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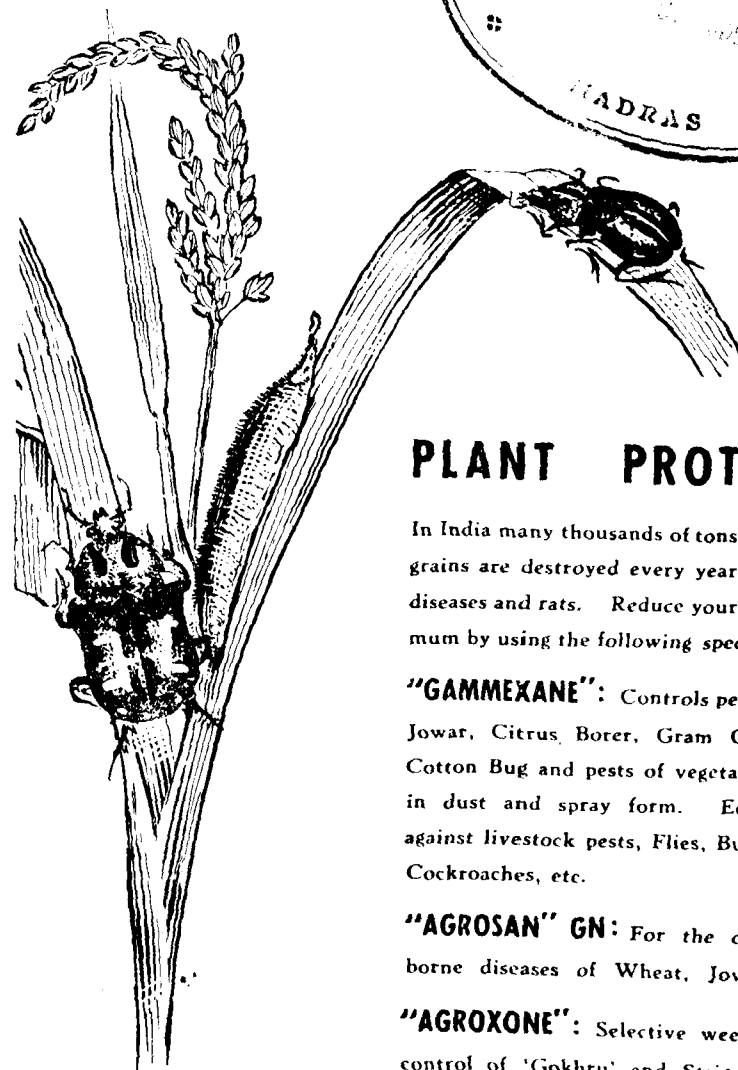
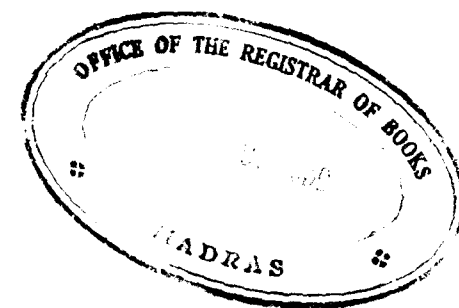
## ANNOUNCEMENT

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1. The prize will be awarded in July 1950
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, 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 with a covering letter showing full name and address of the sender. The author's name should not be shown on the paper, but should be entered under a *nom-de-plume*.
5. Four type-written copies of the essay should be sent.
6. The name of the successful competitor will be announced and the prize awarded at the time of the Conference.
7. Paper or papers accepted will become the property of the Union and the Union reserves to itself the right of publishing all or any of the papers.
8. All reference in the paper to published books, reports or papers by other workers must be acknowledged.
9. The last date for receipt of papers has been extended upto 15th June, 1950.
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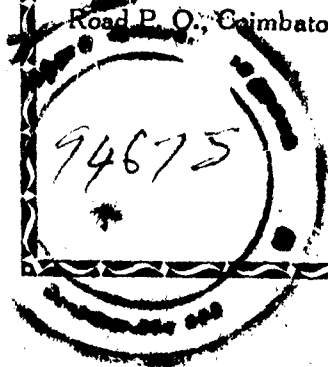
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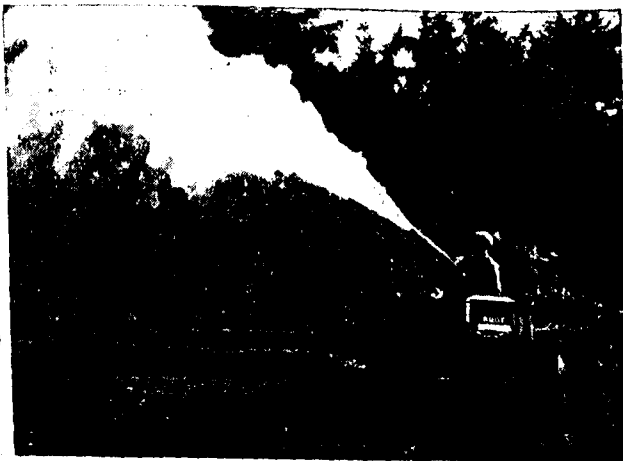
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# The Madras Agricultural Journal

(ORGAN OF THE M. A. S. UNION)

Vol. XXXVII

April 1950

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## Editorial

**Development Plans:** In order to formulate a co-ordinated scheme for the planned economic development of the country a Conference of Chief Ministers of States and Presidents of Provincial Congress Committees was recently convened in New Delhi. Addressing this Conference the Prime Minister of India stressed the need for securing the whole hearted co-operation of the people in order that the attempt of planned economy may be a success. Without popular support and enthusiasm no scheme could be successfully implemented and to secure these the Prime Minister felt that the people should be taken into the confidence of the Government and have a clear idea of what the Government wanted to do. It was also necessary that the entire mass of workers of the country should be made to realise that they are contributing an important share in a big national undertaking. In recent years a number of paper plans had been drawn up but in all these, the Prime Minister felt, no attempt has been made to define the objectives clearly and to distinguish between primary and secondary things with the result that both were equally neglected. The Conference endorsed the views of the Prime Minister and after much discussion came to the conclusion that before a long-term and comprehensive plan is launched it was necessary that an immediate short-term plan to repair the country's damaged economy should be undertaken and implemented in order to create conditions favourable for carrying out the long term programmes to a successful termination. The immediate need was increased production in Agriculture and Industry.

How best to attain this objective is the question. We have no doubt that the conference will work out the details and formulate definite proposals but we should like to draw attention to one aspect of the question. In recent years there has been a tendency, presumably in an attempt to secure uniformity of effort, to centralise many activities which in our opinion are best handled by the states

themselves. India is a country of vast dimensions and conditions vary from state to state. The imposition from above of a uniform pattern of method of approach throughout the country, while no doubt is desirable in many ways, does not often take into account the various environmental factors in different tracts and the schemes often fail. To infuse a sense of enthusiasm among the people there should be scope for local initiative and enterprise. The constituent states should have the freedom to develop their resources and to regulate their economy, without detriment to the national economy or disturbing the over all picture. In the matter of agricultural production and planning this is of utmost importance and due care should be taken that in an attempt at a co-ordinated plan the existing economy of any tract is not unduly disturbed to its disadvantage.

## Fodder problem in Madras

By

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(Received on 23-7-1949)

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**Introduction:** While we are making an all out effort to grow more food and have subsidies for well sinking, grand irrigation projects, an organised supply of manure and seeds, in fact all ways and means that we could muster with all the scientific knowledge at our command to produce enough food for the human population which is certainly a very right thing, have we thought sufficiently of food for the 'Dumb Millions' which form the *backbone* of our agriculture? Fodder scarcity has been more or less a permanent factor in Madras Presidency. During the last one or two decades the severity has been felt more, due to the diversion of the area under food crops into more paying money crops like tobacco, cotton and sugarcane. To add to this, the continued failures of rainfall have resulted in the drying up of the grasses in the grazing areas thereby producing a most alarming state of affairs. How best can this fodder problem for the cattle be faced and how speedily can we avert a crisis which has almost been reached!

**Sources of Fodder:** 1. *Food Crops*:— In most places the cattle are dependent on the straw of cereal crops like paddy, cholam, maize, cumbu, ragi etc., after the harvest of the grains. While paddy straw is extensively used, the straw of the millets serve as a very important source of fodder. Most of them are capable of cultivation under varied conditions of soil, climate and altitude. The leaves, shoots and pods (blusa) of all the pulses are eaten by animals and are nutritious feed. In blackgram, green gram and horsegram the whole plant after the harvest of pods are stacked by ryots specially to be fed to animals. The vines in sweet potatoes and the refuse in vegetable crops are also valuable as cattle feed.

It is therefore abundantly clear that the food crops like paddy, millets, pulses, sweet potatoes, vegetables etc., serve to a great extent as fodder crops and efforts to increase the area under them will have to be augmented for many reasons. The tendency to take to money crops must be controlled to limited extent if we have to be self-sufficient in food and fodder.

2. *Fodder crops*: Fodder crops like cholam and maize can be raised in a short period of two to three months in rotation with other

crops and they yield 15 to 25,000 lbs per acre. Further the land is released for raising other valuable crops after the harvest of the fodder. Superior fodder strains of cholam namely Co. 10 and Co. 11 with juicy stalks have been evolved by the Millet Specialist and these are becoming popular with the ryot. On large holdings areas of 25 to 30 cents left permanently for crops like Guinea grass and Napier grass supplement to a great extent the green forage which is very necessary for cattle especially the milch cows. About 8 cuttings can be taken in a year if good irrigation facilities are available and acre yields of 80 to 120,000 lbs. of green fodder can be obtained annually.

There is a great possibility of developing and increasing the area under fodder crops in the vicinities of towns and municipalities where the sewage water is often allowed to go to waste. The experiences gained at the Municipal Sewage Farm at Madura show that guinea grass is the best suited for the purpose.

3. *Pasture grasses and Legumes*:—The village cattle are often let loose to find their own feed and they depend upon the stray clumps of grasses left here and there. Grazing facilities are not provided in most of the villages except in the tracts famous for the breeding of Kangayam, Ongole and Alambadi animals. Only very small percentage of our animals use forest grazing. There are possibilities of getting more fodder by improving the constituents of the existing grazing areas. The field bunds, roadsides, porombokes often outgrown with useless weeds and scrub jungle in many localities can be turned profitable by introducing the suitable grasses.

*Indigenous grasses*:— The problem of finding suitable grasses for the various parts of the Presidency is being tackled in the Botany Section here for over a decade. From over a hundred species of indigenous grasses collected and tried, a dozen of them have been selected since being good for fodder purposes. The area under these grasses have been multiplied to enable supply of planting material. With the co-operation of the Madras Forest Department many of the grasses were tried in the forest areas and they have been found to be very successful. *Cenchrus ciliaris* is the best for soils rich in lime; however it comes up very well under most soil conditions. It is the staple pasture grass for the Kangayam breed of cattle. *Iseilema laxum* and *I. antheophoroides* are important grasses of the Ongole tract. *Setaria nervosum* is a favourite hill species.

*Exotic grasses*:— Some foreign types tried here have also been very successful. *Panicum antidotale* (the Australian Grass) is best suited for the dry arid conditions of the southern and eastern districts and it

remains green even in summer. The water grass, *Brachiaria mutica* comes up well in places with excessive moisture and as such is the best grass for reclaiming marshy areas. Trials here and at Koilpatti have shown that this is very well suited to be raised under irrigation. The giant star grass, *Cynodon plectostachyum* introduced from Africa as a good spreading habit and as such is becoming popular both as a fodder and soil binder. *Pennisetum polystachyon*, the thin or dry Napier, is getting established in west coast where it has been introduced.

*Legumes*:— Much has to be done in the selection and introduction of the proper perennial or annual legumes as mixtures in pasture *Phaseolus sublobatus*, (pillipesara) and *P. aconitifolius* (dew gram) are sown along with the *Cenchrus ciliaris* in pastures in Kangayam area. Pillipesara is the most popular leguminous fodder in Kistna, Godavary and Tanjore. It stands two or three cuttings and is adaptable to adverse conditions. After harvesting the green leafy matter for fodder the rest is ploughed as green manure in paddy fields. Sunnhemp is another useful dual purpose crop serving as fodder and green manure in cultivated field. The trials conducted here with over 20 legumes showed that *Glycine javanica* a wild ally of the popular Soyabeans collected locally to be a good spreading, perennial plant, drought resistant nutritious and relished by cattle. Two more promising legumes *Centrosema pubescens* and *Teramnus labialis* are under trial.

4. *Forest grasses*:— Forest areas are important sources of fodder in villages situated near by. According to the forest reports 1938 of the total area of 15,124 sq. miles of forest under the Departmental control about 11.55% were left for grazing. The total area of 3,272 sq. miles under forest panchayats were also under grazing. More attention has still to be paid for developing these grazing areas. Control grazing on block systems and rotational grazing have to be strictly followed if the areas are to provide enough fodder. More palatable and nutritious species of grasses have to be introduced to make them more productive. Above all reserve forest can contribute appreciable quantities of hay; though the cost of transport of these hay from the remote areas in the forest is a complicated problem, trials as pressing the hay into bales or 'brickettes' have to be undertaken. Forest grasses can also be converted into silage in forests during flush growth period and sent down to villages and towns in summer when fodder is not available.

