

Journal of the Madras

Agricultural Students Union.

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Farming will never be a success unless the farmer
had more voice in the disposal of
his produce—P. Merrel.

THE JOURNAL

OF

The Madras Agricultural Students' Union.

Vol. XVI]

APRIL 1928.

[No. 4.

Botany of some useful plants-II.

(Continued from January-February issue.)

CANAVALIA BENSIFORMIS.

The sword-bean (Tam. Thambattankai, Coliavarakai or Val-
avarakai) is common throughout India being cultivated in gardens
or round about the dwellings. It is supposed to be a native of
India and several varieties exist. Many wild forms are met with
some of which are held to be poisonous. Climbing and bush forms
are found. The climbers are allowed to trail over trellis frames
or over the roofs. The plant flowers mainly from August to
October but many cases have been observed where flowering
takes place even as late as March or April.

It is a perennial or biennial climber or scandent herbaceous
plant with a rounded and twisted pubescent stem. The leaves are
pinnately trifoliate, with long petiole and prominent pulvinus.
The petiole has a distinct groove on the upper surface. The stipules
are small and warty and the stipels are very minute and subulate.
The leaflets are borne on short cushiony stalks and are ovate
acute, entire, pinnate-reticulate, leathery and sparsely pubescent.

The flowers are in axillary elongated racemes fascicled on a nodose rachis, of a bright pink or white colour with short pedicels. The bracts are minute and the bracteoles are bigger than the bracts and caducous. The calyx is gamosepalous, bell-shaped and obscurely two-lipped the upper lip consisting of two broad sub-connate lobes and the lower of three small teeth. The standard is large, orbicular and clawed. The wings are as long as the standard and spurred. The keels are fused in the middle but free above and below and spurred; they are slightly longer and broader than the wings. Stamens are ten in number and of two different heights. One posterior stamen is free at the base but united with the staminal tube for the major part (monadelphous); the anthers are oblong and uniform. There is a very prominent disc of yellowish glands surrounding the base of the ovary. The ovary is sessile, elongated, and flattened with an incurved style and a rounded terminal stigma. The pod is flattened with a prominent ridge on each valve, 6 inches to over a foot in length and $\frac{3}{4}$ " to $1\frac{1}{2}$ " in breadth. The seeds vary in number from eight to twelve. The pericarp is somewhat fleshy.

When young the pods are sliced and cooked as a vegetable. The mature seeds are used in soups.

PHASEOLUS.

This genus which is widely distributed both in the tropical and temperate regions supplies a number of important pulses and beans very commonly used as articles of diet. The representatives of this genus are mostly herbaceous, erect, prostrate or climbing in habit. Some species exhibit all these variations. The leaves are pinnately trifoliate or very rarely unifoliate with peltately fixed leafy stipules. The flowers are of various colours and occur in axillary racemes fascicled on an elongated peduncle. Conspicuous bracts and bracteoles occur. The gamosepalous calyx is often bellshaped with the posterior lobes usually fused together. The corolla is exerted with a recurved standard; the wings are often large and adnate to the keel; the keel petals are characteristically spirally coiled and include the stamens and the pistil. The stamens are diadelphous, nine and one. The ovary is sessile and many-ovuled. The style which is enclosed inside the twisted keel is itself spirally coiled and is markedly bearded with an oblique stigma. The pod varies in size in different species.

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The flowers are very well adapted for pollination by insects. Nectar is secreted at the base of the ovary and this can be obtained by the insects only if they push in their proboscis through a cleft at the carinal tip. The stamens surround the pistil and the pollen is shed on to the bearded portion of the style. The alae or the wings are adnate to the spirally twisted keel. When insects alight on the wings the pressure thus created acts on the keel which is depressed. Owing to this the stylar end with its pollen dusted brush protrudes from the tip of the keel and thus comes in contact with the body of the insect. It regains its normal position when the pressure is removed.

PHASEOLUS MUNGO.

The black-gram (Tam. Ulundu) is one of the most important of the pulses and is extensively cultivated throughout India. It is grown either by itself or as a mixed crop along with millets or cotton. In some parts it is sown on the bunds surrounding paddy fields. The seeds are sown with the rains and the crop is harvested about November. It prefers heavy soils and forms an important crop in black soils.

It is a hirsute diffusely branching herb the whole plant being rough with reddish and rusty-brown hairs. The entire plant has a dark green appearance. The flowers are axillary and are of a yellow colouration. The pods are generally somewhat cylindric erect, septate between the seeds and covered with long ferruginous hairs, 8-15 seeded and about $1\frac{1}{2}$ — $2\frac{1}{2}$ inches in length. The seeds are usually black but sometimes green seeds also occur.

The seeds enter into the composition of a good many culinary preparations and form one of the articles used for seasoning the various curries. Mixed with flour of rice the black gram as flour or made into a pulp is employed in the preparation of a variety of delicious cakes. Appalams and pappadams are preparations composed mainly of black gram flour. Next to rice it is one of chief ingredients in Hindu diet. The grain and the straw form valuable cattlefood. The seeds are used medicinally in the preparation of a medicated oil. Made into a pulp and mixed with egg albumen it is often applied externally on inflamed parts.

PHASEOLUS RADIATUS.

The green gram (Tam. Pasi or Pachai payaru) is a native of India and is distributed as cultivated and wild forms throughout the plains and up to a height of 6000 feet on the Himalayas. In Madras it is grown throughout the presidency generally as a

subsidiary crop to one of the cereals—as a second crop in rice-fields. It thrives best on good deep soils. The seeds are sown at the commencement of the rains and harvested about October to November.

This resembles *P. mungo* but can be differentiated from the latter by its being less hairy, less robust and the colour of the hair being more brownish than ferruginous. The plant as a whole is paler than mungo and is about 1-2 feet high. The flowers are of a light yellow creamy colour. The pods are generally smaller than those of *mungo* and the seeds are green or blackish green and smaller than those of *mungo*. The easiest way to distinguish the two is to split the seed; the black gram is white when split while the green gram is yellow.

The kernels are largely used mixed with rice by the Hindus and on ceremonial occasions this gram is used in place of dhal. Many sweets are prepared by using this gram. The husk of the seeds is used as an excellent cattle food. When grown thick this plant has a tendency to smother weeds and is used for this purpose in irrigated lands. The flour made from the kernel is employed in place of soap during baths, particularly in oilbaths for children and the constant use of this flour is said to improve the complexion and be cooling to the system.

PHASEOLUS VULGARIS.

The French bean or the kidney bean is a native of tropical America and is at present commonly cultivated in gardens throughout India. In Madras it is grown chiefly in the hillstations and Bangalore and Mysore. In America 145 varieties of kidney beans have been noted. These can be classified into two main groups as bush forms and climbing forms. The bush forms are dwarfy and are the varieties that are commonly cultivated on account of their high yield. Green podded and waxy podded forms are also present.

It is an annual with ovate leaflets. The flowers which are of a white, purple or yellow colour are small and borne on racemes shorter than the leaves. The pods are linear and smooth being $\frac{1}{2}$ " broad and differ much in colour. The seeds are kidney shaped and often have a mottled appearance when old.

Young and green pods are used as a vegetable. The pods are also used after drying or are canned mixed with other articles of food. In the preparation of media for growing fungi powdered french beans are commonly used.

PHASEOLUS LUNATUS.

The lima bean which is also called butter bean or Burma bean by some, is a native of Brazil and is grown in many parts of India in gardens as a vegetable. As in the French bean both bush forms and climbers are found. The seeds are sown about October and the plants come into bearing in the course of 2 or 3 months.

The leaves are trifoliate with small stipules. The flowers which vary in colour from pink to white or yellow are small and borne in axillary racemes. From the peduncle which is elongated the flowers are given off in clusters of 3, rarely more. The pod is flat, broad, green, scimitar shaped 10-12 cms. long and 3 cms. broad. Usually three seeds are formed inside each pod and measure 3-3 $\frac{1}{2}$ cm. by 2-2 $\frac{1}{2}$ cm. The seeds vary in colour being pink, white or mottled. The pericarp is very fibrous.

The seeds alone are generally used mixed with curries or made into soups. Very young pods are sometimes sliced and cooked like french beans.

PHASEOLUS ACONITIFOLIUS.

The dew gram (Tam. Thulukkapyaru) is a native of India and is distributed throughout the country in the plains and on the hills upto 4,000 feet. In Madras it forms a subordinate crop and is grown mixed with others especially with millets on poor or dry sandy soil. Sometimes it is cultivated by itself for fodder and as a green manure. It is generally a hot weather crop sown about June-July and harvested about October-November. Heavy rainfall appears to be harmful to the crop.

It is an annual or perennial herb with a diffused trailing slender stem. The leaves are trifoliate and the leaflets are deeply three lobed, the lobes being narrow and sometimes again variously cut. The flowers are yellow and are clustered at the end of an elongated peduncle. The pods are one to two inches long, glabrous and many seeded.

The pods when young are used as a vegetable. The seeds are used in place of dhal in Bombay. Medicinally the seeds are used in fevers. The whole plant is esteemed as a valuable fodder and a green manure.

PSOPHOCARPUS TETRAGONOLOBUS.

The Goa bean which is an introduced plant is cultivated in gardens in many places in India. Usually it is made to grow over pandals or trellis frames. Some times it is sown round the edges of the fields. The seeds are sown in August-September and the pods come into the market in November-December.

It is a herbaceous climbing plant (twiner) with an obscurely ridged stem sparsely covered with short hairs. Leaves are pinnately trifoliate, the petiole with a groove on the upper surface pulvinate and with peltately attached elongated leafy stipules upto 10 mms. long and 3 mm. broad. The leaflets are provided with cushiony stalks and are stipellate: the terminal leaflet has an additional joint with an extra pair of stipels. The lateral leaflets are oblique while the terminal one is cuneate, acuminate obscurely mucronate, entire with three prominent veins from the base.

Flowers are borne in axillary congested racemes at the end of long peduncles; they are short pedicellate, bracteate and bracteolate, the latter being longer and striate. The gamosepalous calyx is bellshaped and five lobed the two posterior being connate.

The standard is large and greenish white on the outside and blue inside clawed and greenish at the base; the wings are as long as the standard blue and clawed with a T-shaped spur; the keel petals are broad and connate above, with a truncate apex and whitish blue in colour.

Stamens are diadelphous, 10 in number, unequal in length with oblong basifixed anthers. There is a prominent honey disc made up of cushiony, yellow glands surrounding the base of the ovary. The ovary is sessile with a thick curved style and a profusely hairy stigma the hairs being silky white.

The fruit is a legume with a persistent style and provided with four prominent wings which are outgrowths from the pericarp; the wings are crisp and toothed; the pod varies from 18-20 cms. in length and is $3\frac{1}{2}$ cms., in breadth from wing to wing. The seeds are attached to the ventral suture the long axis being parallel to the suture.

When young, the pod is sliced and cooked as a vegetable. Immature ones are sometimes pickled.

EXTRACTS.**Bacteria and the Dairy Farmer**

BY J. F. MALCOLM, M.SC., F.A.C., N.D.A., N.D.D.

