Dalwa season early varieties are, of course, preferred on account of the water supply being limited to a short period.

The chief disadvantage of very early or early varieties in the first crop season is that their harvest comes off in the rainy season. Another difficulty is that when the rains contrary to expectations, commence late, such varieties have their short period of growth further shortened and hence give poor yields. They are also unsuited in general to poor soils, as they have to make rapid growth in a comparatively short period. The ripening of early varieties, ahead of the bulk of the area, also renders them liable to heavy damage by birds.

Late varieties are usually selected where the watersupply is assured till the crop ripens off, and the soil is not too rich. They are preferred for poor lands and in places where the planting is likely to be delayed on account of the monsoon setting late and in places where a punasa crop such as gingelly, ragi or cumbu or a very early variety of paddy is grown previous to the 'pedda' or main crop. Late or very late varieties are sometimes selected on account of the land being ill-drained, and not permitting of an early harvest on account of its being too wet at the time. The very late varieties, which were all introductions from Nellore or the southern districts, where the main crop of paddy is grown mostly during the period of the N. E. monsoon have been found to fare on better than the local late ones, in what has been called the 'intermediate' season, i.e., when planted immediately after an early first crop.

The late varieties, however, generally suffer more from the stemborer which is one of the principal insect pests in the northern Circars. On rich soils they often grow too rank and give only a moderate yield of grain and a large quantity of straw, then unprofitably exhausting the soil. Very late varieties, which stand over after the bulk of the crop is harvested, are often badly damaged by rats and birds.

Varieties of medium duration have, in theory, a combination of the advantages of the early as well as the late varieties without the disadvantages and are therefore now largely grown in all good soils.

It may not be out of place here to briefly refer to the various conditions which shorten or lengthen the duration of paddy varieties and the extent to which each of them affects that period.

In the sarava season, the earlier or later the sowing, the longer or shorter respectively does the duration grow provided other conditions remain the same. But the extent to which the duration becomes longer or shorter varies with the duration itself. In the early varieties, the earliness or lateness in sowing is largely seen in the dates of harvest also, so that the difference in the duration is generally small as shown in table III. In the late varieties however, the dates of harvest are very little affected by the earliness in the time of sowing and hence the difference in duration is large as shown below :—

TABLE II.

Variety.	F. No.	Date of sowing.	Date of planting	Date of Harvest	Duration (days)
1. Basangi ...	10	22-6-21	25-7-21	5-11-21	136
(Early) ...	11	11-6-22	26-7-22	27-10-22	138
2. Konamani.	16	24-5-12	8-7-12	21-11-12	181
(Long) ...	16	12-6-12	8-7-12	21-11-12	163

Earliness or lateness in planting, (the date of sowing being the same or almost the same) also affects duration. In this case, however, the duration of the early varieties is considerably affected while that of the late varieties is not appreciably affected as shown below :—

TABLE III.

Variety.	F. No.	Date of sowing.	Date of planting.	Date of harvest.	Duration (days)
1. Basangi ...	11	11-6-22	26-7-22	27-10-22	138
(Early) ...	11	10-6-23	1-8-23	2-11-23	145
2. Konamani.	16	31-5-12	26-6-12	21-11-12	174
(Long) ...	16	31-5-12	16-7-12	21-11-12	174

In the medium varieties, earliness or lateness in both sowing and planting affects the duration to a moderate extent.

In general, the nearer the date of sowing or planting to the normal date of harvest, the greater is the effect on the duration.

The duration of varieties usually grown in the sarava season is somewhat cut short* when they are grown in the normal dalwa season (i.e., when sown in January and planted out in February). When grown earlier however the duration is prolonged as shown below :—

TABLE IV.

Variety.	Date of sowing.	Date of harvest.	Duration (days)	Remarks.
1. Garikasan-navari ...	3- 1-23	3-5-23	120	Duration in the Sarava season 130 days.
	30-11-22	9-4-23	130	
	1-11-22	21-3-23	140	
2. Rasangi ...	3- 1-23	9-5-23	126	Do. 142 days.
	30-11-23	17-4-23	138	
	1-11-23	8-4-23	158	

* Some varieties when sown after the normal flowering season have a very long growing period, flowering only at the normal flowering term in the following year. Banku paddy, which, when planted in the normal season ripened off in about 4½ months once took over 10 months to ripen on the Saidapet college farm when planted after the usual flowering season.

Some varieties take different periods to ripen off in different localities, owing probably to a change in the environment, especially the climatic conditions. Ratnachudi which takes about 5½ to 6 months to ripen in the northern circars ripened in about 4 to 4½ months on the Palur agricultural station* G. E. B. 24 is taking a longer term in the circars than at Coimbatore or in the southern districts. The duration of some varieties however does not appear to be appreciably affected by the change, e. g. Garikasannavari.

The fertility of the soil is another factor which affects the duration to some extent. In a rich soil there grows vigorously, flowers and ripens slightly earlier than that in a poor soil, the difference noted being up to 4 days in some cases. When the soil is too rich however, or when an over dose of rich nitrogenous manure like ammonium sulphate is applied, the crop runs to vegetative growth and the flowering and ripening are somewhat delayed. Some varieties again appear to flower earlier and ripen off quicker on a poorer soil e. g., G. E. B. 24.

Light also influences duration. A crop affected by shade, such as of a tree, while growing taller flowers and ripens later than one the open.

THE COTTON PLANT—CERTAIN ASPECTS OF.†

P. NARAYANA NAYAR, B. Sc. Ag.

Introduction. As we all know, cotton fabrics form the bulk of the clothing of the people of this country. Rice many take the place of wheat as an article of food, cholam and other minor millets might replace rice but so far nothing cheaper has been found suitable to replace cotton as an article of clothing. Being an economical crop, it is attracting the attention of both the breeder and the cultivator. The breeder's name is made if he succeeds in evolving a strain giving 5 bolls more per plant or having its lint longer by 5 mms. than the local one. It is rare to find a strain with high ginning percentage and long staple combined in high produce of a single plant. It should be the aim of the

* 1909-12, (Vide annual reports)

† Paper read before the Jubilee Conference July 1926.

breeder to evolve a type of cotton with long staple and high yield coupled with high lint weight and not one with high ginning percentage. How the breeder attains his end will be detailed in course of this paper.

The cultivator on the other hand puts his best foot forward in supplying best cotton with regard both to quality and quantity so as to make the maximum profit with minimum labour.

Varieties. Although the Botanist would classify all the cottons of the world under the broad class, Malvaceae, there are varieties in it, those are as varied and different in themselves as the nations of the world. Among the indigenous ones we have *Gossypium indicum* (Karunganni,) *G. herbaceum* (Uppam,) *G. neglectum* (var. *Roseum*), *G. obtusifolium* (nadam) and many other types of annual and perennial cottons.

The importance of cotton has led to the importation of high yielding exotic varieties of which *Gossypium hirsutum* (Cambodia), *G. Purpureum* (Bourbon) and *G. Barbadosense* (Sea Island) are important.

All these cottons have distinguishing characters of their own and need not be gone into in detail here.

Area. ¹—The areas under cotton are mainly sub-tropical including practically the whole extent of crops in U. S. A. Russia, China with portions of Mexican, Indian, Peruvian and Egyptian areas as well as limited cultivation of cotton in Mediterranean lands (Greece, Italy and Algeria). Among the lists of cotton growers within the tropics are Mexico, many West Indian Islands, Columbia, Brazil, Peru, French West Africa with Nigeria and the Sudan East Africa (Tanganyika and Uganda) Peninsula of India, Dutch East Indies and Queensland.