5. *Fodder trees*:— In times of severe and continued drought the leaves from some of the trees allieviate the famine conditions to a great extent. There are a large number of trees the leaves of which are readily eaten by cattle, sheep and goats. The analysis of the leaves of a few of these trees for feeding value have been found to be very good and as such

efforts have to be taken up in the planting of these trees which are useful in many ways to man and his animals. For the varied climatic conditions and localities there are a good selection of them which can be successfully grown.

6. *Utilisation of other sources*:— (a) *Non-leguminous herbs and shrubs*: While the legumes in general are greatly favoured as fodder, there are a large number of other plants such as the different Amarantaceae, Commelinas etc., which are much relished by cattle. Every effort must be made to utilise the weeds of cultivated fields and waste lands to the best of purpose. Nothing should be allowed to go to waste. Extensive trials have to be made in finding out the possible uses of our vegetable wealth which are often neglected or have not received the proper attention due to them. Some plants may be useful in reclaiming areas not suitable for cultivation as the saline or alkaline areas. In Australia species of *Atriplex* have been successfully grown in alkaline areas as browse plants for cattle. In Russia the sunflower (*Helianthus annuus*) has become a very important multipurpose crop suited for fodder, silage, oil, and oilcake. Hence there is ample scope and possibilities for converting much of so called waste into wealth.

(b) *Hay and silage making*:— With the rainfall the grasses are available in plenty in many places; but much care is not taken to store them for a future necessity and this is specially the case in areas adjacent to forests. The superfluous fodder can be converted into either hay or silage. The best hay is obtained by harvesting the grass just before flowering and drying them. Most of the grasses tend well for silage also and the particular aroma created during storage is liked by animals. This method is best adopted in areas where heavy rains do not allow drying up of the cut grass. Fodder maize which gives 15 to 18,000 lbs., of green matter in about 45 to 60 days under irrigation is best suited for conversion into silage.

(c) *Avoiding the waste of many of the straws*:— It is often noticed that a good portion of the fodder fed in the stall is wasted by animals if thick culmed as in cumbu and cholam. A lesson has to be taken by the South Indian ryot from North India where wheat and oats straw are cut into small bits by chaff cutters and fed in baskets or well constructed feeding troughs. Power driven chaff cutting mills are quite common in many of the towns in the North. Though this is adopted by a few ryots here, it has to be popularised to minimise waste.

(d) *Processing of less palatable fodders* like the straw of Thalavirichan cholam, ragi, tenai and many other forest grasses and converting them into nutritious feed by various chemical treatments have to be undertaken to utilise these straws going to waste.

### CONCLUSION

We have sufficiently indicated the gravity of the problem and the methods of tackling them. The best of grasses, legumes and fodder trees should be grown in all agricultural research stations and in the fields of enterprising ryots so that the public may come to know about their usefulness. Free supply of seeds will be an inducement for the ryots to take up the cultivation of these fodders. Utilisation of the available material to the maximum extent and the avoiding of the loss by wastage should be other concerted measures. One more possibility to find enough fodder is by the elimination of the unproductive animals; while this is a controversial issue much thought and planning is necessary.

### Some problems on Banana Breeding

By

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(Received on 1-6-1949)

The province of Madras has an estimated area of 1,36,455 acres under bananas, with an annual production of 11,33,000 tons of fruits. Added to this the banana has also numerous other virtues, which entitles it to be classed as the most popular fruit crop in this province. It thrives from sea level up to 5,500 feet and is as equally at home in the arid hot plains as in the tropical humid zones. With a capacity to yield a quantity of food per acre excelled by none and of a type valuable to infants, invalids as well as for all normal persons the banana assumes a special importance in the present context of intensified food production. It is, therefore, appropriate that the Government of Madras, in conjunction with the Government of India have decided to establish the All India Banana Research Station in our province, in the Tanjore District.

In a crop like the banana which has enjoyed popular estimation from time immemorial, it is to be expected that there would be a very large number of types and varieties with special adaptation for different soil, climate or cultural conditions. This is exemplified by the good yields of Sirumalai and Virupakshi on the Lower Palnis and of the Red Banana at lower elevations, while the very same varieties form no match in yielding capacity or quality to the Chakkrakeli of the Circars, Vamanakeli of parts of Rayalaseema, or the Rastali in the southern parts of the province. Thus the desirable characteristics which should go to give us the ideal banana, are now dispersed over a large number of varieties, types and

species spread over all the different parts of this province and even outside. The task of combining these characters to produce the ideal banana for each region naturally, therefore, is the aim of the banana breeder.

Thanks to several workers, notably Jacob (12) and Venkataramani (13) we have now a mass of varietal descriptions recorded on the basis of an intensive study in all parts of this province. Since a taxonomic study of any crop forms an essential prerequisite of any hybridisation project, it is essential to establish a comprehensive varietal collection area for a careful study of the varieties and the distinguishing features and outstanding qualities of each type.

The classification of the genus offers considerable difficulties, since the plant does not lend itself for study except in the field, and the getting together all types, varieties and species at one place presents great complexities. According to the classification of Linnaeus, cultivated varieties appear under two distinct species, *Musa sapientum* and *M. paradisiaca*. On the score of longer usage, *M. paradisiaca* may be taken as the most appropriate till more is known of its taxonomy. The arbitrary distinction of banana and plantain is not accepted by any banana taxonomist now though the latter term is curiously enough, still in popular usage in South India.

Genetic and the cytological studies on this crop have been done in Trinidad. The basic chromosome number of banana is 11. The common edible types are triploids and therefore, many of the edible varieties are sterile, due to irregularities in pollen development (4).

For breeding better varieties of banana, the following methods are available:

1. **Simple selection:** Banana, rarely if at all, sets seeds and is usually propagated only by suckers. Consequently, selection of chance seedlings is not feasible. The introduction and trial of new varieties and their acclimatisation are therefore of greater promise, for improvement of the crop. Indeed most of our cultivated varieties, notably the Gros Michael and Vamankeli are only recent introductions, and yet they have large and increasing areas devoted to them in this province now.

2. **Selection of natural bud mutations or sports:** It is considered by Fawcett (9) that Gros Michael, the world's most famous variety, was itself a sport, isolated about hundred years ago in Martinique. The other and equally famous Cavendish variety is a sport from Grenada. Although widely distributed, Cheesman (8) doubts whether the Cavendish is everywhere the same or whether it has not given rise to sub-types or local races. In its agricultural history, the dwarf banana has thrown bud sports, some easily recognisable, others so different as to pass for new varieties. One type differs from the usual Cavendish in being taller, but especially

in shedding all its male flowers with their subtending bracts soon after they have opened, leaving the rachis bare, a feature common to the majority of the banana varieties other than the dwarf. The fact that like all the dwarf bananas it fails to set seed indicates however, that it is a vegetative sport of the dwarf. As some of the leading banana varieties are sports, this search for natural sports should be one of the points to be kept in mind in any breeding work.

3. **Use of certain treatments** like high temperature, radio-active rays, chemicals like colchicine etc., to induce sports or mutants are also fruitful lines open to the banana breeder Walter (10).

The main object of hybridisation is to create a variable population and then to select types with the desired combination of characters. In addition to the taxonomical and cytogenetical study, another important step is the preliminary investigation connected with hybridisation with the object of selecting varieties and species to serve as potent pollen parents to various cultivated varieties and also to work out the most convenient pollination technique under our conditions and the most feasible and expeditious way of germinating seeds and raising hybrid progenies.

In large varietal collections of banana, there are found to be individual desirable characters in many of the varieties. But the recombination of these desirable characters are beset with difficulties. They are:

- (1) The commercial types are sterile and produce no seeds;
- (2) They should be induced to set seed for breeding work;

(3) the seed breeding character must be eliminated from the selected type. In other words, starting with a seedless plant, a seeded stage must be passed through to provide material for a combination of characters and the seedless form recovered. Hunter and Leake (11) have stated "within the range of species of *Musa*, all stages are found from forms such as those that supply the bananas of commerce with little or no viable pollen and developing fruit without fertilisation, to forms such as *M. malaccensis* with abundant pollen and free formation of viable seeds. In the extreme cases, the reproductive organs of both sexes are abortive upto 99 per cent and failure to set seed is complete. An initial difficulty therefore, is met with in obtaining a sufficient number of seedling plants to provide material for selection. For this purpose, *M. malaccensis* and *M. Ormatu* have been used as pollen parents, but even here the percentage of viable seed is very low. Cheesman found that *M. malaccensis* is a diploid and Gros Michael a triploid. This latest interpretation is likely to change the existing classification of the genus and has a direct bearing on the problem of raising a seedless form".

Cheesman (7) concludes the principles of banana breeding as follows : " It is reasonable to conclude that a new seedling of commercial usefulness may be diploid, triploid or tetraploid, but is most likely by analogy with existing varieties to be triploid. Viewed in this light, breeding from edible varieties, including Gros Michael, resolves itself into the production of tetraploids which may either prove directly useful or serve as breeding stock in place of their less fertile triploid parents. Breeding from fertile species resolves itself into the production of new polyploids, which again may be directly useful or indirectly valuable as material for further crosses. Triploids, in short, may be produced by synthesis from diploids or by reduction from tetraploids".

At Trinidad, breeding was undertaken mainly to get a type which is resistant to the " Panama " disease. Work was mainly done on Gros Michael with *M. malaccensis* which is immune to " Panama ", as the male parent. " By cross pollination, 49 perfect seeds were secured, of which 17 germinated and 5 seedlings only survived. Of the hybrid seedlings one produced fair-sized fruits of good flavour. This was resistant to " Panama " and was named I. C. I. It had some commercial disadvantages and when propagated by suckers it occasionally set seeds. Further attempts to improve I. C. I. were made by back-crossing to the parents. Gros Michael and I. C. I. proved to be cross sterile and the latter showed a double complement of Gros Michael chromosomes and achievement of practical results by back-crossing was found uncertain". (4).

Coming to our work in India, breeding need not be undertaken for any specific aspect as resistance to any particular disease as in Trinidad. We have a large number of varieties with one or more good and favourable characters in each. We should try to evolve varieties with a combination of these desirable qualities.

We can indicate some of the varieties which may usefully be crossed to get better types in South India :—

1. Poovan and Vamanakeli to get big bunches of 300 fruits or more and the keeping quality of Poovan and the size and sweet fruits of Mauritius, with dwarf plants.
2. Rastali and Chakkrakeli, to combine the good fruit size of Rastali and the sweetness and strong pedicels of Chakkrakeli.
3. Sirumalai or Mala Vazhai with Kapurbale, in order to get the size of fruits of the latter with its adaptability, to different regions, with the sweetness, high flavour and the keeping quality of the former.
4. Mauritius with Nendran for obtaining short plants like Mauritius to withstand high winds, with fruits of Nendran, and with more numerous fruits per bunch.

5. Nendran and Monthan to get hardy plants of the Monthan type with fruits of Nendran quality.

The other items of work as the selection of the best suckers for planting, growth habits and yield of the different varieties, the search for mutants and other aspects on the improvement of banana, like optimum methods of propagation, culture, harvest, packing, transport and utilisation etc., will have to be studied along with the breeding work. It is possible to imagine a day when we will have bunches of the size and number of hands of Poovan with about 300 fruits in each bunch, with individual fruits of the size and keeping quality of Nendran, with the taste and pedicel strength of Chakkrakeli and the strong plants of the size of Mauritius.

**Summary :** South India being one of the leading banana producing regions in India, it is desirable to have a banana breeding station in this part of the country.

2. It is seen that we have a large number of choice varieties of banana and the production of new varieties with combination of desirable characters would enable us to become the main centre of banana production in India.
3. As there are no specific criteria to distinguish the different varieties, taxonomical work should be taken up early. For this purpose a comprehensive varietal collection area should be established first.
4. Search for natural mutants and the work on inducing mutations artificially should be pursued side by side with the work on breeding.
5. The preliminary work of a series of pollination studies with the object of selecting varieties and species to serve as potent pollen parents to other cultivated varieties and to find out the best technique of pollination is as important as any other work in breeding.
6. The difficulty experienced in hybridisation work on banana as shown in Trinidad has been stressed. It is seen that the work though promising is not an easy one. The main point is that we have to start with a seedless plant, induce seeds by crossing with a seeded variety and then finally work to eliminate the seed. Still, with the varieties that we have in South India, we may hope to get good results in our breeding work.

**Acknowledgements :** The author is indebted to Sri K. C. Naik, B. (Ag.), M. sc. (Bristol), Fruit Specialist, Madras and Sri U. N. Rao, B. sc. (Ag.) Assistant Fruit Specialist, Madras for their valuable guidance in preparing this paper.

