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Editorial

Conflicting Doctrines about soils: This is the title of a recent publication by Charles Kellog, reprinted under the auspices of the Food and Agriculture Organisation of the United Nations, which sets out in a vigorous, thought-provoking manner, the complexities that surround our conception of soils and the hidden fallacies that lurk in most of them.

Long ago, four wise men of the East, who happened to be also blind, set out to fulfil a long-felt desire to find out what an elephant was like. When led up to the animal, each began to build up his mental concept of the beast by passing his hands over the portion nearest his reach. One, who got the trunk, said the elephant was exactly like a huge snake; another, who felt the tusk, shouted that the elephant was hard and smooth and pointed like a spear; the third who felt the flanks, said it was like a wall, while the fourth wise man, who got only the tail, concluded it was none of these things but was just like a rope, with some bristles at one end.

In the present state of knowledge, our concepts about soils are almost on a par with this. Though for centuries immemorial, man has been a son of the soil, tilling, toiling and sweating over it, the fundamental questions, as to what exactly soils are, why they vary so much from place to place, in appearance, properties and in productivity, why some soils remain good and fertile for centuries, while others deteriorate within a short period, these still remain as questions, for which adequate answers are yet to be found.

One of the earliest and most popular of concepts is the one promulgated by the great German chemist, von Liebig, more than a century ago, which visualises the soil as a storage bin of plant nutrients. The merit of this view was its straightforward explanation in terms of chemistry of the source of plant nutrient elements. Liebig maintained that crops grew in direct proportion to the increase or diminution of nutrient elements in the soil. Being so simple and seemingly so reasonable, this theory had, and still has, a very wide vogue though Liebig himself once became very unhappy over his theory when he found in the Danube valley, soils which should have been sterile long ago, but which were actually producing better crops than before, without any fertilisers. Even today many people, even those scientifically trained, believe that the soil is just like a bank, where one should put in what is taken out in the shape of crops.

This storage bin concept of soils received support from the early geologists as well, to whom soils were merely pulverised rocks. With the advance of biological knowledge, micro-organisms and organic matter were added to this concept, but without any radical

alteration of the central idea. It was left to the Russians to dig into the soil and see whether it was really like what it was assumed to be in the storage bin theory. They found that soils in nature were made up of a series of layers or "soil horizons" reaching from the surface to a depth of one foot or many feet. It was also realised that all sorts of soil types, varying widely in colour, chemical composition and productivity, were often found, derived from the same kind of parent rocks; in fact, soil types were found to be more closely related to the climate, rainfall and vegetation than to the kind of parent rock. Whereas rocks are distributed over the earth, more or less promiscuously, areas of individual soil types occur in an orderly geographic pattern. Each distinct combination of climate, vegetation, parent rock, relief and time known as the five "genetic factors" gives a soil type with a distinctive set of features and properties.

It has also to be recognised that soils are subject to ever-changing processes of denudation, accumulation and sometimes transportation as well. The surface is constantly being eroded away, and the upper portion of the layer next below the surface is gradually changed into the surface soil. Silt deposits in riverine tracts and in some places volcanic dust also constitute important soil-forming agencies. Rain brings down soluble materials from the air, the percolating water leaches out materials, and evaporation of soil water leaves a crust of various salts on the surface and so it goes on. These physical and chemical changes are further modified by plants, animals and micro-organisms.

As a sort of reaction against the storage bin concept, a number of biological theories have been put forward regarding soils. No doubt a greater recognition of the vital role of biological factors is desirable, but the advocates of the "organic school" go to the other extreme, insisting that organic matter is everything and that chemical fertilisers are downright poisons. They claim that the use of compost and farmyard manure confers special qualities to plants, that they are not only kept free of insects and diseases, but also make the persons who consume them more healthy. Within this organic group itself there are separate schools, some as adherents of Goethe and Rudolph Steiner, others like Howard who derived their views from experience in tropical countries. These organic faddists have made elaborate rituals out of compost making. Very fine shades of differences are magnified into vital differences and some have special "secret" concoctions for compost making, that are claimed to encourage special micro-organisms. To these faddists it is an unforgivable sin to add any chemical nitrogen such as ammonium sulphate or nitrate to compost. Rock phosphate is permissible, but superphosphate is tabooed, because a strong poison, sulphuric acid, enters into the making of it. By the same token, common salt should never be used at all, being the resultant of two strong poisons!

The organic theorists further claim that composts (made according to each particular faddist's ritual) furnish to plants, not only all the elements that the chemists say they need, but also a vital principle produced only by living matter and transmitted to growing plants through such organic manures.

Needless to say much of all this is pure speculation, but like many theories of a metaphysical nature, it is very difficult to prove them wrong. Such speculations are also unfortunate, because a great deal of what the "organic school" say is sound, even if the reasons they assign are unbelievable.

Such conflicting doctrines, however, serve one good purpose; they serve to make us pause and consider whether we really know all that is necessary to be known about soils. A realisation of ignorance is the best incentive to knowledge.

Rainfall and crop yields in Madras State— A preliminary study

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It is common knowledge that an intimate relation exists between rainfall and crop production. The quantity of rainfall received is as important as the nature of its distribution. "Unseasonal rain is as bad as untimely food". The unpredictable nature of distribution of rainfall is the reason for the oft-quoted saying that "Agriculture is a gamble with the monsoon."

In considering the influence of rainfall on yield, scientists refer to the "effective rainfall", which means that portion of the total precipation, which gets actually soaked in the soil and thus becomes available for the nutrition of plants. The effective rainfall received at a place affects the texture of the soil, its nitrogen content and its pH value (iii & iv). Again the water-retaining capacity of the soil depends on its slope, internal structure and humus content. The amount and distribution of water in the soil influences not only every phase of soil formation but also the relationship between the soil and the growing plants (ii). Soils vary widely in their capacity to absorb moisture, particularly during rainy seasons. The important points to be borne in mind when we consider soil moisture in connection with crop growth are (i) the depth to which rain water gets soaked into the soil and (ii) its retention in a particular depth of the soil. Briggs and Shantz (i) found that the water required for the formation of one pound of dry plant material may vary from 250 to 1,000 lb., depending upon the crop in question. It becomes evident, therefore, that cultivated crops can give normal yields only when they get sufficient water from the soil to meet their nutritional demands. Lack of water during any portion of crop growth will be reflected in a lowering of yield. Plant tolerance to drought may be both natural and induced, but the basic needs of moisture must be available for the crop if normal yields are to result.

As the main source of supply of moisture in the soil is only rainfall, the study of the inter-relation between the annual rainfall of the Madras State and the yields of different crops was undertaken. The data of annual rainfall for the years 1902–1903 to 1947–1948 and the corresponding

data pertaining to the area and acre yield of different crops were culled from the "Season and Crop Reports", published by the Civil Supplies Branch of the Board of Revenue, Government of Madras. In regard to area, groups of crops like millets and oilseeds were taken into consideration. In the case of majority of crops yield data could be obtained only from 1917–1918 onwards.

It is well to remember that the yield per acre as given in the "Season and crop Reports" is based on "Normal yield" and "Anna value". The lack of exactitude of the definition of "Normal yield" (average yield on average soil in a year of average character) and the indefiniteness of the "Anna value", known otherwise as "Seasonal Factor" or "Condition Factor", assessed by eye-judgment by village officials, set a limit to the accuracy of the acre yield data. However it may be expected that the available data of yield per acre would give some indication of the influence of weather. (vi)

Method: Twenty-four total correlations were worked out, nine for areas under different groups of crops or individual crops and rainfall and the rest for acre-yields of individual crops and rainfall. In the case of unirrigated paddy, Malabar and South Kanara were treated separately as the rainfall is very high in these districts. In regard to tenai, the Ceded districts were considered as one unit, as 90 per cent of the total area of tenai in the State is in Ceded districts. All the nine correlations and relevant particulars related to area of unirrigated crops and rainfall are presented in Table I. The remaining fifteen correlations and details pertaining to the influence of rainfall on the yield of crops are also given in Table I.

Four graphs were prepared with rainfall and acre-yield data collected for paddy, millets, oil seeds and cotton.

Interpretation of the correlations and the graphs drawn in this connection:

(I) *Rainfall and area under cultivated crops:* None of the nine correlations worked out in this connection is significant. This apparently shows that the ryots do not anticipate failure of rains but sow the seeds in the available area in anticipation of good seasonal rainfall and are even prepared to take a risk before the season is lost.

(II) *Rainfall and acre-yield of cultivated crops:*— (i) *Paddy:* Separate correlations were worked out for the yield of paddy, irrigated and unirrigated, and the rainfall of the State. The yield of unirrigated paddy in Malabar and South Kanara districts was correlated separately with the annual rainfall of the State.

The yield of irrigated paddy of the State bears a significant correlation with the total rainfall of the State indicating that even irrigated paddy is influenced by rainfall, since our irrigation sources depend on rainfall for their freshes.

The yield of unirrigated paddy has also got a significant correlation with the rainfall of the State, showing that unirrigated paddy is benefited by increased rainfall. Untimely heavy falls do not seem to have any adverse effect as they are confined only to limited areas when compared to the size of the State.

The yield of rainfed paddy in the West Coast also bears a significant correlation with the rainfall of the State, while that in the other districts of the State bears a highly significant correlation with rainfall at (P = ·01 level) even though a few large deviations were found in the "Goodness of fit" test.

The graph reveals that the yields of paddy, irrigated as well as unirrigated, were low in the years 1918–1919, 1920–1921, 1926–1927, 1934–1935, 1938–1939 and 1945–1946, mainly due to the low average rainfall of the State. In 1926–1927 the yields of paddy had not fallen as the "season was better than the previous three years on the West Coast" (v).

In 1934–1935 the yield of irrigated paddy maintained itself at the level of the previous year, in spite of the decrease in the rainfall. In 1945–1946, the yield of unirrigated paddy in Malabar and South Kanara districts and consequently that of the whole State increased in contrast to the rainfall of the State, because "the season was generally fair in South Kanara" (v).

In 1941–1942 even though the rainfall was below the average, the yield of dry paddy showed an increase while the yield of irrigated paddy did not change, but in 1942–1943 an increase in the rainfall of the State has depressed the yield of dry and wet paddy due to "inadequate and ill-distributed rainfall in both the monsoons" (v).

The increase in the yield of paddy was not proportionate to the increase of rainfall in the years 1931–1932, 1939–1940 and 1946–1947. "In 1931–1932 paddy was adversly affected by cyclone in the South-East of Madras". The year 1939–1940 had very ill-distributed rainfall in time as well as in space. In 1946–1947 also crops were affected by heavy rains in November and December.

That rainfall has a very striking effect on the yield of irrigated and unirrigated paddy is beyond question. Though the distribution is also important, it would appear that, if rains are adequate, the distribution also will be fair and the yields will be normal or above normal. Bad yields were mostly attributed to defective rainfall in the "Season and Crop Reports."

To verify the significance of the correlations obtained above, regression equations of the significant correlations were worked out. It is seen that the value of X^2 was somewhat higher due to a few extereme values. If these are not taken into consideration the value of P lies between 0·1 to 0·3 in most of the cases. Thus it may be stated that the linear regression does not fully explain the yield and rainfall correlation and other factors may be at work. Probably by working out correlation between yield and the rainfall during the season of a particular crop and working out partial correlations, taking into account critical periods of rainfall, a better picture of the correlation of yield and rains may be obtained. This will be taken up in subsequent publications.

Millets: (a) *Cholam:* (*Sorghum* spp.) There is no significant correlation between the acre yield of cholam and rainfall of the State. This shows that in years of drought the crop does not fail completely and in years of excess rainfall does not record bumper yields. This millet is sown mostly on black cotton soils after sufficient moisture is received, and hence the amount of rainfall does not interfere, unless there is a very bad drought for months. This is reflected in the absence of significant correlation between annual rainfall and yield of this millet.

(b) *Tenai:* (*Setaria italica*) The correlation of acre yield of *Tenai* with the annual rainfall of the Ceded districts alone, where 90 per cent of the total area of the State under *Tenai* is concentrated, is significant. This may be due to the fact that *Tenai* is raised on lighter types of soil and hence heavier falls benefit the crop immensely.

(c) *Cumbu:* (*Pennisetum typhoides*) The acre yield of *cumbu* bears a significant correlation with the annual rainfall of the State. This indicates that *Cumbu* responds well to higher rainfall.

(d) *Ragi:* (*Eleusine coracana*) *Ragi* is generally grown under irrigated conditions in rich soils. But it is grown also under unirrigated conditions to the tune of about eight lakhs of acres in this State. The yield of *Ragi* has got a significant correlation with rainfall, indicating thereby that *Ragi* is benefited by higher rainfalls.