The terms, bacterium, conveys to many people the ideas of disease, infection and death. They seldom hear it used except by members of the veterinary and medical professions in connexion with diseases of man and animals, and have therefore been led to believe that most bacteria are disease producing. Comparatively few bacteria, however, cause disease, the vast majority are harmless, and many are of great industrial importance. Moreover, if it were not for the action of bacteria in nature, conditions would quickly arise which would render animal and plant life impossible in this world.

Dairy farming is probably affected to a much greater extent by their action than any other industry, the work of the dairy farmer being largely devoted to controlling their activities in the soil, in the crops during storage and in the dairy produce.

Soil Bacteria.—The fertility of the soil is largely dependent on the bacteria which occur in it. The putrefactive bacteria bring about the decomposition of the plant and animal remains and farmyard manure, rendering their constituents available to growing green plants. In other words, they convert useless organic substance into valuable fertilizing material. If it were not for their action dung and guanos would be of no use as manures. The nitrifying bacteria act on ammonium compounds, converting them into nitrates. In this way they increase greatly the fertility of the soil, as green plants can make use of nitrates for their nitrogen requirement but not of ammonium compounds. The presence of these nitrifying germs in the soil is essential for the fertilizing action of nitrogen in sulphate of ammonia, farmyard manure, and guanos. Other soil germs, termed the nitrogen fixing, make use of free or atmospheric nitrogen for the manufacture of their food-stuffs, and in doing so cause it to combine with other substances. The nitrogen brought into combined state, or as it is popularly termed 'fixed' by them in this way ultimately becomes available to green plants which themselves cannot make use of free nitrogen. Such bacteria have therefore an important action in promoting the fertility of the soil. Some of this nitrogen fixing bacteria are peculiar in

that they can live in association with leguminous plants e. g., beans, peas, vetches and clovers. These plants benefit from this growth association, and will not thrive in soils from which such germs are absent, because they obtain their nitrogen from them. For this reason leguminous crops can be grown more successfully than other crops on soils deficient in combined nitrogen.

Bacteria in hay and silage:—Germs bring about the decomposition and heating of fodder, grain and other foodstuffs, provided sufficient moisture is present to permit of their growth and action. One of the chief objects of haymaking and harvesting operations is to secure the crops under such conditions that bacterial growth is prevented. The crops are dried in the field by exposure to the sun and wind, and then stored in stacks or sheds to protect them from rain, so that insufficient moisture is present in plant tissues to enable bacteria to feed on them. On the other hand, in the preparation of silage the crop is cut green and stored at once in the silo tower, so that sufficient moisture is retained in the plants to permit of the growth and action of the bacteria responsible for the silage fermentation process.

Bacteria in the Dairy:—Bacteria are of great importance in the production of milk, butter and cheese. Many can thrive in milk. They use its constituents as their food, and render it unfit for sale by causing it to become badly flavoured, curdled or slimy. Other bacteria are of importance not because they produce change in dairy produce, but because they are responsible for diseases in human beings and farm animals and care must be taken by the dairy farmer to ensure that the produce is free from such germs as those causing mastitis or "weed," tuberculosis, typhoid fever, diphtheria, and scarlet fever.

Lactic bacteria:—Certain germs, the so-called true lactic bacteria, are of great use in dairying in the preparation of sour milk beverages, butter and cheese. They thrive in milk causing it to become acid or sour and to curdle. Such sour milk has a pleasant clean flavour unlike that of stale milk, where the fermentation or souring may be due not only to true lactic bacteria but also to coliform or intestinal germs. Sour milk has been used as a beverage and food since ancient times. If the fermentation is due to true lactic bacteria, not only is the milk a wholesome foodstuff but also a valuable medicinal agent for the treatment of digestive troubles.

What is a Starter? The true lactic bacteria are used in butter making to ferment or "ripen" the cream. They naturally occur in unpasteurised cream, so that such cream may be allowed to ripen naturally but putrefactive and other bacteria may also be present which may lower the quality of the butter. The best results are obtained by ripening pasteurised cream with a vigorous and pure culture of lactic bacteria. Such a culture is commonly termed "starter." The germs are grown in pasteurising milk, a fresh inoculation of such milk being made daily to enable them to retain their power, and not to be killed by the lactic acid they produce. Some of this starter is added to the pasteurised cream, which is then allowed to ferment until it is sufficiently sour for churning. The lactic acid produced by the germs prevents to some extent the growth of other bacteria which would cause undesirable change in the cream and butter—in other words, it acts as a preserving agent in the same way as vinegar acts as a preserving agent in pickles. Butter made from cream ripened in this way generally keeps better and has a more pleasant flavour and aroma than butter made from sweet or fresh cream, unless the latter has been prepared under special conditions. Moreover more butter is obtained under ordinary conditions, from ripened cream than from the same volume of unripened cream.

Starters in Cheese-making. Starters of true lactic bacteria are used in cheese-making to ensure that the lactic germs are present in the milk in sufficient numbers and vigorous condition to cause it to ripen quickly. The ripening of the milk is necessary to prevent the growth of putrefactive bacteria in it and in the curd and ripening cheese, the lactic acid acting as a preserving agent. The bacterial population of a good Cheddar or Dunlop cheese should consist almost entirely of true lactic bacteria. The lactic acid also promotes the action of rennet, the cooking and maturing of the curd and the ripening of the cheese. Moreover the lactic bacteria have a direct action on the ripening of the cheese by producing agents which render the curd more digestible. They are also to a great extent responsible for the flavour of the cheese. Blue moulds occur along with lactic bacteria in blue-veined cheese such as Stilton and Gorgonzola, and play a part in the ripening process. Their growth is permitted by the loose structure of such cheeses. Putrefactive bacteria, in addition to lactic bacteria and mould assist in ripening some of the soft

Bacteria are therefore of great importance in dairy farming, and the success of the industry depends to a great extent on their activities being kept under control. Where they produce harmful effects their growth must be prevented, where beneficial their growth must be promoted. Their beneficial effects far outweigh their harmful and the dairy farmer has therefore greater cause to regard them as friends than foes.

(From Scottish farmer dated 24-8-28)

After 35 Years.

The Secretary of State for Scotland through the Board of Agriculture asked Mr. J. R. Campbell B. Sc. Dublin to make "Inquiries as to how far agricultural education in Scotland is reaching those actually engaged in farming and is directly productive of improvement in farming practice." Mr. Campbell possesses unique qualifications for conducting such an enquiry, and he has now completed his task. Thirty-five years ago or thereabouts he was assistant lecturer in agriculture in the West of Scotland college. He was also frequently engaged in extension lecture work in the college area. He knew the beginnings of the work as these were known to few and after many days no one better qualified for making a general survey for taking stock could have been found. In a certain public capacity, but not as a journalist, we have been favoured with a perusal of the completed report. It would be as improper to criticise it at this stage as it would be for us to publish it, but without any breach of confidence we may indicate certain lines of thought suggested by its perusal.

An outstanding feature of the review is the discovery of a changed attitude towards agricultural education and research on the part of Scottish farmers generally. The attitude of aloofness with which the pioneers 30 or 40 years ago were familiar has gone. The actual results of patient teaching and guidance in matters of farm practice may be difficult to express in actual cash terms, but their cumulative effects are beyond question. The fact is apt to be overlooked that there are in Scotland approximately 75,000 agricultural holdings; of these 50,000 are of not more than 50 acres in extent; of the remaining 25,000 no fewer than 16,000 do not extend to more than 150 acres. In other words there are in Scotland not more than 9000 "big" farms. The position to-day would seem to be that while agricultural education has won many adherents among the 9000 and the 16000, it has

made little or no impression on the 50,000. The problem of the future is to how to bring the influences which have operated to good purpose with the men farming on the large scale, to bear with equal power on those engaged in the similar way.

Few parts of the work done during the past 35 years have left deeper permanent impressions than the short courses for farmers which were a marked feature of the earlier days of the agricultural colleges. The younger men who took advantage of these classes were naturally the most progressive and acquisitive of their generation. They were not afraid to put in some hard work in order to attend these short courses. In most cases they did not cease to be learners when their attendance at these courses came to an end. In the majority of cases they were the pioneers in their districts of progressive movements in the day of extension lectures, co-operative effort in buying and selling and generally the best allies of extension lecturers and country instructors. Mr. Campbell is obviously impressed by the extent to which he found this to be the case in definite areas where personal enquiries were made. The lesson deduced is that these classes should be revived and multiplied. They should be held in the central colleges and to this end these colleges should be planted, as they are in the cities of Aberdeen, Edinburgh and Glasgow. What has so deeply impressed the official reporter on his return to the scenes of his early labors was well known to some of us and largely promoted our resistance to proposals to shift the Glasgow college out of the city. The centre of an educational area is not the point where you put the stationary leg of a compass on a map and describe a circle but the point in the area most accessible to students from all quarters in the area.

In order to make full advantage of these short courses—which are attended daily by youths between 20 and 20, the primary qualification is not a scientific but a good general sound education. This is a fact which needs to be well—rubbed in in all quarters at the present day. The student who has been well grounded in English composition (which includes a thorough undertaking of the rules of English syntax) and arithmetic will assimilate the instruction conveyed by a competent teacher in short courses better than one who has been treated to a shallow acquaintance with snippets so common in modern elementary schools. The chemical, biological and economic hints conveyed during attendance on a short mid-winter course will whet the appetite of the right-minded student

for more. He will continue his studies, taking full advantage of popular expositions of scientific results to be found in the agricultural press.

Among actual results in respect of improvements in farm practice, one is impressed by the changes in laying down rotation pasture, the reduced use of perennial ryegrass and the increased intelligent use of cocksfoot and wild white clover. The influence of 40 years' teaching at the Kilmarnock Dairy School is indubitable, and in connection therewith we may say that Mr. Campbell does not hesitate to put down concrete figures as representing the enormous monetary value to the South-West of Scotland of that teaching. The great advance in profitable poultry keeping is equally marked, figures being given which show increases in numbers of all kinds of poultry kept, and in actual egg production per hen. Equally striking are the results in respect of milk production per cow due to the work of the Scottish Milk Record Association, working in alliance with dairy school and college instruction. Nevertheless there is yet much land to be possessed, as, so far, only 17 per cent of the milch cows in the purely dairying districts are as yet under the supervision of the Association.

We have said enough to indicate the discriminating nature of Mr. Campbell's report "After 35 years" and be speak for its full text an attentive hearing when it appears.

(From Scottish Farmer dated 24th March 1928).

Co-operative Marketing.

(Continued from March issue)

(2) One result of small holdings is that financing cannot be properly organised and has to be effected locally, making it at once costly and wasteful. In his evidence before the Agricultural commission Dr. Mann stated that in Khandesh the cotton growers were not dependent on money-lenders. If that is so, that is probably the only instance of financial independence of cultivators. In some outlying areas, things are very bad indeed. It has been reported by an experienced Bengal official that cardamom sold in Darjeeling at Rs. 60 to 90 a maund in 1925, whereas the cultivators obtained on an average Rs. 30, sometimes as low as Rs. 12, because they had obtained advances from the ring of Marwaries, who control the trade. This is not an exception but the rule for the system of financing is exceedingly complex, as described in the

appendix to the report of the Babington Smith Currency Committee. A rough idea may be obtained from a study of the process at present obtaining in Assam. The big *mahajan* gets his money from his Calcutta firm or bankers at 6 to 9 per cent. He charges 12 to 15 per cent from the smaller *mahajan* who in his turn levies anything from 18 to 30 per cent on local traders. By the time finance filters down to the actual cultivators, the interest rate is anywhere between 24 and 60.