The aggregate area under cotton averaged during 3 years (1919—21), 58½ million acres, as compared with 59½ millions during the 5 previous years and 59½ million acres in pre-war period of 1909—13. The figures of the most recent period show therefore a decline in the apparent area amounting to 2.3 per cent as compared with the average 1914—18.

Of 58½ million acres under cotton, India contributes 21 million acres. The area devoted to cotton occurs in almost all parts of India. In some portions of Central Provinces, United Provinces and Sind, cotton is grown over 30 per cent of total cultivated area but in many regions cotton does not exceed 10 per cent of the land under crop.

²Season and crop report for Madras for 1924—25.	Madras² has a total area of 2 million acres under cotton of which 247,468 acres are under Cambodia and over 2½ million acres under others.
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The total output is 562, 710 bales of 400 lbs each of cotton.

It may not be out of place here to mention that Indian cotton is of short staple, the great majority of crop yields a length not more than ¾," Cambodia (brought originally from Indo-China) attains 1" and more and Tinnevely ¾ inch with a ginning percentage of 32, and Cambodia cotton grown in Madras Presidency is already considered as best varieties of Indian cotton.

Method of branching.—The cotton plant is peculiar in as far as it produces two types of branches. The vegetative or monopodial branches are produced in the early stages of plant growth while the fruiting or sympodial branches appear along with flowers. In each axil there is a main and a secondary bud. Vegetative growth is affected by the development of a monopodial growth from either of the buds. Reproductive growth is affected by development of a sympodium from the former bud only. The length of vegetative growth is controlled by formation of secondary branches. If all these branches are monopodial, the appearance of the first flower will be delayed until a tertiary branch appears. The fruiting branches can be easily made out from the monopodials by their zig-zag appearance and the presence of a flower, flower scar or boll opposite to the leaf. The first sympodial node varies from 8 in *Gossypium hirsutum* and *Roseum* to 30 in *Nadam*.

It is therefore evident that the sympodial branches should be numerous and early if we want to have a heavy and early crop. In Indian cottons monopodials follow sympodials while in exotic ones few or no vegetative branches are produced after the first sympodial node.

Secondary sympodials are marked in plants which are top bored. Even if the plant is bored after producing sympodials, secondary sympodials are produced at a quick rate to compensate for the inability to produce more primary fruiting branches and eventually the yield of such plants is found to be very high. This suggests the idea whether topping cannot be resorted to as a means of increasing the yield. We are not unfamiliar with the practice of topping Tobacco to increase the weight of leaves and consequently to increase the yield.

Duration.—Cotton seeds sown under normal conditions of tilth, moisture and temperature germinate in 4 days. Under our conditions the germination period can be considered as varying from 4 days to one week.

Leake and Kulkarni¹ experimenting with seeds in different positions while planting, found that seeds planted with apex upwards germinated earlier than others while those with apex downwards germinated later, and those with apex sideways came up last. But Kottur² after complete experiment concludes that there is no position which has an appreciable influence on the germination of seed, vigour of seedling or yield of individual plants. The latter is the generally accepted view.

Squares or flower buds begin to appear nearly 90 days after the date of sowing. Not all these develop into flowers. It has been observed by Hilson³ that the early formed flowers take longer time to mature into a boll than the late formed ones. Shedding is more in late formed buds. On an average the squares take 25 days to develop into a flower. The causes of bud and boll shedding in cotton which have attracted and are attracting the attention of the eminent Botanists working in this direction, are beyond the scope of this paper. Mr. Hilson's conclusion that insects play but a minor part in shedding, is generally the accepted view of the case and the problem is patiently awaiting solution.

Observations with Cambodia cotton go to show that it takes 45-55 days for the flower to grow up into a boll and burst. Early formed flowers have longer maturation period than later formed ones. The bursting is loculicidal and each lock is held between two carpels.

Flower.—The inflorescence is a cyme and flowers are solitary and leaf opposed. Cotton flower is hermaphrodite capable of cross fertilisation soon after opening. Self fertilization is effective. Members of the old and new world groups are fertile *interse* but exhibit complete sterility when attempts are made to effect a cross between the two groups.

The persistent bracts which envelop the young flower and which later on enclose the growing boll may be one whorl of 3 or more than one whorl of three each in which case every whorl alternates with the other. Although the bracts are generally green, in *Arboreum*, they are pink. The teeth on the bracts vary both in number and length. From observations made in West Indies by Dr. S. C. Harland it has been shown that the number of teeth in bracts vary from 3—20 and each

W. I. Bull species has a definite value for the number of teeth to which it breeds true. As the plant becomes older, the number of teeth becomes fewer and hence it is preferable to count the plants which have just commenced to flower. Bracts of secondary sympodia have lower teeth numbers than those from main fruiting branches. When crosses were made between types differing in the number of teeth F_1 , in two cases showed complete dominance of larger number of teeth but in the third case F_1 showed intensification and has a larger number of teeth than either of the parents.

Cotton flower opens in the mornings between 8 and 11 a. m. On the Cotton Breeding Station at Coimbatore it has been observed that on days when the temperature was low or when the sky was overcast and cloudy hardly a flower opened before 11 a. M. This shows that a certain optimum temperature and sunshine are essential for the opening of the flower.

The colour and size of corolla varies with each species. The colour varies from creamy white in Cambodia to dark yellow in

Sea Island and many indigenous species, but it is purple in Arboreum. The red colour of Arboreum is due to the sap being coloured red by the presence of red anthocyanic colouring matter in it, Red is dominant to yellow and breeds true.

All indigenous varieties of cotton and also Sea Island possess eye at the base of the petal which varies in size and shade of colour. Cambodia is without eye. It has been observed on the Cotton Breeding Station that the eye is dominant over no eye and breeds true with regard to a natural cross between Cambodia and Sea Island. It behaves as a simple Mendelian factor.

The stigma is 3-5 fid according as the ovary is 3-5 carpelled. It has been observed with Cambodia cotton (col) on the Cotton Breeding Station that 5 locked bolls are produced in larger numbers in early stages with practically no 3 locked ones; as the season advances 5 locked ones diminish. During the second flush most of the flowers produced are all 3-fid and most of them shed before setting into boll.

Calyx is gamosepalous, cup shaped with 5 teeth showing the fusion of the 5 sepals and is persistent. Resin glands in shape of dark dots are studded all over the calyx.

The number of ovules varies from 5-17 per lock. In Cambodia it is generally varying from 5-12 while in Cernum it goes up as high as 17. The weight of ovules is found to increase from 1st to 3rd. There is an equality of weight as we go from 4-7 and then again there is a gradual fall but the last one generally weighs more than the first. The variation as observed on the Cotton Breeding Station continues till the ovules develop into seeds. That this is a provision of nature and not an accident is shown by the fact similar observations were recorded by Professor D. B. Halsted in the case of pulses. The number of ovules per lock

is not directly proportional to the number of locks per boll. Usually a three locked boll has larger number of ovules per lock than a 4 locked one and that in its own turn has a larger number of ovules than a 5 locked boll. But on the whole a 5 locked boll contains the largest number of ovules. It has also been observed that although a 5 locked boll weighs more than a 4 locked or a 3 locked one, the average seed weight increases from 5 to 3 locked bolls.

Botanical Gazette
Vol. IXVII.

Factors that increase the yield. Cotton is one of the important crops that readily respond to good cultivation. The germination

has been noted to be very poor in ill-prepared lands and the effect of bad preparation of the land manifests itself in very poor yield. Therefore, it is well worth the trouble to give good preparatory and after cultivation to a cotton field. Both drill sowing and planting on ridges result in higher yield than broadcasting.

Every ryot would bear testimony to the fact that a manured field of cotton gives more yield than an unmanured one and experiments conducted at the Government Farm, Koilpatti go to corroborate this fact.