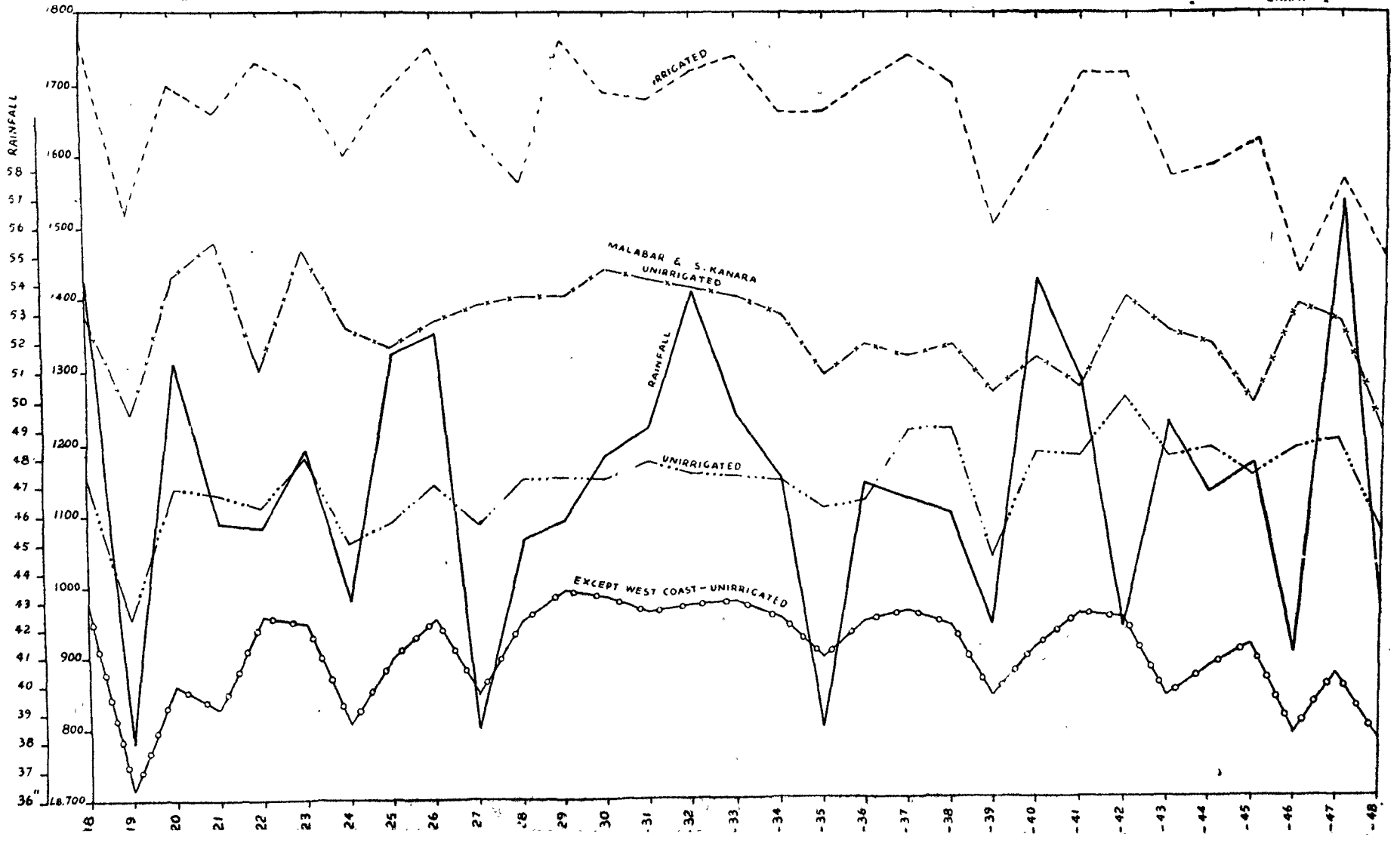
Incidentally the following observations may be recorded. The normal yield of *Ragi* (unirrigated) is 678 lbs. per acre while that of *cumbu* is only 498 lbs. per acre. Therefore, in portions of Chittoor and Salem districts where nearly 1,46,000 and 2,79,000 acres are grown under rainfed *cumbu*, it may be advisable to substitute *ragi* for *cumbu*, taking into consideration soil fertility factors. As a matter of fact, certain ryots in Chittoor district have already taken to this change over.

The graph reveals that there is a general fall in the yield of all the crops in the years 1918–1919, 1923–1924, 1926–1927, 1934–1935, 1941–1942, 1942–1943 and 1945–1946. In all these years except

MADRAS PROVINCE — RAINFALL AND ACRE YIELD

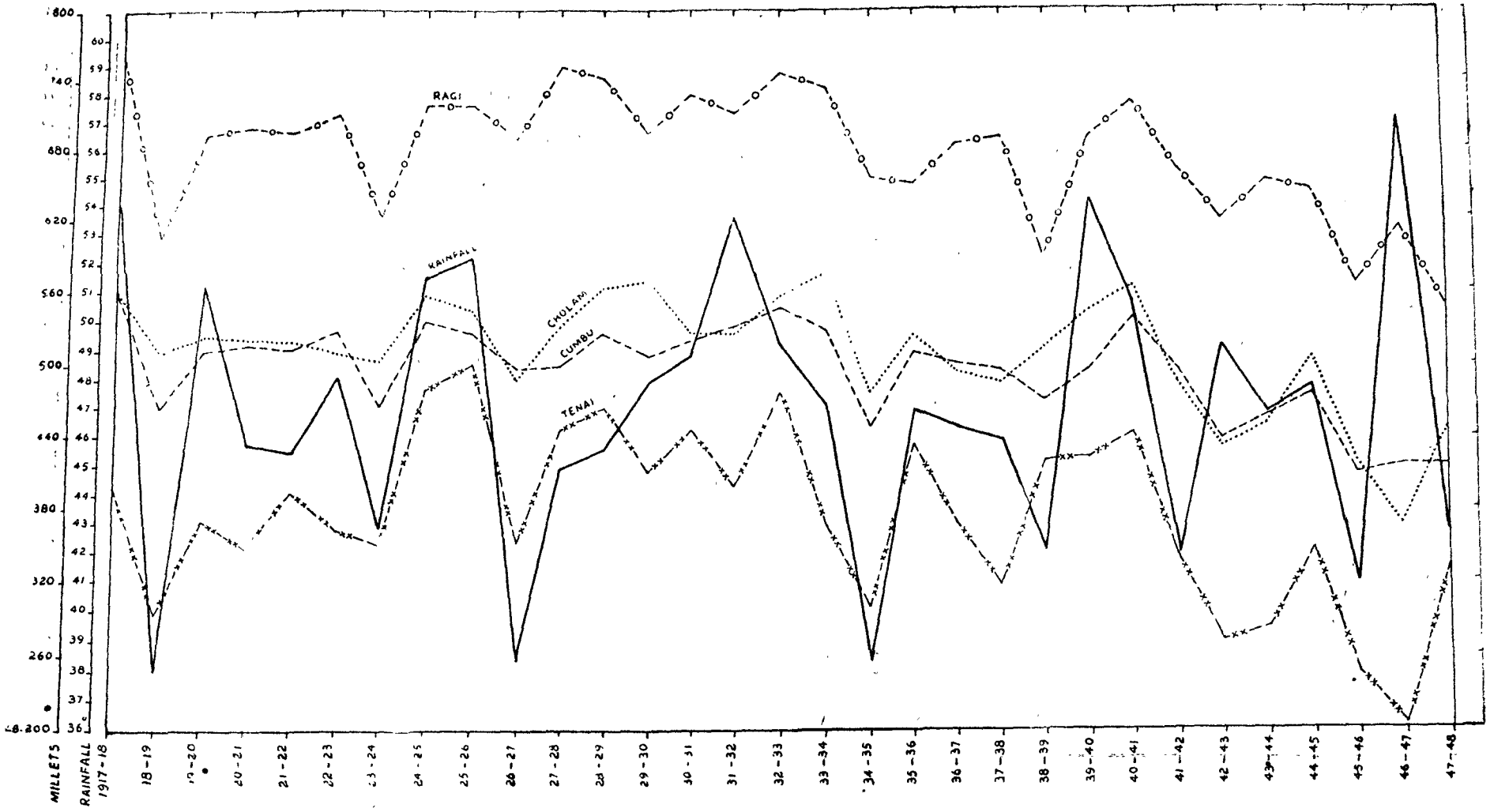
[PADDY]

GRAPH 1



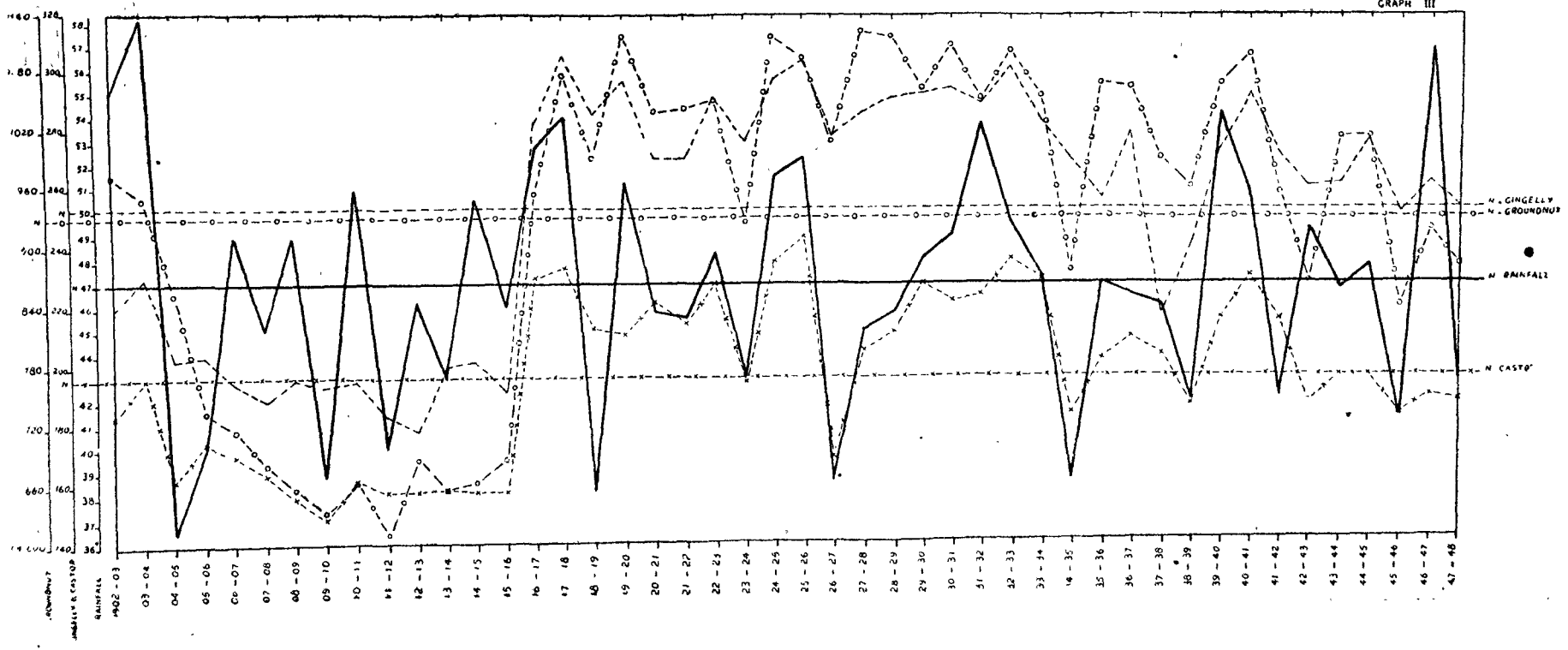
MADRAS PROVINCE - RAINFALL AND ACRE YIELD
[MILLETS]

GRAPH II



MADRAS PROVINCE – RAINFALL AND ACRE YIELD
[OIL SEEDS]