Unnecessary middleman:—The small unit and the imppecuniosity of the cultivator necessitate the employment of a larger number of middlemen. It is true that for the marketing of food crops and low valued crops, there are fewer intermediaries than for commercial crops and high valued crops. But even in the case of the former, there are far too many, especially if the producing areas are at a distance from the markets. Perishable commodities like potatoes should change as few hands as possible. But at Poona there are at least 5 *adatyas* or brokers representing sellers through whom potatoes must pass before they reach, not the actual buyer, but another intermediary, a representative of the buyer called a *dala*. In the case of paddy in Bengal, it is collected by a village *faria* (small dealer) from the ryot and sold through *paikar* (wholesale dealer) to a *bepari* who is either a dealer on his own account or merely a commission agent financed by another middleman higher up the chain. A *bepari* cannot sell the dhan or unhusked paddy directly to the mills but must carry it to an *aratdar* (godown keeper) who levies not only his usual charges but also commission. From him the paddy goes to a *dalal* (broker) who charges Rs. 3 per 100 maunds on an average and finally to mills.

4. *Their malpractices*:—These different classes of persons not only take middlemen's profits without performing any commensurate economic service, but they frequently practice rogueries of the worst description. In the report of the Mango Marketing Committee published recently by the Bombay government, a vivid description is given of secret buying without the knowledge of the producer. The *dalal* (buyer's broker) will not deal directly with the seller but only with an *adatyas* (seller's broker) and bargains are struck secretly by manipulation under cloth. Even in an organised cotton market like Amraoti, a government officer on special duty recently found out from the books of different *adatyas* that the price paid to cultivators was often lower than the price obtained from buyers.

5. *Chaotic measures of weight.*—Apart from this, there are malpractices on account of different measures of weight in use for different purposes. In the *gur* (unrefined Indian sugar) market in Poona, the producer has to deliver 256 lbs. per *palla* but the middleman sells at 240 lbs. per *palla*. In the case of tobacco, the *adaty* buys at 300 lbs. per *palla* and sells at 280 lbs. per *palla*. Besides there is almost a bewildering diversity in measures of weight in different places and even in the small place for different commodities. To give only one instance in Jalpai-guri (Bengal) the local weight is 93 tolas but Habigunge tobacco, for which it is a great centre is dealt in on the basis of 80 tolas. Illiteracy on the part of the ryot is as much responsible for this state of affairs as is the action or rather the inaction on the part of the government. As early as October, 1913, the Government of India appointed a committee to go into the matter and in their resolution dated January 3, 1922, declared themselves in favour of adopting throughout India the system of weights at present in vogue on railways. But nothing further has been done.

6. *Corrupt weighing.*—The weighman (called *Koyal* in Bengal) is an employee of the buyer and frequently manipulates scales to the detriment of the seller. The evil is well-known in Bengal and loudly calls out for reform. Even in the case of organised cotton markets, Rao Bahadur K. V. Rahama of the Berar Co-operative Institute is constrained to plead for platform scales in place of the present beam scales as a check to the knavery of the weighman. In fact, the justification for the existence of the Cotton Sale Society at Pachora (the only surviving society in Khandesh, and that even not a co-operative body in spite of vigorous propaganda) is simply that it secures fair weighing.

7. *Arbitrary deductions.*—At the time of weighing, various arbitrary deductions are made, some of which are enumerated below :—

(e) *VRITTI*, a customary allowance for Hindu religious and charitable purposes. The name differs in different parts of India but the practice obtains elsewhere.

(b) *DHALTA*, allowance for drying.

(c) *MUTHI KABARI*, "handful" for staff.

(d) *KHARCHA* (also called *jhara bojat*), allowance for bagging and stacking.

(e) *NEWAJ*, deduction for mosques and Muhammadan charities.

(f) *KOYALI*, weighman's allowance.

(g) *HAMALI*, postage charges.

8. *Adulteration.*—Absence of grading lowers considerably the price of the produce. This is insisted upon in the Report of the Mango Marketing Committee referred to above. But in the case of export crops, grading is far more necessary. Unfortunately however, unscrupulous dealers seize every opportunity for making unjust profits. Very soon after the introduction of 4F American cotton in the Punjab, it was discovered that the *deshi* and 4F could be mixed without buyers being able to detect it. This could not be done at the *kapas* stage (cotton with seeds on) by cultivators, for the seeds were different. It was the middlemen, who were responsible for this adulteration. Similarly, in the old days when the basis for red wheat in the Punjab was 7 per cent barley and 3 per cent dirt, dealers used to mix up barley and dirt with consignments of wheat which were above this standard.

9. *Lack of warehousing and transport facilities.*—Warehousing and transport are very inadequately developed. If a cultivator lives away from a market, he is in a very difficult position indeed. He has to send his produce in the time-honoured bullock-cart over bad roads at considerable expense. If he cannot obtain a fair price, he can neither store his produce in the distant market, nor can he bring it back to his village. It is for this reason that small itinerant dealers like *farjins* can carry on trade under such unfair conditions. Apart from this, railway transport is inadequate. There is a chronic shortage of waggons during the crop-moving seasons, precisely when they are most urgently required. Freight is also very costly, as will appear from the following table compiled by Rao Bahadur P. C. Patil :—

Railway system.	Freight for carrying one ton of wheat through 200 miles.
United States ..	Rs. 7.56
Madras and Southern Mahratta Railway ...	„ 10.32
Great Indian Peninsula Ry. ...	„ 11.07

Different marketing methods:—There is no uniformity in marketing methods, rendering an All-India Act for regulating markets and licensing middlemen impossible. There are on the one hand, several remote areas where barter is still in vogue, e.g., in the outlying parts of Assam and the Agency and hill tracts of Madras. There are on the other hand several highly organised markets where futures alone are dealt in even by cultivators, e.g., in Nandyal cotton market in Madras.

Swat the middleman:—How are these difficulties to be removed? Wherein lies the remedy. It is clearly impossible to follow a supine policy of *laissez faire* when the buyers and sellers are of such unequal economic strength. If the ryot can be properly organised and made independent of middlemen with their numerous malpractices most of the evils enumerated above will be removed. A systematic attempt "to swat the middleman" is therefore clearly called for. To quote the words of a report issued by the State of Massachusetts, too long a line of commission men, produce merchants, jobbers, bucksters, retailers and what not simply passing goods from hand to hand like a bucket brigade at a fire is not only inefficient and wasteful but is very costly. In these days a hydrant and a line of hose are wanted."

Co-operation:—As soon as the question of eliminating middlemen crops up co-operation is suggested as the remedy. But it is forgotten that cooperation is a worldwide movement which has assumed different forms in different countries in conformity with their history and their social and economic circumstances. Co-operative marketing being a kind of agricultural co-operation has almost endless diversity. There can be no artificial uniformity in respect of anything connected with agriculture, for that must obviously be a reflex of the people and the soil. A study of the system prevailing in foreign countries will however be helpful, if it is possible to deduce certain general principles and correlate them with circumstances prevailing in India.

(From Indian Journal of Economics—January 1928.)

(To be continued.)

What is Efficiency?

At the present time a great efficiency movement is sweeping the industries. The attention of employers in general is directed toward that one goal as to how to produce the maximum production at the minimum expense. The term speed or speeding up, has become a by-word, coined by the so-called efficiency experts, many of whom have been drafted from the rank and file of impractical men. Asked to investigate factory conditions, they file a report with the employers who have been induced to employ them, making a recommendation that in their judgment the only way to increase their output without additional expense is to drive their men, speed them up, make a machine out of them, and when worked out replace them. There is nothing scientific in such a recommendation. Every successful scientific invention of the past has had a tendency to reduce the physical labour, and to encourage the individual to think and work *with his head rather than with his hands*. It is not the aim of scientific management to induce men to act as nearly like a machine as possible. True, a foreman will prove his efficiency by the measured quality and quantity of his output, but it must come through systematic planning and education of the individual. *Men must be led and not driven*. Instead of working un-willingly for their employer they must work in co-operation with the management. Mistakes, instead of having to be corrected, must be avoided. So the first thing that must interest is the careful selection of the man that is going to have full charge of any given department. He must first of all be an expert in his line of work. *Nothing is so detrimental as to have a man fall into a position by luck, without having the necessary qualification*. A foreman must be looked up to by the men under him, as one that has had a little more experience than they have had, for it will not take long for the men to find out if such is not the case, and when they do, he will not be able to exercise the proper control over them, and will eventually destroy the efficiency of his department.

The greatest efficiency can be obtained only when the men are happy, satisfied, and contented with their surroundings. Since it is hard to find any two men that will do the same amount of work in a given time discretion must be exercised by the foreman in the placing of his men where they can be used to the best

advantage, with his work always planned in advance, so that they may know they always have a job ahead of them.

Richard M. Van Gaasbeek, in "American Industries."
(Journal of Agric. Victoria, 10th Feb. 1916).

The examination system.

A NEW SPIRIT WANTED.

In the following article contributed to "The Times Educational Supplement" a correspondent discusses the disadvantages from the point of view of testing true culture of holding examinations at the end of every stage of education. Though his remarks are primarily applicable to British conditions they convey some instructive lessons to us in India also.

The increase in the number of post primary schools and the probable raising of the statutory leaving age to 15 make it expedient to consider whether or not a special leaving examination should be instituted for all schools under State control. The Hadow Committee while acknowledging that the majority of their witnesses were opposed to the establishment of a final examination for post primary schools, yet said in their report that they were of opinion that it would be desirable to make available a special examination of a type suitable for pupils leaving such schools.

Here at the outset we have a difference of opinion among experts on the subject in hand. The two main reasons given by those in favour of leaving examinations are :—

(a) That they set up standards for pupils and teachers alike, and since they mark the end of a course of study pupils are more likely to remain at school until the course is completed than they would be were the completion not marked in an obvious way.

(b) The certificates awarded are of value both to those who go on to further education at the universities and colleges and to those who seek employment in factories and in offices.

These are the reasons in favour of leaving examinations. Against them are the objections that they "tend to cramp the individuality of the schools, bring about a loss of freshness and elasticity, and tend to overpressure; the value of the work done in the school, moreover, is apt to be estimated by the number of certificates obtained." At first sight this last objection may not appear to be serious, but if the work of a school is so judged there

is a tendency to cramming, pupils choose subjects chiefly because they are "easy" while other subjects in their course not to be taken at the examination are neglected. The whole work of the school, in fact tends to be dominated by the examination. The question becomes, not "How shall we gain a competent knowledge of our subjects of study" but "How shall we persuade the examiners that we have such a knowledge" No young person can serve two masters—study and examinations—and he often learns to hate both.

UNIVERSITY METHODS.

The methods of conducting examinations for schools appear to be based on the practice of the Universities; we have printed papers of questions, special days set apart months previously, time limits for answering papers, the passing of some candidates and the failing of others. Underlying this procedure is the assumption that the methods of testing attainment suitable for adults are also suitable in the case of young people. It is questionable whether this assumption is well grounded.