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## Manurial Experiments on Rice

## III. Application of green manures in combination with Phosphates \*

By

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To maintain the food supply for an ever increasing population every endeavour for conserving the essential elements of soil fertility will have to be made, more so, in these days of acute food shortage. The productive power of soils is steadily reduced when successive crops are grown and no adequate manuring is made. Organic matter is the sheet anchor of soil

\* Parts 1 and 2 were published in M. A. J. XXXV and XXVI 1950.

fertility in this tropical climate. The soils in almost the whole of Madras Presidency are generally deficient not only in organic matter but also in nitrogen. (1) For replenishing the organic matter depleted from the soils green manuring is the cheapest way. Green leaf manures not only supply essential plant nutrients but also improve the physical structure of the soils. The oxidation of manures resulting from the decomposition of green manures is said to assist the rendering of elements already in the soil more available as plant food and has a stimulating effect on the activities of beneficial organisms. Green manure in combination with phosphate fertilisers was found to yield best results in several places notably at Agricultural Research Stations, Samalkot and Manganallur (2). Among phosphatic manures the results with superphosphate and bonemeal was found to be encouraging in their direct and residual effects. Hutchinson and Milligun (3) showed that the addition of superphosphate to green leaf promoted its decomposition better even in a season when the moisture content is not high enough to allow of rapid decomposition of the green manure crop. Work at Pusa indicated that under natural conditions phosphates in organic combination became more available to plants. To test these findings at Anakapalli and to find out:

(1) The optimum quantity of green leaf (sunn hemp) required for recording maximum yields in paddy, (2) whether the application of phosphatic manures is necessary in addition to green leaf, (3) the form and quantity of phosphatic manures to be applied and (4) the economies of green manuring, an experiment was laid out at the Agricultural Research Station, Anakapalle in 1937-38 and continued for a period of five years. The results of the experiment are summarised below:—

**Material and Method:** There were twenty treatments in all, green leaf and Phosphoric acid treatments being tried alone and in combination (a) 3 levels of green leaf, viz., 4,000 lbs., 6,000 lbs. and 8,000 lbs., sunn hemp per acre, (b) two forms of phosphoric manures as bonemeal-superphosphate, (c) two levels of phosphoric acid viz., 10 and 20 lbs., phosphoric acid and (d) a control, no manure. The layout was a factorial design replicated four times. The planting was done with 6" spacing either way. The experiment was continued year after year in the same field. Seedlings from a rainfed nursery, which is common in this district were planted every year. Since the raising of the seed bed depended upon receipt of rains and plantings could be done only when water was available in the diversion channels which are full only if the monsoon is favourable, ages of seedlings at planting and dates of planting differed in each year. The experimental plots were dug out and turned in every year and the required amount of green leaf was spread over the surface in the treated plots and trampled in 3 or 4 days prior to planting. Bonemeal was also applied along with the green leaf. Superphosphate was applied at planting time. The variety grown was G. E. B. 24.

**Results and discussion:** The main factors that are responsible for difference in yields of paddy in Vizagapatam district are (a) Manuring, (b) the age of seedlings and (c) time of planting. Each factor is dealt with separately below:—

(a) *Effect of manuring:* The figures presented in the table (1) below indicated that the response to green leaf manuring was marked and that increased doses of green leaf contributed to increased grain yields. Increases due to addition of small quantities of either bonemeal or superphosphate were insignificant and erratic. Superphosphate, however, tended to give slightly better yields than bonemeal on the same phosphoric acid basis. There was no interaction between green leaf and the different kinds or doses of phosphatic manures. Moreover one of the good points in green leaf manuring was reported to be its capacity to bring into soluble form the available phosphoric acid in the soil. The beneficial effect of green manuring on grain yields was more marked in years of belated rainfall and late planting conditions.

TABLE I.  
Grain yields in pounds per acre  
1. Green leaf.

| Treatment.                                   | 1937—'38. | 1938—'39. | 1939—'40. | 1940—'41. | 1941—'42. |
|----------------------------------------------|-----------|-----------|-----------|-----------|-----------|
| 8000 lb. per acre ...                        | 1915      | 3367      | 1969      | 3437      | 2475      |
| 6000 lb. per acre ...                        | 1918      | 3117      | 1762      | 3007      | 2354      |
| 4000 lb. per acre ...                        | 1719      | 2527      | 1523      | 2648      | 2039      |
| 0 lb. per acre ...                           | 1360      | 2146      | 954       | 2182      | 1521      |
| General Mean ...                             | 1728      | 2786      | 1552      | 2818      | 2097      |
| Standard error of treatment mean ...         | 37.00     | 41.95     | 37.28     | 38.48     | 40.48     |
| Critical difference at P=0.05 ...            | 54.83     | 108.64    | 105.84    | 109.45    | 115.00    |
| 2. Phosphates.                               |           |           |           |           |           |
| Super 20 lb. phosphoric acid per acre ...    | 1671      | 2275      | 1603      | 2816      | 2210      |
| Super 10 lb. phosphoric acid per acre ...    | 1721      | 2827      | 1564      | 2939      | 2162      |
| Bonemeal 20 lb. phosphoric acid per acre ... | 1796      | 2844      | 1607      | 2788      | 2004      |
| Bonemeal 10 lb. phosphoric acid per acre ... | 1707      | 2777      | 1505      | 2747      | 2080      |
| No phosphoric acid ...                       | 1688      | 2724      | 1482      | 2803      | 2030      |
| General mean ...                             | 1728      | 2789      | 1552      | 2818      | 2097      |
| S. E. of Treatment mean ...                  | 41.64     | 46.88     | 41.64     | 43.02     | 45.26     |
| Critical difference at P=0.05 ...            | 61.46     | 132.58    | 118.23    | 122.16    | 129.00    |

With regard to straw yields in years when plantings were delayed as in 1939 the increases in yields in green manured plots seemed to be more as in the case of grain yield.

TABLE II.  
Yield of straw in lbs. per acre.

| Treatment                                                         | 1937—'38             |                           | 1938—'39             |                           | 1939—'40             |                           |
|-------------------------------------------------------------------|----------------------|---------------------------|----------------------|---------------------------|----------------------|---------------------------|
|                                                                   | Straw yield per acre | % increase over no manure | Straw yield per acre | % increase over no manure | Straw yield per acre | % increase over no manure |
| 1. No manure ...                                                  | 1760                 | 0                         | 2704                 | 0                         | 1495                 | 0                         |
| 2. Bonemeal to supply 10 lb. $P_2O_5$ ...                         | 1863                 | 6                         | 2482                 | 5                         | 1457                 | -2                        |
| 3. Bonemeal to supply 20 lb. $P_2O_5$ ...                         | 1944                 | 10                        | 2852                 | 5                         | 1634                 | 9                         |
| 4. Super to supply 10 lb. $P_2O_5$ ...                            | 1666                 | -5                        | 2482                 | 5                         | 1506                 | 1                         |
| 5. Super to supply 20 lb. $P_2O_5$ ...                            | 159                  | -10                       | 2666                 | -1                        | 1497                 | 1                         |
| 6. Green leaf at 4000 lb. ...                                     | 2130                 | 21                        | 3222                 | 19                        | 1881                 | 26                        |
| 7. Green leaf - 4000 lb. + bonemeal to supply 10 lb. $P_2O_5$ ... | 2426                 | 38                        | 3481                 | 28                        | 2105                 | 41                        |
| 8. Green leaf to supply 20 lb. $P_2O_5$ ...                       | 2204                 | 25                        | 3555                 | 31                        | 2180                 | 46                        |
| 9. Green leaf + super to supply 10 lb. $P_2O_5$ ...               | 2482                 | 41                        | 3777                 | 40                        | 2099                 | 40                        |
| 10. Green leaf to supply 20 lb. $P_2O_5$ ...                      | 2222                 | 26                        | 3630                 | 34                        | 2053                 | 37                        |
| 11. Green leaf at 6000 lb. per acre ...                           | 2444                 | 39                        | 4704                 | 74                        | 2287                 | 53                        |
| 12. Green leaf at bonemeal to supply 10 lb. $P_2O_5$ per acre ... | 2555                 | 45                        | 4555                 | 68                        | 2493                 | 67                        |
| 13. Green leaf at 20 lb. $P_2O_5$ per acre ...                    | 2640                 | 50                        | 4593                 | 69                        | 2471                 | 65                        |
| 14. Green leaf + super 10 lb. $P_2O_5$ per acre ...               | 2648                 | 50                        | 4744                 | 75                        | 2546                 | 70                        |
| 15. Green leaf + super 20 lb. $P_2O_5$ per acre ...               | 2611                 | 48                        | 4744                 | 74                        | 2484                 | 66                        |
| 16. Green leaf at 8000 lb. per acre ...                           | 2555                 | 45                        | 4777                 | 77                        | 2677                 | 79                        |
| 17. Green leaf + bonemeal to supply 10 lb. $P_2O_5$ per acre ...  | 2963                 | 69                        | 5260                 | 94                        | 2716                 | 81                        |
| 18. Green leaf + bonemeal to supply 20 lb. $P_2O_5$ per acre ...  | 2555                 | 45                        | 5260                 | 94                        | 2716                 | 81                        |
| 19. Green leaf + super to supply 10 lb. $P_2O_5$ per acre ...     | 2611                 | 48                        | 5777                 | 114                       | 2738                 | 83                        |
| 20. Green leaf + super to supply 20 lb. $P_2O_5$ per acre ...     | 2666                 | 51                        | 5000                 | 85                        | 3018                 | 102                       |

The combined effect of phosphates and different doses of green manure was more marked in such seasons, the increase being 41%, 67% and 87% over no manure plots. Even in normal seasons the combined effect of green leaf and phosphates over green leaf alone in the different treatments was marked in the case of straw yields. As in the case of grain yields,

green leaf with super-phosphate was more beneficial than green leaf with bonemeal. Between the different levels and forms of phosphoric acid there was no perceptible difference in straw yields.

(b) *Age of seedlings and time of planting*: At Anakapalle it was observed that seedlings whose ages ranged between 5 to 9 weeks did not show significant difference in yields in case of early and late varieties. In the case of season bound varieties like G. E. B. 24, it was noticed that seedlings aged 6 to 7 weeks were best suited for this locality. In this experiment G. E. B. 24 was planted and the ages of seedlings and yields of grain from manured and unmanured plots are furnished below:

| Age of seedling | Yield of grain in lb. per acre |           | % increase over no manure |
|-----------------|--------------------------------|-----------|---------------------------|
|                 | Manured                        | Unmanured |                           |
| 40 days         | 2927                           | 2493      | 17                        |
| 46 days         | 2905                           | 2435      | 19                        |
| 56 days         | 1788                           | 1524      | 17                        |
| 61 days         | 2202                           | 1776      | 24                        |
| 76 days         | 1661                           | 1218      | 36                        |

Forty to forty-six days old seedlings gave good yields. The results are in exact conformity with those recorded previously on this station.

(c) *Time of planting*: It was observed under Anakapalle conditions, that for medium duration varieties the effective tillering phase is between the 30th and 60th day after planting, provided that, the plants are normal, the seedlings are young and the post transplantation period is long. These are conducive for better crop performance as the results (1938 and 1940) in this experiment indicated. As mentioned already due to the absence of regular irrigation system, lack of assured water supply and because of the seasonal vicissitudes paddy plantings in this district are often delayed and at times uncertain. In this experiment the beneficial effects of manuring were felt more in the seasons when the post transplantation period till flowering was short. Results are furnished below:—

| Year | Post transplantation period (from planting to flowering) in number of days |    | % increase in yield over no manure |
|------|----------------------------------------------------------------------------|----|------------------------------------|
| 1940 | ...                                                                        | 82 | 17%                                |
| 1938 | ...                                                                        | 80 | 19%                                |
| 1937 | ...                                                                        | 60 | 17%                                |
| 1941 | ...                                                                        | 48 | 24%                                |
| 1939 | ...                                                                        | 42 | 36%                                |

In view of these results the advisability of green manuring paddy in this district cannot be over emphasised.

**Economics**: The economics of manuring are presented in table V. The indications were that (1) increased doses of green leaf enhanced the margin of profit which ranged between Rs. 10/- and Rs. 21/- for the five treatments but the increased profits over no manure recorded by treatments 8000 lb. and 6000 lb. per acre were practically similar. (2) application of phosphatic manures as bonemeal and superphosphate alone at 10 lb.  $P_2O_5$  and 20 lb.  $P_2O_5$  per acre resulted in loss. From the above data the following inferences are drawn: (i) that application of  $P_2O_5$  resulted in loss and (2) increased doses of green leaf varying from 4,000 lb. to 8,000 lb. enhanced the margin of profit.

The experiment could not be treated as a serial experiment since the error varied widely from season to season.