Likewise good and frequent irrigations go a long way in big and healthy boll production. The high yield and good quality of cotton grown in Avanashi Taluq is a point in favour of high manuring, copious irrigation, coupled with good cultivation.

Consistent with the minimum amount of spacing the output is increased by increasing the number of plants per acre. Therefore a judicious seed rate should be adopted.

Another factor is the number of bolls per plant. The variation in yield of a single plant in pure strains varies from 5-50 in Cambodia, hence if all the plants in a field are vigorous and high yielding the total out-turn will really be appreciably high.

It is the bounden duty of the breeder to see that his strain produces the maximum number of locks per boll, as a boll with a larger number of locks weighs more than

one with a lesser number. It has been observed that this is beset with a serious handicap of larger percentage of shedding in bolls with larger number of locks. It is therefore of the highest importance to get a strain which while giving the maximum boll per plant and larger number of locks per boll, will exhibit the shedding tendency to the minimum.

Bolls with multiples of 3 or 4 locks have often been found but they are as a rule immature or ill developed.

This is one of the 2 lines of work of a breeder. Starting with a ryot's crop, the breeder evolves a strain which is more uniform, and high yielding than the local one. This is one of the main lines of work of the

(vii) Selection & acclimatisation. Agricultural Department. As a result we have 295 (CO1), 440 and 864 in Cambodias and N14, CO numbers of the South and Sircar numbers of the North.

This line of work is more difficult and less sure than the former and involves the judicious rejection of the heterozygous selections. This work is still in its infancy
(viii) Hybridisation and we are glad to boast of one successful cross between the Roseum and Indicum and we are on the eve of making some more out of the Cambodia and Sea Island and also Cernum and Indicum crosses.

This chapter brings us to the hereditary characters of Cotton.

Some hereditary characters.—As early as 1908, Fyson observed that the red colour of the leaf stalk and pink spot at the base of the leaf, pink spot at the base of the petals, and nakedness of seed were dominant characters. He also studied the behaviour of 3 unit characters, viz., rounded vs. pointed shape of leaf, white or yellow colour of flower, white fuzzy vs. naked seed for 5 years and concluded that these segregate on Mendelian lines. He further found that red colour of flower was dominant to yellow. Microscopic examination showed him that yellow colour which is dominant is a sap colour. He also observed that length and fineness of lint were dominant over short and wooly nature, habit of bolls opening widely dominant over that of opening only a little. He inferred that narrow lobing is dominant over broad.

¹Bot. Memoirs
Vol. II No. 6.

Kottur² working on Kumpu cottons contradicts Fyson and says that a broad midlobe is dominant over narrow and a long midlobe dominant over a short one. He found that length and breadth of bracteole seem to behave as simple Mendelian factors.

Experiments conducted in the West Indies³ go to show that strength of staple is not a character transmitted by means of seed

but it depends very largely on external conditions which prevail during the growing season. The length of lint produced is a function of the parent plant which it transmits as a whole to its off spring, the differing length of the lint attached to the individual seeds bearing only a secondary relation to the lint of the offspring. The length to which cotton lint will attain in any season is dependent on the water supply of the plant at the critical period of the development of the boll. Hence in making comparisons of length of cotton lint grown in different seasons or in different lands the results will be 'erroneous' if the rainfall is in no way comparable.

²W. I. Bulletin
No. X.

In concluding I have to thank Mr. R. C. Broadfoot, Cotton Specialist, for the very kind impetus and encouragement given to me in the course of the preparation of this paper and for the ready consent which he gave for perusal of the records at the Cotton Breeding Station. I have to thank the ladies and gentlemen present for the opportunity given to me this day for speaking on this subject.

Conclusion.

VETERINARY FIRST AID.

Wounds and Antiseptics

An Address by

F. A. KENDALL B. V. Sc., Ag. Chief Inspector.

As every stock-owner knows, all animals are liable to sustain injuries; often, may be, serious enough to cause him some concern, particularly in the case of valuable animals. Common against injuries are wounds of various kinds. It is, therefore proposed to give you a little first aid instruction regarding wounds and their

treatment, which may be useful especially to those out of the reach of professional assistance. Wounds are variously described as incised or clean-cut, lacerated or torn, contused, punctured, and so on.

Incised or clean-cut wounds are caused by some sharp-edged article, e. g. a knife, piece of glass, broken metal, a plough-share; in fact, anything which has a sufficiently sharp edge to produce a cutting effect. Such wounds may be easily recognised by the cut appearance of the skin and flesh. They may be dangerous because of the bleeding, which is more likely to occur in these than other kinds. Sometimes large blood vessels are severed, and early collapse of the animal may follow.

Lacerated or torn wounds, as the term implies, show irregular or jagged edges, the result of some object tearing its way through the tissues. They are commonly caused by contact with a nail, hook, barbed wire, stump or broken branch of a tree. Bleeding from these is not usually so free or alarming as in clean-cut wounds, though occasionally it is serious when a blood vessel is actually torn apart. Even then it is not quite so dangerous because the blood vessel stretches more or less before it gives way and the broken ends recoil. This tends to lessen the volume of escaping blood.

A contused wound is one caused by violent blow of some kind, such as a kick, a heavy fall, or by colliding with some object. The tissues are literally burst open. Bleeding is not a conspicuous feature because the larger blood vessels usually escape injury. The damaged skin and flesh will, however, be saturated with blood from the broken muscles. These wounds may be dangerous, not from the bleeding, but because the bruised and broken flesh may become mortified.

Another kind of wound that may have serious consequences is the punctured wound. These are caused by such objects as a nail, prong on a fork, metal, peg or stake, cow's horn, or even shaft of a vehicle. Their size and depth vary according to the instrument causing them; some indeed may be so small as to escape notice for some time. They rarely bleed but, for several reasons, they must always be regarded with suspicion.

Germs are introduced by the offending object and transplanted into the tissue. The wound may not be discovered for sometime meanwhile blood poisoning or lockjaw may develop from the germ activity. If the wound be close to the joint, the joint cavity may be opened. Such wounds are also dangerous when the foreign body or portion of it, is lodged in them and when they occur in the chest or abdomen they should be carefully watched.

Besides the descriptive terms I have used there are one or two others used in the general sense. For example, a simple wound is one which does not involve important structures, or organs. It is usually confined to the skin and flesh where the bleeding is not serious and healing follows quickly.

A wound is complicated when important structures are damaged e.g. joints, internal organs, bones, nerves and large blood vessels; also those in which foreign bodies are lodged. A wound is said to be clean when no germ activity is set up. This is much the same as a simple wound. The septic or poisoned wound is the reverse. In animals most wounds are more or less septic, for if contamination does not occur when the wound is inflicted, it usually happens later because of the insanitary surroundings.

Treatment.—We shall now pass on to the treatment. First of all, a few words as to suitable equipment for this purpose. Antiseptic preparations are essential—lysol, Jeye's fluid, or similar agents; carbolic acid, Condy's fluid, chloride of lime, are very useful; tincture of iodine is perhaps best, but rather expensive. If these are not available, petrol or phenyle can be used. If no recognized fluid antiseptic or disinfectant can be had, one can be made by dissolving a little washing soda or common salt in boiling water. This preparation should of course, be cooled down before being used.

Dry antiseptics like boracic acid or failing this, a mixture of powdered lime and chalk are useful for after-treatment. They should be used in the ratio of one in eight.

Cotton wool and bandages are almost dispensable. In emergency, new clean cheese-cloth or towelling can be used in place of cotton wool. Bandages may be made of discarded bedsheets or table cloths, but it is essential they should be clean.

