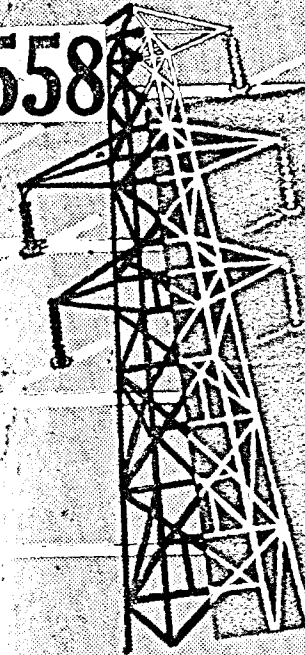


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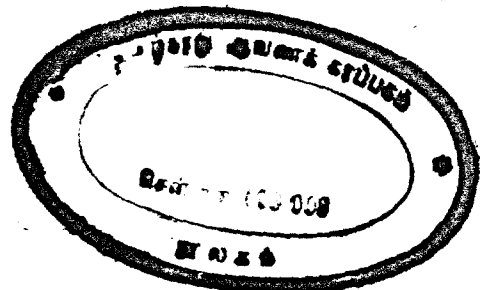
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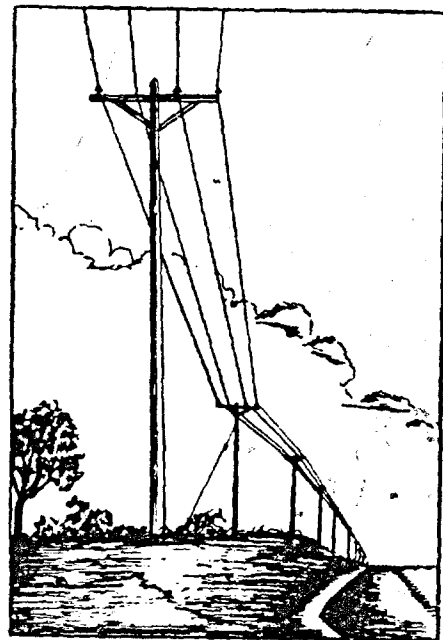
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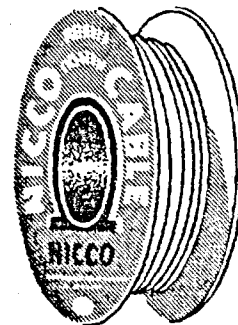
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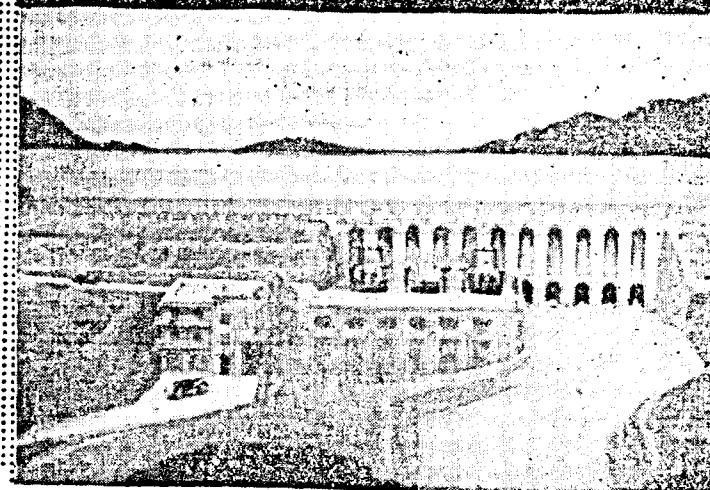
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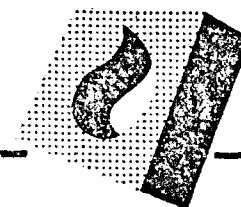


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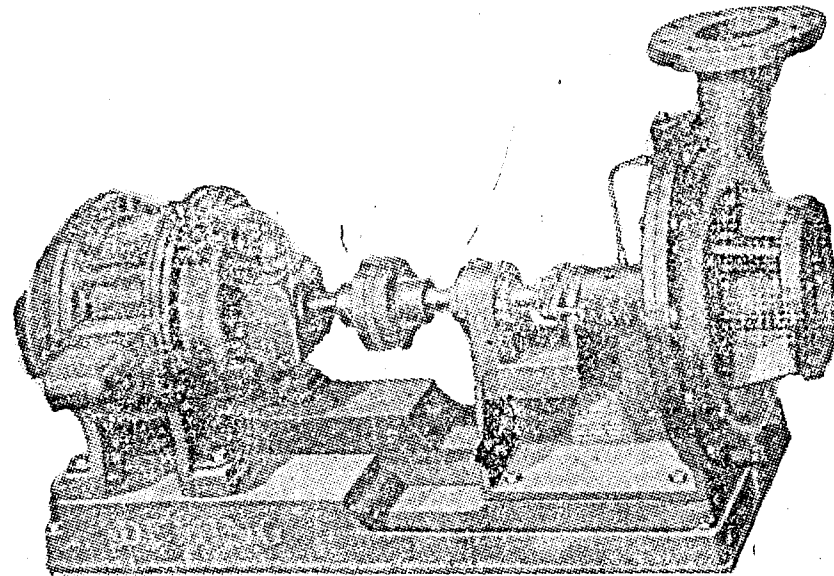
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No. 2