An examination is supposed to discover chiefly what a candidate has learned, but this it cannot do; it merely discovers whether or not he can answer half a dozen questions thrust before him. A question well answered indicates positive knowledge; a question inadequately answered does not indicate positive ignorance; it may mean lack of time, slowness in forming sentences, a love of scholarly work necessitating deliberation, difficulties of penmanship, physical indisposition, a nervous temperament.

It is an exacting, not to say an unfair, feature of leaving examinations that candidates are required to be able to answer, during a particular week of their school life, 30 or 40 questions in, say, half a dozen different subjects. Even the universities are more lenient, for in many cases the degree examinations may be taken at different times of the course. Our young people may have spent three or five or six years at their school, but because they have not attained the requisite degree of mental retentiveness it follows automatically that they cannot proceed to train for careers in the ministry, in teaching, in medicine, or in law. Does the punishment fit the crime? I had recently the painful experience of seeing students of 17 and 18 in tears on learning that their names did not appear in the list of passes in a leaving examination, and they were students who had worked steadily during their course.

The demand that a pupil shall during a specified week be a kind of encyclopaedia is not the only unfair feature of school-leaving examinations. Other factors which have undue influence on a candidate's chances of passing are skill in literary expression and proficiency in examination tactics. Those who are unable to express themselves clearly on paper are handicapped not only in the essay paper but in almost all the papers. Failure in history or science may be due not to want of knowledge of these subjects but to want of facility in the use of words.

For the average student examination difficulties are increased by extraneous obstacles. For instance, the first question attempted may turn out to be more difficult than it appears and time is lost both through flurry consequent on discovering that say, 15 minutes have gone and nothing of importance has been set down and in deciding whether to proceed with the question in hand or to attempt another. In papers where certain marks are attached to each question a boy will generally attempt those with higher marks partly because he scents a challenge. Another point is that the endeavour of the examiner to defeat the crammer may be successful in defeating both student and crammer. It is possible to word a simple question so as to make it difficult. For instance compare "Is a stone of halfpennies heavier, or lighter than half a stone of pennies" with "Is half a stone of copper heavier or lighter than a stone of copper?"

It may be replied that all this constitutes part of the examination. If that be so the student's course should include lessons and practice in examination tactics. But what of the unfortunate who cannot learn these? And again could not the time devoted to learning such things be spent in worthier ways.

The modern examination tends to become a test comparable with those performed at a physical laboratory. The paper of questions corresponds to the different tests to which the material is subjected, the scale of marks to the reading recorded, and the keeping apart of examiner and examined to the elimination of the personal equation. But human progress cannot be measured with a metre scale.

WHY EXAMINE AT ALL?

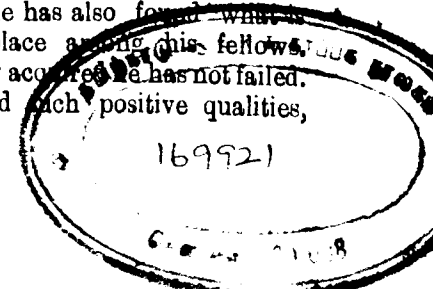
Let us be bold and say, "Why examine at all?" The only sound answer to this question is that the results of examination provide, in the case of successful pupils, material for a certificate of attainment which forms a passport to the further education

or to apprenticeship. As the Hadow Report says, "Boys and girls are handicapped, both from the economic and from the educational standpoint, unless they can produce some tangible evidence of their attainments." The contention that a well-devised leaving examination sets up a standard at which to aim, and provides an incentive for pupils to remain at school to the end of the course, is in reality an adverse criticism on the existing ideas regarding school work. A well-devised examination, should provide the aim, the standard, and the incentive.

Are the leaving examinations adequate to the task of helping to find for what career a boy or girl is fitted? Should failure to pass on the English paper mar a youth's chance of becoming an engineer? or failure to pass in Latin prevent a girl taking a university course in science? We do not choose our statesmen, novelists, journalists, cricketers by formal examination. Suppose all our country cricketers were to sit for an examination consisting of two papers, one on the theory and practice and the other a general knowledge paper, how would the results accord with the lists of batting and bowling averages? and what if all who failed to obtain more than 50 per cent of the marks were excluded from county cricket?

AN ALTERNATIVE.

Keeping before us the desire of those leaving school to have a passport to the beginning of the next stage of their career, and also the desire of those under whom they are to be trained for preliminary information about their charges, what ought the education authority and the school to give? To an employer a testimonial or a trustworthy recommendation is as valuable as an ordinary leaving certificate; therefore we infer that the document given to a pupil on leaving school should combine his school record and a testimonial, together with the certificate of results at the leaving examination conducted by an external body. Every pupil should receive this document. It ought to contain no reference to faults, because they may ultimately be overcome, and there out to be no suggestion that its holder has failed. After years of school life to turn away a pupil stamped as a failure is unjust. Has the school given him nothing? He has learnt the R's a little of music, of science, and of art; he has also found what is of perhaps of equal importance, his place among his fellows. Even if all this have been but imperfectly accomplished he has not failed. The new leaving certificate should record such positive qualities,



where they exist, as willingness to do honest work, love of fair play, possession of the team spirit, cheerfulness, conscientiousness, health of body, intelligence of mind, love of games, love of nature. Result in the leaving examination should be indicated by the terms "Excellent" "Very Good" and etc., down to "Fair" and circumstances which militated against progress during the course or at the formal examination—poor health and so on—ought to be stated. Finally, this report ought to enable university and other authorities to see readily whether the standard of attainment is equivalent to a pass in their entrance examinations.

The examination should be spread over the last school year and should be conducted in the spirit of one trying to find in a kindly manner what the candidate really knows of the curriculum. The present system succeeds rather in finding what he does not know. In this way the school would learn to regard the syllabus as of more importance than the examination. The formalities of the Government examination might well be abolished. When written papers are set time limits ought to be exceptional and oral examinations ought to be freely used. In such subjects as history and science questions ought to be framed so that knowledge may be displayed without resort to the writing of essays. Above all, it must be remembered that school studies exist for the children, not children for school studies.—(*The Hindu* April 18th)

AGRICULTURAL COLLEGE, COIMBATORE.

METEOROLOGICAL OBSERVATIONS.

April 1928.

	Barometric pressure reduced to 32° F inches.	Wind velocity per hour (Miles.)	Maximum shade tempe- rature.	Minimum shade temperature	Rainfall in inches.
	28.525	2.1	89.4	72.4	0.09
	28.513	2.7	88.6	70.2	0.72
	28.487	2.6	89.9	70.6	0.19
	28.509	1.7	90.6	73.2	...
	28.560	2.0	92.5	74.2	...
	28.549	2.4	93.7	74.0	...
	28.491	1.5	94.5	72.4	...
	28.505	2.1	93.9	74.5	...
	28.509	2.8	94.0	72.7	0.79
	28.459	1.7	90.0	74.5	...
	28.461	3.3	91.5	73.0	...
	28.475	2.8	92.5	74.0	0.31
	28.434	2.1	91.0	70.0	0.38
	28.382	1.8	92.0	73.0	...
	28.440	2.5	94.0	70.5	0.19
	28.450	3.9	91.2	73.8	...
	28.468	3.1	94.8	76.1	...
	28.466	3.2	95.3	74.4	...
	28.508	3.8	96.3	74.6	...
	28.504	3.9	95.3	74.4	...
	28.442	4.0	95.3	74.2	...
	28.440	3.5	98.7	74.3	0.11
	28.472	2.1	97.4	74.9	...
	28.472	2.2	97.8	74.2	...
	28.517	2.2	98.4	74.7	...
	28.500	1.6	97.3	73.6	...
	28.474	3.0	99.5	74.7	...
	28.457	2.2	97.8	75.4	...
	28.486	2.4	97.0	74.7	...
	28.485	2.2	97.0	74.3	...
	28.500	2.1	97.0	74.3	...

Madras Digests.

NOVEMBER 1927.

Exhibitions :—Exhibitions were held during the month at Melmalayanur, Vaniyampadi, Kalavai and Katpadi, at Kalpathi, Amalapuram, Maruter and Kodavasal, in all of which the department took active part.

Godavari circle :—(Waltair up to October 1927):—125 villages were visited during the month. Guzerat and Victory ploughs and Kirloskar mhote buckets were demonstrated. Saline lands round Narasapatam showed decided improvement with the application of green manure crops.

Guntur circle :—A severe cyclone was experienced during the month. This damaged demonstration plots put down in ryots' lands. 93 villages were visited. Eleven ploughing demonstrations were held and 23 ploughs sold.

Bellary circle :—The cyclone which did damage elsewhere proved very useful, to *Hingari* crops, especially groundnut. 75 villages were visited. Demonstration plots were harvested. One at Kampli was estimated to yield 4500 lbs. of paddy per acre. The plot at Markapur gave with G. E. B. 24 paddy, a net gain of Rs. 16 an acre over the local plot. 69,250 lbs. of Kumpta cotton seed were distributed to the applicants.

Madras circle :—November was rainy throughout the circle, especially in the first fortnight. Standing crops were benefitted and paddy cultivation was in full swing. Groundnut harvest was begun. 168 villages were visited. Some meetings of Co-operative Unions were attended. 63 ploughing demonstrations were held and 178 ploughs sold.

Trichinopoly circle :—Good showers that fell benefitted all crops though the tanks could not fill. Paddy work showed decided progress. At Andarkovil, Co., 3 paddy introduced three years ago showed an area of 300 acres under the variety this year. Similarly with G. E. B. 24 in another village. At Annalagaram, Aduthurai strain 5 paddy gave 6 kalams more than the local which yielded 33 kalams per acre. 188 villages were visited. 15 roll-easy mhote wheels and 11 ploughs were sold.

Madura circle :—The rainfall though below the average was well distributed. Sowings were well advanced. A new sub-circle with headquarters at Palni stimulated work. 314 villages were visited. 96 bags of kolingi seed were supplied to co-operative societies and 29 bags were distributed locally.

West-coast circle :—The staff visited 175 villages in the month and advised about manurial systems and distributed green manure seeds. One gratifying result of the maintenance of Tali-paramba school was found in a student farming his own lands at Kuthuparamba—5 acres of paddy under improved methods and 10 acres of coconut plantations and bananas.

Coimbatore-Salem circle :—The staff visited 179 villages and were engaged in distributing and sowing cotton seed. 244 acres were drillsown during the month.

Cattle-Farms :—At Coimbatore, heavy yields of guinea grass were obtained. At Hosur, 115 tons of green fodder were pitted for silage. At Pattambi, 15,000 lbs. of wild grass were cut and soiled. At Coimbatore Cow No. 8 of the Bangalore herd gave this month a highest yield of 50½ lbs. on one day. 33 cows and 44 buffaloes were served by Government stud bulls.

General :—The digest gives, with reasons, particulars of the breeds of cattle maintained at Chintaldevi, Hosur and College Farms.

Further a brief account is given of a disease amongst crows in the Tanjore district and its close relation with diseases in fowls.

Notes on rice-beetle, rice-bug, hairy caterpillar and rats are added.

A fairly full account is given of the wilt disease of betel-vine in Poonamallee, Chingleput district.

During the month the Director of Agriculture made an extensive tour in Ganjam and Godavari districts and observed the defects in local practices and inspected the improvements that were in progress.

December 1927.