For stitching wounds, surgical needles in three or four assorted sizes should always be at hand, but in case of emergency either pins or ordinary sewing needles may be used as makeshifts for stitching small skin wounds. Packing needles being requisitioned for large wounds. Stout thread, whipcord, well-woven twine, or $\frac{1}{4}$ inch tape will do as substitutes for catgut and silk. One or two pairs of artery forceps are valuable for clamping cut blood vessels to enable them to be ligatured. A surgical knife and pair of scissors complete the emergency outfit.

To stop bleeding:—The actual treatment of a wound is largely dependent on its character and situation. I will deal with bleeding first, which is often the foremost concern. If the blood is merely oozing and tends to congeal quickly there is no cause for alarm, and no special steps are needed to check it. When large veins or arteries are cut, it is necessary to act at once, without any preliminary dressing of the wound, for any delay may be fatal. If possible the bleeding artery or vein should be seized hold of with a forceps or pincers and tied with fine thread. A horse-hair is handy for the smaller blood vessels. If this fails to stop the bleeding, pressure on the blood vessel should be tried. If the wound be on the leg, pressure can be best applied by placing a tightly-rolled pad of cotton-wool or a large cork crosswise against the leg near the wound, and securing it in position with a tightly-drawn bandage. The object is to press the blood vessel against the bone. A most important point is this—if the blood be from a cut artery, the pad must be placed 2 or 3 inches above the wound; if from a vein, the same distance below the wound.

Bleeding from an artery can be recognized by the bright-red color of the blood and the jerky way it runs; blood from a vein is a darker brick-red color and flows smoothly. The arteries run down the limbs; the veins run upwards. Therefore to stop a vein bleeding, pressure must be applied below the wound and above in the case of an artery.

When the bleeding is checked or considerably lessened, one may proceed to clean up the wound and apply stitches. The method of stitching will be discussed presently.

Now, it sometimes happens that bleeding cannot be stopped either by tying up the blood vessel or by applying a pressure

bandage in the way just described—a wound about the body for example. In such a case the next best thing is to pack the wound cavity tightly with cotton wool or a piece of clean towel and put two or three stitches across the wound to keep the pack in. The ends of the stitches should be left long enough to tie in a bow, so that if in a few hours it is desired to change the pack the stitches may be simply loosened and not taken out. A blood-soaked pack soon becomes foul, and should be removed after 6 or 8 hours. If bleeding commences again, a fresh pack should be placed in the wound.

Stitching of Wounds:—All open or gaping wounds that obviously require closing should be stitched. First remove any dirt and congealed blood with warm water in which a little washing soda has been dissolved, and then flush the wound with an antiseptic solution consisting of two teaspoonfuls of lysol, creolin, or Jeye's fluid to a pint of water. Failing these, use phenyle or solution of chloride of lime. Any loose shreds of flesh should be trimmed off with scissors but no skin should be cut away unless it is so badly torn that it cannot be stitched.

Simple stitching with thread or fine twine usually suffices for small wounds. The stitches should be from a $\frac{1}{4}$ to $\frac{1}{2}$ an inch apart and not less than a $\frac{1}{4}$ of an inch from the edge of the skin. For large deep flesh wounds in horses and cattle the stitching should be done with a large needle $\frac{1}{4}$ inch tape being used. The stitches should be at least half an inch from the edge of the wound and each stitch not less than half an inch apart.

The wound must not be closed completely but an opening left at the lowest part to provide drainage for any discharge. This also will permit of the wound being easily flushed out with antiseptic solution. When the wound is healing the stitches should not be removed too soon. In animals they are as a rule, cut out too quickly. Any that remain when the wound has healed may be easily pulled out after snipping with scissors. When pins are used to close a wound both edges of the skin must be pinched between the finger and thumb to facilitate passing the pins through. Thread is wound in a figure of 8 round the point and head of each pin and tied. To remove this kind of stitch, simply pull the pins out.

After Treatment of Wounds :—If a wound be a simple one with only a small amount of discharge it is sufficient to wipe the discharge away three or four times daily. Most of you have seen a dog licking a wound—that is his method of keeping it clean. Clean cloth or cotton wool or cheese cloth should be used each time the wound is cleaned. The wound should afterwards be dusted with boracic acid or powdered chalk; a tin pepper-castor is handy for the purpose.

Large, deep wounds with abundant discharge must be syringed out three or four times daily with a liquid antiseptic, e. g. ; Condyl's fluid, lysol or chloride of lime in water. If none of these is available, boiled water in which washing soda or table salt has been dissolved should be used. After syringing or washing, the wound should be dusted with boracic acid, zinc oxide, or powdered chalk. In order to prevent any scalding by the discharge the skin should be smeared with lard, vaseline oil, or soft soap; and at all seasons, but particularly in summer, the skin around the wound should be smeared with fly repelling dressing. A good mixture is four parts of creosote or Stockholm tar to six of turpentine and ten of olive oil. The wound should never be dressed up with tar or axle-grease or such things.

Restraint is necessary sometimes to stop the animals tearing or rubbing their wounds. A horse can be backed into a stall and his head tied on each side to the rear posts; or short stick like a broom handle can be fixed to his head-stall and a suringle. The tail may require tying to one side to prevent the hair being caught in the stitch.

Cattle are not so fidgety. If necessary, put a wooden triangle or fork of a sapling on the neck, similar to that used to stop them going through a fence. Smaller animals such as sheep, pigs and dogs that have been injured may be bandaged to protect wounds. It is advisable to muzzle dogs before attending to any injury, and to keep them muzzled afterwards so as to prevent them tearing out the stitches with their teeth.

Treatment of Contused or Punctured Wounds :—Now a word or two about the treatment of other wounds. Contused wounds, unless extensive or gaping, need not be stitched. In any

case they should not be completely closed. Adequate drainage is essential. Flush them freely and frequently with antiseptics, Condyl's fluid is a very good antiseptic; iodine, of course is better but is costly, though it can be economically used if applied on a piece of cotton-wool tied to a stick. For this purpose tincture of iodine should be diluted with four parts of water. Punctured wounds must not be stitched except when an animal has been gored and internal organs are exposed. Enlarge them, if necessary, for drainage purposes by cutting the skin down to the level of the cut made. Care must be taken to see that no foreign body remains in the wound.

Nail punctures in horse's feet require special attention. Clean hoof, pare out the horn round the puncture, inject iodine or carbolic acid or insert a small plug of cheese-cloth or other material saturated with either of these agents. Cover with a pad of clean material, and fix a piece of leather over the sole. Repeat the dressing twice daily. Keep all manure and urine swept away from the horse's feet.

Open joints are serious and difficult to treat. They are recognizable by the clear amber or straw-colored discharge and the hot painful swelling round the joint. As a rule, treatment is only worth while with valuable animals or stud stock, as working animals seldom become sound even if cured. Careful injections of small quantities of peroxide of hydrogen four times daily should be tried. Horses may need slinging to rest an affected leg.

Abdominal wounds with exposure of the bowels are always dangerous and many are fatal. If treatment is attempted, the patient may require throwing. If so, protect the parts first with a sheet of table cloth. When secure, wash all dirt and blood away, carefully replace the bowel if necessary, close the wound with strong tape and bandage the body with a sheet to support the wound. Antiseptics should be applied only to the surface wound and never injected deeply. Small animals offer better chances of recovery than horses and cattle. Wounds entering the chest cavity are treated in practically the same way.

SUMMARY OF POINTS IN TREATMENT.

1. Determine the character and situation of the wound.

2. If practicable remove the animal to suitable place for treatment.

3. When haemorrhage is serious attend to it first. Delay may be fatal.

4. If there be no severe bleeding, remove dirt and congealed blood; clip the hair round the edges and trim off any shreds of flesh. Save the skin wherever possible.