THIS ISSUE

Editorial	...	7
Lightning Arrester Logic	...	9
Thoughts for Food	...	17
The Mulliyar Pumping Scheme	...	21
International House		
Magazines Exhibition	...	24



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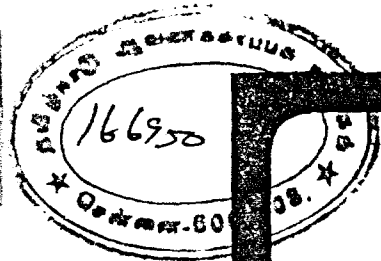
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EVERY ISSUE

South-Madras Electric Supply News	...	27
Our Book Shelf	...	30
Current Topics	...	34
Strictly Personnel	...	37
சென்னை மாகாணத்தில் மின்சார அபிவிருத்தி	...	44

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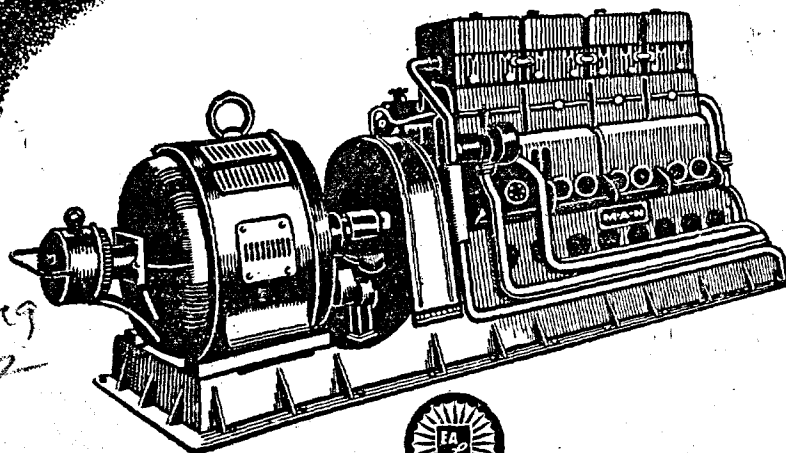
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EDITOR: R. PARTHASARATHY

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JULY—SEPT. 1951

NO. 2

Guest Editorial:

A DISASTER AVERTED

DURING the last 12 months India has passed through a period of great crisis—the danger of a widespread famine. Free India with the co-operation of her own people, and the assistance of outside nations, has well-nigh surmounted the crisis. It is true that the immediate threat has been warded off, but this is only a milestone. Beyond still lies a long and tricky road which we shall have to tread before the war against food shortage is won.

The story of the natural calamities that overtook the nation from June 1950 onwards has often been told, but it will bear repetition. As a result of floods in some parts of India, and a devastating drought which affected the whole of the “rice

bowl”, about five and a half million tons of foodgrains were either destroyed or lost. India is a vast country; a shortage of rains in some parts or floods in others is not an unusual occurrence, but 1950 was a freak year. Not during the last 50 years were there so many calamities, nor were they ever concentrated in so short a period as three or four months. This led to an extraordinary situation—a rapid depletion of grain stocks and increasing demands from the States. It was estimated that the failure of crops owing to the drought in Bihar would affect three crores of people; in Madras, owing to the failure of the monsoon for the fourth year in succession, about two crores of people would have had to pass through difficult times; and conditions in some other

States like Hyderabad, parts of Bombay and Rajasthan would be only slightly better.

Quick remedies had to be devised to meet the desperate situation. The original import target of foodgrains was raised, new contracts were made, foodgrains were borrowed from other countries, and every effort was made to ensure maximum supplies, during the first half of the year. Even so, the country faced a grim situation. Day after day, sometimes hour after hour, the Centre was inundated with demands from States which had stocks for a few weeks—sometimes only a few days—and frequently the rationing system collapsed in some part or the other of the country, for lack of supplies.

The year 1951 opened with stocks totalling 700,000 tons, which were the lowest on record, and were barely sufficient to see the country through for one month. Because of the shortage of shipping as a result of the Korean War, it became impossible to bring into the country grain in sufficiently large quantities to relieve the strain through which it was passing. A stage had been reached when it became necessary to apply a 25 per cent cut in rations throughout the country. This extreme step had to be taken to conserve the country's stocks.

As a result of the cut, the country's stock position improved steadily and slowly though at the cost of considerable suffering.