TABLE V

| Treatments             |           |                 |                                                                    | 1937—38 to 1941—42 Average figures for 5 seasons |                                                   |  |
|------------------------|-----------|-----------------|--------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------|--|
| Green leaf (Sunn-hemp) | Bone meal | Super phosphate | Value of extra yield of paddy over no manure (control in one acre) | Cost of manuring one acre                        | Profit or loss incurred in manuring over one acre |  |
| 1. Control             | ...       | ...             | ...                                                                | ...                                              | ...                                               |  |
| 2. ... 10 lb. $P_2O_5$ | ...       | ...             | 2—3—0                                                              | 1—3—5                                            | 3—6—5                                             |  |
| 3. ... 20 lb. $P_2O_5$ | ...       | ...             | 0—15—7                                                             | 2—6—10                                           | 3—6—5                                             |  |
| 4. ... 10 lb. $P_2O_5$ | ...       | ...             | 1—11—1                                                             | 2—0—7                                            | 3—11—8                                            |  |
| 5. ... 20 lb. $P_2O_5$ | ...       | ...             | 1—13—9                                                             | 4—1—2                                            | 5—14—11                                           |  |
| 6. 4000 lb.            | ...       | ...             | 13—15—11                                                           | 4—6—6                                            | 9—9—5                                             |  |
| 7. 4000 lb.            | 10        | ...             | 15—11—6                                                            | 5—10—0                                           | 10—1—6                                            |  |
| 8. 4000 lb.            | 20        | ...             | 14—15—0                                                            | 0—13—4                                           | 8—1—8                                             |  |
| 9. 4000 lb.            | ...       | 10              | 17—5—11                                                            | 6—7—2                                            | 10—14—9                                           |  |
| 10. 4000 lb.           | ...       | 20              | 16—14—11                                                           | 8—7—9                                            | 8—7—2                                             |  |
| 11. 6000 lb.           | ...       | ...             | 26—9—4                                                             | 6—9—10                                           | 19—15—6                                           |  |
| 12. 6000 lb.           | 10        | ...             | 24—13—11                                                           | 7—13—3                                           | 17—0—8                                            |  |
| 13. 6000 lb.           | 20        | ...             | 28—12—9                                                            | 9—0—8                                            | 19—12—1                                           |  |
| 14. 6000 lb.           | ...       | 10              | 31—13—1                                                            | 8—10—5                                           | 23—2—8                                            |  |
| 15. 6000 lb.           | ...       | 20              | 28—0—11                                                            | 10—11—0                                          | 17—5—11                                           |  |
| 16. 8000 lb.           | ...       | ...             | 30—2—0                                                             | 8—13—1                                           | 21—4—11                                           |  |
| 17. 8000 lb.           | 10        | ...             | 35—11—1                                                            | 10—0—6                                           | 25—10—7                                           |  |
| 18. 8000 lb.           | 20        | ...             | 35—7—9                                                             | 11—3—11                                          | 24—3—10                                           |  |
| 19. 8000 lb.           | ...       | 10              | 38—6—3                                                             | 10—13—7                                          | 27—8—7                                            |  |
| 20. 8000 lb.           | ...       | 20              | 38—14—11                                                           | 12—14—3                                          | 26—0—8                                            |  |

## CONCLUSIONS

In order to determine the optimum quantity of green leaf manure (as sunnhemp) that is necessary for paddy and to assess the relative merits of phosphatic manures alone and in combination with green leaf, an experiment was laid out at the Agricultural Research Station, Anakapalle during 1937-38 and conducted for five successive years. The following conclusions are drawn from this experiment.

(1) Increased doses of green leaf upto 8000 lb. resulted in increased yields. However 6000 lb. seemed to be the economic limit.

(2) In adverse seasons when there was delayed planting increased yields due to green leaf manuring were more marked than in normal seasons.

(3) Application of phosphates alone in 10 and 20 lb. doses per acre as bonemeal or super phosphate has not increased the yields. But their combination with green leaf resulted in slightly increased grain yields. The effect of the combination was more beneficial on straw yields.

(4) Hence in districts like Vizagapatam which suffers from lack of assured water supply the adverse seasonal effects on grain yields can be minimised to a great extent by green leaf manuring.

## ACKNOWLEDGEMENT

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Cultivation of Elephant Yam (*Amorphophallus companulatus*) in Sivakasi (Ramnad Dt.)

By

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(Received 15—3—1950)

Elephant yam "*Senai Kiyhangu*" as it is called in Tamil, is an important root crop noted for its high yield and keeping quality. It is cultivated to an extent of 1855 acres in Ramnad District, mainly concentrated in Sivakasi and surrounding villages. It is largely exported to various places up to Madras in the north and Tirunelveli in the south.

**Season and Soil:** It is mainly cultivated in April-May, though it can be cultivated in other months also. It is chiefly grown in garden lands in rich loamy soil. Red loam is preferred to black loam as the keeping quality of the produce is said to be higher in the former. Like other root crops, it is a heavy feeder and hence a high fertility is essential.

**Preparation of the land:** A good tilth is aimed at. Hence ploughing begins sufficiently early and continues at intervals until the surface soil has been thoroughly broken up to a depth of 6"–9". five ploughings are necessary, if it is done by country plough. A basal dressing of 50 cart loads of Farm Yard Manure is applied after second ploughing and worked into the soil by subsequent ploughings. When the crop is four months old, a top dressing of 4 bags of groundnut cake or 10 cartloads of well rotted cattle manure are applied through irrigation water.

**Planting:** It is followed by onions and ragi in a two year rotation in garden lands. Bed system of planting is in vogue. Beds of 7' length and 3½' width are formed with irrigation channels. Planting starts from April onwards and continues till the middle of May. About 1,200 beds are formed per acre. Seed material is prepared from selected corms which are cut into 4 to 6 bits, each containing a portion of the bud ring at the centre depression. Small pits 6"–9" depth are made with *manvetties* (harrow) giving a spacing of 1½' on either side. The cut bits of corm are so placed in the pits that the bud portion comes into contact with the soil and then covered over with one inch layer of soil. About 3000 lb. of seed material is required to plant an acre. Sprouting takes place after a month. Usually each bit will give rise to 3 shoots, one after another.

**Irrigation:** First irrigation is given immediately after planting and second irrigation on the 3rd day. A judicious method of irrigation according to the needs of the crop is adopted. For the first 3 months, irrigation is given at intervals of 10 days, at intervals of 6 days for the next 2 months and for the last 3 months, it is given twice a week.

**After cultivation:** Three weedings are done in the first 3 months by means of a small hand hoe called "*Kalaikilli*" followed by a earthing up by *manvetti* in the 4th month. Afterwards, practically no hoeing or weeding is done.

**Harvest:** The crop will be ready for harvest by the end of the eighth month when the shoot portions of the plants begin to wither indicating the maturity of the crop. Harvest is done by means of an implement called "*vichatthu*" (sickle). If the prices are high, the corms will be lifted even in the 6th month and if the market is dull, the harvest will be postponed by a month or so. It is said that corms will not be affected if they are allowed to remain in the soil even for a longer period. As a matter of fact the seed corms are allowed to remain in the soil till required for the planting.

**Yield:** The yield of a good crop ranges from 40,000 to 45,000 lb. per acre. Generally harvest is done by the merchants at their cost who purchase the entire crop in the field itself. The weight of a single, well developed corm will be about 10 lb. the average being 5 lb.

**Pests and diseases:** There is no serious pest or disease affecting this crop. Occasionally termites (white ants) attack the seed corms planted. This could be prevented by mixing crude oil emulsion in irrigation water. As regards diseases, *Alternaria* leaf blight is noted in the later stages of the crop. This can be controlled by spraying 1% Bordeaux mixture.

**Cost of cultivation:**

|                                                        |       |           |
|--------------------------------------------------------|-------|-----------|
| <i>Preparatory cultivation:</i>                        |       | Rs. A. P. |
| 5 ploughings-10 pairs at Rs. 4/- per pair              |       | 40—0—0    |
| Forming beds and channels                              |       | 18—8—0    |
| <i>Manures and Manuring:</i>                           |       |           |
| Cost of 50 cartloads at Rs. 4 per cart load            |       | 200—0—0   |
| Cost of 4 bags of groundnut cake                       |       | 70—0—0    |
| <i>Seeds and Sowing:</i>                               |       |           |
| Cost of 300 lb. of seed corm                           |       | 200—0—0   |
| Planting charges                                       |       | 14—0—0    |
| <i>After cultivation:</i>                              |       |           |
| 3 weedings - women                                     |       | 15—0—0    |
| Manvetty hoeing                                        |       | 15—0—0    |
| * <i>Irrigation charges:</i>                           |       |           |
| 44 irrigations at Rs. 12/- per irrigation by Mhote     |       | 528—0—0   |
| <i>Harvest:</i>                                        |       |           |
| On contract at 4 as per bag 112 lb. for 400 bags       |       | 100—0—0   |
|                                                        | Total | 1,200—0—0 |
| <i>Receipts:</i>                                       |       |           |
| By sale of 400 bags of 112 lb. each at Rs. 6/- per bag |       | 2,400—0—0 |
| Net profit per acre                                    |       | 1,200—0—0 |

Irrigation charges can be reduced very much, if irrigated by pumpset.

## THE MADRAS AGRICULTURAL JOURNAL

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The pages of the Madras Agricultural Journal shall be open ordinarily only to the members of the Madras Agricultural Students' Union.

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**Tables:** The number of tables should be restricted to those absolutely necessary, as numerous tables detract from the readability of the article. Each table should be numbered consecutively from 1 up and must have a heading stating its contents clearly and concisely. The tables are to be typed on separate sheets, with their positions marked in the text.

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## Weather Review — For March 1950

### RAINFALL DATA

| Division          | Station                    | Total for the month in inches | Departure from normal in inches | Total since January 1st in inches | Division        | Station        | Total for the month in inches | Departure from normal in inches | Total since January 1st in inches |
|-------------------|----------------------------|-------------------------------|---------------------------------|-----------------------------------|-----------------|----------------|-------------------------------|---------------------------------|-----------------------------------|
| Orissa & Circars. | Gopalpore                  | 2.2                           | +1.6                            | 4.5                               | Central-Contd.  | Coimbatore     | 0.0                           | -0.5                            | 1.9                               |
|                   | Calingapatnam              | 1.0                           | +0.6                            | 2.9                               |                 | Tiruchirapalli | 0.3                           | -0.1                            | 3.4                               |
|                   | Vizagapatnam               | 0.2                           | -0.3                            | 0.5                               | South.          | Negapatnam     | 0.0                           | -0.8                            | 3.0                               |
|                   | Anakapalle*                | 0.1                           | -0.7                            | 0.5                               |                 | Aduturai*      | 0.0                           | -0.5                            | 2.6                               |
|                   | Samalkot*                  | 0.2                           | -0.5                            | 2.6                               |                 | Pattukottai*   | 1.7                           | +0.3                            | 6.6                               |
|                   | Kakinada                   | 0.5                           | J. N.                           | 1.7                               |                 | Mathurai       | 0.7                           | J. N.                           | 4.6                               |
|                   | Maruteru                   | 2.1                           | +1.6                            | 2.5                               |                 | Pamban         | 2.1                           | +1.4                            | 5.9                               |
|                   | Masulipatnam               | 0.1                           | -0.3                            | 1.4                               |                 | Koilkatti*     | 0.1                           | -1.3                            | 6.8                               |
|                   | Guntur*                    | 1.5                           | +0.7                            | 1.7                               |                 | Palayamcottai  | 1.6                           | +0.6                            | 5.9                               |
|                   | Agri. College, Bapatla*    | 0.1                           | -0.7                            | 1.5                               |                 | Amba-samudram* | 1.8                           | -0.4                            | 8.4                               |
|                   | Veeravanam* (College Farm) | 0.6                           | (x)                             | 2.2                               | West Coast.     | Trivandrum     | 3.2                           | +1.7                            | 4.6                               |
|                   | Rentichintala              | 1.3                           | +1.2                            | 1.3                               |                 | Fort Cochin    | 1.2                           | -0.8                            | 6.4                               |
| Ceded Dists.      | Kurnool                    | 0.2                           | J. N.                           | 0.3                               |                 | Kozhikode      | 0.1                           | -0.3                            | 1.2                               |
|                   | Nandyal*                   | 0.1                           | -0.3                            | 0.5                               |                 | Pattambi*      | 0.0**                         | -0.8                            | 4.9                               |
|                   | Hagari*                    | 0.0                           | J. N. &                         | tr.                               |                 | Taliparamba*   | 0.0                           | -0.5                            | 0.1                               |
|                   | Siruguppa*                 | 0.0                           | -0.1(a)                         | 0.2                               |                 | Nileshwar*     | 0.0                           | -0.3                            | 0.0                               |
|                   | Bellary                    | 0.0                           | -0.2                            | tr.                               |                 | Pilicode*      | 0.0                           | -0.5 @                          | 0.0                               |
|                   | Cuddapah                   | 0.0                           | -0.2                            | 0.1                               |                 | Mangalore      | 0.0                           | -0.5                            | 0.0                               |
|                   | Anantha-rajpet*            | 0.0                           | -0.6                            | 0.3                               |                 | Kankanady*     | 0.0                           | -0.6                            | 0.0                               |
|                   |                            |                               |                                 |                                   | Mysore & Coorg. | Chitaldrug     | 0.0                           | -0.2                            | 0.1                               |
|                   | Nellore                    | 0.0                           | -0.2                            | 0.1                               |                 | Bangalore      | 0.0                           | -0.4                            | 0.1                               |
| Carnatic.         | Buchireddipalem*           | 0.0                           | -0.3                            | 0.1                               |                 | Mysore         | 0.0                           | -0.5                            | 0.8                               |
|                   | Madras (Meenam-bakkam)     | 0.4                           | +0.1                            | 1.3                               |                 | Mercara        | 0.0                           | -0.8                            | 2.5                               |
|                   | Tirurkuppam*               | 0.2                           | -1.0 @                          | 0.3                               | Hills.          | Kodaikanal     | 1.1                           | -0.7                            | 4.8                               |
|                   | Palur*                     | 0.0                           | -0.6                            | 0.5                               |                 | Coonoor*       | 2.9                           | +1.4                            | 8.4                               |
|                   | Tindivanam*                | 0.0                           | -0.6                            | 0.8                               |                 | Ootacamund*    | 0.0                           | -1.3                            | 1.8                               |
|                   | Cuddalore                  | 0.0                           | -0.7                            | 0.7                               |                 | Nanjanad*      | 1.7                           | +0.8                            | 4.1                               |
| Central.          | Vellore                    | 0.4                           | +0.1                            | 1.2                               |                 |                |                               |                                 |                                   |
|                   | Gudiyatham*                | 0.0                           | -0.3                            | 0.2                               |                 |                |                               |                                 |                                   |
|                   | Salem                      | 0.3                           | -0.2                            | 2.2                               |                 |                |                               |                                 |                                   |
|                   | Coimbatore (A. C. R. I.)*  | 0.0                           | -0.2                            | 1.4                               |                 |                |                               |                                 |                                   |
|                   | Coimbatore (C. B. S.)*     | 0.0**                         | -0.4                            | 1.7                               |                 |                |                               |                                 |                                   |

- Note:—**
- (1) \* Meteorological Stations of the Madras Agricultural Department.
  - (2) Average of ten years data is taken as the normal.
  - (3) (x) Readings are recorded only from February, 1948.
  - (4) @ Average of seven years data for Tirurkuppam and eight years data for Pilicode is given as normal.
  - (5) (a) Taluk office normal is 0.22" and Rainfall is 0.0".
  - (6) J.N. Just Normal.
  - (7) tr. Trace viz., fall between 0.01" and 0.04".
  - (8) J.N. &—Actual deviation is 0.03".
  - (9) \*\* Actual fall is 0.02".