5. Apply freely a good antiseptic at the earliest opportunity and continue its use throughout while the wound discharges. Fall back on household agents like soda and common salt in boiled water if no antiseptic is available.

6. Stitch wounds that require it as soon as possible—leave an opening for drainage.

7. Do not stitch punctured wounds—enlarge them if necessary. Explore for foreign bodies. Flush them out frequently with antiseptic or swab with iodine if available.

8. Protect wounds from flies.

9. Keep the patient in clean and wholesome surroundings.

10. Use any practicable means of restraint to prevent further damage to the wound and to facilitate healing.

11. Keep an eye on the patient's behaviour.

(From Journal of Agriculture, Victoria—August 1926.)

ON COCONUT.

P. S. JIVANNA RAO, M. A.

The birth-place of coconut :—Controversy on the subject does not appear to have been closed. Divergent views are still held regarding the original home of the palm, Dr. O. F. Cook of America maintaining that America is its native home whereas O. Beccari the palm specialist considers that Asia was its original home. In India it is as old as 'God Ganesa.'

Coconut not Cocos :—The etymology of the word was well discussed years ago by Murray in his New English Dictionary and by I. B. Balfour in the Annals of Botany in 1887. It is wrong to spell the word any longer, as some publications in this country still do, with an 'a'.

Malformations.—People intimately familiar with the coconut palm have some peculiarity or other to report on it which is of a novel or out of the way nature. These peculiarities are mostly of the nature of malformations and the existence of so many in the case of a single species ought to be of special interest especially if the causes underlying them could be properly understood. The peculiarities are as follows (cf Botanical Abstracts Vol. 4 Entry 989.)

1. Transformation of inflorescences into branches with small inflorescence persisting at the top.

2. Increase in the number of female flowers. The inflorescence may be simple or with only one or very few branches and most of the female flowers may produce fruits, albeit of small size, or fewer fruits of a normal size may be produced.

3. Proliferation.. Female flowers may be transformed into small shoots (bulbils).

4. Fruit without seed.

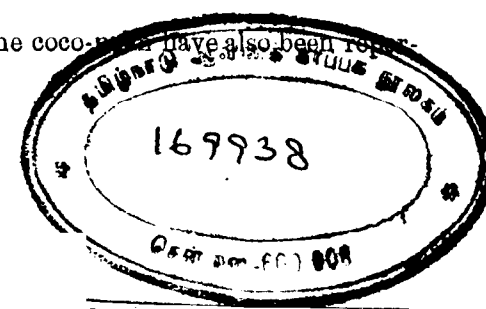
5. Fruit with two cells.

6. Polyeumbryony. Three or four stems will be produced.

7. The second and third carpels may sometimes insinuate themselves and appear as outgrowths.

To the above abnormalities may be added what the writer saw some years ago in a village Tukacheri near Kumbakonam. The tree was about 60 ft in height and was of an odd-looking appearance with leaflets still united and it was barren to such a degree that people called it the male coconut. As female flowers were, however, present though in fewer numbers in the inflorescence it is too early to surmise any tendency towards sex separation (dioecism) in coconut palm as in the palmyra.

Instances of branching in the coconut have also been reported from time to time.



CURRENT TOPICS.

Animal Breeding:—The most important law in breeding is the law of inheritance or as it is sometimes termed the law of similarity. Like begets like; therefore animals resemble their parents and are dependent on their ancestors for their characteristics. Then there is what is termed the law of variation. Nature has decreed that no animals shall be born exactly alike. Variation is noticeable when different strains are crossed; it is also affected by environment. Again there is always that tendency to revert *i. e.*; to throw back to some ancestor. This tendency becomes marked when mongrel and crossbred sires are used. It is to defeat the tendency to variation and reversion that our breeders are continually striving. To do this and to fix certain characteristics inbreeding and linebreeding are sometimes adopted.

Inbreeding is the mating of animals closely related, such as sire and daughter, dam and son and the term is applied generally to the mating of two animals each with over 50 per cent of the same blood. By inbreeding certain characteristics can be intensified and fixed and wonderful results obtained in a few generations. While inbreeding intensifies desired qualities it also magnifies faults. Consequently closely related animals that are to be mated must be very carefully selected.

Linebreeding is the mating of animals belonging to the same family but not having more than 50 per cent of the blood. For instance a farmer finds that a certain bull which he is using is giving good results and requiring another obtains one belonging to the same family to cross with the progeny of the first bull. This is line-breeding: Linebreeding is very popular amongst Victorian breeders of today and appears to be giving good results. It is the safest method that can be recommended to the beginner.

(Journal of Agriculture, Victoria, December, 1926.)

Importance of Tree-Planting: Rains remove twenty times as much plant food as crops.

This annual bathing bill costs the U. S. A. farmers more than 200 million dollars every year. Rainwater carries away to the ocean millions of tons of soil. With this rich topsoil goes 126,000

million pounds of plant food material twenty times the amount permanently removed by cropping. But this is only a fraction of the damage wrought. The real scourge of erosion is that it takes away not only the elements of plant food but soil leaving in many instances unfertile material difficult to till. In one instance it was found that 7 inches of topsoil were removed by sheet erosion in 24 years from a gently sloping field in Missouri. Soil scientists agree that most of the wornout lands of the world are in their present condition because much of the surface has been washed away and not because they have worn out by cropping.

A single county in the Piedmont region contains 90,000 acres of land formerly productive but now permanently ruined by erosion. Another county has 60,000 acres in a similar state.

(From Journal of Heredity: November 1926)

The Atmospheric Nitrogen Industry. The foundations of this industry were laid in 1785 by the experiments of Cavendish on the union of nitrogen and oxygen in the electric spark.

During the 19th century other experiments showed that N and H could unite to form ammonia (NH_3) when sparked and that nitrogen, carbon and alkali at high temperature could form cyanamides.

The industrial application of these methods of bringing inert N of the atmosphere into utilisable states of combination was not successful until the opening years of the new century when Birckel and Eyde in Norway were able to operate the union of N and in the electric arc on a technical scale.

About the same time the patents of Frank and Caro for the fixation of atmospheric N by leading it over heated calcium carbide when calcium cyanamide was formed, began to be worked and the product could be either directly used as a fertiliser or decomposed by water to yield ammonia.

Although the union of N and H in the presence of catalysts had been achieved long previously it was not until the experiments of Haber and Le Rosignol and their technical exploitation by the Badische Company that synthetic ammonia became a reality.

The three processes—production of nitric acid by the direct union of N and O in the electric arc, the formation of cyanamide and the direct synthesis of ammonia are those which have found technical application.

Chile nitrate, once almost the sole source of N supplied more N than all other sources in 1915. In 1922 it supplied only one-fifth of the world's needs for N and in 1925 a little under one-third.

The output of by product ammonium sulphate in 1913 was 280,000 tons of N and has not increased since. Whereas the output of fixed atmospheric N in 1900 was nil it had grown in 1925 to the impressive total of 550,000 tons or nearly one half of the world's production of fixed N.

The production of cyanamide has remained nearly stationary since 1917 but the synthetic ammonia output has risen rapidly since then.

In 1924 more than 300,000 tons of N were fixed as synthetic ammonia.

(Chemistry and Industry, Oct. 29, 1926.)