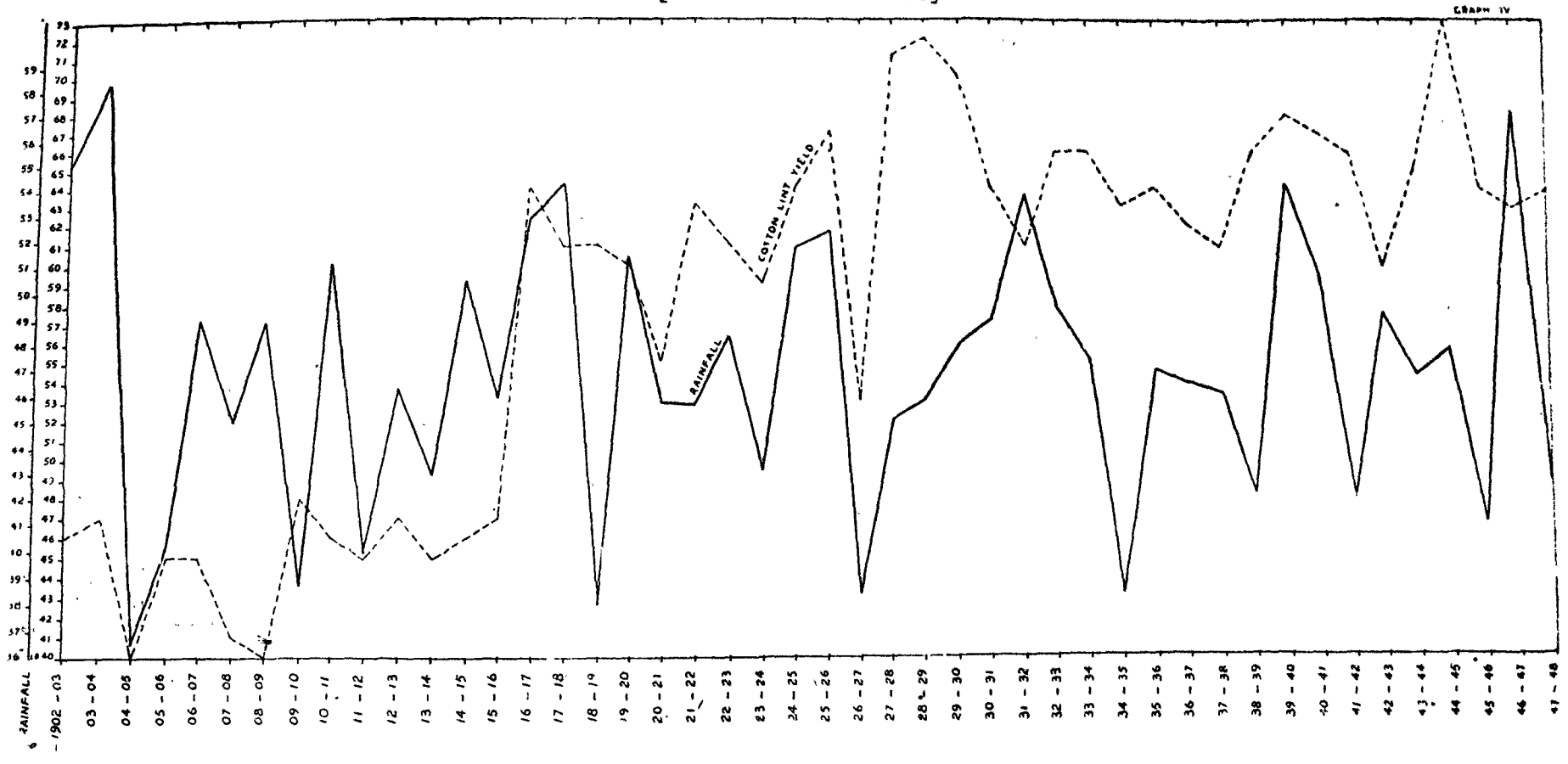
GRAPH III



MADRAS PROVINCE – RAINFALL AND ACRE YIELD

[COTTON – LINT YIELD]

GRAPH IV



1942 – 1943 the fall in the yield may be due to low rain-fall of the State. In the year 1942 – 1943, even though the rainfall of the State was above normal by 2 inches, the yields of millets were low. This has been attributed, in the Season and Crop Report of that year, to the untimely rainfall which affected *cumbu* in Madhurai, Ramanathapuram and Tirunelveli districts.

As in the case of paddy, in millets also, there was a downward trend of yield after 1940 – 1941 owing to unfavourable seasons in 1941 – 1942, 1945 – 1946 and 1947 – 1948 and untimely heavy and ill-distributed rainfall, favouring incidence of insect pests and diseases in the rest of the years.

(III) *Oilseeds:* The annual rainfall of the State was correlated separately with the yields per acre of gingelly, groundnut and castor, for forty-one years from 1902 – 1903 to 1947 – 1948.

(a) *Gingelly:* The yield of gingelly has no significant correlation with the total annual rainfall. This, in part, may be due to the fact that the gingelly crop requires very limited moisture, and that too only at particular periods. Correlation of yield with seasonal rainfall may show some significance. This will be attempted in a later paper.

(b) *Groundnut:* The yield per acre of groundnut has got a positive significant correlation of 0·3116 ± 0·1432, showing that, inspite of its being a weak one, the yield of groundnut is influenced by the rainfall received during the year. This is because groundnut is grown generally from July–August to November–December when the South-West monsoon and North-East monsoon are active. Further, the soils in which groundnut is grown are of a light type and this makes it all the more obvious, that groundnut requires rainfall in abundance during its growing season and for the successful penetration of the gynophore into the soil.

Though untimely heavy fall, such as the one received soon after sowing and during the flowering phase may adversely affect the yield, such incidence is negligible when the whole State is taken into consideration.

(c) *Castor:* The acre yield of castor also has got a positive significant correlation with the rainfall of the State. This may be explained by the fact that as castor is generally grown in poor soils and occupies the ground for almost the whole year, it gets the full benefit of rainfall received during the year.

The graph reveals that there was a progressive deterioration in the yield per acre of groundnut from 1902 – 1903 to 1909 – 1910 irrespective of the fluctuations of rainfall during the same period. From 1916 – 1917 onwards there was a general increase in yield of all the crops viz. gingelly, castor and groundnut. This was mainly due to a revision of policy by the

Board of Revenue in estimating crop yields. The yield of groundnut, thereafter, fluctuates almost in the same manner as rainfall except in the years 1929 – 1930, 1931 – 1932 and 1942.

(IV) *Cotton:* The yield of lint per acre of rainfed cotton was correlated with the rainfall of the State for the period of 46 years from 1902 – 1903 to 1947 – 1948. The yield has a positive correation with rainfall but it is not significant. This indicates that the yield of cotton is influenced also by factors other than the rainfall of the State. Cotton is very easily susceptible to pests and diseases.

The study of the graph reveals that depressions in rainfall have caused similar reductions in cotton yields in the years 1904 – 1905, 1911 – 1912, 1923 – 1924, 1926 – 1927, 1934 – 1935 and 1945 – 1946. In 1934 – 1935 the yield of cotton did not fall so low as the rainfall of the year. There had been an increase in the yield of cotton in the years 1909 – 1910 and 1918 – 1919 in spite of low rainfall. There had also been decrease of yields in the years 1931 – 1932, 1942 – 1943 and 1947 - 1948 in contrast to the increase of rainfall, mainly due to adverse weather conditions.

V. *Sugarcane:* The acre yield of jaggery from sugarcane, was correlated with the rainfall of the State for 46 years. The correlation, though positive, is not significant. This is because sugarcane is mainly grown under irrigated conditions and the yield is also more influenced by manuring, cultural operations and varieties than by rainfall.

Summary and Conclusions

(a) *Paddy:* Though in paddy fields water stands always to a depth of 2 inches the crop responds well to timely monsoonic showers. Paddy, which is by nature a water-loving plant, is significantly influenced by rainfall, when raised under purely rainfed conditions.

(b) *Millets:* (i) Cholam: In years of drought the crop does not fail completely and in years of excess rainfall does not give a bumper yield. It requires only optimum amount of timely rains.

(ii) *Tenai:* The total rainfall influences the yield of *Tenai* of the Ceded districts.

(iii) *Cumbu:* It responds well to higher rainfall and requires more soil moisture than cholam.

(iv) *Ragi:* In heavy rainfall years *ragi* records higher yields.

(c) *Oilseeds:* (i) *Gingelly:* In view of its varying sowing seasons in different districts in the State, its short life-period in the field, high

susceptibility to pests and diseases and sensitiveness to adverse weather conditions, it is not possible to record from the available data, as to whether the crop responds well or ill to the rainfall received.

(ii) *Groundnut:* The yield of groundnut is directly proportional to the rainfall received during its growth period. Yield depends on the successful penetration of the gynophore, which, in turn, mainly depends on optimum soil moisture conditions.

(iii) *Castor:* Though drought-resistant by nature, this crop responds well to higher rainfall. By virtue of its long span of life in the field of nearly one year, it gets the maximum benefit from the rainfall received in any year.

(d) *Cotton:* Besides rainfall, there are other factors also that determine the yield of cotton. Rainfall has an appreciable, though not a decisive influence on cotton yields.

(e) *Sugarcane:* Nothing definite can be said in regard to this crop since it is seldom cultivated under purely rainfed conditions, except perhaps in South Kanara where it is grown under very favourable rainfall conditions,

Conclusion: It is to be mentioned that more revealing information of the effects of rainfall on the yield of crops will be obtained if multiple correlations between rainfall at different periods and the yields are worked out. As yield is also dependent upon other climatic factors such as sunshine, humidity etc., partial correlations between yield and different elements of weather may throw more light on the problem of yield. It is hoped that these aspects will be dealt with in later publications.

Acknowledgment: The authors are greatful to the Director of Agriculture for his encouragement to write up this note and to the Senior Lecturer in Agriculture, Coimbatore for his help in part compilation of the data.

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TABLE I.

S. No	Details of Correlation	Correlation Co-efficient r:	Significant or not	Regression equations for significant correlations *Where Y is the expected yield in lbs. and X is annual rainfall for the State
1.	Rainfall and area under paddy (unirrigated) in Malabar and South Kanara ...	− 0·0612 ± 0·1505	Not	...
2.	Rainfall and area under (unirrigated) paddy in the whole State ...	+ 0·0002 ± 0·1857	Not	...
3.	Rainfall and area of *Cholam* (unirrigated) in the whole State ...	− 0·1181 ± 0·1497	Not	...
4.	Rainfall and area of *Ragi* (unirrigated) in the whole State ...	+ 0·0086 ± 0·1857	Not	...
5.	Rainfall and area of *Tenai* (unirrigated) in the Ceded districts ...	+ 0·2412 ± 0·1802	Not	...
6.	Rainfall and area of *Tenai* in the whole State ...	+ 0·0350 ± 0·1856	Not	...
7.	Rainfall and area of *Cumbu* (unirrigated) in the whole State ...	+ 0·1213 ± 0·1844	Not	...
8.	Rainfall and area under Oil Seeds (Castor, Groundnut, and gingelly) in the whole State ...	+ 0·0835 ± 0·1502	Not	...
9.	Rainfall and area under Cotton (unirrigated) in the whole State ...	+ 0·0188 ± 0·1856	Not	...
10.	Rainfall and acre yield of Paddy (irrigated) in the whole State ...	+ 0·4011 ± 0·1701	Significant	Y = 7·2804 X + 1309
11.	Rainfall and acre yield of Paddy (unirrigated) in the whole State ...	+ 0·4281 ± 0·1678	Significant	Y = 5·3830 X + 889
12.	Rainfall and acre yield of Paddy in Malabar and South Kanara for thirty one years ...	+ 0·2486 ± 0·1799	Not	...

S. No.	Details of Correlation	Correlation Co-efficient r.	Significant or not	Regression equations for significant correlations *Where Y is the expected yield in lbs. and X is annual rainfall for the State
13.	Rainfall and acre yield of Paddy in Malabar and South Kanara for forty six years ...	+ 0·3324 ± 0·1422	Significant	Y = 6·5504 X + 1000
14.	Rainfall and acre yield of paddy (unirrigated) in the whole State except Malabar and South Kanara Districts ...	+ 0·4892 ± 0·1620	Significant	Y = 7·1284 X + 569
15.	Rainfall and acre yield of Cholam (unirrigated) in the whole State ...	+ 0·1900 ± 0·1824	Not	...
16.	Rainfall and acre yield of *Cumbu* (unirrigated) in the whole State ...	+ 0·3779 ± 0·1719	Significant	Y = 3·1733 X + 349
17.	Rainfall and acre yield of Ragi (unirrigated) in the whole State ...	+ 0·4174 ± 0·1688	Significant	Y = 4·8053 X + 452
18.	Rainfall and acre yield of *Tenai* (unirrigated) in the whole State ...	+ 0·2962 ± 0·1773	Not	...
19.	Rainfall in Ceded districts alone and acre yield of *tenai* in Ceded districts ...	+ 0·4764 ± 0·1633	Significant	*Y = 8·0684 X + 146
20.	Rainfall and acre yield of gingelly in the whole State ...	+ 0·2471 ± 0·1461	Not	...
21.	Rainfall and acre yield of castor in the whole State ...	+ 0·4072 ± 0·1377	Significant	Y = 2·1223 X + 96
22.	Rainfall and acre yield of groundnut in the whole State ...	+ 0·3116 ± 0·1432	Significant	Y = 9·7133 X + 473
23.	Rainfall and acre yield of sugarcane (irrigated) in the whole State ...	+ 0·1615 ± 0·1488	Not	...
24.	Rainfall and acre yield of cotton (unirrigated) in the whole State ...	+ 0·1481 ± 0·1491	Not	...