**Weather Review for March, 1950.**

The month commenced with a western disturbance over North Baluchistan and the adjoining area. A number of mild western disturbances, formed throughout the month over different portions of the country, became unimportant in short spans of existence, say, a day or two.

On 9—3—1950 the dry air spread further into the central parts of the country and the Northern Deccan. On the same day a feeble incursion of maritime air took place over South-East Madras, East Mysore and the Madras Deccan.

Colder and drier air spread over the North-West India, Madhya Bharat and West Central Provinces.

The rainfall in Madras Presidency should be considered as fairly normal in the Andhradesa. In the Tamilnad and Kerala it should be considered as slightly sub-normal.

Very few notable falls were received in the last week of the month under review. Particulars of these falls are given hereunder :

| S. No. | Date    | Place         | Rainfall in inches. |
|--------|---------|---------------|---------------------|
| 1.     | 24—3—50 | Gopalpore     | 2.0                 |
| 2.     | 25—3—50 | Kallakurichi  | 2.0                 |
| 3.     | 27—3—50 | Pamban        | 1.5                 |
| 4.     | 28—3—50 | Trivandrum    | 2.3                 |
| 5.     | 28—3—50 | Palayamcottai | 1.5                 |

In Kallakurichi, 4.7" of rain was received during the period 25th to 28th March, 1950.

Agricultural Meteorology Section,  
Lawley Road P. O., Coimbatore  
Dated 14—3—1950.

C. B.

**Departmental Notifications****GAZETTED SERVICE—POSTINGS AND TRANSFERS**

| Name of Officers         | From                                   | To                                     |
|--------------------------|----------------------------------------|----------------------------------------|
| Sri Bujanga Rao, C.      | Asst. Fruit Specialist, Aduthurai.     | Superintendent, F. R. S., Kodur.       |
| „ Daniel, F. L.          | Assistant in Soil Physics, Coimbatore. | Assistant Soil Physicist, Coimbatore.  |
| „ Lakshmanan, T. S.      | Assistant in Chemistry, Coimbatore.    | Assistant Agrl. Chemist, Coimbatore.   |
| „ Krishna Rao, D. V.     | Assistant in Chemistry, Coimbatore.    | Assistant Agrl. Chemist, Coimbatore.   |
| Obeidulla Shah Sahib,    | Regional Deputy D. A., Cuddapah.       | Assistant Marketing officer, Cuddapah. |
| Sri C. Raghavendra Char, | Assistant in Chemistry, Coimbatore.    | Assistant Agrl. Chemist, Coimbatore.   |
| „ Satagopa Iyengar, V.   | On leave,                              | Regional Dy. D. A., Cuddapah.          |

**Subordinate Service.**

|                          |                                                |                                           |
|--------------------------|------------------------------------------------|-------------------------------------------|
| Sri Ananda, U.           | A. D., Coonoor.                                | S. A. D., Mangalore.                      |
| „ Abraham, E. V.         | Assistant in Entomology, Aduthurai.            | P. P. A., (Entomology) Tanjore.           |
| „ Adivi Reddy, A.        | Fruit Assistant, Kodur.                        | A. D., Anantapur.                         |
| „ Balaraj, G.            | On leave,                                      | Marketing Assistant, Trichy.              |
| „ Bindu Madava Rao,      | A. A. D., Puthur,                              | F. M., Live Stock Farm, Koila.            |
| „ Bapayya, D.            | R. S.,<br>F. M., Lam, A. R. S.,<br>Guntur,     | A. D., Tiruvur.                           |
| „ Dasaratha Ramaiah, V.  | On leave.                                      | Fruit Assistant, Kodur.                   |
| „ Edwin Mangala Das,     | A. D., Sivaganga,                              | A. D., Siruperumpudur.                    |
| „ Guruswami Naidu, R.    | P. A. to D. A. O.,<br>Guntur,                  | P. A. to D. A. O., Kurnool.               |
| „ Jaganathan, S.         | A. A. D., Villupuram,                          | Assistant in Oilseeds, Marudur.           |
| „ Muthuswami, S.         | Fruit Assistant,<br>Mettupalayam.              | Fruit Assistant, Coonoor.                 |
| „ Morachan, Y. B.        | P. P. A., Ooty,                                | A. D., Erode.                             |
| „ Muthuswamy, S.         | Teaching Assistant in Agriculture, Coimbatore. | P. A. to D. A. O., Mathurai.              |
| „ Narasimhamurthy, G.    | Seed Development Asst. Millets Bellary,        | Special A. D., Bellary.                   |
| „ Narayana Rao, K. L.    | Teaching Assistant in Agriculture, Bapatla.    | Teaching Assistant in Botany, Bapatla.    |
| „ Nagarajan, K. R.       | Ento—Assistant<br>Nellikuppam,                 | Assistant in Entomology, Coimbatore.      |
| Mrs. E. K. Perianayakam, | On leave.                                      | Assistant in Fruits, Madras.              |
| Sri Parthasarathy, I. V. | On leave,                                      | Teaching Assistant in Economics, Bapatla. |

| Name of Officers         | From                                       | To                                           |
|--------------------------|--------------------------------------------|----------------------------------------------|
| Sri Purnapraghnachar,    | A. D., Adoni,                              | Special, A. D., Sugarcane Hospet.            |
| „ Rangaswami, G.         | P. P. A., (Mycology) Ootacamund,           | Assistant in Mycology, Coimbatore.           |
| „ Swaminatha Iyer, M. K. | Assistant Instructor Central Jail, Trichy, | Seed Development Asst. Paddy, Trichinopoly.  |
| „ Sobanadri, N.          | Teaching Assistant in Economics, Bapatla,  | Teaching Assistant in Agricultural, Bapatla. |
| „ Subramaniam, K.        | A. D., Sriperumpudur,                      | A. D., Sivaganga.                            |
| „ Santhana Raman, T.     | Assistant in Entomology, Coimbatore,       | Assistant in Entomology, Aduthurai.          |
| „ Seshadri, T. V.        | On leave,                                  | A. D., Chittoor.                             |
| „ Satyanarayana Rao, G.  | A. D., Chittoor.                           | Special A. D., Sugarcane, Madanapalli.       |
| „ Sethuraman, M. S.      | P. P. A. (Mycology), Tanjore,              | P. P. A., Ootacamund.                        |
| „ Venkataswami, Y.       | P. A. to D. A. O., Kurnool,                | P. A. to D. A. O., Guntur.                   |
| „ Venkatachalam Pillai,  | A. D., Cuddalore,                          | A. D., Virdachalam.                          |

The following B. Sc. Ag. are appointed as upper subordinates and are posted to the vacancies shown against each:

|                      |                                                    |
|----------------------|----------------------------------------------------|
| Mr. Anthony.         | Asst. in Mycology, Kalpata.                        |
| Sri. Sundaram, T. S. | Agri. Instructor Agri. Training School, Orathanad. |
| „ Venugopal P. K.    | Pepper Asst., Mattanur.                            |

The following fieldmen are appointed as upper subordinates and are posted to the vacancies shown against each:

|                             |                                                          |
|-----------------------------|----------------------------------------------------------|
| Mr. Appalanarasaiah, K.     | A. A. D. Markapur,                                       |
| „ Chellaya Naidu, N.        | A. A. D. Prodathur.                                      |
| „ Chellayya K.              | A. A. D. Hospet.                                         |
| „ Jagannathan, K.           | A. A. D. Anantapur.                                      |
| „ Raghava Rao, S.           | Seed Development Asst. Millets, Bellary.                 |
| „ Ramalingeswaran, B. V. S. | Soil Conservation Asst. Contur Burnding Scheme, Bellary. |
| „ Surya Rao, V.             | A. D. Kovur.                                             |
| „ Venkataswami Naidu, N.    | A. A. D. Cuddapah.                                       |
| „ Venkatachariar, J.        | A. A. D. Yellamanchilli.                                 |

### Agricultural College and Research Institute, Coimbatore.

#### LIST OF ADDITIONS TO LIBRARY FOR MARCH 1950.

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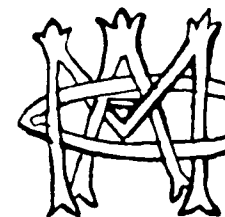
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# The Hostel Tatler



The next morning a cart drew up at Gopal's house. His mother ran to the doorway to receive Gopal. To her surprise she found her son getting down with her grand-child also from the cart. She received the child with open arms and she said that she was glad he brought the child for his second marriage Gopal then told her that he consulted an astrologer about the girl whom he was going to marry, so that she should also not die, soon after the marriage. The astrologer said that the girl's horoscope was a very bad one, as he would have to lose his father within a month after the marriage. At this his mother stopped him and asked him to write a letter to her brother breaking off the alliance, as the horoscope did not agree. Gopal's little child ran up to his grandma with lisping words.

So in the unexpected good fortune of having got back his son, there was enough for him to laugh, at the adventure of the imaginary astrologer and his mother did not know the trick he had played,

## PATRIOTS ARE THEY ALL

By

M. SUNDARAM

Ours is a land abounding in patriots, patriots of all shades and status, patriots who served some cause or other, patriots who lost their fortune and patriots who made a fortune. Here are some. Have a look at them.

\* \* \*

It was dark and cloudy, with a howling wind. It was a storm raised by nature; a man-made storm was to follow soon.

There by the river rose the massive walls of the huge prison. Thousands of human souls were languishing within those walls. The sentry was walking up and down with a gun on his shoulder. The tread of his feet was sounding loud in the stillness of the night. The prison bell struck two; what an hour for a man to be awake, when nature itself was sleeping. Even condemned criminals were fast asleep. Even the sentry was feeling sleepy; this could be seen in his unsteady pace.

In the darkness of the cell, in deep slumber, all unaware of his fate, a boy of fifteen was sleeping, Dreaming of the glories of his motherland.

Steps were heard. The jangling of keys and the unlocking of doors made a great noise. The heavy doors creaked under their weight. The sound awakened the boy. He blinked awhile, when dragged from the world of imagination into the world of reality. It was Friday morning - the day he was to be hanged on the gallows. Not an illusion, but a grim reality. Seven days ago he had been brought for trial before the special court. A boy of fifteen, charged of treason. All that had been found on his person were a few pamphlets stirring his countrymen to battle, battle against imperialism. Seven days before he would have never dreamt of dying; but now what a sudden change. When the judge pronounced his sentence he was shocked beyond measure.

There was his mother, when he was sentenced to die like a dog on the gallows. What a terrible commotion on that face! The mother who had suckled him when he was a child. It was not so long before, barely fifteen years. In the midst, of all this, there was only one consolation - he died for the sake of his country, he died so that foreign rule may end, he died so that his kinsmen and friends may inhale the fresh air of freedom.

On the fifteenth of August, as the first beams of light streamed into the world, old and haggard figure, with dishevelled hair and matted grizzly beard, deep-set eyes, sunk in a hollow, pallid face, tottered out of the gates of the prison. The world was new to him. "What is it?" He asked a man pointing at an aeroplane that was flying overhead. He wandered round the town full of bewilderment. He stared at the posters, in utter amazement. He knew not what they meant, everything was so new. Everything seemed a wonder to an eye that had not seen the world for years. A cinema advertisement caught his eye - it seemed queer. The language itself seemed alien. His eye lighted upon a flag, Free India's flag, flying over a great building. His memory rushed back thirty-two years. Not one year or two, but thirty-two long and dreary years. The scene of his trial was still green in his memory. Then he was an unsophisticated lad of twenty-two, charged of rioting before a military administration. It was a miracle how he escaped a death sentence. Thirty-two years in an underground cell, no light, all darkness, darkness everywhere. What of his youth? The time when man thinks of pleasure, all those years were spent in a dungeon. Now he was an old man.