Vaginitis in cows :—When you have cows which constantly return to the bull but do not breed, this is in most cases due to the inflammation of the vagina, round about the vulva, in the lower angle of the front of the vagina. In appearance it looks as if there were little grains of sand underneath the membrane of the passage. The cows will go in calf if you wash them for 4—5 days with a disinfectant like lysol or one which has a soapy basis, *i. e.*, which becomes frothy when mixed with water. Do not use a mercurial disinfectant. 2 per cent of lysol is strong enough. Before the cow goes to the bull, wash it with bicarbonate of soda, a table spoonful to a gallon of water.

Lice :—The louse lays eggs which are fixed to hairs by a cementlike substance. These eggs are laid out one at a time, but an adult louse will lay 5 or 6 times a day. They hatch out in 7 to 10 days. The louse has a circle of hooks all round the mouth and by means of these obtains a good grip of the victim. It then inserts long piercing things into the skin and sucks the blood.

Three different kinds of louse may be found in man—the head louse, the body louse and the crab louse, so named because of its shape.

Cleanliness is the simplest cure. Frequent washings of the body and clothes with soap and water will get rid of them. Blue ointment is of value against the crab louse. An ointment of one part of kerosene or eucalyptus oil to five parts of lard is a cure for head louse.

The Farmer's Unledgered Income :—Studies of more than 7000 farms well scattered over the United States and representing various types of agriculture show that the value of that part of the family living which is obtained from the farm roughly approximates one-ninths of the farm receipts and one-third of the net income, and that even in years when the money margin shows a deficit this unledgered income is able to maintain for the farmer a reasonably contented state of mind.

(From Journal of Agricultural Gazette, September 1926.)

English Village Life : The Royal Society of Arts, England, on the 26th of January last held a conference on the preservation of ancient cottages. This was presided over by the Prime Minister and substantial support was visible. This Society along with the Council for the Preservation of Rural England and Rural Community councils will, it is made out, take active steps to revivify the rural parts and to preserve the beauty of village and country cottage architecture which gives a special charm to the whole of the English country side.

Formosa as a Sugar Country : This island was ceded to Japan by China in 1895 and now it is the base of Japan's sugar supply.

The area of the island is 13,944 square miles of which 7400 are unoccupied, though in this region there are 85,000 "savages" so called. The population numbers 4 millions and they occupy a little over 4 million acres. There are rich alluvial deposits. Of the 2,900,325 acres under cultivation there are 1,926,020 acres of private ownership and 962,296 acres of Government property.

Fourteen kinds of crops are raised and the climate is semi-tropical with a soil that welcomes a variety of crops. 60,897 acres are under fruit. 29 per cent of the cultivated area is under irrigation schemes. Independent farmers number 917,787 and lead in progress. There are 694,325 tenant farmers and 2,305,396 farm laborers so that there is no labour problem as in most cane countries.

Rice competes with sugarcane and in some instances has paid better, and in 1925, 1,359,000 acres were planted to rice. The production was 32,214,456 bushels. This includes wet and dry rice.

In 1902, a sugar bureau was established to raise the quality and the quantity of sugar.

The rich alluvial deposits in the island are derived from clay, slate and to a small extent from sandstone and the soils are of a heavy clay texture. Formosa is nitrogen hungry. Phosphoric acid and potash are plentiful. There is considerable green manuring which is found profitable but is not in general practice in most cane fields. They calculate getting 31 pounds of nitrogen per acre on this plan. Cane trash is buried under.

In 1895, the cane industry was in a neglected condition. Rosebud variety of cane was introduced. Protection of the sugar up to 90 per cent of the declared value of the Java sugar was held for a term of years which was later reduced to 50 per cent and area under cane increased.

1925 shows an output of 575,735 long tons, raws that are all sent to Japan for refining and this was from an area of 294,148 acres and from 4,732,246 tons of canes. The low output of about 16 tons cane per acre is due to four reasons :—

- (1) Presence of a lot of small cane farmers who are hard to move and who operate independent of sugar companies and raise other crops as tea and rice in abundance.
- (2) Presence of many isolated farms on hills where they cannot be irrigated.
- (3) The skimpy use of fertilizers.

and (4) Weather difficulties—particularly typhoons which rage over the Pacific, and long droughts in summer.

(Abstracted from the Planter and Sugar Manufacturer, Jan. 15, 27.)

Japan :—The Prime Minister in his speech before the Diet amongst other things said that “in the execution of the policy of social improvement in the agrarian districts, the Government would enlarge the scope of the plan for the maintenance and establishment of independent farmers which was previously instituted, and after referring to the conspicuous increase of population every year, the insufficiency in the output of wheat and rice and the increase in the volume of imports of cereals, continued that unless a lasting and fundamental policy was established concerning the population and the supply of foodstuffs, the nation would some day find itself in difficulty and with this view the acceleration of the development of the Hokkaido (northern part of Japan) was of urgent necessity.

Groundnut in New South Wales :—Experiments carried out at Grafton farm during 1925–26 have given interesting results. October planting averaged an acre yield of 800 lbs. nuts and 2027 lbs. hay, while the January planting was only 50 per cent.

In the variety trials, white Spanish came out first with 1317 lbs. nuts an acre while Java, red Spanish and Valentia went down.

In spacing tests with rows 3 feet apart, white Spanish-3 inch spacing plot (using 44 lbs. per acre) gave 1717 lbs. nuts an acre and 6 inch spacing (using 23 lbs. an acre) gave only 1417 lbs. an acre. The spacing plots were sown on December 25th and harvested on 26th May.

India's Road Development :—A movement is afoot under the leadership of Mr. Reginald Ford, Manager Dunlop Co. India to provide for a road development fund by importers of car manufacturers outside India and oil concerns, contributing in three equal proportions for three years a sum of one lakh of Rupees a year. (Free Press.)

Unemployment Problem — Theories examined :—Dr. K. Kunhikannan, Entomologist, Mysore, lecturing before the Y. M.

C. A. at Bangalore on 18-2-27 condemned in strong terms the hackneyed theories for solving unemployment viz, that modern youth should be given agricultural education and vocational education should be introduced in High schools. He said, owing to the continuous growth of population and gradual decay of handicrafts and industries, the bulk of the people had been driven to the land with the result that the yield power was now at zero and no holding gave more than Rs. 10 per acre.

Owing to the conflict of what are known as urban and rural standards of life the cry of 'Back to the Land' and vocational education was a false cry because labour is cheap and productivity of the soil is the lowest. If the question of unemployment had to be solved in any way, it must be that the agricultural education and vocational education must be given not to the youth in school and colleges but to those who were unaffected by western influences.

Cattle Breeding in India :—Mr. W. Smith, Imperial Dairy Expert delivered a lecture on the subject at which Lord Irwin presided. The lecture was illustrated by cinema films. Mr. Smith said that with the exception of parts of the Punjab, the quality of cattle was deteriorating. In London fresh milk was 75 per cent cheaper than that in Indian cities. His Excellency said that the waste of expenditure incurred on useless cattle was something in the neighbourhood of 6 crores. If that figure was true India was spending on useless cattle as much as she was spending on her whole army.

Permanent Settlement :—In his reply to the address from the Oudh talukdars on 22-2-27, Lord Irwin said :—"You have made a request for the grant of a permanent settlement. You may be sure I fully realise the importance of maintaining stable conditions in which agriculturists can look with confidence to the future and I am ready to do all I can to assist the Indian agriculturist on whom in a great measure the prosperity of India lies. But much grain has passed through the mill since Lord Cornwallis gave Bengal its permanent settlement. India's place in the commercial markets of the world and the intricacies of her financial and social problems have brought many new factors into the picture which necessitates elasticity in public revenues and expenditure, . . . There are moreover obvious objections to

permanent settlement. It involves the sacrifice of a share of the State in the growing value of the land and perpetuates assessments which must become more and more uneven as time goes on. Any measure which tends permanently to limit the share which any class is called upon to contribute to the general revenues is almost certain to result in an unfair burden on other classes. The evidence before the Government does not bear out the contention that the present system of periodic revision of land assessment places any real obstacle in the way of real improvements to land or adversely affects the agricultural development generally.