Exhibitions :—The department took part in the All-India Exhibition at the time of the National Congress in the Xmas-week. All circles and sections at the College were represented. Members of the staff were in attendance all through the Session to answer queries and explain the nature of the work of this department. Dairying and ploughing demonstrations were a special feature. At Angadipuram, an exhibition was held.

Godavari circle :—Demonstration paddy plots were harvested and gave satisfactory results.

Guntur circle :—In the Kistna district similar results were obtained where a phosphate was applied.

Bellary circle :—G. E. B. 24 paddy was noted to be spreading in area.

Madura circle :—Larger areas were being drill-sown with cotton.

Coimbatore-Salem circle :—Drill-sowing of cotton was being demonstrated at Udumalpet.

Cattle Farms :—The survey of Ongole cattle which was undertaken following the decision of the Government in 1924 was completed, in Ongole, Bapatla and Narasarowpet taluks and almost in Guntur. Following figures obtained are interesting:—

Taluk.	No. of pure Ongole cows.	No. of breeding bulls.	No. of cows per bull.	Average frequency of calving.	Average at which heifers calve.
Ongole ...	16,200	97	170	One calf in 2 years.	4½ to 5½ years.
Bapatla ...	10,187	104	100	do.	do.
Narasarowpet.	13,248	135	91	2 to 2½ years	4½ to 6 years

The survey disclosed that there was no want of interest on the part of cattle owners but that facilities were fast disappearing under the stress of modern conditions.

General :—The digest records details about the outbreak of rinderpest in Ooty municipality, watering of groundnuts, paddy beetle and blast disease of paddy besides noting the progress made in paddy cultivation at Coimbatore with systematic manuring and careful attention.

January 1928.

Godavari circle :—Officers visited 41 villages and advised ryots to use bonemeal with green manure for second crop paddy. Two Rasangi types and G. E. B. 24 showed in the demonstration plots on the Samalkota station a net gain of over Rs. 120 and Rs. 150 per acre.

Guntur circle :—Officers visited 122 villages and demonstration plots were harvested. One notable feature was the discovery of the superiority of Co. 3 paddy at Pedaravur which introduced two years ago gave this year 3740 lbs. of grain an acre while the local Kusuma gave 2890 lbs.

Bellary circle :—Harvests of groundnut and first crop paddy were finished. Second crop paddy was being planted. Jonna crop suffered from insect pests and was poor while *Hingari* cotton was affected by drought. At Cumbam, 114 paddy nurseries with reduced seed rates were sown under departmental supervision. Markapur showed an increase in the area under G. E. B. 24 which during the year stood at 400 acres. 68 villages were visited, roguing was done in seed farms and estimates of yields of kappas were made so as to enable advances to be given to ryots.

Trichinopoly circle :—Harvest of a demonstration plot at Valadi gave a net gain to the ryot of Rs. 20. The Tanjore Trichi mirasdars' conference was held at Aduthurai.

Madura circle :—In the Tinnevely black-cotton soil tract, 17,250 acres of cotton were sown with drill this year. 216 villages were visited. Rains were however disappointing in the month.

West-Coast circle :—The Taliparamba School Day was celebrated and an agricultural show held in connexion with it. 170 villages were visited.

Coimbatore-Salem circle :—There was practically no rain during the month. Garden and dryland crops suffered and cholam gave a diminished yield. 140 villages were visited. Small shows were held at Parur, Idigarai, Pandamangalam and Yettapur.

General :—The digest gives an account of the survey made in Salem for finding out what materials are available for preparing silage and of the operations of the Veterinary department with reference to the incidence of anthrax infection in industrial materials, such as hides and skins.

February 1928

Exhibition :—The stimulus given last year in sending coirfibre exhibits to the British Fair in London showed itself this year in the export of 15,000 to 20,000 tons of coir. At Cannanore an exhibition was held for the benefit of the Indian Territorial Force which gave an opportunity for officers of the Agricultural, Veterinary and Co-operative departments to deliver lectures. This year's

S. P. C. A's cattle show at Madras brought out five calves reared from Government bulls. Exhibitions were held at Rajole, Cocanada, Bobbili and Bhalligudem. In the Kurnool district Koilkuntla and Mahanandi held their own shows. Shows were held at Cauvery-pauk, Tiruvettipuram, Kotappakonda, Chinnaganjam and Kalugumalai.

Godavari circle:—Demonstrators attended a number of co-operative conferences and Jamabundi camps and advised ryots to use three-roller cane mills. A new subcircle was opened at Parlakimedi. At Anakapalli an acre yield of 13,103 lbs. of jaggery was obtained. Navakote paddy gave the highest yield of 3,052 lbs.

Bellary circle:—Unusual rainfall in the month was harmful for all crops except sugarcane and paddy. Jonna harvest was delayed. Cotton bolls shed badly and groundnuts in the fields began to germinate. The district officers visited 72 villages.

Madras circle:—172 villages were visited. Demonstration plots were harvested. Paddy and green manure seeds were distributed. The superiority of Co. 2 paddy and of kaki jonna was established.

Trichinopoly circle:—Two inches of rain that fell in Tanjore did more harm than good. 114 villages were visited and demonstration plots were harvested. The two plots at Vishnampet and Thigalur were a great success.

Madura circle:—Showers received dislocated paddy harvest but were beneficial to the cotton crop. With their help some ryots sowed green manures. 48 ploughs were sold. Cotton seed farms were inspected and rogued out. Demonstrations were given at Kalugumalai and Ottapidaram.

West coast circle:—Unusual rains fell in Malabar and there were showers in South Kanara. This rendered the campaign against *Spodoptera* easy round about Ponnani. Attempts were made to demonstrate preparation of silage from hill grass in the Udipi division. The district officers visited 188 villages.

Coimbatore—Salem circle:—Showers received in the beginning of the month though insufficient were welcome for cotton. The staff visited 145 villages and 25 ploughs were sold. 19 Sindewahi furnaces were constructed in six villages in Kollegal and Dharma-puri taluks.

Madras Forecasts.

PADDY CROP OF 1927-28 SECOND CROP-INTERMEDIATE MONTHLY REPORT.—(17-4-28)

In the Circars and Deccan, the condition of the crop is good and the yield is expected to be normal or slightly above normal. In Nellore, early sown *kesari* paddy has been suffering from insect attack but late sown crops are good. In Chingleput, South Arcot, Chittoor and North Arcot, the crop has been affected by drought. In Coimbatore, Madura, Ramnad and Tinnevely, the yield was normal or slightly above normal.

GROUNDNUT CROP OF 1928—FIRST REPORT. (14-4-28)

The area sown with summer groundnut in the districts of South Arcot, Chittoor, North Arcot and Tanjore during the three months January to March 1928 is estimated at 44,000 acres against 44,500 acres estimated on the corresponding date of last year.

2. The crop is young. Difficulty is felt in parts in irrigating the crop owing to the insufficient water-supply in wells and tanks.

3. Figures by districts are given below:—

District.	Acres.
South Arcot	32,000
Chittoor	6,000
North Arcot	4,000
Tanjore	2,000
Total	44,000

GINGELLY CROP OF 1927-28—FOURTH OR FINAL REPORT. (14-4-28)

[On an average of the five years ending 1925-26, the area under gingelly in the Madras Presidency has represented 12.6 per cent of the total area under gingelly in India.]

The area sown with gingelly in 1927-28 is estimated at 832,800 acres as against the estimate of 659,500 acres made on the same date last year. The latter estimate fell short of the actually recorded area of 681,900 acres by about 3 per cent. The

estimate this year is about 22 per cent above last year's actuals. The area in an average year is estimated at 774,680 acres.

2. 202,900 acres have been reported as sown since the date of the previous forecast issued in January. These late sowings were mainly on wet lands in the Circars, Carnatic and the South where gingelly was raised as a second crop after paddy.

3. The increase in area occurs in most districts and is due to timely sowing rains. There is marked increase in area in West Godavari, Chingleput, South Arcot, North Arcot, Salem, and Coimbatore where the area has risen to 275,000 acres as compared with 154,900 acres in the previous year.

4. Yields normal or slightly above normal are reported from the Circars, the Deccan (Bellary excepted) Nellore, Salem, Coimbatore, Madura, Ramnad, and the West Coast. Yields below normal are reported from the other districts, especially North Arcot Trichinopoly, and Tinnevelly. The condition of the late sown crop is generally fair.

The seasonal factor for the Presidency works out at 99 per cent of the average as against 92 per cent in the previous year. On this basis the crop of 1927-28 is estimated at 110,900 tons as against 84,800 tons in the previous year and an average yield of 104,750 tons.

COTTON CROP OF 1927-28-FIFTH OR FINAL REPORT. (14th April 1928)

[On an average of the five years ending 1925-26, the area under cotton in the Madras Presidency has represented 10.5 per cent of the total area under cotton in India].

The area sown with cotton in the Madras Presidency in 1927-28 is estimated at 2,079,400 acres against 1,956,500 acres in the February forecast. The main increases were in Tinnevelly (62,000 acres) and Kurnool (18,000 acres).

The present estimate for the Presidency represents a reduction of about seven per cent from the final area of 2,231,100 acres in 1926-27.

2. Picking of cotton is in progress throughout the Presidency and will be finished by the end of this month.

The staple is up to the usual standard.

The colour of the first pickings was dull in parts of the south wing to the rains which fell after the first bolls had formed.

3. Normal yields are expected only in Guntur and Nellore. The crop has been affected by drought to some extent in most of the other important districts.

The seasonal factor for the Presidency works out at 94 per cent of the average as against 83 per cent last year. On this basis, the yield works out at 421,800 bales of lint against 388,300 bales in the previous year, an increase of about nine per cent and against an average of 487,900 bales.

4. The estimated area and yield under the several varieties are given below :—

[Area in hundreds of acres; yield in hundreds of bales of 400 lb. lint].

VARIETY. (1)	AREA IN.		YIELD IN.	
	1927-28	1926-27	1927-28	1926-27
	(2)	(3)	(4)	(5)
	Acres.		Bales.	
Irrigated Cambodia ...	148,2	168,1	87,5	88,7
Dry Cambodia ...	193,6	198,3	27,0	26,5
Total, Cambodia ...	281,8	366,4	114,5	115,2
Karunganni in Coimbatore ...	130,5	115,6	23,7	26,3
Uppam in the Central Dt. ...	38,1	42,1	5,8	6,6
Nadan and Bourbon ...	25,6	23,0	1,2	9
Total, Salems ...	194,2	180,7	35,7	38,1
Tinnevellies ‡ ...	525,7	525,3	139,9	134,6
Northerns and Westerns ...	868,0	1,005,6	100,2	74,8
Cocanadas ...	189,2	192,4	35,0	27,5
Others ...	20,5	20,8	2,5	2,4

‡ Includes Uppam, Karunganni, and mixed country cotton in the South.

Bengal Forecasts

RABI CROPS FOR 1927-28.—(Issued on 28th March 28).

(NOTE:—On an average of the five years ending 1925-26, the area under summer rice in Bengal has represented some 0.5 per cent. of the total area under rice in British India).

Character of the season.—The rainfall during the latter part of the monsoon period was sufficient for cultivation and for sowings of the early spring crops in East and parts of North Bengal Districts. Elsewhere the weather was generally unfavourable throughout. Lack of adequate soil moisture since the latter part of October somewhat affected the growth of early crops, but rainfall in the end of January improved the prospects of late crops. Some showers at the time of writing would be beneficial to transplanted summer rice.