Note:— *Rainfall of Ceded districts alone to be taken as value of (X)

On the Tuber Development of four Important Varieties of Potato in the Nilgiris

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Introduction: In the State of Madras, the Nilgiris district enjoys a cool, equable climate and is well suited for potato cultivation. No less than three crops are raised in a year. When there is demand in the market the ryots harvest their crop even before the haulms have dried up. With a view to find out the correct stage of harvest to secure maximum yield, a study of the tuber development in four of the more important commercial varieties of potato that come up well in the Nilgiris was undertaken.

The literature giving information on tuber development in potato is very scanty. Werner (1917) working at the North Dakota Station, U. S. A. found that tubers of the variety Green Mountain harvested in August 10, 20 and 30 and in September 8 and 11 showed a daily increase of 2. 34 bushels during the last 3-day interval. The total yield secured in August 10 was 121 6 bushels per acre, as compared against 220 bushels secured in September 11. Kohler (1909) experimenting with the variety Early Ohios at the Minnesota University Farm, by digging tubers at 7-day intervals from July 31 to August 30 obtained a daily increase of marketable potatoes at the rate of 7·18 bushels per acre. The daily gain near the end of the period was lower as the foliage died.

Material and Methods: The four varieties studied included Great Scot, Royal Kidney, Duke of York and President. These were planted in the summer of 1949. Uniform seed tubers weighing 2 ounces were used. The plot received a basal dressing of farm yard manure and the modified Nanjanad manure mixture at the usual rate.

The sprouts emerged from the soil after three weeks from planting. Tubers from 10 plants were dug out and their weights recorded at 10-day intervals, beginning from the 50th day after planting as the tuber formation is known normally to start from the 45th to the 50th day of planting.

Experimental Results: The average weight of tubers from a single plant calculated from 10 plants and the percentage of weight to the final weight for all the varieties under trial are furnished below:

TABLE-I.

	Great Scot (Duration 110 days)		Royal Kidney (Duration 110 days)		Duke of York (Duration 120 days)		President (Duration 120 days)	
	Weight in grams	% of weight to the final wt.	Weight in grams	% of weight to the final wt.	Weight in grams	% of weight to the final wt.	Weight in grame	% of weight to the final wt.
Harvested 50 days after planting	0·03	0·006	0·4	0·10	0·14	0·02	3·9	0·87
do. 60 days	11 4	2·51	10·5	2·74	2·5	0·50	32·2	7·21
do. 70 days	40·0	8·81	22·0	5·74	20·0	4·03	3·91	8.75
do. 80 days	216 0	47·61	108·0	28·22	98·0	19·75	118·0	26·43
do. 90 days	354·4	78·13	368·6	96·31	290 6	58·57	297·7	66·67
do. 100 days	439·4	96·86	382·7	100·0	482·0	97·15	447·5	100·0
do. 110 days	453·6	100·0	382·7	...	496·1	100·0	446·5	...
do. 120 days	453·6	...	...	...	496·1	...	...	...

It will be seen from the table that the tuber development in all the varieties is slow till the 70th day of planting. The rate of development, is maximum by the 80th day of planting. This is more or less in agreement with the findings of Clark (1921) working on the conditions attending the development of potato tubers at the Colorado Potato Experimental Station at Greeley. Further it will be noticed, that the maximum rate of tuber development occurs between the 70th and the 90th day after planting in the case of Great Scot, between the 80th and the 90th day for Royal Kidney and between the 80 and the 100th day for Duke or York and President. Thus, assuming that an acre of potato crop yields 10,000 lbs. of tubers, the daily increase during the period of maximum production is 346 lbs. per acre in Great Scot, 681 lbs. per acre in Royal Kidney, 387 lbs. per acre in Duke of York and 368 lbs. per acre in President.

The duration of the varieties from the planting to the drying up of the haulms under Nanjanad conditions, were 110 days for Great Scot and Royal Kidney and 120 days for President and Duke of York. It was also noticed that whenever the tubers were dug out before the haulms dried up, there was profuse skin peeling in the tubers which lowers their market value.

Conclusion: In the Nilgiris, Great Scot is the chief commercial variety and the tuber development in this is complete when the haulms are just drying up (vide Table-I). If harvested before the haulms dry up there is loss of yield depending on the time of harvest. For example, in the case of Royal Kidney and President although tuber development is complete in 100 days the haulms do not dry up till after 10 days in the former and 20 days in the latter. There is no loss in the yield, however, if the crop is harvested when the haulms have completely dried down. In order to prevent skin peeling and to obtain maximum yields it is desirable to harvest the crop when the haulms have dried completely.

Summary: Four varieties namely Great Scot, Kidney, Duke of York and President were studied for tuber development.

Tuber development in all these varieties is slow till the 70th day after planting.

The duration and the time of commencement of the maximum rate of production and also the time of completion of the tuber development seem to vary with varieties and appear to bear no definite correlation with the vegetative duration of the crop from time of sprouting to the time of dryage of the vines.

The crop continues to remain green for sometime even after the completion of the tuber development in the case of Royal Kidney, Golden Wonder and President and hence harvesting of these at this stage does not affect the yield, but the tubers undergo skin peeling when a potato crop is harvested before the vines dry up and therefore affects the quality of the produce. To obtain maximum yield and good quality tubers it is desirable to harvest the crop when the haulms have completely dried.

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The Araku Valley Scheme

By

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Introduction: Aruku Valley is a narrow strip of land about seven miles in length, two miles in width and is situated on the Visakhapatnam—Jeypore road at a distance of about 71 miles from Visakhapatnam. It has an altitude ranging from 2,500 to 5,000 feet. A stream called Pathalagedda which is a tributary of the Machkhund river, runs in the middle of the valley and the land slopes gently towards the stream from either side. The valley is 5,705 acres in extent, and is very thinly populated by hillmen. The annual rainfall is about 52 inches distributed as follows :—

Hot weather period (January to May)	9·76 inches	(average of four years)
South-West Monsoon (June to September)	31·54	do.
North-West Monsoon (October to December)	11·15	do.
	52·45	

There will be hailstorms in April—May, strong gales in May and October and frost in winter. The minimum and maximum temperatures range from about 36° F in winter to about 100° F in summer. The soils are poor, (sandy loam) with poor retentive power, and the holdings are scattered. ragi, samai, paddy (dry and wet) and niger are the principal crops grown in the valley.

2. **Work done (1944 to 1949)** In 1944, a scheme was sanctioned with the immediate object of growing potatoes, and exotic and indigenous vegetables for supply to the army at Visakhapatnam. The ultimate object was the development of the Agency tract. The Military supply scheme continued till the end of March 1946.

During 1946—1947, another scheme for the increased production of food crops under the *share cultivation system* was tried and the following were the details of the scheme. An area of 551 acres held by the Department was thrown open to the ryots for cultivating under the guidance and supervision of the department under share system i. e. the ryots were advanced free seed, manure and work cattle and in return half their gross produce were recovered by the Government. Food crops like ragi, wet and dry paddy, and samai were cultivated in these lands by 232 ryots jointly with individual responsibility over their holdings in 19 blocks of about 30 acres each in each village. A sum of Rs. 16,845/- was

spent towards the supply of manures, seeds and cattle and in return a sum of Rs. 8,752/- was recovered by the Department in the shape of half the gross yield. The crops did not give normal yields due to the failure of monsoons. The following are the details of cropping and yields obtained.

Name of crop	Area cultivated	Yield obtained in lb.	Half-share realised
Ragi ...	161·56 acres	1,01,742	50,871
Wet Paddy ...	14·00 ,,	19,176	9,588
Dry Paddy ...	54·38 ,,	34,332	17,166
Samai ...	222·86 ,,	82,700	41,350
Niger ...	*109·51 ,,	5,054	2,527

*Party double-cropped after samai.

During the years 1945 to 1947, another scheme for the uplift of hillmen was run, and the details are furnished below :—

Hillmen Uplift Scheme: A scheme for the uplift of hillmen was sanctioned, its main objects being (1) Free distribution of improved seeds of food crops; (2) Free distribution of manures and fertilisers; (3) Free lending of work cattle and implements.

The scheme was actually put into operation from July 1945, and during this year 800 lb. of improved strains of ragi seed, and 4,000 lb. of improved strains of paddy seed were distributed to about 140 hillmen to cover an area of 82 acres. Distribution of manures was also arranged, and during this year a total quantity of 500 bags of groundnut cake (each bag weighing 160 lb.) and 250 maunds of ammonium sulphate were distributed to 226 hillmen in 20 villages and were applied to 500 acres of paddy and ragi. It was found that both wet and drylands responded well to manuring. The following figures will illustrate the fact.

	Yield per acre (grain in lb.)	
	Unmanured	Manured
Dry Paddy ...	600	1,000
Dry Ragi ...	800	1,000
Wet Paddy ...	1,000	1,800

The scheme continued during the subsequent two years also, i. e. 1946 and 1947. Besides the free distribution of seeds and manures, 30 pairs of work cattle and also implements e. g., ploughs, hoes etc. were lent free to hillmen to take up the cultivation of their lands. The following statement shows the quantities of seeds and manures distributed.

Year	Paddy seed	Ragi Seed	Potato	Ground-nut seed	Ammo-nium Sul-phate	Ground-nut cake	Ammo-nium Phosphate
	lb.	lb.	lb.	lb.	lb.	lb.	lb.
1945—1946	4,000	800			6,250	8,000	
1946—1947	4,100	1,640	2,240	2,116 Ordinary	336	1,18,400 Potassium	33,000
				Super	672	Nitrate	326
1947—1948	4,566	1,640		1,000	782	782	

The total cost of the scheme during the three years was Rs. 1,01,498/-.

This free distribution enabled the hillmen to realise the advantages of better types of cattle and implements and regular cultivation instead of shifting cultivation (termed "Podu") and also helped them to realise the advantages of using better seed and intensive manuring. As a result of free lending of work cattle, an additional area of 192 acres was brought under cultivation. Formerly transplanting and manuring in wetlands were not being practised, but as a result of Departmental propaganda and demonstrations, transplanting was adopted and the yields were nearly doubled, as can be judged from the following figures:—

Yield per acre (grain in lb.)

	Ryots method (broadcasting, no weeding, no manuring)	Improved method (transplanting weeding, and manuring)
Ragi	800	1,650
Paddy	1,000	2,500

Colonisation scheme: In the year 1947, a comprehensive colonisation scheme on the lines of the Wynad colonisation scheme were as below:

The total area of the Araku Valley is 5,705 acres of which about 3,472 acres are under cultivation leaving about one-third fallow. There are about 500 land-holding ryot families and about 100 landless families of hillmen employed as farm labourers. Hence all the 600 hillmen families are cultivating an area of 3472 acres. Still there is room for an additional population of atleast 100 families from the plains to settle as colonists. Thus it was proposed to develop the entire Araku Valley, and besides accepting all the hillmen in the valley as colonists i.e. 600 families, provision was made to select from plains 100 families with agricultural bias. Ex-servicemen were proposed to be selected to make up these 100 families. Thus 700 families were proposed to be settled on the land, and the proportion of the colonists was fixed as follows:—

Existing land-holding hillmen	...	72%
Existing landless hillmen	...	14%
Plainsmen and ex-servicemen	...	14%

It was proposed to allot to each hillmen colonist 6 acres of land (5 acres dryland and one acre of wetland) and to each colonist family from the plains 7 acres (five acres of dryland and 2 acres of wetland). The total area of the valley was purchased and an amount of Rs. 2,14,840—14—0 due to hillmen towards compensation was deposited in the Co-operative Central Bank, Vizianagaram. But when parcelling of lands into 5 acres dryland and one acre wetland was taken up by the Survey Department, practical difficulties arose on account of the uneven nature of the soil and the existing plots with well marked out contours had to be disturbed. Hence this item of work was given up. The colonisation scheme itself was finally dropped, and no colonist from the plains has been settled here.