All India Sugar cane crop—Final forecast for 1926-27 :—The area sown is estimated at 2.92 million acres and the total yield 3.20 million tons of raw sugar, the increase over last year has been 9 per cent in area and 8 per cent in yield.

Assam Winter Rice crop :—1926-27—Final forecast :—The estimated area is 3.405 million acres and the produce 24,510 million cwts. on the basis of a normal yield of 8 cwts. of rice an acre.

Co-operation in Bihar and Orissa :—The report of the Co-operative Department for 1925 shows all round progress. The number of societies rose by 800 and membership by 15,000 and the working capital to 410 lakhs of rupees.

Some central banks are doing good work in spreading primary education. During 1925, it is understood 75 patasalas were opened by them for which they contributed Rs. 7500, the District Boards making a contribution of Rs. 14,000.

Co-operation in the Punjab :—The report for 1925 bears evidence that the co-operative movement is fast gaining ground, the number of societies having risen from 3,300 in 1915 to 15,000 with a capital of 9 crores and a membership of 450,000. The most important features of the year's work are :—the development of the provincial co-operative bank, Land mortgage banks, and the better farming and cattle-breeding societies.

With an advance of four and a half lakhs of rupees, 3372 acres were redeemed. The co-operative movement has attained such a stage that the Punjab Government think that an expert in technical banking should be attached to the Registrar's staff. There are 600 thrift societies formed almost entirely amongst non-

agricultural classes. There are societies for the education of children—both boys and girls. A new type evolved in Amritsar and Gurdaspur districts is the class of *Land Revenue Redemption Societies* (8 in number), the object of which is to collect annual contributions from members until the interest of the sum so collected is sufficient to pay their land revenue.

Bombay Agricultural Situation:—An official communique states that to give relief to ryots owing to damages by locusts and failure of rain, measures have been taken to give bonuses to low paid patels and doles to inferior village servants and for improving village water supply in Ahmadnagar and Poona districts. Taccavi loans are being given in Bijapur district amounting in all to over Rs. 250,000.

Bengal cotton crop 1926-27. Final report:—The total area sown with early cotton which is chiefly grown in the Chittagong Hill tracts, is the Tripura State and to a small extent in all districts is returned as 163,228 acres and that with the late crop at 1403 acres. The weather was generally favourable. The outturn of the early crop is estimated at 60,248 bales and that of the late crop 820 bales.

Tourists:—Mrs. Orchard, representative of the Labour Union Chicago, with her husband Mr. John E. Orchard, Colombia University, New York, is on a visit to this country. Her object is to study the labour conditions in the East. Dr. Goldstien, Founder of the National Home for Jews in Palestine is in India to investigate the problem of agricultural colonies.

Railway Extensions:—It is ascertained that 900 miles of railway will be opened in 1927-28 of which the following are portions in Madras:—S. I. Ry. Shoranur-Nilambur—41; Virudunagar-Tenkasi—75; Dindigul-Pollachi—75; Madura-Bodinayakannore . . . and Cuddalore-Vriddachalam—85 miles. M. S. M. Ry, Nidadavole—Narasapatam—47 and Gudivada—Bhimavaram—41 miles. These tracts are proposed to be tapped because of the enormous difficulty in the movement of timber and agricultural produce viz cotton, groundnut and paddy.

Coir Industries in the Circars:—We learn experiments are in progress at Ambajipetah in the Godavari district with a

view to demonstrate that if West Coast methods are adopted, coir fibre and yarn could be produced on the East Coast approximately equal in quality to that of the Malabar Coast. This will secure for the East Coast yarn on a commercial basis and improve the economic position of some of the coastal areas.

Parnell Cup:—The staff of the Paddy section raised a sum of Rs. 130 amongst themselves in appreciation of the qualities of Mr. F. R. Parnell who had been the Paddy Breeder since the inception of the station in 1914 and who retired on a proportionate pension in February 1925 to take up duties under the British Cotton Growers' Association for work in South Africa. The sum collected was sufficient for a bust of Mr. Parnell and a rolling cup in his name for the best team in an inter-class Hockey tournament. Both these have been handed over to the Principal by the donors recently. The bust has been skillfully done and is the work of the artist of that section—Mr. T. S. Alwar Ayyengar.

NEWS AND NOTES.

Officers' Club:—The Officers' Club was treated this month to two excellent entertainments, one by the management of the Narayana Gurukula, Coonoor when Mr. Narasimha Ayyengar, B.A. Private Secretary to Mr. K. T. Paul helped with vocal music. On the second occasion, Mr. P. D. Karunakar, M. Sc. gave a conversation on his four and-a-half years' experience of his own University-Iowa and of American life.

Visitors:—During the month two Honorary visitors paid official visits to the College. They were Mr. Rao Sahib Rangaswami Ayyengar, B. A., B. L., Cuddapah and Lt. Colonel R. Dennistoun, Nilgiris. Mr. Wynne Sayer, Secretary, Sugar Bureau visited the Imperial Sugarcane Station during the middle of the month.

Students' Club:—On the 12th, the last working day for the senior students, this club celebrated its Annual Day. The special feature this year was the addition of a fancy dress competition in which eight students took part and their performances were excellent. Mr. B. V. Venkatachary as waiter, Mr. M. P. Narasimha Rao as a Tirupathi pilgrim, Mr. K. H. Subramanya Sarma

as a Lala, Mr. R. Vaidhyathan as a Zulu fighter, Mr. Sanjivi Shetty as a hunch-back Moplah straw vendor, and the two Natesans as Postmen, created peals of laughter.

After the usual tea Mr. K. Ramanathan as a Bhaghavathar gave a delightful discourse on "Chitrasena Upakhyanam" in Tamil.

Reports of both the literary and games' sections were then read and prizes and cups were kindly given away by Mrs. Ramaswami Sivan. The following is culled from the reports:—

Owing to increase in strength of Class I this year, the number of members rose to 82. Two Madras dailies, one Bombay Daily, and 11 periodicals—both English and Vernacular—were subscribed for. A few periodicals and books were also presented by Messrs. R. O. Iliffe, R. C. Broadfoot, Rao Sahib M. R. Ramaswami Sivan, C. N. Krishnaswami Ayyar, and T. V. Ramakrishna Ayyar. Eleven public meetings were held. Chief among the speakers were Messrs. A. Srikantayya Bar-at-Law, T. V. Apparasundram, M. A., L. T. M. Ed., R. K. Shanmugam, B. A., B. L., M. L. A., Mustafa Effend L. Ziadg, of Egypt, Dr. S. K. Dutta, Rao Bahadur T. A. Ramalinga Chettiyar. One outstanding feature in the activities of this club during the year was in connexion with the visit of the Royal Commission to the College. The Marquis of Linlithgow visited the Hostel by special arrangement and gave them an address. Sir Gangaram and Prof. N. Ganguli visited on different occasions and engaged them on conversazione.

A benefit musical entertainment was arranged in connexion with the Poppy Day Fund and a sum of Rs. 45-0-0 was contributed.