But he did that for his country. A country that needed men like him, to sacrifice their health, wealth and life for the sake of his motherland. Now he was a ruined man, with no friends, no relations, no one in the wide world to pity him. He, poor soul had dreamt of a rousing reception to a hero who had sacrificed everything; but what a great disappointment! The world seemed as though he had never been born at all. Oh! Ingratitude! thy hand is cruel indeed.

\* \* \*

A gleaming new car stopped before a huge pandal, decorated with festoons and placards. A fat gentleman, clad in national attire alighted from the magnificent limousine. Garland after garland fell on his shoulders, amidst loud applause. What a rousing reception to a national hero! A high official, a prominent citizen, a multi-millionaire businessman who had sacrificed a few thousands of rupees and spent a few weeks in jail. You should hear him talk of his jail experiences where he enjoyed all facilities, being an A class prisoner. "Oh! What a dreadful time I had in that small room! I was in very bad need of some sea breeze. The doctor advised me to have it regularly. Once in a time my heart misses a beat nowadays, I am sure it is the after-effect of my jail life. That little cot and easy chair, how uncomfortable they were! The jail authorities allowed me only half a dozen letters a day, that in-deed was terrible. How much loss I incurred in my business due to that, I cannot assess, but it must be a few millions. And, all for the sake of my country, for the sake of those great leaders who urged the nation to sacrifice." No doubt his black market business suffered due to his absence. His military contracts had a set-back; for it had to be hastily transferred to one of his sons. Here is also a hero - a hero who now controls the Government from his bed. No doubt he is great; he is popular. Now he is rewarded with a ministership - a small reward after all, for such a big man.

You can hear the sound of a clattering bell. Don't you hear it? Strain your ear a bit. It is the office of a Chief Secretary. Some Sir X..... He is very busy, executing the orders of his boss, the popular minister.

A man of over fifty, with a bald head but with a majestic bearing, wielding power over a large department with as much ease as he had done under his former alien masters. He had been decorated with a knighthood for the brilliant services that he had rendered to perpetuate, the holy kingdom of no less unholy masters. He had been one of the picked few of the gems who stood as stalwart pillars guarding the interests of their masters. Now he is guarding his people's interests. Against whom? We don't know, perhaps against himself. No doubt he is also a hero to be honoured with a high post. What a paradox! The hand that had signed, many a death warrant of noble patriots and heroes who fought for the right cause is also a patriot now!!

The boom of 18 guns rent the air. It was the announcement of the royal arrival, the Maharaja—really wonderful that one who owned a few square miles of land and knew but one thing in his life, to enjoy at the cost of others - was returning from abroad. A special plane had been sent to him by the State. He had lived all his life in England, playing cricket

and betting on horses. He had the proud privilege of being the winner of the Derby. Twelve crores had he squandered to win this peerless honour twelve crores of rupees taken from a country, whose people were starving for one square meal a day.

He had got a knighthood for his marvellous services and been decorated with K. C. I. E., for being a pillar supporting the British Empire. Now he was the Rajapramukh of a Union of States. He had been honoured with this high office for his sacrifices - the sacrifice of his country men. Greetings were being received from various quarters on his Royal Highness's safe arrival. He salutes a tri-colour flag - that which he had formerly insulted many a time.

Yet, they are all patriots. Time alone is fit to judge, who is the real patriot and who is not.

## OVER A FAG

This term many students have begun to grow a beard. This is certainly not an indication of the non-availability of blades or razors nor an economy stunt. The only thing that it shows is a laziness; perhaps they are imitating a Shaw or a Tagore, if only for their beard value.

It is good news that our Mari's Fibre Laboratory has now begun to do good work, for its customers. Mari's brother succeeded Mari, who is now preoccupied with his firewood side-line and as a result, the laboratory is now found always busy. The heads of students coming out of the 'Lab' are perfectly lookable; there is no sudden change from black to green. Congratulations to Mari for attaining the sine-qua-non of success by installing his brother!!!

Fasting has become now a days a fashion for students. Any student's strike in any part of the country will never go unattended by fasting. But the converse is not quite true. Any fasting by students will never mean that the students are striking work also. This type we had recently. Some students went on fasting on the memorable and sad occasion of Gandhiji's anniversary. They began fasting at the stroke of 6 P.M. on 30th January but proposed to breakfast at 6 P.M. Really a quixotic idea to eat to stomach's content just at the moment when the

Mahatma was shot a couple of years back. This fasting is surely a kind of remembrance of Bapuji if not an appeal to nature striking work against nature for having taken away our Bapuji.

\* \* \*

The tours of the second and third year students have all ended. These tours are intended to show the students how they cannot use in their practical life the knowledge they have gained here. This is also a warning that they should not enter into the bad books of the villagers when they go as Agricultural Demonstrators and Farm Managers.

\* \* \*

The electrification of certain bath rooms has had a good but unexpected effect. The lights in the bath rooms show clearly that the water is not clear and free from suspended impurities. So people cannot mistake bad water to good and add insult to injury by bathing during nights. So better not to bathe. Thanks to our warden for this sort of "kindness".

### YOUR EDITOR WRITES

Learn to labour and to serve.

India has attained her republican status. Our leaders are at the helm of our affairs. Hence we can expect — we have a right to — that they will mould a Model State where new arts shall bloom and life shall be a divine song and where India will be an Earthly Paradise. In the moulding of such a state, our share is no less important. We, the Agricultural Graduates are the translators and the transmitters of research to the farmers of the land and on us lies the great responsibility of improving the food position of India. At present, our land is poor and the people under-nourished.

With these poor folk, who prefer to live in blissful ignorance we have to live and evolve the means of their and our emancipation.

We must utilise all the resources at our command to find out, more and more good and new things and try to transmit this knowledge to the rural folk. What is required is action and that too quick action. The time at our disposal is very short and the things to be achieved are many. Time is fleeting and waits for no man. Let us then be up and doing, with a heart for any fate; always striving, always learning and always serving your brethren to the best of our ability.

### CHAMP WIMBLY

The old Irigala treads the court  
As one who guards a leaguered fort  
His long-sleeved shirt reveals no space,  
His trousers cling with ancient grace  
His racket must be Henry VIII  
His shoes, perhaps, of later date  
Yet all who see him cry: "There's one  
Who says he's played at Wimbledon".

Behind the line he takes his stand,  
And serves a deadly overhand.  
Since this is commonly a blob,  
He follows with a gentle lob  
And always you can hear him say,  
In accents ever-courteous "Play"  
For still he has the air of one,  
Who used to play at Wimbledon.

With firm resolve he trots to net,  
But it is fairly safe to bet,  
Although his posture is correct,  
The bat and ball will not connect.  
And he will reckon underbred  
The cad who lobs him overhead  
For this, he says it's never done  
In bygone days at Wimbledon.

Mixed Tennis now for him is rare,  
He says the ladies can't compare  
With those who once served underhand;  
Whose instincts made them understand  
The harder shots were for the men  
The standard was much higher then  
More suited to the play of one,  
Who made his mark at Wimbledon.

And now, when he returns from tour,  
He finds it hard to get a four  
So seated in a shady spot  
He pours contempt on every shot,  
But caustic though his comments are,  
We know that later in the 'bar,  
We only have to stand him one  
To hear him brag of Wimbledon.

## BOAT WOMAN

By

CHANDRASEKHARAN NAIR

Tombs and cemeteries have a peculiar fascination for me, a reaction compounded of fear, repulsion and solitude.

Mr. Nirmal and myself were roaming in the suburbs of Calcutta. It was in one of the famous Hotels near Rash Behari Avenue that we became acquainted. He was thirty-five, knew Tagore's Gitanjali by heart, could sing with a voice that resembled Pankaj Mullick, and was a very pleasant companion. We saw and heard many things and one afternoon we reached a place very far from Dum Dum. The weather was inclement and we sat under a Margosa tree and were thinking what we could do next. Just then we heard some one reciting a Sanskrit verse. From the right side, a man who resembled Swami Vivekananda opened an iron gate and came out reciting the Sanskrit sloka which we just heard. My look of curiosity was understood by Mr. Nirmal and he told me that what we saw through the open gate was the burial ground of a sect of people of Calcutta, whose name I do not remember now. The stillness of place, the shade and the coolness all these attracted us to that spot and we went in through the iron gate. Luscious grass, which gave way under the feet like velvet, five or six separate pathways which intersected the big lawn and some cows grazing assiduously these attracted our immediate attention.

We directed our steps to a gigantic tamarind tree in the shade of which we saw seven or eight tombs. The place resembled a Christian cemetery but each of the tombs had a contrivance to hold a wick lamp. Two of them had been strewn with flowers which had now faded. One tomb had an epitaph in Bengali, which Nirmal read aloud.

"Kailas Nath Nithyanand,  
The Iron Hand of Fate snatched this beloved  
Soul away at the age of 28".

Near the "Beloved soul" lay the tomb of an Advocate named Bhattacharya and these two souls who might not know each other while living had the opportunity to lie side by side and made equal at least after their death.

We saw in a corner of the burial ground, some eight or ten women singing a mournful song and doing some rites. Nirmal and I went silently near them and stood behind a margosa tree. A beautiful square-shaped tomb embellished with flowers met our view. Light from an oil lamp was flickering. There were nine women. They had no jewels or ornaments. Their features did not indicate either they were wealthy or poor. Four or five of them had their hair hanging loose and they were all sitting around that square-shaped tomb and singing a heart-rending song.

Oh! that song; it was so terribly sad to hear it in that gloomy cemetery. My friend was trying hard to control his tears, as he could grasp the meaning of the Bengali song.

And old man was passing near us, holding a basket in his left hand and a spade in his right. He had a big and dirty turban on his head, big whiskers, and earrings, and a black thread around his neck and a very deeply wrinkled face. He was the typical Bengali worker. He was the gardener of that burial ground.

Nirmal offered him a cigarette, which he accepted with pleasure and with the garrulity of old age, began talking, sitting on the root of a big tree. We also sat near him and listened.

"Your name?" Nirmal began his queries.

"Jambunath". He replied.

"How long have you been working here?"

"Forty-two years.—Yes, forty-two years."

"This burial ground is very well-kept; but who are those women? Are they any relations of the deceased?"

"They are not anyway connected with him. They are prostitutes. Yes, women of the streets, who polluted fifty square miles around them by their presence". What nonsense is this old fool of a gardener saying, we thought. Those women sitting round the tomb and weeping with so much sorrow! Were they the women who sell their love to any one who would pay for it! Why should they weep for a man who was already dead and buried?

Through the curling smoke of the cigarette, Nirmal again questioned the gardener.

"Whose body is inside that tomb?"

"Babu Manohar Das Ghosh"

"What was he?"

"A Judge of Midnapore"

"Why should these prostitutes squat around his tomb and cry now? While living he might have been their sole protector. But now, is he not penniless?" asked Nirmal with a contemptuous smile. Though the old man was uneducated, he was shrewd enough to catch the meaning.

"Babu, don't say that. That tomb has in it the body of a great man. He was the protector of prostitutes and destitute woman. Yes, their greatest protector and well-wisher. If Bengal had only ten more such men as he, Bengal would be a heaven on earth."

It occurred nearly thirty years ago. Manohar Das Ghosh was the son of a rich man in Gorakhpore and was studying in a College. To spend

*the summer vacation, he did not go to his native place, but went to Midnapore and resided in a charming little bungalow near a river, where one could see green fields all around, and ponds full of lotuses.*

The river flowed smoothly behind his bungalow. There were steps from the bungalow leading to the river and on these Manohar would sit for hours together, watching the shadows of the clouds on the clear surface of the river. There was a small boat on the opposite bank of the river, and occasionally, people were ferried across by this boat from one shore to the other.

One day he heard a song which thrilled his heart. He looked towards the river and saw the boat coming from the opposite shore with no passengers in it. Only a solitary girl was in it. Her dress was that of a worker woman, aged about fifteen or sixteen years. Altogether she was a very attractive lass and she was handling the oars with a very practised hand. It was her singing that had thrilled Manohar. The song was of course quite an ordinary one, about a quarrel between two lovers. But it was sung with so much sweetness that Manohar was thrilled through and through.

He found out that she was the only daughter of the boatman 'Jayaraj'. He was ill and so the daughter had to take his place for eking out their livelihood. From that day onwards Manohar would find some cause or other to go to the opposite shore by the boat and would return after some minutes. This he would repeat three or four times a day.

One day when he was alone in the boat he asked her "Your name?" "My name is Madhuri".

That song—you were singing the other day, about some quarrel between lovers—will you sing that song, Madhuri?

Madhuri laughed, exposing her pearly teeth and roseate lips.

Another day he asked: Shall we go a little distance against the flow of the river?"

"Yes" She replied.

The boat began to move up-stream. Her palms as well as her face, reddened, due to the exertion.

"Shall I help you, Madhuri?" Manohar asked.

"In what way?"

"In rowing"

She assented. He sat beside her and began to row the boat.

"Madhuri, Do you know that I too can sing?"