Details of work on Departmental Farms: during the years 1944 to 1947, besides the cultivation of potatoes, exotic vegetables, other crops like paddy, ragi, samai, groundnut, plantains etc. were also tried getting improved strains of these crops from the plains. Regular cropping trials and experiments were started in the year 1947–48. A short resume of the work done so far is given below :—

3. RESEARCH

Cereals: *Work on Paddy (Wet):* Thirty-three varieties of paddy obtained from Agricultural Research Station, Anakapalle were tried, of which the following six i.e. Mtu. 1, S. S. 5, G. E. B. 24, B. G. 1 and Bellamonji, which gave acre yields of above 3,000 lb. were compared in yield trials with local Tellasannam as control. Of these B. G. 1 and S. S. 5 have fared well and are already under distribution. S. R. 26 B paddy variety, was tried and found suitable for saline areas and is now spreading. Transplanting of paddy, manuring and weeding which were being done on the farm were copied by the ryots as a result of which their yields have almost doubled. Mass selection in the main local varieties was taken up and the seed was distributed.

The present programme consists of the growing of promising strains for seed multiplication and continuance of mass selection work in the local varieties.

Dry Paddy: Thirty varieties of paddy received from Agricultural Research Station, Anakapalle were tried along with ten varieties, among which the local variety Bhattadhan was the best. Hence mass selection in this local variety Bhattadhan was taken up, and the mass selected seed is under distribution to hillmen.

Ragi: Ragi is an important crop of this valley. Five strains of ragi got from the Agricultural Research Station, Anakapalli were compared with the local variety *Jagaralamandya* as control. The local proved better and mass selection work in this and in another popular local variety, *Muddaimuskal*, was taken up. AKP. 7 Ragi was however

found to yield well and it is now under distribution. The application of 10 cart-loads of cattle manure and two bags of groundnut cake per acre to ragi was found to give almost double the average yield.

The programme of work consists of mass-selection in the local varieties i.e. *Jagaralamandya* and *Muddaimuskal*, and growing the mass-selected crops on the farms and distribution of the seed.

Jonna: Among the three strains of Jonna tried, AKP. 1 and AKP. 2 were found to fare well and are being grown and multiplied on the farm.

Wheat: The glumed variety from Siruguppa seems to come up well and it is programmed to continue its trial.

Oilseeds: Niger and castor are grown in the locality, of which Niger occupies a very large area and is the principal money crop of the hillmen. Mass-selection work in this crop was taken up, and is being continued. Improved castor varieties from Tindivanam are introduced and they are spreading in the valley. Other oilseed crops like groundnut and gingelly which are new to the valley were also tried, of which groundnut came up very successfully while gingelly was a failure. The cultivation of groundnut has been taken up by the hillmen and it is spreading.

Pulses: Among the pulse crops, green gram, black gram, red gram and bengal gram were tried. Of these red gram was found to come up well in this locality though it was sometimes susceptible to frost attack during December – January.

Root Crops: *Potato:* The cultivation of potato has received special attention in this valley. About a dozen varieties from Mysore and Ooty were tried, and finally 'Mysore Rickets' or 'Maddigedda' was chosen as suitable to this tract. Potato was found to come up well as a rainfed crop (from June to September) and as an irrigated crop from November to February. The Summer crop i. e. from March to June was not very successful due to drought conditions during the period. The summer crop is stunted in growth and gave very low yields (just equalling the seed material put in). Gradual enriching of the soil with green manure and lime was found to increase the yields. Four manure mixtures suggested by the Agricultural Chemist of which one is Nanjanad mixture, are being tried on potato. The planting of whole tubers was found better than cut pieces. The crop yield at present is about three tons of good-sized tubers in both the seasons. But the limiting factors for extension of the potato area are: (1) Seed preservation during the summer months from March to May; (2) Market; (3) Availability of fertilisers and; (4) Availability of irrigation water for the winter crop. On account of the above limitations its cultivation has not spread in the valley.

The present programme consists of the following items of work :—

(1) Growing the crop on a bulk scale in the monsoon and winter months.

(2) Trial of manure mixtures.

(3) Storage and preservation trial for seed material from the crop grown here.

Among the other root crops tried like sweet potato, ginger, turmeric, onions, tapioca, arrow root and colocasia, sweet potato was found to come up well in this locality and has given yields ranging from 10 to 15 thousand pounds per acre. Its cultivation has spread in the valley, but the limiting factor is again marketing. Seven Almora varieties are under trial and some of these are giving very big tubers about 8 to 10 lb. each with a high carotene content. Sweet potato is being grown on a bulk scale and the trial of Almora varieties is being continued.

Fibre crops: Seven types of perennial cottons received from the Cotton Specialist are under trial of which Barbadense Type I and II are found promising and are under multiplication. Other fibre crops tried are gogu, sunnhemp and jute varieties.

Vegetables: *Exotic:* In the early years exotic vegetables like cabbage, cauliflower and knolkhol were successfully grown and supplied to the Military. The yields ranged from 10 to 15 thousand pounds per acre. The cultivation of these is now being taken up by hillmen.

Indigenous: Almost all indigenous vegetables were successfully grown on the farm, notable acre yields being, Brinjals: 21,685 lb. Tomato: 9,300 lb. Gourds: 11,080, Bendai: 4,675 lb. and Clusterbeans: 5,150 lb.

At present both exotic and indigenous vegetables are being grown on the farm periodically on an area of about 200 acres, and the produce supplied to the residents of the colony.

Bananas: Bananas are not cultivated in this valley on a field scale. Among the dozen varieties tried, Amruthapani and Sirumalai were found well suited for this tract, and they are being grown successfully under rainfed conditions. The suckers are being distributed to hillmen.

Sugarcane: Sugarcane Co. 419 has been introduced for the first time during 1948—'49. Ryots have taken to it, being used for chewing purposes. Co. 419 and Co. 527 are being grown on the farm for trying jaggery making.

Fodder and green manure crops: Fodder crops like fodder jonna, maize, Thin Napier grass, and lucerne and green manure crops like sunnhemp, indigo and wild indigo were tried, which gave respectively 20,000 lb., 21,000 lb., 25,000 lb., 4,000 lb. of fodder per acre, and 5,000 lb, 3,000 lb.. and 1,500 lb. of green leaf per acre. At present Thin Napier grass and sunnhemp are being successfully grown on the farm.

Work on fruits: About 60 varieties of fruit trees of both hill and plains varieties and a few spices are being grown in an area of 18 acres since 1947. Among those, citrus, Annonas, Guavas, Sapota, Banana, Pomegranate, Pineapples, Papaya, Plums, Peaches, Pears, Apples, Tree-Tomato, Passion fruit, Cape-Goose-berry and Strawberry are coming up well. Among the lemons, Lucknow Seedless and Nepali Oblong and guava (Lucknow No 49) have started bearing profusely and their layers are being distributed to hillmen. Pineapple suckers are being distributed free every year. Seedlings of Strawberry and Cape-Goose-berry, Tree-Tomato and Passion fruit are also under distribution. Sweet Oranges, Plums, Peaches and Apples have just started bearing.

4. WORK IN PROGRESS

(a) **Demonstration:** (i) *Growing of potatoes and exotic vegetables:* Ever since the inception of the scheme, potatoes and exotic vegetables were grown both on the farm and on ryots' holdings and were demonstrated to hillmen. If seed material, fertilisers, irrigation and marketing facilities are given, potato cultivation can also spread in the valley.

(ii) *Cattle manure preservation, and farm wastes compost making:* The soils of this tract are inherently poor and the cattle manure that can be got is quite insufficient. Hence special attention was paid in demonstrating better methods of preservation of cattle manure. Compost making is gaining popularity and almost every village is having nearly 20 pits.

(iii) *Prevention of soil erosion:* Due to the sloping nature of the land and heavy rainfall there is much of soil erosion. To check this, demonstrations of contour bunding, by putting up earthern and stone embankments, gully-plugging and ploughing along the contours were done.

(iv) *Green manuring of fields:* Demonstrations are being conducted regarding growing of green manure crops like sunnhemp in wetlands and drylands and application of green leaf to wetlands to increase the fertility of soils.

(v) Tractor ploughing of lands was also demonstrated to hillmen, as a result of which 502·87 acres of land of hillmen was ploughed so far. The lending of tractors to hillmen for hire at half rates is being continued.

(b) **Propaganda:** Twenty villages of the valley are tackled for propaganda purposes, and the following are the main items of work tackled.

(1) Introduction of improved strains like B. G. 1, AKP. 7 paddy, T. M. V. 2 and 3 groundnut, Co. 419 sugarcane etc. and explaining the advantages of growing them.

(2) Improved cultural and manurial practices like transplanting, weeding, green manuring paddy and tractor ploughing.

(3) Improving soil fertility by the application of compost, checking soil erosion and growing green manure crops.

(4) Mass selection in important local crops like ragi, paddy, samai and niger every year.

(5) Cultivation of exotic vegetables like cabbages and growing fruit plants like guavas, lemons, plantains, pine-apples etc.

(6) Control of pests and diseases.

(7) Exchange of white Leghorn cockerels with the *desi* ones, to grade up the local stock.

Subsidiary Industries: (i) *Dairy:* A dairy unit with 19 she-buffaloes and one buffalo breeding bull was maintained and the milk sold to residents of the colony. The strength of the dairy herd is now increased to 25 she-buffaloes.

(ii) *Poultry:* A poultry unit with white Leghorn birds was started and the cockerels both hatched here and from the Agricultural Research Station, Anakapalle were exchanged with the local ones to grade up the local stock. As the supply of cockerels from Anakapalle is now stopped, eggs of Leghorn birds are being exchanged with the local ones.

(iii) *Sericulture:* The rearing of mulberry silk worms was first taken up by this Department in 1947. The worms were successfully reared and 17½ tolas of silk yarn was produced. This work was subsequently handed over to the Industries Department.

(iv) *Pisciculture:* Fingerlings of 'Mirror carp' variety of fish were first introduced in 1946 into one of the departmental ponds for rearing. To growth and development of the fish are very satisfactory, but the fish did not breed and multiply. Hundred and eighteen fingerlings were again introduced during this year.

(v) *Sheep breeding:* During 1949, 19 ewes and 2 rams of the Mandya breed sheep (woolly type) were got from Hosur. They are thriving well here and are multiplying; their strength is 2 rams, 15 ewes, and 24 lambs. One shearing was taken during 1949, and a total quantity of 25 lb. of wool was received. It is proposed to build up the stock to about 50 or 70 adults, and distribute them to the local hillmen.

(vi) *Cattle improvement:* A Murrah buffalo breeding bull was maintained on the farm for free service and grading the local scrub cattle.

Miscellaneous trials: (a) *Pyrethrum:* Pyrethrum which was tried here was not found to grow satisfactorily and its flowering was also poor.

(b) *Cinchona:* Cinchona is being tried at two places (Anantha-giri and Sunkarametta) in two acres at each place. The seedlings were planted in 1946—'47 and they have now come to flowering. But their growth is however not encouraging.

(c) Eucalyptus, Camphor, and Silver Oak plants are being grown as avenue plants in the colony.

Fasciated Pedicels in a Variety of *Capsicum annuum*, L.

By

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The genus *Capsicum* comprises a wide range of forms varying in shape and pungency. Different degrees of importance have been attached to the morphological characters for taxonomical classification. The Index Kewensis recognises fiftyfour species, Roxburgh (1832) mentions six species, but modern systematists consider that there are only a few real species in the genus. Hooker (1885) recognises three species, namely *Capsicum minimum*, Roxb., *C. grossum*, Willd., and *C. frutescens*, L., and Irish (1898) has made it into two species namely *C. annuum*, L. and *C. frutescens*, L. Shaw and Rahman (1928) agree with Irish and maintain the two species in their monograph. Bailey (1923) and Erwin (1931) have further reduced it to a solitary species, namely *C. frutescens*, L. The shape of the fruit and the nature of the calyx are reliable characters but the

pendent or erect nature of the fruit seems to occur in both the species *C. annuum*, L., and *C. frutescens*, L. Shaw and Rahman (1928) have taken into consideration the number of pedicels in the axils as the main differentiating character in their classification and observe that plants with solitary pedicels are *C. annuum*, L., and those with more than one as *C. frutescens*, L.

In a variety of *C. annuum*, L., (var. *acuminata erecta*, described by Shaw and Rahman) two fruits with fasciated pedicels were noticed (fig. I. B.) wherein the fruits were completely free and the pedicels alone were joined. There were ten calyx lobes and in the transverse sections of the fruits both were bicarpellary, (fig. II. B.) thus confirming that the fruits had developed from two separate flowers. Transverse section of the fasciated pedicels revealed two distinct vascular rings. Normal fruits are medium in length, 4 to 6 cm., circular in cross section, erect, dark green with much purple colour and becoming red when mature.

This phenomenon slightly disturbs the classification of Shaw and Rahman (1928) and suggests a possibility for the occurrence of more than one flower in the axils of *C. annuum*, L. also as in the case *C. frutescens*, L. The interesting abnormality seems to support the classification of Bailey (1923) and Erwin (1931) who advocated a single species namely *C. frutescens*, L. However, it appears that the number of flowers in the axils cannot be taken as a satisfactory differentiating character in identifying *C annuum*. L. from *C. frutescens*, L.