Acreage.—The normal area under the different *rabi* crops dealt with in this forecast is estimated at 3,024,500 acres. The area actually sown this year is reported to be 2,607,300 acres as against 2,753,300 acres last year. Of this, the area under summer (*boro*) rice is returned at 399,700 acres as against 408,200 acres last year and that under tobacco is 290,300 acres as against 295,200 acres last year.

Outturn.—According to District Officers' estimate the outturn of the different *rabi* crops for the Province as a whole works out to 75 per cent. of the normal as against 77 per cent. last year, the return for the more important *rabi* districts being as follows:—

Rajshahi 53, Jalpaiguri 93, Rangpur 100, Pabna 83, Malda 58, Dacca 68, Mymensingh 80, Faridpur 72, Bakarganj 82, Tippera 54, Naokhali 80, Nadia 27, Murshidabad 51, Jessore 50, Khulna 82, Burdwan 50 and Midnapore 75.

Summer rice and tobacco crops.—The outturn of summer rice according to district estimates is 78 per cent. of the normal as against 72 per cent. last year. The gross yield of the crop for the Province on a basis of the normal yield of 14 maunds of clean grain per acre is estimated at 160,300 tons this year as against 151,200 tons last year.

The outturn of tobacco crops is estimated at 92 per cent. of the normal as against 93 per cent. last year. Taking 12½ maunds as the normal yield of the crop per acre the gross yield of the crop for the Province this year is estimated at 120,200 tons.

UNIVERSITY OF MADRAS.

B.Sc. Ag Degree Examination, 1928

PART II.

Botany I.] Saturday, 31st March. [7—10 a. m.

[N. B. —Only FIVE questions are to be answered. Question VI is compulsory.]

I. Give a botanical description of the 'Cholam plant'. Show how the structure of the stem of the Cholam differs from that of the Paddy.

II. Classify the oil producing plants of Madras according to the families to which they belong. From what part of the plant is the oil secured in every case? Take any one of them and state its economic importance to Madras.

III. Give a short description of 'Red rot' on Sugarcane (*Colletotrichum falcatum*). What effect did it have on the Sugarcane cultivation in Madras? Suggest remedial measures.

IV. How are mangoes generally propagated? Discuss the advantages and disadvantages of the various methods in vogue.

V. Of what use is the method of 'hybridization' in the improvement of Agricultural plants? What are its disadvantages?

VI. Describe any Mendelian experiment. Point out the influence of Mendel's line of work on the breeding of plants.

Botany II.] Saturday, 31st March [1—4 p. m.

[N. B.—Answer any five questions.]

I. Give an account of the different modes of reproduction in the 'Green Algae'.

II. Explain with reference to *Selaginella* what you understand by 'alternation of generations'.

III. Describe the life history of a Rust fungus.

IV. How will you proceed to demonstrate that plants respire? Explain with sketches the structural arrangement which facilitates the exchange of gases.

V. Mention the different ways in which new species may originate. Explain the view of Charles Darwin regarding the origin of new species.

VI. Show how green plants obtain Nitrogen needed as one of the constituents of food.

VII. Write notes on:—Wind-pollination; Root-parasites; Concentric bundle; Xerophytes.

Chemistry I] Monday, 2nd April [7—10 a. m.

[N.B.—Only five questions are to be answered. Question VI is compulsory.]

I. What are Zeolites? Explain how they influence the physical and chemical properties of soils.

II. What do you understand by the terms 'flocculation' and 'deflocculation'? How are these changes brought about in soils in actual farming? Discuss the advantages or otherwise of inducing these conditions in soils.

III. Give a list, with their composition, of the nitrogenous manures suitable for South Indian Soils. State the circumstances under which you would use the different nitrogenous manures.

IV. Give the approximate chemical composition of Trichinopoly phosphate and discuss the possibilities of its utilization in South Indian Agriculture.

V. Explain fully what is understood by 'Unit value' of manure. Illustrate your answer by showing how you would utilise this knowledge in the purchase and sale of manures.

VI. Sketch in detail a field experiment to test the effect of a potassic manure on Ragi. (Eleusine Coracana.)

Chemistry II] Monday, 2nd April. [1—4 p. m.

[N. B.—Answer any five questions].

I. (a) Explain how nitrogenous compounds are synthesised by the wheat plant and how they are translocated and stored in the plant.

(b) Point out in what respects, if any, the groundnut and sweet potato plants differ from wheat in the above processes.

II. (a) Explain the process of the malting of cholam. State how the enzyme can be isolated from the malt and how the action of the enzyme can be illustrated.

(b) State the sources and functions of:—

Zymase, Papain, Lipase, Rennin.

III. (a) What do you understand by Protein consumption? How is it affected by feeding an animal with (a) proteid food only, (b) fat only, (c) carbohydrate only, (d) a mixture of proteid, fat and carbohydrate?

(b) Explain how this knowledge is utilized in framing suitable rations for feeding of young cattle.

IV. (a) Explain how the composition of a crop will be affected by manuring. Illustrate your answer, if possible, from the results of any field experiments you are aware of.

(b) State the approximate composition of the following foods:—

Ragi grain, Cholam fodder, Groundnut case, Wheat bran and Cotton seed.

V. (a) What are the constituents of milk? Design a simple experiment in tabular form to show its composition *qualitatively*. Give briefly an epitome of the processes for estimating its constituents *quantitatively*.

(b) What should be their relative proportions in genuine cows' milk and buffaloes' milk?

VI. (a) Name and write the formulae of the important compounds contained in butter fat. How does butter differ from margarine and cocotine?

(b) What precautions should be taken for the preparation of butter of good keeping quality and why?

Agriculture I] Tuesday, 3rd April. [7—10 a. m.

[N. B.—Answer any five questions.]

I. Explain under what conditions you would prefer the use of:—

(a) Artificial fertilisers to farm yard manure.

(b) Muriate of potash to kainit.

(c) Basic slag to super phosphate.

(d) Ground lime to ground lime stone.

II. Explain in detail how you would build a herd of good milking cattle out of any local mixed breed.

III. What is experimental error and what are the several factors that contribute to it in a field experiment? Explain any one method of calculating this error.

IV. The value of land differs from village to village. Explain the several causes that affect the land value.

V. The present system of land-lease is of no advantage either to tenant or land lord. Suggest improvements by which both tenant and land lord would derive equal benefit.

VI. Assume that you have got 200 acres of dry land of which 100 acres are deep black loam, 60 acres are of red loam of moderate fertility and the rest is of shallow and gravelly nature. The land assessment for black loam is Rs. 2-4-0, for red loam Rs. 1-8-0 and for gravelly soil Rs. 0-6-0 per acre. The rain fall is

1 inch in April, 1.25 inches in May, 6 inches in June, 5.5 inches in July, 5 inches in August, 4 inches in September, 3 inches in October, 2 inches in November.

From December to the end of March there is no rain.

Your intention is to put every year as big an area as possible under commercial crops. Give out the rotations that you would adopt and prepare a statement of annual receipts.

Agriculture II]

Tuesday, 3rd April

[1—4 p. m.]

[N. B.—Answer any five questions.]

I. Describe what improvements you would suggest in the present methods of the handling and transport of fruits in India.

II. You have an acre of sugarcane estimated at 30 tons of cane ready for milling. Give a detailed estimate of the cost of converting the crop into jaggery. What is the minimum price of jaggery (per maund of 28 lb) which would justify your preferring this method to selling the standing crop itself for Rs. 400?

III. In regard to (a) groundnut (grown as a dry crop) and (b) tobacco, give cultivation data under (i) main varieties grown (ii) important characteristics of the varieties, (iii) seed rate, (iv) out-turn of finished produce per acre and (v) nature of the pests or diseases to which the crop or the finished produce is subject.

In regard to (a) suggest any means by which the cost of harvesting may be reduced; and in regard to (b) recommend a suitable artificial manure mixture giving the approximate cost per acre of such mixture.

IV. What is ensilage? Describe how it is made. Discuss the conditions under which it may be specially recommended. Work out the cost of ensilaging 10 tons of green cholam

fodder in a trench Silo. If the green cholam itself is valued at 250 lbs. per rupee, what will the cost per 100 lbs. of the resulting ensilage work up to?

V. (a) Describe what factors are likely to give rise to the following dairy troubles: (i) butter tends to be too soft, (ii) butter is not uniform in colour but mottled, (iii) butter is too slow in coming, (iv) fresh milk has a disagreeable odour, (v) curdling of milk when heated, (vi) frothing of cream in the churn.

(b) What is meant by pasteurisation of milk and what advantages are claimed for it? How does it differ from ordinary boiling?

VI. What is the role of 'fumigation' in the methods of preserving grain? What are the materials used and describe the details of the process. Describe any small type of grain Elevator. [7—10 a. m.]

Wednesday, 4th April
Essay] Write an essay on the possibilities of saving the ryot population from the local money lender by the aid of the co-operative movement.

OR

Discuss the present state of the cattle industry in the Presidency and suggest suitable measures for its improvement giving at the same time your views on the subject of legislation to prohibit the export of cattle and the slaughter of cows.

NOTES

Double cropping in Northern India:—In the Eastern Gangetic plain double cropping is very extensive in alluvial low lands which are subject to annual inundations but which do not consist of stiff and heavy clay fit to bear a single crop of *khari* rice.

In the Central Gangetic plain, double cropping is becoming extensive as a result of the extension of canal irrigation.

In Oudh, double cropping is least in the rice tracts of the districts which lie amidst tanks and *jhils* and are intersected by rivers and streams which have a tendency to flood the countryside.

In the Western Gangetic plain increase in the area under double cropping is due to the extension of canal irrigation while in the districts of North Bihar this is mainly dependent upon the amount and distribution of rainfall.

Agricultural Credit:—In France the system of agricultural credit is based mainly upon heavy state subsidy administered through the Credit Agricole. Credit societies of the Raiffeisen type supply short term credit. These credit societies are members of regional banks which are also based upon mutuality. Longterm credit was first instituted for agricultural sale and production societies. It has been administered through the regional banks, the sum being advanced on their guarantee and secured by mortgage. The maximum term of loan is 25 years.

Uses to which credit is put:—Following are the figures for a few villages in a district of the United Provinces. On every Rs. 100 borrowed, Rs. 24 is spent on purchase of cattle, Rs. 14 on payment of rent and revenue, Rs. 11 for seed, Rs. 13 for food and maintenance, Rs. 9 for litigation, while permanent improvement on land and social and religious ceremonies respectively claim Rs. 6 and Rs. 23.

Assam Population:—The total population of Assam Tea gardens in 1921 including managers, dependents and assistants was 922,245. Of these, no less than 563,000 were immigrants. These made up approximately half of the total number of immigrants into the province. The total number of foreigners on account of the Tea industry was that year about $1\frac{1}{2}$ millions or one-sixth of the whole population. Immigrants however are settling down by families rather than singly.

Industrial Assurance:—At present the amount of Industrial Insurance business in India is nil but the remarkable growth of the same in the United States will be an object lesson. In 1896, there was only one company with 4816 policies and wrote 727,168 dollars. In 1926, 1,000,000,000 dollars were freshly written and no fewer than 40,000,000 policies were in force.