He sang a song. It was the song of a lover imploring the love of his beloved. Madhuri laughed - Manohar sang some more songs. Her face flushed and she bent her head down in maidenly modesty.

Manohar invited her to his bungalow one day. She wondered at the various articles she saw there. The gramophone delighted her. She saw her own spotless beauty in a large mirror and she stood spell-bound. Manohar showed her many famous pictures which she looked at with surprise.

"Madhuri, those articles have not so much beauty to attract me"

"Then with what beauty are you pleased?"

"Shall I say it?"

"Please do"

He hesitated. "My Madhuri, you alone are my attraction". That innocent village maid's heart glowed at such praise from the civilised, urban youth. She wavered, but that was only for a moment. Their friendship crept through dangerous paths and her father knew nothing of these. Manohar's holidays came to an end and he returned to his College in Calcutta. By degrees he forgot that village and that artless village girl, spending his time in studies and games as though nothing had happened.

The clock had just struck twelve and Sessions Judge of Kalighat had just taken his seat. Black coats and white turbans, scheming advocates and silent spectators - all these blended together to form an imposing scene. What an imposing figure he cut in court. That broad and high forehead denoted a high intelligence and deep learning. The day's work began with the reading of a judgement on seven or eight culprits who had been charged with murder and loot. Three were sentenced to be hanged, two for transportation for life and the rest acquitted.

The next case was then called for. The accused in this was a woman. Though by jail life and suffering she was very pale and weak, her beauty had not been wholly lost. A life of sorrow and misery was written on her face. A policeman was standing with a sword in his hand near her.

The Chief Clerk queried:

"Your name?"

"Madhuri"

"Father's name?"

"Jayaraj"

The judge's head began to reel on hearing the name.

"Age?"

"Twentyfive"

"Place of residence?"

"A village near Midnapore" she replied.

Beads of perspiration appeared on the judge's forehead.

"Hear now the accusation against you. You tried to drown your child of two days in a stream on the 17th of March, knowing fully well that it had life".

The judge had to wipe the beads of clammy sweat from his forehead. Various thoughts crowded into his memory. Suddenly he jumped up and said to advocate Mr. Danagopal "Excuse me, I am not feeling quite well to-day" and entering his chamber he locked the door.

The same evening he went to the Jail at Kalighat and saw the accused there. Madhuri had no suspicion that this respected Session Judge was the man who had first befriended her in the boat and then seduced her. He asked: "How did you get into this state, Madhuri?"

Her eyes filled with tears.

"My lord, it is a long story".

"Tell me, Tell me everything.

"I am the daughter of a poor boatman. A youth came to my village to spend his holidays. I loved him.

We were young and heedless and he returned to his town after the holidays. Only then did I know that I was pregnant. I tried all means to know his whereabouts but to no purpose. My father and villagers drove me out from their village. I wandered from place to place. I gave birth to a child near a haystack; but fortunately it was lifeless. Then again I roamed about. I begged for my bread but no one gave me any. I was goaded to desperation and I sold my body to feed my hunger. At last, in a fit of lunacy I committed this action."

Tears flowed from his eyes but she did not see. He began to sob. He knelt before her and asked, "Madhuri, Do you remember me?"

"No".

"Look at me and see the face of the vilest of creatures".

"She was wonderstruck, but only for a moment. "Manohar Babu, My Babu" she cried and fell down in a faint. The man's heart melted with pity. He supported her and cried for a long time."

Manohar Das Ghosh took leave for a fortnight and went to Calcutta. He saw many people and at last he succeeded in saving Madhuri from the gallows.

He took her to a small house in Calcutta. He came to know that in Calcutta there were so many hundreds of women fallen from virtue, expelled from homes who had to sell their body, not because they loved that kind of life but solely as a means to eke out their livelihood. He realised that there must be a flaw in society which could produce prostitutes. He decided to construct a "Women's welfare centre" for such

fallen women, he considered this a primary duty and felt that God had created him to do such a service to humanity. He resigned his post of Sessions Judge. Under his supervision "The Women's Welfare Centre" grew day by day. He spent his entire wealth and all his strength in this work. He wiped the tears of thousands of fallen women, who became members of this welfare centre. Such a benefactor left this earthly world this day last year. The women you see there, are those that found their life made useful by his kindness and they are those who have come to pray that the departed soul may rest in peace. The old man ended his story.

Mr. Nirmal and I slowly rose up and approached the tomb. There the women were still weeping over their Protector's tomb. I gathered a few flower petals and sprinkled them on the tomb and then we both came away as if from the Temple of God.

## WHERE THERE IS A WILL

By

H. BHROOMINATHAN

The little village of Urkad was in a ferment for the second time in a month. The first was occasioned by the death of Zamindar Pillai, the veteran motorist and bon viveur, in his ninetyfifth year. Friends came in hundreds to the funeral. Knowing the old gentlemen's peculiarities, they paid *from their own pockets* the return fare from Alvarkurichi, confident of getting their money's worth. They were not disappointed. Zamindar Pillai, who was completely off his rocker, had quite original ideas of his own, on funerals as in most other things. At the expressed wish of the deceased, 365 Ford cars -- one for every day of the year, as the "Daily Mail" shrewdly pointed out the following morning, were collected from all over the district to convey the distinguished company from the hall to the Zamindar temple and then to the cemetery. But that was not all. At the further express wish of the deceased, these 365 Ford cars were driven backwards instead of forwards to and from the ceremony. "If one reversed his arm for a beggar", the Zamindar said to his Divan, "why not reversed gear for a motorist"? Why not indeed!

The scene on the return journey to the hall, when the brakes of the 175th Ford gave out on the steepest part of the hillock, will never be forgotten by the villagers, nor for that matter by the driver of car No. 176.

The second ferment a few days later reduced the inhabitants of little Urkad to a state of positive hysteria. The village became so

of his father's ultimatum expired. His Highness had and a very terse statement it was. If the parental fortune could have been as easily inherited as the family vocabulary, Rajkumar would not have been playing Tennis with Mandu at 10 A. M.

The fair Miss. Mandu, feeling instinctively that much depended on the game (her mother had intimated as much before she started) had scorned the idea of cuddies. She could not help noticing, as the match proceeded that Raj was unusually gloomy and silent. Being what her father called "A jolly bright girl" she had determined at all costs to make the game cheerful and a lively affair. She laughed. She fluttered. She made eyes at him until her eyelashes almost dropped off but all to no purpose. "If only he would say something" she thought. "If only she would stop talking", thought he. Miss. Mandu decided she must act and act swiftly. With superb judgement, she fainted. The Rajkumar, surprised and alarmed, threw a handful of sand in her face thinking it was water, propped her up against one of the net posts and ran to the club house for assistance. When he met her, later on, on the verandah, a look in her eye gave him a horrible suspicion. The look in his told her that she had failed. Rajkumar mumbled a few words of sympathy, helped her into her car and packed her off to her house. Really nice girls did not talk while you were playing, nor did they faint in courts.

At 2 O'clock Rajkumar stepped into the court, with Nirmala. Until five months' ago Nirmala scorned Tennis as a game for imbeciles. She had in fact, only become a tennis enthusiast to ensure a fair share of Rajkumar's company, but in so short a time her progress have been remarkable even for one who rode, shot and played tennis better than most men. Nirmala even talked like a man and her hair was bobbed. Her friends called her "athletic and amusing" her enemies "manly, massive and masculine". One flippant youth who could not bear the sight of her, once alluded to her buxom waist as "once round that..... twice round the gas works".

Realising that something was in the air, and being well aware of Rajakumar's earlier contest with her most dangerous rival, Nirmala played the game of her life. At the first game she executed one of the finest volleys against the wind, that Raj had ever seen. Things were going pretty well in the second set (where she was four up) but in the third set, out of her kindness of her heart, she began to tell Raj what he was doing wrong. First it was his left heel, then it was his right arm, and finally it was head. He could not help looking at Nirmala all the time and wondering whether a muscular, masterful woman like her, would really make the best wife for him. By the time they reached the last game he thought not, with the result that Nirmala returned home alone one up on Raj but one down to Cupid.

When Rajkumar motored home to tea in solitary state, to prepare for the third round of tennis at 5-30 P. M. there was only one in it. Miss Kamala, a quiet business-like young person of considerable facial charm. Raj suddenly realised, it was Kamala or (literally) nothing. All he could hope for was that she would neither taint nor show him what his left arm should be doing at the top of the swing. Stepping briskly into his car, he headed at full speed. As he swung rapidly round the corner up the steep hillock, past the Urkad private home for the Feeble-minded, a horrible sensation seized him. A Ford car, the property of Miss Kamala, was being driven backwards towards him at a speed of 30 miles, by the owner. It seems that she had pressed the wrong pedal and found herself coming back instead of going forward and then had lost her head. Before Raj had time to apply his brakes, much less to reverse, the crash came. Raj shot head foremost through his wind shield, cannoned off Miss Kamala and took the Ford's glass screen in his stride. That was all. Miss Kamala badly bruised and unconscious, was carried into the adjacent sanctuary for the feeble minded, where she received all care and attention.

The funeral of the Rajkumar took place two days later at little Urkad. Local critics aver, that compared to the obsequies of the former Zamindar, this affair was distressingly tame. But their disappointment was alleviated two month's later, when it was announced that Miss Kamala, now completely convalescent had consented to become the wife of Dr. Thondan, the sole proprietor of the Little Urkad Private Home for the Feeble-Minded.

## DREAM PAST

By

K. VENUGOPAL

Tit, tat ..... tit tat ..... tit tit tat .....

The engine whistled and its angry puffs nearly broke the ear drums with its violent noises. Still fourteen miles away from Madura! It sent a thrill in my heart, the vibrations of which were communicated to my nerves. Having nothing else to look at I began to remember what I had seen in the past. I began to think of the number of times I had gone by this way. Twenty-two. Twenty-two trips I had made to this self-same city of Madura for my education, spread over five couples of years from 1936 to 1946.

Tuk tuk ..... Tuck ..... Tuk ..... Tuck ..... tuk.

The train was passing over the Vaigai bridge. I knew I had entered Madurai.

"Porter, Sir?"

I picked up my luggage myself; the porter smiled at me as if he were an old friend. I recognised a part of him and that was his hypocrisy. The station had not changed even one bit, it was as stationary as the very God in the Temple a few hundred yards away from it. I had seen the men change from tuft to crop, people from congress to communism, waterlands to brick and mortar and orthodoxy to atheism. But this station has remained unchanged and looked like the ancient heavy mahogany chair of Victorian make in an ultra modern parlour, completely out of place. It was a compromise between reaction and revolution and a conservative confident of carrying on its course till it was assigned a place among the antiques of oblivion.

"Sir, ticket"

My reverie was broken by the demand of the ticket collector. You know it was the ancestors of these ticket collectors who were the clerks of Chitrakupta. Mix five parts of authority with five parts of impertinence and 90 parts of greed and you will get a ticket collector. If I had that much freedom of speech, I might have said "Here it is, you vulture" and thrown the ticket on his face. Because I did not have it, I gave the ticket humbly into his hands, praying all the while to the almighty, to save my heavy luggage from being weighed. I slipped outside.

"Sir, Taxi", "Sir, Cart".

I waited for my prospective tongawalla. "Sir where do you want to go? Please get up into my cart ..... laughing .....? Sir you are only looking at the outside. This horse will run and win any race ..... Don't I know that you are all great people. The fare, you know Sir, why should I say it? ..... Hei, Porter, bring Sir's luggage here. Sir, shall we start? Where will you stay, Sir? Home .....? Oh Yes, no home. that is right. Will you alight in Mangamma choultry? The pity is you won't get rooms there. Then why not Udipi Hotel? If that is not suitable we can go to Ambal Cafe, Sir, All facilities Sir. All facilities are provided at Ambal's. Sir, Where will you go or shall we go to Y. M. C. A. Sir?"

The rocket was shot. To escape was impossible, to submit was to be shaven clean and I mustered all my courage and called my porter to carry my luggage and walked on. The disappointed cart drivers were railing against my conduct in a volley of oaths. That was the type of treatment you receive, for not utilizing their services.

I reached Mr. R ..... 's house. The porter was paid off, after usual offer and refusal, quarrel and counter quarrel, offence and counter-offence, abuse and counter abuse. Then the usual social decorums of "How do you do's" were gone through. Mr. R ..... was still a bachelor and lived in the same single room in the same surroundings. It was in the air that he was going to marry and with him the last of my friends would all become married men. I accused him of breach of trust, but he coolly diverted my attention to the window in the opposite house. A fair face! a very fair face indeed! I knew the reason why he continued in that single room, for so long a period. Whether he got married or not. I will carry on with my single ticket for life; it was all that I was worth for; I laid myself on the floor and went to sleep.