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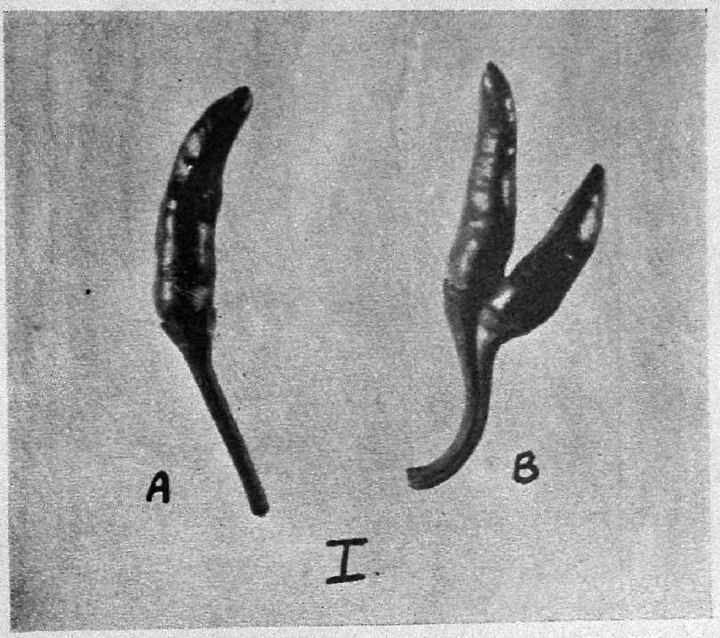
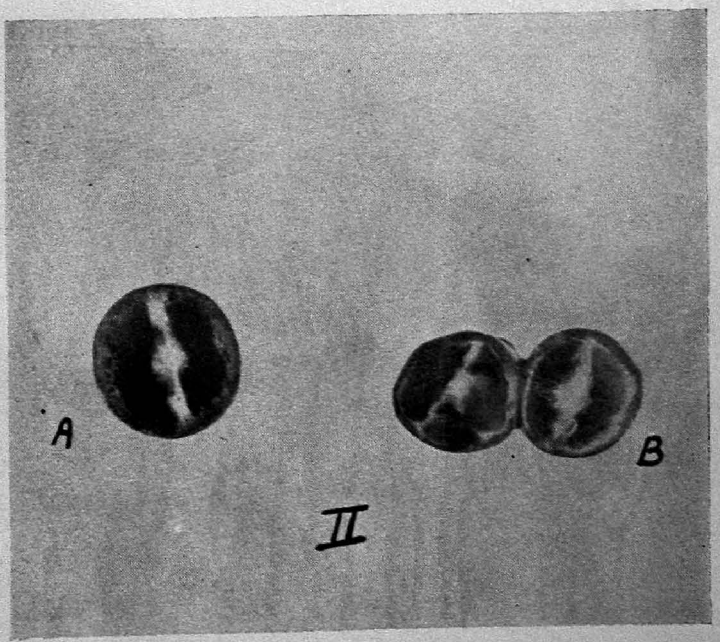


A. Normal and B. Fasciated.



Transverse Secions of A. Normal and B. Fasciated Fruits.

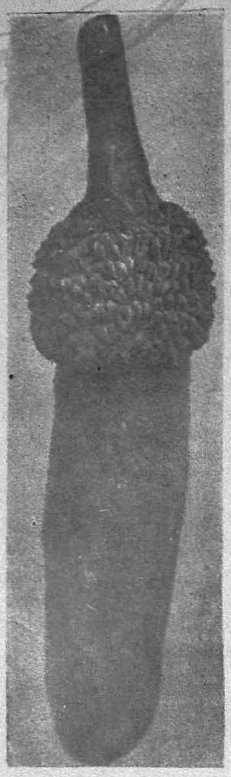


Fig. 1

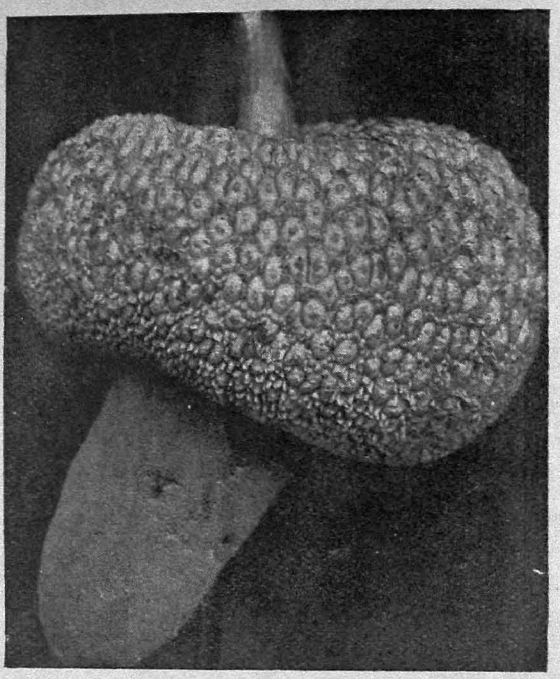


Fig. 2

Fig. 3

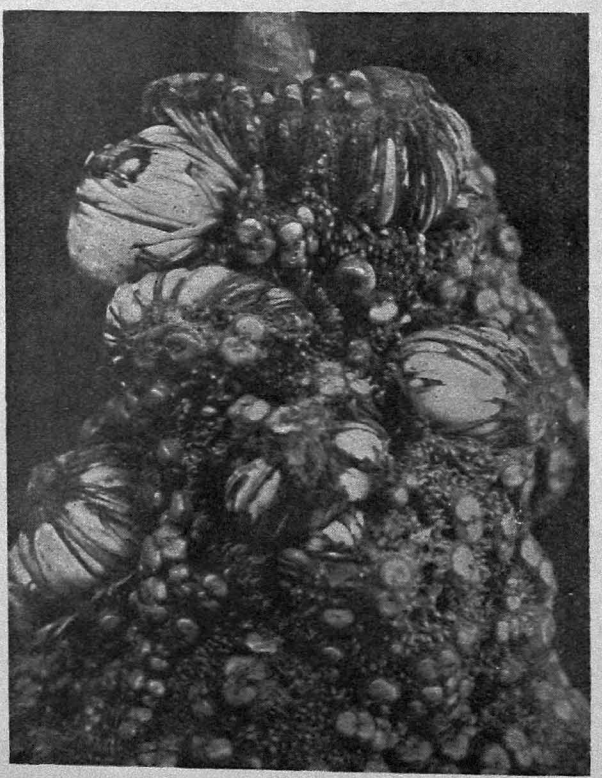


Fig 4

Floral Abnormalities in Jack

By

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(Received 24—11—1930)

The Jack tree *(Artocarpus integrifolia, L.)* is monoecious, bearing spikes of male and female flowers. The spikes are enclosed in stipules when young. Numerous male spikes are produced and within three weeks of its emergence from the stipule the male spike drops off, while the female develops into the so-called jack fruit. The latter as is well known, is a large multiple fruit with a spinescent appearance. Each spine represents the hardened apex of a perianth. These apices fuse together and form the spiny rind of the fruit. The female inflorescence has a number of fertile flowers and numerous sterile ones surrounding the fertile ones. The stigmas appear at the end of each spine. In a fertile flower the perianth enlarges, becoming succulent and enclosing a pericarp with a single seed. The unfertilised ones thicken out into flat ribbons and are often edible. An aborted seed and pericarp are found in these. The steriles develop into the whitish flakes filling up the intervening space. The colour of the edible flakes varies from pale yellow to reddish orange. At the Agricultural Research Station, Pattambi, a study is being conducted on this fruit plant, maintaining a collection of about 160 trees. The number of female spikes in a tree may vary from 3 to 40 per cent of all the spikes produced and they take 90 to 110 days to mature. A few abnormalities noted during the study are reported below.

1. **Spikes heterogamous:** The peduncle is thick as in the female spike. A portion of the spike towards the base bears female flowers and the rest towards the apex are male. Three such spikes were noted and all of them dropped off the tree within three weeks of their emergence. In rare cases they have grown larger, the female part developing the characteristic spines while the male portion of the spike is arrested in further growth (Figs. 1 and 2.)

2. **Malformed female spikes:** In a normally developed fruit the steriles form the highest percentage followed by the abortives while the edibles are below 25 per cent of all the flowers produced. The typical configuration of the jack fruit is more or less oval. The normal development of the fruit depends to a large extent on the proportion of male and female spikes in a tree, the extent of their fertility and environmental factors. Very often distortions in the development of the fruit, cracking of the rind of the mature fruit and fruits without any edible flakes are observed. What proved to be a rare abnormality is shown in figs. 3 and 4. Three such fruits were noted in one particular tree out of the entire

Among the factors affecting storage of *gur* the chief one is its quality. Good quality *gur* hard in consistency, with a good crystalline structure, and with less of mineral matter, keeps best. Particular cane varieties like B. 208 are noted to yield *gur* of very good keeping quality. Excess liming of juice prior to *gur* manufacture is known to improve the keeping quality of the resulting *gur*. Varahalu (1937) indicated that an atmospheric humidity of 50 to 60% was ideal for preserving jaggery well. Excessive manuring of sugar cane with artificials like sulphate of ammonia is reported not only to interfere with the initial quality of the *gur* but also with its keeping quality. *Gur* from ill-drained lands, where swampy conditions prevail during the monsoonic months though apparently good at the time of manufacture deteriorates quickly on storage. Size and shape of the *gur* preserved will also interfere with its keeping quality.

Storage of *gur* on any considerable scale is done only by the merchants; most of the cane growers sell out their produce immediately after manufacture. Various methods are adopted for storing *gur* in this State and these are detailed below.

Southern Districts: In the Tiruchirapalli, Madhurai and Coimbatore districts small quantities of *gur* intended for domestic consumption are stored by house-holders in earthen pots closing their mouths with cane trash and plastering with cowdung and red earth,

Merchants stock *gur* in gunnies inlaid with palm-leaf mats. Each bag contains 140 lb. of *gur* and the bags are kept separately but not stacked one above the other. Rare cases of packing *gur* in dealwood boxes are also met with. Bulk storage of *gur* is done by spreading a layer of cane trash 6" to 8" thick on the floor of a pucca room on which *gur* cubes are spread evenly to a height of about 9" to 1 foot. Three layers of *gur* cubes alternating with trash layers are spread and *gur* is preserved for varying periods, Some merchants fill *gur* in ordinary gunny bags and keep them in godowns on the floors of which paddy husk or groundnut shell is spread to ward off dampness.

West Coast: In the South Kanara district, solid as well as semi-solid *gur* is prepared. Solid *gur* will be in the form of moulds each weighing 7–14 lb. These moulds are packed in leaves known locally as "mandakas" and stored in a place to which smoke from the kitchen or the hearths has access. This is reported to preserve *gur* well. Semi-solid *gur* is poured into galvanised iron tins of four gallon capacity, each tin holding about 56 lbs. of the stuff. These tins are stored in damp-proof godowns.

Central Districts: The methods adopted are practically the same as those followed in the Southern districts. Bagasse instead of trash is spread in layers for bulk storage as noted above. The gunny bags inlaid with mats are stacked one over the other and the stack is rearranged once

in three months to put the lowest bag above and bring the topmost to the bottom. When large quantities of *gur* are to be stored for an year or more, godowns are specially constructed. In a well-ventilated room, low cross-walls about 1½ feet in height from the floor and at 2 feet distance from each other are built. On these walls stone slabs are put and on this improvised platform walls are built allround leaving a corridor 2' wide between this inner structure and the outer room. In this inner room bagasse is spread on the floor and *gur* stored in ½ foot layers alternating with bagasse layers of equal thickness. At the top bagasse is spread and wooden planks are put above this layer to keep off moisture.

Ceded Districts: In the Hindupur taluk *gur* is prepared in the form of small pellets each weighing about two tolas. These are heaped on cemented floors to a height of four feet and turned over once in two months, alternately the pellets are filled into gunny bags and stored.

At Hospet *gur* is made into slabs. They are also broken into convenient slices and stored in double-walled bags of date-palm leaf and are kept in a dark room over wooden planks.

Northern Districts: In the Srikakulam district *gur* is put in small earthen pots. These pots are inverted one over the other and stored in a room. On the floor of this room sand is sprinkled.

In the Anakapalli tract, *gur* is prepared in the form of bucket-shaped moulds. These moulds are wrapped in a piece of hessian cloth whose sides are stitched together. These moulds are stored 5 to 6 deep in any vacant house. No extra precautions are taken with regard to flooring or ventilation of these storage houses.