Games:—These were lively owing to the increased strength in the College. There were two additional tournaments:—one Handicap Tennis doubles and the other Inter-class Hockey Tournament for the Parnell cup. In *Cricket*, out of the five matches played for the Father Rony's Shield by a combined team of students and officers two were drawn and the rest ended in our defeat. In *Hockey*, nine matches were played in all of which, three were for the local Hockey tournament. After defeating two strong teams, our team came up for the finals in which, however,

we had to yield to the Foresters, whom we heartily congratulate. In *football*, we tried our strength with the London Mission School in the Abraham Memorial Tournament but owing to absence of two good players due to sudden ill-health we lost the match. *Tennis* was the most favourite game of the year, membership rising as high as 45. In the handicap doubles, Messrs. S. Muthuswamy and S. Ramaswamy came out successful. In singles for the Cecil Wood Cup, S. Muthuswamy beat B.V. Venkatachary in the finals. In the Interclass tournaments, Class I snatched the "Victory Cup" in Hockey, Cricket and Football. In the Grigg memorial Sports our College won through Mr. K. Ramaswamy the cup and medal for the open mile race.

The following were awarded colours:— Mr. S. V. Ramachandran for Hockey, Messrs. Brito Muthunayakam and K. V. Natesan for football. The Parlakimedi Cup for the best all-round sportsman was awarded to Mr. K. Ramaswamy.

The proceedings were wound up by a speech from the Principal and President, Mr. Rao Sahib M. R. Ramaswami Sivan.

The Committee expressed their grateful thanks to several ladies and gentlemen who helped them during the year.

Office-Bearers for 1927-28.

K. Ambikacharan	...	...	Club Secretary.
T. Krishna Reddi	...	...	Games Secretary.
C. Annamalai	...	...	Representative. Class II.

Students' Tour:—Students of Class II were taken on a week-end tour to the Nilgiris. Messrs. T. V. Subramaniam, H. Shiva Rao and S. N. Chandrasekhar accompanied the party. A similar tour was undertaken by students of Class I conducted by the Principal who was assisted by Messrs. P. S. Jivanna Rao, P. N. Krishna Ayyar and S. Narayana Ayya.

University Examinations:—These examinations commenced with theory for Part I on Monday the 22nd Instant and will end with Practical for Part II on Wednesday, the 12th April.

Viceroy's Prize:—We are glad to learn that the Silver Prize for Madras has been won by Mr. K. Ramanathan of class III.

University:—A portrait of the Right Honble V. Srinivasa Sastri Privy Councillor was unveiled in the Senate House, Madras on the 14th of this month by Viscount Goschen.

EDITORIAL.

Our Viceroy:—Our readers will remember that this Union sent a message of welcome to His Excellency Lord Irwin on the 4th April 1926 on his arrival at Bombay. His active interest in agriculture, the several speeches and references he has made on this subject in the Council Chambers at Delhi and Simla, and at the investiture ceremonies in the several durbars, his institution of prizes for boys—all show his keen interest. It is understood that he visits Mysore and he may probably also spend a day or two on the Nilgiris. It is likely that His Excellency may visit in this tour one or two nearer places in Madras and we hope Coimbatore will be one. It is no exaggeration if we say that, possessing Agricultural and Forest Colleges, which train students for development work in this country, Coimbatore does not yield in importance to any presidency town. In fact, it enjoys a very pleasant climate which will be lovely at the time of His Excellency's visit to Ootacamund. We hope His Excellency will find enough in these two institutions to strengthen his own conviction that Agriculture and Forests are the main-stay of this country, and will be tempted to include these two institutions in his programme.

Land-Revenue Bill:—After a very long cogitation and anxious consultations the Local Government have with the approval of the Governor-General introduced a bill to regularise their claims on land. This is a measure of vital importance to the cultivator and has been long overdue. Barring Permanent settlement which enriches only one class and that a small class of the population, the Land Revenue Bill if passed into law will strengthen the hands of the ryot and give him a status in the eyes of the law which any executive order liable to be misunderstood will only keep at arm's length and thus secure better harmony between the Government and the people.

Honorary Visitors:—For nearly 18 years the system of nominating gentlemen interested in agriculture as Honorary visitors to the College has been in operation and during the current triennium which will end with June 30 next, one was appointed from each district in the Presidency. Owing to numerous causes these gentlemen have not been able to come, the number of visits not exceeding ten during the last three years. It would seem necessary to interest M. L. Cs. and other public spirited gentlemen

if not also Zamindars in the affairs of the College. But an element of representation through election though in a partial manner may perhaps prove more attractive. As there are a number of Ryots' associations in the Presidency and several District Boards are working with elected Presidents we would suggest that these institutions may be permitted to elect severally or jointly one representative from each district. It is hoped that this may prove more successful.

The Budgets:—It is extremely gratifying that Sir Basil Blackett at Delhi and Mr. T. E. Moir in Madras have been able to show surplus budgets and a return to normal conditions. This is now then the time for larger expenditure on nation-building departments, and several financial members also seem alive to this fact as is evidenced by the Bengal Government's decision to adopt the late Mr. C. R. Das's scheme for rural construction and sanitation. In our own province, rural problems are not less pressing and the recent pronouncements of all the three Ministers seem to assure us quick developments in this line. 16.16 lakhs is to small a sum for improving a cultivated area of 320 lakhs of acres.

DEPARTMENTAL NOTIFICATIONS.

Appointments posting and Confirmations:—

Mr. F. L. J. Lobo, a certificate holder, to be lower subordinate 5th grade, on probation, under Deputy Director of Agriculture, Live Stock Hosur.

Mr. R. Swami Rao, Demonstrator on relief at Saidapet Teachers College, posted to Kalahasti.

Mr. I Kurma Rao, Assistant Manager is confirmed

LEAVE:—

First Circle:—

Mr. M. V. Kondal Rao, Assistant Demonstrator Ellore, leave on, average pay for one month from 5th March 1927.

Third Circle:—

Mr. K. L. Ramakrishna Rao, Assistant. Cotton duty, leave on average pay for 9 days and leave on average pay for 13 days.

Mr. K. Ramanatha Ayyar, Demonstrator, leave on average pay for one month and four days.

Mr. S. Mahadevan, Farm Manager, Nandyal, leave on average pay for 15 days from 5th March 1927.

Fourth Circle:—

Mr. M. C. Krishnaswami Sarma, Assistant Manager leave on average pay for 17 days from 5th March 1927.

Fifth Circle:—

Mr. R. Subramana Ayyar, Assistant Demonstrator, Pattukotai, leave on average pay for 14 days from 1st March 1927.

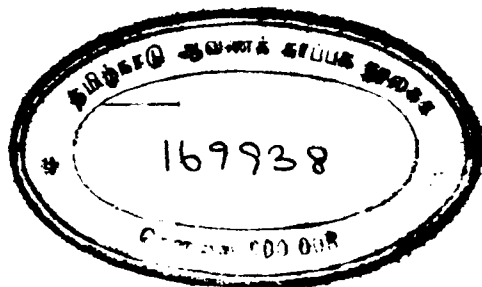
Seventh Circle:—

Mr. E. K. Govindan Nambiyar, Demonstrator, Tellicherry, leave on average pay for 15 days from 6th February 1927.

Mr. P. K. Kannan Nambiyar, Assistant Manager, leave on average pay for 15 days from 9th March 1927.

C. E's Section:—

Mr. C. S. Krishnaswami, Assistant leave on average pay for 15 days from 16th March 1927.



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3. Hassan.	137, Opposite Mysore Government Agricultural Department.	D. S. Sreepathi Rao.
4. Chickmagalur.	1048, Bazaar Street.	T. Guru Rao.
5. Chickballapur.	C/o Friends Union Stores, Chamarajapet Main Road.	Do.
6. Doddballapur.	C/o H.P. Surappa Setty 1198, Cloth Bazaar	Deverasayya (Kunigal).
7. Bangalore.	7/12 3rd Cross Road. New Taragapet.	Do.

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K. S. Ranganathan, B. Sc. II.
R. Chandramowli, B. Sc. I.

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