I was awakened in the noon and the meal was served. The usual items, mutton curry and fowl roast and curd. Mr. R ..... always was a kind host. The feed was heavy and so again I lay on the floor, to continue my sleep. I woke up in the evening but Mr. R ..... was not in the room and I found a note written by him, that I could lock the room and take the key with me as he had a duplicate key. I dressed and writing down in his note that I would come to him only the next day morning, started off. While closing the room, I looked at the opposite window: It was closed air-tight. I walked through the concentric square lanes and bylanes dividing the main roads. I knew that to walk through them was to eat dust, for no profit. The grandeur of the temple Gopurams with its central golden pagoda, evoked a strong desire to enter the venerable abode of God. I always liked Madurai, because I always liked God—Siva and Sakthi; Chokkanathan and Meenakshi, Father and Mother. I remembered my first visit to the Shrine. The solemn tintinnabulations of bells, the cloudy incense vapour and the illuminating camphor flame, the intoxication of the souls that came here to forget their agony and to pray to Him to be forgiven for their sins! Oh, ye negators of God, come into this living sanctity, open your masked eyes and view Him whose flame of compassion has burnt to ashes the wickedness of all his sons. See Him, look at Him, examine Him and perceive Him and then say whether He is only a shape made of stone or a symbol of the Universal Spirit permeating the cosmos. I believe in him even though He had turned down my requests to bless me with a pass mark in my examinations. I infer that he strongly held the view that the mark business was solely the affair of professor's red pencil and in that he had no power, either to coerce or to influence the professor.

It was Friday and a number of people were inside the temple. I went near the altar. Despite our gracious Government's temple entry bill you are not permitted to enter near the shrine to touch the Lord, to present your offerings. A super-fat gurukkal was standing near my God and on the outside some strong built men, who looked like pick-pockets.

The revolution my entry would create was the centre of my thought and my commonsense answered that my back was weaker than the combined force that would be applied over it, if I tried to experiment upon my desire. With disappointment written all over my face, I cleared out of the temple, abusing the Government's temple-entry bill in my mind, since its louder utterance would take me to the New Jail with a tag attached to my neck, written over it a "communist".

I walked down to the River Vaigai; my sweet gracious Vaigai: my charming, heavenly Vaigai. She was my companion during my stay at Madura. During Full moon days on her lap I would lie and roll and her tender caressing hands used to embrace me close to her, while her rippling waters whispered in my ears the secrets of her heart. Our secret conversations were always disrupted by the nauseating odour from the sewage pumping station; thus always hastened my withdrawal. It was with a sense of contempt that I used to look at the pumping station.

The night was slowly spreading its dark pall over the surrounding visibility. I got up and walked through Shenoy Nagar. Some fair faces were at the gates but most of them had gone inside. You know night is not the time for exhibition. Some broken lines of music, some laughter, some bits of conversation, were alone the external symptoms of the inhabitants inside. A contingent of Erskine Hospital nurses passed me and their cheap cosmetics and scents sent to my head a strong chill and cold shivers. "Sister, sister where do you go?" my mind asked very silently.

I passed Gory turning. A big compound and big buildings inside it. I knew the compound, I knew the buildings. It was my American College. Tears came into my eyes as I thought of my life here. I remembered the heroic fights that were fought inside the precincts. The glorious August revolution, the I. N. A. trial strike, the R. I. N. protest strike, and the Congress Elections. Men who think low of this Institution go inside its gates, question every brick, stone, tree and being there, inmates. On, seat of Democracy and Revolution, accept this humble slave's tribute. I salute you Oh! cradle of liberty and I pray to God to make every one of your sons, a hero worthy of your tradition.

Yet men are mortal. As high and quick as we ascent the flights of ancient glory so low and violent is our descent into the depths of present depravity. I suddenly felt hungry and where could I go but to the Hostel of my friend and philosopher — Mr. K. C. N..... next moment I was inside J..... B..... Hostel. The proprietor was my friend, he had known me for years and innumerable times he had patiently waited to collect my dues, believing in my honesty. Between his short interrogations and my long answers I finished my meal of biriyani, chops and omelet. I took an extra strong tea, paid my bill and told my friend that I would call on him the next day and went out.

The time was nearing ten and I made my way through North Veli Street into Nadar New Street and from there to North Avani Moolai Street, thinking of reached North Gate. I had no definite destination and hence I went at a leisurely pace. I was just crossing the dingy, dismal land in between Chittrai Street and North Gate. A low house with a broad verandah, attracted my attention. I knew the house when I first came to Madura. Probably the same inmates might reside there now. A fat old woman bulging cheeks and whispered "Ayyah, new commodities. Please come inside. They are untouched by hand. You are the first". I knew what she meant, and quickened my pace to get away from that pimp. My legs carried me swiftly to the North Gate. Around the parapets of the road were laid in various shapes of prostration, the bodies of several men. These were naturally the homeless, and roofless, whom you can see anywhere in every town. Ill-fed, ill-clad and unhoused, these miserable wretches pass their life from day to day without a hope of decent establishment. Life and existence is a long spell of misery to these mute beasts who toil just to gain a poor meal. Oh! you beast of wealth, is it not due to your shameful partiality, that these men in whose veins run the same blood as flows in my own are to live a life so abject so vile? When will these people be saved. Is there any salvation for these people?

My head was dizzy. I walked a great distance to suppress my feelings. I looked at the time in my watch. It was 5 o'clock in the morning. There was the red horizon illuminating the golden pagoda over the shrine. The beauty was spreading. In wonderment I said "This is my beautiful Madura. If she has poor people it is not her fault".

## ON THOSE WHO GAVE US LIGHT

B.

P. CHANDRASEKHARAN NAIK

To-day a child can fill a dark room with a flood of light by touching a switch, whereas even a King could not have done that a hundred and fifty years ago. The men who tried to light their houses with gas or electricity were laughed at and even wise men thought that was a mad idea. An inventor will say that it is a hopeful sign when the world laughs at him, as he knows that it was the fate of those who had achieved their aims.

No one really knows how men discovered the use of fire. But it is possible that man might have seen trees catching fire by lightning and afterwards they learnt that fire could be got by rubbing two pieces of drywood or bamboo pieces. That practice continues even to-day in the case of some primitive races in many parts of the world. Striking fire from flint and steel came into practice, only very long afterwards, as men did not know how to get and use iron.

When people practised this method for catching fire to cook their food and keep themselves warm at nights, they accidentally found that certain resins and gums from trees would burn with a brighter light and last longer. They would melt resin and dip twigs to make torches which would serve to light up their houses at night. Till the beginning of the 19th century, no other method of lighting streets and houses was in vogue. Men seldom journeyed at night and when they did have to go, they did so with the help of torches. When we read about the past splendour of England with its baronial halls, we should also note that during nights they were quite gloomy places with their smoky lamps and dim candles.

In 1773, in a coal mine at White Haven, gas used to escape in the pit and this catching fire, produced a flame a yard long and two yards wide. As this gas escaped continuously, the flame kept burning always. The miners of that time did not know how to extinguish this and they constructed a brickwork around the flame and put on a metal tube which they carried to the top. The gas rushed through this tube and burnt high in the air and thus lighted up the country all around for a long time. This set a clever man, Dr. Clayton, thinking. In one of his experiments, he burnt coal in a retort and caught the gas escaping in bladders. Sometimes, to amuse his friends, he would prick the bladder with a pin and light the issuing gas by means of a candle and it burnt until there was no longer any gas in the bladder. Dr. Clayton had gone so far towards making coal gas that he could have made it a success. But he did not know how great a discovery he had made, and nothing substantial was done with coal gas for another 50 years.

Real credit for the invention of a light from coal gas goes to a Scotchman named William Murdock. He joined as a mechanic in Messrs. Boulton and Watt, Steam Engine Makers in Birmingham during 1777. He was always inventing things, but was too modest to publicise them. He also made a model steam locomotive and tried it one night. Till then he had no idea that coal gas could produce steam which would make the engine go with terrific speed. Murdock was the first man to think out what could be done with coal gas. One night, Murdock called a boy to get a thimble for him. He had a kettle full of coal and he caused the gas to be driven out into a large metal case and in this he fixed a metal tube. He made one or two holes in the thimble for issuing gas. Of course, the gas blazed merrily. That was the first trial on coal gas. No wonder people of that place thought Murdock a wizard. During 1795 Murdock lighted his house with coal gas. The gas was made in his garden and carried by a pipe to a position near the ceiling and in that poor Scotchman's cottage, gas was first lighted. In 1802, Murdock lighted his employer's premises and in 1803, their factory as well. People found that the light from gas was cheaper and cleaner than oil lamps and candles.

A certain Mr. Winsor, a German in England, proposed to the Government to light the streets with gas. It is interesting to note that Sir Walter

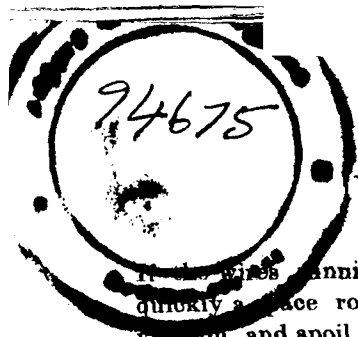
Scott did not believe in gas lighting and he said "There is a mad man in London proposing to light London with - What do you think? Smoke!" It is interesting to note that the same Sir Walter Scott did light his house with gas and the same Mr. Winsor formed a company for gas lighting the streets of London and he earned a profit while Murdock the pioneer, remained poor.

In 1813, Westminster bridge was lighted by gas. People, who saw this, thought that a roaring flame should be inside the pipes and consequently they should also be hot. But they could hardly believe their senses when they found that the pipes were really cold. From 1817 onwards, lighting with gas spread in all important English towns. Many improvements were made afterwards to make the light better. The most important improvement in this respect is the incandescent light of 300-400 candle power for which the use of 'mantle' was required.

The discovery that electricity could give light was made by Sir Humphry Davy. Sir Davy had a great electric battery to which he joined two wires. When the ends of the wires touched each other nothing happened but when the ends are drawn a tiny way apart, a light appeared. But it produced such a heat that it burnt up the wires. So Sir Davy fastened two pieces of charcoal one on the end of each wire and could thus make a splendid light. The explanation of this phenomenon was that when the end of wires were held close together the current rushed to the end of the wire and when it reached the charcoal, leapt over with such force to the other piece of charcoal that it carried away tiny fragments of charcoal with it. These fragments formed a sort of bridge for the electric current to pass from one piece of charcoal to another. But the air resisted the passage of current so much that the bridge of charcoal was made white-hot and thus gave a brilliant light. The carbon that carried the current soon got burnt away while that receiving current did not.

The next step over this was the alternating current but the danger of this was that when exposed to air it burnt fiercely and so could not be used for house purposes. So to make that useful for house purposes, a vacuum was found necessary. The first man who made a small electric lamp was Joseph Wilson Swan, and Thomas Alva Edison, the famous American inventor improved it further.

The first difficulty experienced was to replace the carbon rods in the arc lamp. At first a very costly metal, platinum, was tried. But it soon burned away and it was also too costly so that very few people could afford to buy such lamps. Edison baked strips of bamboo till they become carbon while Mr. Swan soaked threads of cotton in acid and then baked them. After much experimentation a satisfactory method was found at last. Lamps were made with filaments of certain rare metal called tungsten which gave a brighter light. Heat causes things to expand and so when an electric current enters the lamp, it causes the glass rapidly to expand.



...glass running through the neck of lamp did not expand just as quickly as glass round them would open, air rush through, destroy the vacuum and spoil the lamp. Platinum expands very rapidly under heat and so though it is too costly to be used as the filament of the lamp, it is used to join on the filament. The glass bulb with necessary shape is made hot and soft; a vacuum is created inside and the bulb sealed at the bottom with the filament in the centre of the glass. The lamps used in lighthouses are powerful arc lamps whose candle power ranges from 10,000 to 30,000. To day even poor people can afford to light their houses with electricity provided they live in a town with electric supply.

We cannot forget, that in many villages, even nowadays the houses are illuminated only by oil lamps. The history of oil lamps dates far back to some thousands of years and then they were made of conch shells. Later the lamps were made of stones, then clay and still later out of iron or bronze. But they were all merely open receptacles to hold a little oil on which floated a wick supported by a spout. After many centuries, men learned to cover the top of lamp except for the spout and a small hole to pour the oil. But even this was not satisfactory as the flame was poor and smoky.

In 1781 a Swiss, Aime Argand turned his mind to make a lamp which should not be smoky smelling, but could give a good and steady light. He had a circular wick woven which would fit over a brass cylinder in his lamp and could be moved up and down. He allowed air to though this cylinder from beneath and this supplied the inside of the wick with oxygen. This wick and cylinder mechanism worked smoothly, but with all his efforts, he could not make the flame bright until his young brother, who was watching him, picked up a broken flask, fitted it over the flame and immediately the lamp gave a clear and steady light. This was the first use of a lamp chimney and was one of the greatest discoveries made in lighting. Argand's lamp manufactured in England in 1782 was a great success. But it took nearly fifty years to get a good illumination, the fault being not with the lamp but in the oil used.

The oil used in ancient times came from certain plants and the fats of animals. Curiously enough, in certain parts of Asia and Europe some people used the crude petroleum oozing from the ground. Kerosene oil which we now use did not come into existence until Warren dela Rue in 1852, invented in England, a new process of refining petroleum and when Edwin L. Drases drilled the first Pennsylvania oil-well in 1859. Soon many wells were in operation, oil became abundant and better means of refining were invented. Better lamps also were made and we now get improved Argand lamps, Student lamps and Hurricane lamps etc.

We owe a great debt of gratitude to these old-time inventors by whose perseverance, a poor man is now able to light his house with a kerosene lamp and a rich man in town with electric light.

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