In the East Godavari district and in parts of West Godavari, storage godowns are specially built for preserving *gur* over a long period. Godowns in the former district are of a better type and every precaution is taken to ward off moisture and attack by ants. Most of these godowns are found in the Ramachandrapur taluk of this district and a few are met with in Kakinada and Peddapuram taluks also. Except in a few cases almost all of these godowns are owned by merchants.

Gur is considered fit for storage only when manufactured from the end of January to the end of March. In the summer months it is rarely necessary to smoke the godowns. Usually one and occasionally two smokings are given during this period. During the monsoon months smoking may be necessary once every fortnight. In all fourteen to fifteen smokings are given during one year, each time about 5 bags of paddy husk being used for each compartment. If the godown is partly empty the amount of husk used is comparatively less than when it is full. Care is taken to store

the best quality *gur* on the topmost tier, for the chances of the smoke coming into contact with the *gur* are less than those in the lower tiers. Once the smoking is commenced it will not be possible to enter the godown till after six days, until the *gur* inside has cooled down. Thus the periodicity of smoking and the quantity of paddy husk necessary for smoking each time depends upon the discretion of the person in charge of the godown. It should be noted that in this godown it is possible to take out or put in more stocks without in any way lessening the keeping quality of the *gur* stored in it. This is the advantage the godown has over the permanently sealed, pucca godowns that may be found in the Central districts.

Smoking is a crude way of keeping off moisture from deleteriously affecting the keeping quality of *gur*. The technique of smoking is not standardised but is a matter of discretion of the person in charge of the godown. Barring these two defects the godowns in practice have turned out to be very effective store houses for *gur* in which the stuff could be kept undeteriorated for over a period of 12 months or over.

There is only a slight fading of the colour of the *gur* thus stored, consistency remaining practically the same. The owners of the godowns charge the people storing *gur* at the rate of 5 to 8 annas per basket for the entire season. It is estimated that about 3,25,000 imperial maunds of *gur* are preserved in such godowns each season and that the loss in storage in these godowns will be 1·2% on the weight of *gur* stored. In view of these advantages it is desirable to build such godowns either individually or on a co-operative basis throughout the State and arrange for the storage of *gur* in them. This will not only enable the cane growers to sell their produce at a time when the prices are ruling high but will also prevent the national loss involved in improper storage and handling of *gur*.

Summary and conclusions: Even though Madras is chiefly a *gur* producing state and *gur* is a commodity required for consumption throughout the year, effective measures for preserving it are not extensively in vogue. Specially designed and efficient godowns are to be met with in East Godavari district and these are well worth copying in the other parts of the State.

Adverse effects of wet weather are minimised by smoking in these godowns. It is necessary to devise a more hygienic and upto date method for this.

Weather Review — For November 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.	Gopalpur	8·9	+5·0	47·6	Central—*Contd.*	Coimbatore (C. B. S.)*	3·1	—1·9	20·5
	Calingapatnam	4·4	+1·0	30·0		Coimbatore	2·4	—1·6	16·5
	Vishakhapatnam	4·3	—0·4	37·2		Tiruchirapalli	5·1	—1·9	25·4
	Anakapalle*	4·8	+2·0	33·9	South.	Nagapattinam	13·6	—3·9	44·3
	Samalkot*	2·5	—2 0	41·2		Adutturai*	9·9	—2·6	32·7
	Kakinada	8·3	+2·7	41·9		Pattukottai*	7·0	—1·5	30·6
	Maruteru*	3·3	—0·4	52·1		Madhurai	0·3	—5·4	31·7
	Masulipatnam	3·9	+1·9	36·3		Pamban	8·7	—3·0	23·2
	Guntur*	1·0	—1·2	31·5		Koilpatti*	1·2	—6·5	17·9
	Agrl. College, Bapatla*	3·5	—0·2	30·5		Palayamcottai	4·9	—2·5	22·3
	Rentachintala	1·2	—0·7	22·8		Ambasamudram*	6·7	—4·9	26·8
Ceded Dists.	Kurnool	0·2	—1·0	29·0	West Coast.	Trivandrum	3·5	—3·5	62·7
	Nandyal*	0·2	—1·1	25·7		Fort Cochin	4·3	—2·4	134·8
	Hagari*	3 0	+1·5	24·1		Pattambi*	5·3	+0·3	158·1
	Siruguppa*	2·5	+1 2(a)	28·7		Taliparamba*	4·8	—0·4	148·7
	Bellary	1·0	—1·0	23·5		Nileshwar*	1·7	—4·4	172 4
	Cuddapah	1·1	—2·4	20·3		Pilicode*	3·0	-2·5@	144·9
	Kodur*	2·9	—7·2	22·6		Mangalore	2·8	—1·1	148·9
						Kankanady*	1·8	—2·0	150·4
Carnatic.	Nellore	9·5	—2·2	52·9					
	Buchireddipalem*	4·4	—9·7	39·1	Mysore & Coorg.	Chitaldrug	3·0	+0·6	24·8
	Madras (Meenambakkam)	6·3	—7·7	36·0		Bangalore	7·1	+4·4	31·5
	Tirurkuppam*	5·8	-6·6@	35·9		Mysore	4·2	+1·5	28·4
	Palur*	5·1	—9·9	34·3		Mercara	2·0	—1·0	134·5
	Tindivanam*	5·8	—2·8	25·6	Hills.	Kodaikanal	2·4	—7·8	43·5
	Cuddalore	8·5	—7·0	29·2		Coonoor*	10·5	—4·8	43·3
						Ootacamund*	3·7	—3·1	42·6
						Nanjanad*	3·3	—2·1	54·8
Central.	Vellore	0·9	—6·8	19·2					
	Gudiyatham*	2·0	—3·1	15·3					
	Salem	2·0	—1·8	29·9					
	Coimbatore (A. C. R. I.)*	3.9	—0·8	21·9					

Note:— (1) * Meteorological Stations of the Madras Agricultural Department.

(2) Average of ten years data is taken as the normal.

(3) @ Average of seven years data for Tirurkuppam and eight years data for Pilicode is given as normal.

(4) (a) Taluk office normal is 1·43″ and rainfall is 2·42″.

Weather Review for November, 1950

The month began with the seasonal trough of low pressure over the Bay of Bengal, which, on the next day, shifted south-westwards. This caused a marked strengthening of the North-east monsoon in the Madras State and Mysore.

On 3—11—1950 a trough of low pressure appeared in the east Arabian sea off the Kanara Coast and became less marked the next day. Three days hence the seasonal low was found re-establishing itself over the South Bay of Bengal and remained fairly well-marked for four days. On 15—11—1950 it became well-marked over the South-west Bay of Bengal. In association with it, the North-east monsoon became active over the Peninsula, south of latitude 14° North. On 16—11—1950 it concentrated into a depression. The rain-belt associated with the depression extended from East Pakistan to coastal Andhradesa on 17—11—1950. After two days the seasonal trough of low pressure re-established itself for the second time over the South Bay of Bengal. On 21—11—1950 a fresh low pressure wave was found moving westwards through the Gulf of Siam and this moved into the Andaman Sea the next day and remained in that region for three days.

The pressure distribution over the South Bay of Bengal and the South-east Arabian Sea became normal on 27—11—1950. The month ended with a well-marked anti-cyclonic circulation in the upper air over Burma.

There is nothing worth recording about the variation in day temperatures.

Night temperatures were below normal over the major portion of the region, particularly in the second half of the month. Ooty recorded the lowest minimum temperature of 36° F. on 26—11—1950.

Particulars about the zonal rainfall in the Madras State and noteworthy falls in the month are given below :—

S. No.	Name of the zone.	Total Precipitation.
1.	Orissa and Circars	Above Normal
2.	Ceded Districts	Below Normal
3.	Carnatic	Far Below Normal
4.	Central	Below Normal
5.	South	Far Below Normal
6.	West Coast	Below Normal
7.	Mysore and Coorg	Above Normal
8.	Hills	Below Normal

Except the Circars and the Mysore and Coorg regions the North-east Monsoon showers in the rest of the Madras State in November 1950 were disappointing.

Noteworthy Falls.

S. No.	Date.	Place.	Rainfall in inches in a period of 24 hours.
1.	3—11—50	Turaiyur (Trichy Dt.)	5 5
2.	4—11—50	Kakinada	3·2
3.	11—11—50	Pamban	3·7
4.	13—11—50	Nellore	6 3
5.	15—11—50	Nagapattinam	5:9
6.	15—11—50	Cuddalore	3·9
7.	16—11—50	Madras (Nungambakkam)	3 5
8.	17—11—50	Gopalpore	3·8

The weather in second half of the month was practically dry.

Agricultural Meteorology Section,
Lawley Road Post, Coimbatore
Dated, 11—12—1950.

M. B. V. N., C. B. M. & M. V. J.

Departmental Notifications

GAZETTED SERVICE—POSTINGS AND TRANSFERS

Names	From	To
Sri John, C. M.	Principal, A. C. & R. I., Coimbatore,	Director-Cum Coconut Specialist, Kasaragod
,, Krishnamurthi, C.	Asst. Entomologist, on leave,	Asst. Entomologist, (Civil Supplies) Vijayawada.
,, Kalyanasundaram, N.V.	Agronomist, Siruguppa,	Sugarcane Inspector, Mathurai.
,, Krishnamurthi, R.	P.A. to D.A.O., Tanjore,	Asst., Cotton Extension Officer, Bellary.
,, Raghavan, A.	Asst., Cotton Extension Officer, Bellary,	Asst., Cotton Specialist, Hagari.
,, Rayappa Pillai, M.	Asst. in Paddy, Rice Research Station, Tirurkuppam,	Supdt. A. R. S., Samalkot.

SUBORDINATE SERVICE—POSTINGS AND TRANSFERS

Names	From	To
Sri Ali Hyder,	A. D., Kudligi,	P. A. to D. A. O., Bellary.
,, Barthan, P.	P. P. A., (Entomology) Salem,	A. A. D., Namakal.
,, Balraj, G. J.	Marketing Asst., (on leave)	A. D., Paramakudi.
,, Banumurthi, N.	A. A. D., Vijayawada,	A. A. D., Rasipuram.
,, Ganapathy, N. K.	A. A. D., Tirunelveli,	A. D., Srivaikuntam.
,, Gopalan, S.	A. A. D., Kulitalai,	A. D., Parambalur.
,, Krishna Rao, M.	P. P. A., Vijayawada,	A. A. D., Gobichetti-palayam.
,, Krishnamurthi, K.	A. A. D., Patapatnam,	A. A. D., Devakottai.
,, Krishnamurthi, P.	A. A. D., Chodavaram,	A. A. D., Dindigul.
,, Kumaraswami, P.	A. A. D., Hospet,	A. D., Hospet.
,, Krishnamurthi Rao, S.	P. A. to D. A. O., Bellary,	Special A. D., T. P. Scheme, Bellary.
,, Krishnamurthi, B.	A. D., Madakasira,	A. D., Ooty.
,, Krishnan, K.,	A. D., Kozhikode,	P. A. to D. A. O., Tanjore.
,, Md. Baig,	A. D., Bhimavaram,	Paddy Seed Development Asst. Bhimavaram.
,, Narasimhamurthi, V.	A. D., Vizayanagaram,	F. M., Dairy Cum Bull Farm, Vizayanagaram.
,, Nataraja Iyer, V.	A. D., Pudukottai West,	A. D., Pudukottai East.
,, Narasimhamurthi, H.	A. D., Hospet,	Special A. D., T. P. Scheme, Hospet.