State National Insurance:—In 1924 Japan made the following payments under the Post Office Pensions Act. 51,462,000 yen to 1430 persons for invalidity, 113,386,000 yen to 4132 persons for old age, 99,257,000 yen to 3384 sick persons; 155,619,000 yen to 1194 feeble children besides eight million yen for miscellaneous purposes.

Beggars in Calcutta:—In 1921 the number was 6,691 of whom 2,539 were men and 4,152 women who were accompanied by 2641 dependents. The number is reported to have considerably increased since through immigration largely.

Land mortgage Bank:—A company called the "Land Mortgage Bank of India, Ltd." was registered in London on October 4, 1863, whose object was to grant loans on the mortgage of landed property in India. It had a subscribed capital of 2 million pounds. It had its agents in Calcutta, Bombay and Madras. In the first one or two years it earned enormous profits and paid an annual dividend of 6%. It continued its work for 20 years more and in 1886 it was closed as the loan business had almost ceased. The reasons for failure were stated to be the steady fall in the average price of tea and the probability of further reduction in value and the non-extension of permanent settlement throughout India, making loan operations a matter of considerable difficulty. New rivals also added their share.

Co-operative Finance:—In 1925-26 the working capital for the whole of India was nearly 58 crores of rupees. The largest share amounting to 11 crores belonged to Madras. Punjab came next with a little over 9 crores. Bombay was a good third with a little under 9 crores. Bengal gave only $7\frac{1}{2}$ crores.

Field Rats in Sind:—The affected tract is almost a flat plain. The soil is of a light colour and very deep. The rainfall is scanty and varies from 2 to 10 inches a year. Almost the whole of it falls in July, August. April and May are hottest, maximum reaching 113° the minimum going down to 55° in January-February. Rice is the crop which suffers worst and is grown in June to November and is dependent entirely on canal water. Three important species of rats are responsible for damage. Some live in the vicinity of water, some enter the forest at high altitudes but most are migratory and live in rice fields when the crop is standing. They suddenly multiply and cause loss. They are nocturnal and move about at night. Before the earheads are produced they feed upon the lower pulpy portions of stems which they cut. When the earheads are in the milky state they suck the milky contents and when the crop is ready they cut earheads and store. They also eat crabs and frogs and in off seasons feed on roots of grasses. They breed in October and November. Each litter counts from 14 to 18.

Lemon Industry in Italy:—Italy exports lemon in a variety of forms. The chief products are fresh lemons citric acid and essence. The total export amounts to 535,978 quintals (200 lbs.).

The chief harvest is gathered in May and June—surplus and rejected fruits are used in making essence and citric acid.

Bombay cattle:—The breeds can be divided as follows:—Heavy draught breeds—The Kankrij—Krishna valley and Gir breeds. (2) Light fast draught breeds—The Mysore and Khillari breeds (3) Medium draught—The Dangi (4) Purely Milk breeds—The Sindhi (5) Dual purpose—Gir, Kankrij and Thar Parkar.

To improve the breeds three farms have been opened in three tracts—namely (1) Willingdon cattle farm near Karachi—started in 1919, works with Sindhi cows (2) Northcote cattle farm Chharodi opened in 1899; aims at improvement of Kankrij animals—has an area of 2310 acres of grazing lands (3) Banhapur Central farm (Dharwar)—1920; works with Mysore animals.

Minister at Lalgudi:—Hon'ble Mr. M.R. Seturatnam Ayyar, Development Minister presided at the annual meeting of the Lalgudi—Sivagnanam agricultural co-operative Society held this month. The president Mr. Minakshisundaram Mudaliyar welcomed the minister and the report on the working of the farm under their control was very interesting reading. It should form an object lesson to paddy growers in that tract. Hon'ble Mr. Ayyar, as one of the biggest landowners in the district and as one who has spent the best part of his life in the interests of the landowners made a fitting chairman and offered wholesome remarks which coming from him would, we hope, find a more ready response not only from a large part of the audience there assembled but also from the wider interested public especially in the paddy tracts of the Presidency.

Farm yard manure substitute:—With the overgrowing increase in the area under cultivation and the rapid diminution of supply of cattle manure and other manures in this country ryots are at their wit's ends as to how to manure their crops. We are well aware that in the pits or in other storage places they collect not only what little dung they can but all rubbish, scrapings, dry leaves, leaf-stalks etc.: but these latter do not get rotten so well though some amount of dung and urine present might bring about slight changes in their quality. English farmers were also in the above predicament 4 or 5 years ago and the researches of two agricultural scientists—Richards and Hutchinson—unveiled the mystery

surrounding the transformation of all organic matter into useful manures. Based on their discovery workers in India have made experiments with all sorts of farm yard rubbish for the past 4 or 5 years and the recent trials at Coimbatore have shown that pricklypear, cotton and chillies stalks, plantain stems, and all other sorts of rubbish can be converted into useful manures when carefully packed and treated with bonemeal and cowdung as aids in starting the process of conversion. Will this catch the ever-anxious ryot who is now groping in the dark?

Co-operation:—The next provincial cooperative conference will be held at Coimbatore.

REVIEWS.

"The Indian agriculture":—The current number of this Tamil Monthly issued from Sri Nilayam Press, Trichinopoly, contains useful articles. "Hair marks on cattle"—"A note on Potato cultivation" are important and are dealt with in easy and colloquial language. We are gratified to know that this monthly has entered on its 7th year. It shows its popularity. With the moderate annual subscription of Re. 1 it should command a large circulation. We commend it to the attention of the Tamil knowing Agricultural public.

International Review of the science and practice of Agriculture—January 1928:—This number contains very useful summaries under different heads. The notes especially on "Agricultural Legislation" in several countries are very informing.

"The Madras bulletin of co operation":—April 1928. This number of the bulletin contains, amongst other things, the addresses and resolutions passed at the 16th Madras Provincial Co-operative Conference held at Rajahmundry, and a scheme of Rural Reconstruction by the veteran lawyer and Co-operator, the Hon'ble Mr. V. Ramadas Pantulu. In his address as Chairman of the Reception Committee of the Co-operative Conference Dr. P. Gurumurthi in describing the present position of the co-operative movement says, "When we talk of the movement we refer generally to the credit side of it since it is chiefly credit that is vitally important to our village. The Stores' side does not appeal to our countrymen as in the West, because we have plenty of foodstuffs everywhere. The average ryot is still in the grip of the money lender and the agricultural indebtedness of the Presidency has risen to the appalling extent of about 100

crores though there is a glut in the District and Provincial Banks." Dr. Radhakamal Mukherji's Presidential Address is pitched in a very high key. He says that there are three outstanding features in the rural situation which one encounters in trying to improve agricultural efficiency. (1) Agriculture is the least organised of Indian occupations. (2) Co-operation has touched only a fringe of our population. (3) An illiterate and inefficient peasantry depending upon time-honoured methods and practices is suddenly "caught and enmeshed in a new economic system which has as its upholders the Government and vested interests, as its tools the money-lender, the Trader and the labour recruiter and as its allies the school master and scribe." He adduces reasons for the slow progress of co-operation, compares the ancient rural communalism with the modern village system, affirms that agricultural credit is not the whole remedy and that rural construction cannot be achieved, through the medium of institutions and practices which may be foreign to the social tissue or may be unassimilated by it, and concludes that if India remains true to the ideals of the past she must build her social and economic future after the co-operative pattern, a functional and regional democracy which will embody the social values still preserved in her village communities, guilds and brotherhoods and which will protect them against the inroads of industrial capitalistic economics.

"*Young men of India, Burma and Ceylon*":—This high class monthly maintains its reputation and excellence. The April number contains amongst other articles one on the "University of Toronto" by Rev. L.A. Dixon and another on "Men and Women whom I have known" by Rev. R. A. Hume. Rev. Dixon traces the history of the Toronto University from its humble beginnings in 1827 to the proud position which it occupies to-day, ranking first of all the overseas Universities with the exception of those of India, its enrolment now amounting to nearly 6,000. We would unhesitatingly assert that the Tamil University Committee will find useful material for their recommendations in this account. In the first instalment of the other article Dr. Hume brings out the stern but loving qualities of his mother which shaped his character and shows how a parent's influence makes or mars the life of a child. The announcement of further reconstruction work this time afresh at Indukurpet with opening a Rural Community School is quite welcome.

"*Tropical life*":—April 1928. Mr. F. C. Ingrams figures as the "Friend" this month. Mr. Ingrams boasts of a life-long

connection with the Hudson's Bay Co., which has just celebrated its 250th Anniversary of its birth and has spent the best part of his life in South American countries. His knowledge of the fur bearing animals is astonishing. Other useful articles and notices are "Sisal for Marine cordage," Coconut notes, "The British Industries Fair" and "Is there too much of Coffee?" In this number Prof. Schwarz's view on the Africans of the Kalahari Desert as expressed in a lecture he delivered in London before the Royal Colonial Institute is summarised. From this it is understood that the earliest bushmen are the M̄sarwa a yellow race with Australoid affinities and as such akin to the Australian aborigines and the Patagonians. They form the basis on which the Hottentot nation was built up. Prof. Schwarz seems to hold the view that the South African natives form a collection of living peoples illustrating the progress of humanity from pre-historic times and also they indicate migrations of races from Europe, Asia and North Africa.

Agricultural Journal of India:—March 1928. In this number Dr. F. J. F. Shaw's article on the *Imperial Agricultural Research Conference* rightly occupies the place of honour. Dr. Shaw gives an exhaustive account of the genesis, growth and the present position of the Conference in all its ramifications and would leave us in India to learn lessons from it. His concluding sentence is well-worth reproducing. "At the present moment when the organization of Agricultural Research in India is one of the great problems before the country, the unanimous recommendations of the Empire Conference for a unified system of recruitment for a colonial Agricultural service, for a closer *liaison* between research workers in different parts of the Empire and for a central research organization for the study of fundamental problems point out the path of progress."

In view of the scarcity of cattle manure and the necessity for the preparation of synthetic Farm Yard Manure as a substitute that is engaging the attention of the Department in Madras, Messrs. M. Carbery and P. S. Finlow's experiments at Dacca and their experiences as recorded in the subject of the Artificial Farm Yard manure are worth perusal. Their experience that Phosphate of Ammonia is an excellent starter in the manufacture of *Artificial Farm Yard Manure* and is an efficient substitute for Ammonium sulphate and bone-meal or for cattle urine and bone meal perhaps deserves to be tested and confirmed in Madras. We here still cling to cowdung. Mr. A. P. Cliff concludes in this number his

very original article on "Agriculture Implements suitable for the use of the Indian Cultivator." His sensible observations will, we hope, attract the attention of the laymen and extract praise from even unwilling lips. They are that tractors, reapers and binders and threshing machines are utterly and absolutely beyond the scope or range of 99.99% of the cultivators of this land. What the ryot wants is some small but sound improvement that can be incorporated into his present conditions of living and working and not a big thing that demands first enormous capital, large holdings or their equivalent, mechanical sense in short the conditions of Australia and Western America. His small scattered holdings, tiny plots, poor bullocks, intense poverty and utter lack of mechanical knowledge are conditions we must accept and facing them concentrate on those improvements, viz., better seed, new manures that can be adapted into those conditions and which once accepted by that 99.99% of typical cultivators bring enormous aggregated good to the country as a whole. This is as true of implements as other lines of improvement. Mr. Cliff claims that the implements he has outlined in his contributions fulfil these conditions and will considerably help the cultivators. Mr. C. M. Hutchison's short complete account of the reinforcement of organic manures with artificial fertilizers is timely, authoritative and suggestive.