Names	From	To
Sri Narayana Rao, T.	A. D., Harpanahalli,	Special A. D., T. P. Scheme, Kampli.
,, Parthasarathi, V.	Asst. in Mycology, Coimbatore,	F. M. Central Farm, Coimbatore.
,, Prahlada Rao, C.	A. A. D., Adoni,	A. D., Kudligi.
,, Padmanabha Raju, B.	A. D., Rajampet,	A. D., Bhimavaram.
,, Prabhakara Rao, C.	A. D., Gannavaram,	A. D., Kudligi.
,, Periaswami, S.	Asst. in Entomology, Shembaganur,	A. A. D., Attur.
Sri Rangamannar, D.	Asst. in Entomology, Siruguppa,	Asst. in Cotton, Siruguppa.
,, Ramachandra Rao, A. V.	A. D., Yellamanchilli,	A. A. D., Villipuram.
,, Ramachandran, L.	A. D., Darsi,	A. D., Madakasira.
,, Raghava Rao, K. V.	A. D., Rapur,	A. D., Nandigama.
,, Radhakrishnan, K. S.	Asst. in Meteorology, A. R. S., Hagari,	A. A. D., Hospet.
,, Suryanarayanaraju, R. V. S.	A. A. D., Ramachandrapuram,	A. A. D., Tiruchirapalli.
,, Srinivasa Rao, K.	A. A. D., Narasapur,	A. A. D., Ambasamudram.
,, Sriramachandramurthi, N.	A. A. D., Amalapuram,	A. A. D., Tirunelveli.
,, Subba Rao, A.	A. A. D., Nandigama,	A. D., Pattikonda.
,, Sriramamurthi, G.	A. A. D., Kakinada,	A. A. D., Tirumangalam.
,, Sheenappa, K.	Coconut Nursery Asst., Coimbatore,	Special A. D., Sugarcane, Mangalore.
,, Shanmugam, C.	A.A.D., Ambasamudram	A. D., Tenkasi.
,, Sitaramaswami, U. B.	F. M., Dairy-Cum Bull Farm, Vizagapatam,	A. D., Vijayanagaram.
,, Surendranath, G.	Chillies Asst., Lam Farm, Guntur,	Asst. in Paddy, A. R. S., Pattambi.
,, Subramania Iyer, R.	Special A. D., Manure, Musiri, (on leave)	A. D. Sattur.
,, Swaminathan, S.	A. D., Perambalur,	A. D., Pudukottai.
,, Swaminathan, K.	A. A. D., Tiruchirapalli,	A. A. D., Kulithalai.
,, Sethuraman, M. S.	P. P. A., (Mycology) Ootacamund,	P. P. A., (Entomoloy) Salem.
,, Sriramachandran, K.,	Asst. in Mycology, Coimbatore,	Asst. in Mycology, Wynad.
,, Suryanarayana, P. S.,	A. A. D., Namakkal,	P. P. A., (Entomology) Calicut.
,, Suryanarayana-Veerabhadra Rao, V.	A. A. D., Razole,	A. A. D., Lalgudi.
,, Venkataramaiah, C.	A. A. D., Vijayanagaram,	F. M., Dairy-Cum Bull Farm, Vizagapatam.
,, Venkatanandhachari, G.	A. D., Nellore,	A. D., Harpanahalli.
,, Viswanathamurthi, K.	Paddy Seed Development Asst., Bhimavaram,	Asst. in Paddy Deep Water Paddy Station, Pulla.
,, Venkateswara Rao, A.	Special A. D., Kovur,	A. D., Rapur.
,, Venkataraman, A.,	Coconut Nursery Asst., Maruteru,	Coconut Nursery Asst. Coimbatore.
	Asst. in Chemistry,	A. A. D., Nilakottai.

APPOINTMENTS

The following candidates are appointed in the Madras Agricultural subordinate Service and are posted in vacancies shown against each :—

Sri Damodaram Nambiar, M. (Malabar)	Asst., in Chemistry, Coimbatore.
,, Dharma Rao, C. (Kistna)	Asst., in Chemistry, Coimbatore.
,, James, K. I. (Cochin)	Asst., in Cotton, Coimbatore
,, Pandurangan, S. V. (Tanjore)	Seed Development Asst., (Millet) Coimbatore
,, Raman, K. (Madras)	Asst., in Entomology, Shenbhaganur, Madura
,, Rajagopalan, C. K. (Malabar)	Asst., in Pulses, Coimbatore
,, Radhakrishnan, T (Madras)	Asst., in Chemistry, Coimbatore.
,, Ramaswami, A. N. (Madura)	do.
,, Sivarama Shetty, K. (S. Kanara)	do.
,, Sekharan, K. V. (Malabar)	Asst., in Entomology, Coimbatore.
,, Subramania Chetty, R. (N. Arcot)	A. A. D., Erode.
,, Subba Rao, S. V. (W. Godavari)	Asst., in Entomology, Siruguppa.
,, Satyanarana Raju, G. (Vizag)	A. A. D., Tindivanam.
,, Thyagarajan, N. M. (N. Arcot)	Asst., in Chemistry, Coimbatore.
,, Thyagarajan, R. (S. Arcot)	Asst., in Chemistry, Coimbatore.
,, Vijayan, K. M. (Malabar)	Asst. in Mycology, Coimbatore.

Agricultural College and Research Institue, Coimbatore

LIST OF ADDITIONS TO LIBRARY FOR DECEMBER, 1950.

1.	BRISTOL '20' Chart	(1950)	Ferguson Tractor Chart Farm Mechanization.
2.	CENTRAL BUREAU VOOR BAANN:	(1950)	SCHEME CULTURES List of cultures: Konniklike
	.....		Nedarlandse Academic Voor Western Schaappen.
3.	GAUMANN (E.):	(1950)	Principles of plant Infection; Crossby; Lockwood.
4.	KRAMER (Paul J.):	(1949)	Plant and soil water relation-ship Mc Graw Hill Book Co., Bot. Science.
5.	.....		Sample surveys for estimation of yield of food crops: Indian Council of Agricultural Research. New Delhi.
6.	SCHAFER:	(1949)	Essentials of histology Ed. by Carleton and Leach. Longmans Green Co.,

The Madras Agricultural Students' Union,

LAWLEY ROAD P. O.

*

Appeal

All members and subscribers of the Madras Agricultural Journal are earnestly requested to clear off all their arrears, if any. This would be a great help to the finances of the Union.

The Hostel Tatler

CONTENTS

TRICK

By

H. BALASUBRAMANIAN

Fun and frolic pervaded the house of Gopal ; his mother was in a state of joy and was busy running about, to get new sarees and shirts, for the ensuing marriage of her only son, Gopal.

The bridegroom however, instead of sharing his mother's joy was sitting dejectedly in a corner. It was not merely the grief at the loss of his wife, at the early age of twentyfour that weighed so much upon his mind, but what galled him more, and took away all his cheer, was that his mother should be so forgetful to his wife's memory, who had been to her, so loving and so gentle a daughter-in-law. Now, within two months, her insisting on his marrying another girl, was really too much. And that too, her brother's daughter, in itself an highly improper marriage, from the nearness of relationship, but made much more so by such indecent haste. He had also become the father of a child of two years six months. This, more than everything else dashed his spirits to the depths of gloom.

His silence was disturbed by the entry of his friend Mani and his mother, who were really puzzled at the strange behaviour of Gopal, who was to be married in another week. In vain was all that his mother or his friend could do to divert him. He still appeared in mourning for Sumathi, his first wife, nor could he be brought to join in any of the festivities or rejoicings of that (as appeared in him) disgraceful day. After his mother left him, he gave vent to his pent-up feelings and disclosed to his friend that he could never marry another girl. That night he felt quite restless. In his sleep he saw the spirit of his wife, saying "Behold the son that is yours, before you launch out into a second marriage." This thought threw him off his bed and he stealthily left the house the same night to his father-in-law's house to see his son.

Sumathi's father was surprised to see his son-in-law, but welcomed him all the same, wishing him a happy married life at least with his second wife. Gopal told his father-in-law, about his deterimination not to take a second wife and requested his father-in-law to allow his son to remain with him.

Gopal's mother was overwhelmed with grief in not finding her son, the next morning. She could not even receive her brother, who was to be her sons's father-in-law. She made up some excuse, saying that her son had to leave the place in a hurry due to some urgent official work. Her brother was in a fix, and finally left the house, desiring to fix up the betrothal a week later, on the next auspicious day.

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,

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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 langushing 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 phamphlets 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 mesure.

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 adminstration. It was a miracle how he escaped a death sentence. Thirtytwo 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 partiots 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 smoothy 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 Monohar 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 gramaphone 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 clamming 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 heedlees 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. BHOOMINATHAN

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

delirious with excitement that even the oldest inhabitant was heard to say "Well, I will be hanged" twice within half an hour. Little Urkad became the happy hunting ground of special correspondents and alert youngmen with cameras.

Words failed them when the will of the defunct Zamindar became public property. Under this remarkable document his son, the Rajkumar inherited the family's fortune of Rs. 3,50,000 a year (free of income-tax). But on one condition. That condition was that the Rajkumar should, within six calendar months of his father's demise, marry a spinster who lived or whose parents lived within a radius of seven miles from the lodge gates of the palace. Otherwise.....but of that later.

It can be realised how deeply the locality was stirred when the news spread that Mrs. Mandu, the Rajakumar's aunt and Maharani of Singa, another near by Zamin, had left her comfortable palace and moved into furnished quarters, half a mile from the hall. Mrs. Mandu, leaving nothing to chance, had actually driven over from Singa Palace to the lodge gates, examined the mileage on the speedometer and made it seven miles, two hundred and forty-two yards and a few feet.

For five months, the little Urkad was like a bundle of taut wires. So great was the strain that it was a wonder, some of them, Mrs. Mandu for instance — did not snap. All this time, the Rajkumar had given no sign of any decision. He, as is the habit of all eligible young men with receding chins, had dallied with each maiden in turn, but nothing approaching a firm offer had passed his lips. By this time, the agony of anticipation, was indescribable. No fewer than twenty-three rich families had taken their residence in the vicinity of Urkad. From North, South, West and East, they had come, dragging with them, their daughters. The housing accomodation in what was known as "the seven-mile radius" became strained to its utmost. The shop keepers enjoyed an immense trade. Little Urkad hummed with activity. It was as though a family vault had been turned into a Palais de Dance. The mothers of the "contemptibles" as they were called, vied with the new invaders in the theatre (one in Ambai's two miles off) in the palace etc. The Rajkumar, sandy, sentimental and thirty, was having the time of his life. Never had so many alluring spinsters been congregated within a radius of seven miles for his delectation. Not one of them ever doubted that he will fail to fulfil the condition of his father's will. Even the new arrivals knew him too well for that. The thought that his continued silence would transfer an income of Rs. 3½ lakhs (free of income tax) to the proprietor of the local home for the Feeble-minded was simply out of the question. Little Urkad, nay, all Thirunelveli expected that Rajkumar one day would do his duty.

With only three weeks to go, Rajkumar's engagement was still not announced. The seven - mile radius was like a volcano on the verge of eruption. The atmosphere was electrical. Reliable critics had narrowed the issue down to three eligibles, whose chances were ranked in this order: Miss Mandu, (2) Miss Nirmal, (3) Miss Kamala.

Time passed and with only seven days to go the Rajkumar was still undecided. There would be just time, he told himself for a registry office wedding, to be followed, no doubt by a temple ceremony of imposing proportions. But, tomorrow, at all costs, he must make up his mind between the charms of Mandu, Nirmala and Kamala.

Rajkumar would doubtless have postponed the great adventure until the day after he had realised that the morrow in question happened to be a "karinal" a Friday and the 13th as well. As it was, he spent Thursday afternoon alternately cursing his eccentric father and reading "Advanced Tennis" by Dr. Booms. When he was half - way through the chapter on "Volley against wind" he realised that a game of tennis contained all the ingredients for the supreme test of human character. His own attitude towards the present crisis, his conscience told him, was only to be expected, on recalling the numerous occasions at tennis when he had lost his nerve and temper, made wrong decisions and paid the penalty. Tennis was obviously an ordeal that laid bare the soul and revealed the innermost depths of the heart.

Miss Mandu, Nirmala and Kamala for instance were three charming girls, but though he confessed to be attracted by all of them, he felt, he knew surprisingly little about them. He had studied their features and the way they talked and did their hair but their real selves were as much a mystery to him as Dr Booms' method of playing a volley against the wind. He had read in books that the acid test of marriage was the daily meeting of husband and wife at breakfast. He quite agreed that if a man felt like breakfasting with a woman for better or worse, in sickness or in health, for the rest of his life, then he might safely ask her to marry him.

After tea the, Rajkumar called his chokra and sent him off with letters to deliver. Events moved swiftly and the following programme was arranged for the morrow.

10 A. M.	Tennis with Miss Mandu
2 P. M.	,, ,, Nirmala
5 P. M.	,, ,, Kamala

Friday the 13th, dawned brightly, an ideal day for tennis at half-past nine, when Rajkumar was preparing to leave the hall, a representative of "Daily Depress" called to ask if his Highness had any statement to make in view of the short time remaining at his disposal before the last day

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 hear 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 gainst 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 Madura.

"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 Chitragupta. 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 byelanes 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 Madura, 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 Shenoynagar. 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, each will tell the heroic battle fought with fortitude by its illustrious 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 immunerable 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 though 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. Probobly 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 existance 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 horizen illumunating 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

By

P. CHANDRASEKHARAN NAIR

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. Bnt 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 a 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 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 Scotch—man 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. Winser, a German in England, proposed to the Government to light the streets with gas. It is intersting 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. Winser formed a company for gas lighting the streets of London and he earned a profit while Murdock the pioneer remained poor.

In 1813, Westminister 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 experimention 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.

If the wires running through the neck of lamp did not expand just as quickly a space 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 earlned 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 illimunation, 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 perseverence, a poor man is now able to light his house with a kerosene lamp and a rich man in town with electric light.