Bombay Buletins, 95, 136 to 143, 145 and 147. The Bombay Agricultural Department is to be very heartily congratulated on the useful work it is doing on practical lines and the amount of cheap and handy bulletins it is issuing for the information of the public. Each of the bulletins above mentioned is written in a simple, easy and popular language and describes the subject fairly fully. Hints and recommendations are given by specialists in the line wherever necessary to suit local conditions. Our readers will we hope, share with us the pleasure of knowing the diversity of subjects dealt with when we state that "Oranges and allied fruits," "Cattle breeds and Cattle breeding in Bombay," "Lemon in Italy," "Sugarcane mills and small power crushers in Bombay," "Green manure trees and shrubs in Konkan and Kanara," "Dry farming methods in Deccan," "Cotton Manuring in Khandesh," "Sakrand Agricultural Research station in Sind" and "Gul making in Deccan" form each the subject of a separate bulletin. Space forbids us to treat more exhaustively. We crave our readers' forbearance and indulgence and hope when needed they will refer to these bulletins. We can assure them they will do so with pleasure and profit.

The Parasitic Hymenoptera of Economic importance noted from South India:—by T. V. Ramakrishna Ayyar B. A. Ph. D., This is a paper in (1927) September issue of the "Bulletin of Entomological Research."

The author gives a list of the important parasitic Hymenoptera which play an economic part in South India, and the paper includes representatives of the most important Ichneumonidae, Braconidae, and Chalcidoidae groups. The host relations of most of these forms are also noted with their distribution in the Madras Province. Economic Entomologists interested in the biological control of insect pests will find the list helpful. The author however does not claim that the list is in any way complete or the information contained therein is not capable of revision as more work is done in the line. But as a reference list—the first of its kind—it cannot but be very useful. The fact that a pre-eminent Entomological Journal has published it goes to confirm our view.

A contribution to our knowledge of South Indian Braconidae—Part I by T. V. Ramakrishna Ayyar B. A., Ph. D., (Memoirs of the Department of agriculture in India Entomological Series). This publication appears to us to be the first connected account of the biology and the systematics of the parasitic hymenoptera of the Indian region and Dr. Ayyar's work may be welcome to economic Entomologists in view of the fact that many of them look forward to the Biological Methods of pest control as a very promising field. Since the correct identification and a knowledge of the main facts in the life habits of each economic parasite are of utmost importance in all biological control a publication of this kind will be of greatest help to Agricultural Entomologists in India. In this memoir which deals with one Sub-family of the important family Braconidae, the author records 23 species of which 2 genera and 18 species are described as new to science.

Dr. Ayyar's discussion on the common Indian Species of 'Microbracon' and his remarks on the long misunderstood *M. lefroyi* A. a parasite of the Cotton Boll Worm are very interesting.

We congratulate the author on the publication of the results of his excellent and useful research and hope he may be able to continue in this line of work and issue further papers. We are sure that the separation of teaching and research recently made for purposes of administrative convenience will not be taken as

entitling a teacher or a researcher to work in water-tight compartments but is meant more to emphasise that aspect of work one is ordinarily expected to do. We hope that Dr. Ayyar will appreciate our point of view and not be deterred from pursuing his line of research work which he has all along been doing with zest.

DEPARTMENTAL NOTIFICATIONS.

GAZETTED OFFICERS :—Leave etc., Rao Bahadur D. Ananda Rao, Deputy Director of Agriculture, IV circle, leave on average pay for two months in continuation of the Easter holidays. Mr. Y. G. Krishna Rao, Assistant Director, to be in charge. Mr. B. Ramayya, Temporary Deputy Director, II circle, leave on average pay for three months in continuation of the Easter holidays. Mr. A. V. Tirumurughanatham Pillai, Assistant Director, to be in charge. Mr. A. C. Edmonds, Deputy Director, I circle leave on average pay for three months from 17th April 1928 and leave on half average pay for 4 months in continuation thereof. Mr. P. H. Rama Reddi, Deputy Director, III circle, leave on average pay for 10 days in continuation of Easter. Mr. C. Ramaswami Nayadu, Assistant Director, to be in charge. Mr. K. T. Alwa, Assistant Director, on Special duty, Bellary, leave on average pay for 21 days from 11th March 1928.

NON-GAZETTED :—Appointments, transfers etc. :—Mr. A.K.R. Ayyar, Agricultural assistant. Powerkhera, Central Provinces, to be Upper subordinate, I grade on probation and posted to VIII circle, Coimbatore; Mr. S. S. Katchepeswara Ayyar, demonstrator, to be in charge of Erode Taluk with headquarters at Erode. The following transfers are made : Mr. D. S. Subramanya Ayyar from Pollachi to Udumalpet, Mr. V. S. Ramaswami Ayyar from Udumalpet to Dharapuram, Mr. P. V. Raghavendra Rao from Dharapuram to Hosur

LEAVE ETC. :—FIRST CIRCLE :—Mr. B. Madhava Rao, Assistant demonstrator Aska, leave on average pay for 15 days from 17th May. P. Lakshminarayana, assistant demonstrator, Bhimavaram, leave on average pay for one month from 24th April. Mr. K. Manga Raju, Manager, Anakapalli, extension of leave on average pay for one day.

SECOND CIRCLE :—Mr. K. Varadachari, manager, Guntur, leave on average pay for one month from 19th April, Mr. V.

Ratnaji Rao, demonstrator Nayadupeta, leave on average pay for one month from 25th April. Mr. K. V. Seshagiri Rao, assistant demonstrator, Tenali, leave on average pay for three weeks from date of relief. Mr. K. Gurumurthy, demonstrator, Gunnavaram, leave on average pay on medical certificate for one month from 25th April and on half-average pay for two months in continuation.

THIRD CIRCLE :—Mr. K. Balaji Rao assistant demonstrator. Adoni, leave on average pay for 20 days from or after 10th April. Mr. S. Varadarajulu Nayadu, assistant manager extension of one month's leave on medical certificate

FOURTH CIRCLE :—Mr. N. C. Tirumalachari, Manager, Palur, extension of leave on medical certificate for one month.

SIXTH CIRCLE :—Mr. S. V. Ramachandran demonstrator, Uthamapalayam, leave on average pay for 15 days from 2nd April. Mr. C. S. Namasivayam Pillai, assistant demonstrator, leave on average pay for 19 days from 17th April. Mr. L. Sanakaram Pillai, demonstrator, leave on average pay for 20 days from 23rd April.

SEVENTH CIRCLE :—Mr. P. K. K. Nambiyar, assistant manager, extension of leave on average pay for one month and 11 days. Mr. P. Kannan Nambiyar, assistant demonstrator, leave on average pay on medical certificate for one month from 15th April. Mr. E. Achyutan Nayar, assistant manager, leave on average pay for 10 days from 12th April. Mr. V. K. K. Kunhunni Nambiyar, demonstrator, leave on average pay for 6 days from 23rd April. Mr. K. S. Ramanna Rai, demonstrator, leave on average pay for one month from 20th April.

LIVE STOCK :—Mr. P. M. Appaswami Pillai, Assistant Manager leave on average pay for one month from 15th April. Mr. T. Seshachala Nayadu, Manager, Chintaldevi, extension of leave on average pay for three weeks.

C. S' SECTION :—Mr. V. Chidambaram Pillai, Manager, Koilpatti, leave on average pay for one month from 23rd April.

G. A. C's SECTION :—Mr. R. Kochkrishnan Pillai assistant leave on average pay for 3 weeks in continuation of the Easter.

G. L. B's SECTION :—Mr. S. Ramaswami Raju, Sub-assistant extension of leave on average pay for two weeks.

P. S's. SECTION :—Mr. N. Subramanyam, Manager, Aduthurai, leave on average pay for 8 weeks in continuation of Easter

Mr. V. N. Ramunni Kidavu assistant manager, Pattambi, leave on average pay for one month from 20th April. Mr. R. Subbayya Gounder, Sub assistant, leave on average pay for one month from 16th April.

M. S's SECTION :—Mr. V. Gomathinayakam Pillai, assistant, leave on average pay for one month in continuation of Easter. Mr. N. Krishnaswami assistant, leave on average pay for 14 days from 17th April.

EDITORIAL.

The Townsend Committee on Co-operation:—We heartily congratulate the Townsend Committee on the very arduous work it put forth during the full four months it toured in the Presidency but we are afraid its recommendations will not enthuse Co operators in this Province. One would have wished that this committee was appointed after the report of the Royal Commission was published; for their recommendations would certainly have full reference to the policy that should guide Governments in India in the matter of co-operation, which the Townsend Committee with its narrow terms of reference cannot satisfactorily deal with. Nevertheless as a committee expected to look into the past working of the department and its effect on the co-operative movement in future, it has done its work fairly well and probed into details where others would not. Its recommendations as regards Land Mortgage Banks will be welcomed by all but one outstanding defect is in the outlook of the committee in regard to their finances. Debenture loans are no remedy and the Government should have been asked to invest a substantial portion, without which public confidence in the banks would not be created or sustained. The Committee recommends that an agricultural officer of the status of a Deputy Director should be attached to the Registrar to help in the work connected with societies under the Labour Commissioner. We believe the Committee has erred in supposing that rural work can be got on without an agricultural officer and we are sure Government would appraise this recommendation at its true worth. No hint has been thrown as regards relaxation of departmental control over societies which is necessary if they are to develop. On the otherhand, the Committee would give far more powers to the Registrar which, we fancy, in these days of hypercriticism, the public would see vested if necessary solely—in the Government.

(v)

The Journal of

THE

Mysore Agricultural & Experimental Union

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(vi)

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(vii)

The Ramasastrulu-Munagala Prize 1928.

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 1928, 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.

Secretary

M. A. S. Union.

(viii)

Amendments to the Rules of the Union

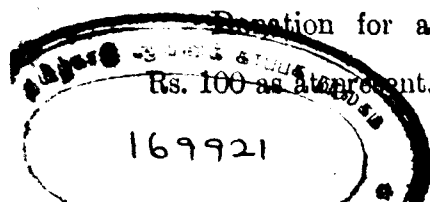
Members under old rules whose arrears to the Union exceed a sum equivalent to their two years' rate of subscription for the journal will not be eligible either to vote or to serve on any of the Committees.—M. Rajagopalan.

In rule 3 after the word "journal" insert the word 'quarterly.'—C. S. Krishnasami.

The title of the journal instead of as at present shall be "the Madras Agricultural Journal"—Organ of the Madras Agricultural Students' Union.—V. Muthusami Aiyer.

There shall be an editorial board of not less than five members ordinarily to represent one section each of whom two namely the Editor and one member shall be members of the working committee; the Vice-President shall be the ex-officio member of the board.—V. Muthusami Aiyer.

Donation for a patron shall be Rs. 250 instead of Rs. 100 as at present.—V. Muthusami Aiyer.



Handwritten initials "JL" and the name "J. S. Muthusami" are visible below the stamp.