After all is said and done a cut is only a negative act. The real causes for the improved food position are much strenuous work in the deficit States, the spontaneous goodwill of friendly nations who came forward with sympathy, ships and foodgrains, and the cheerfulness with which the people have borne the hardships of austerity rations. To America, in particular, this country owes a special debt for her two-million-ton food loan.

The stocks in the hands of Government have increased, an additional 19 lakh tons have been allotted to the deficit States, and by the end of the year a total of over five million tons of food grains will have arrived in the country. Criticism is sometimes heard that there is little merit in having beaten back famine by the help of imports costing crores of rupees. There is force in the argument, but it fails to realise the necessity for drastic remedies to meet an unprecedented crisis. It must, therefore, be the country's ceaseless endeavour to reach self-sufficiency in food, and it behoves us all to bend our energies to that end.

LIGHTNING ARRESTER LOGIC

Electrical lines and equipment receive maximum protection from lightning arresters only when these arresters are properly applied to the line. Principles for obtaining this maximum protection.

UNTIL money grows on the proverbial tree, every one is interested in obtaining the greatest value from his purchases. When electric operating companies buy lightning arresters, they are investing in protection. Naturally, they are interested in obtaining the maximum protection for their equipment from this investment. As a result, lightning arresters must be applied in the manner which will provide this maximum protection. However, lightning arresters, like all other equipment, can be damaged by misuse; consequently, they must be applied within their voltage limits—as specified by the manufacturer.

ARRESTER PRINCIPLES

An intelligent application of arresters requires an understanding of their basic functions. The primary purpose of an arrester is that of providing a low impedance path to ground for a lightning surge. In this manner, overvoltages due

to lightning are drained off the line before they can cause damage to transformer insulation and other equipment which could be affected.

In addition to this primary function, the arrester must also perform certain secondary operations. First, while draining the lightning surge from the line, the arrester must not allow this surge current to build up a large impedance drop across the arrester, thereby reflecting a high voltage on to other equipment on the line. Secondly, the arrester's inherent manner of operation causes the lightning surge to form a path to ground for 60-cycle power follow current, and so the resulting arc must be extinguished by the arrester. In actual construction the arrester functions are performed by a refined air gap in series with either a non-linear resistive element, or with an expulsion chamber somewhat similar to an expulsion fuse. The valve type arrester (Figure 1), using the non-linear resistance element, starts to drain surge current to ground when the series gap is sparked over by a lightning surge. The resistance element offers low resistance to the flow of surge current, thus keeping the IR drop across the arrester to a low value. The element, however, offers a very high resistance to the flow of

cycle power follow current which tends immediately to follow the surge discharge.

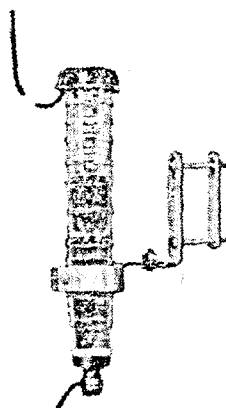


FIG. 1

The follow current is limited to such a low value that the arc cannot be maintained across the arrester gap. The wide variation in resistance to the flow of current causes the element to be termed a "valve element" and the arrester a "valve type arrester".

The expulsion arrester (Figure 2) operates on a somewhat different principle.

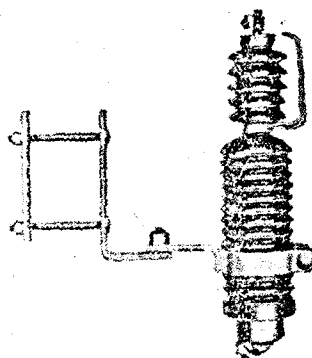


FIG. 2

Again, the lightning surge is drained from the line by the sparking over of the series gap. Since the expulsion chamber has

practically no impedance to surge, the surge current builds up little impedance drop. However, the 60-cycle current which immediately follows the surge discharge, establishes a high current arc across the series gaps and through the expulsion chamber. This arc then develops a gas pressure within the expulsion chamber, and the arc is extinguished at the first current zero by an expulsion action, similar to that of an expulsion fuse, leaving the arrester ready to operate again when required.

Obviously, the series gaps of the arresters must be designed so that the 60-cycle voltage on the line is not great enough, by itself, to cause the series gap to spark over. In effect, systems with higher voltages require arresters which have gaps with larger spacings. Consequently, the impulse level, or the lightning surge voltage necessary to spark over the arrester, also increases as shown in Figure 3.

This curve is a plot of the lightning surge voltage crest (minimum impulse)

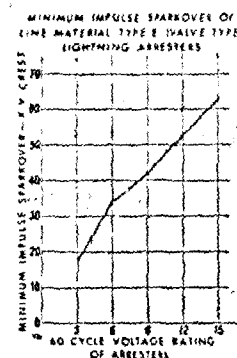


FIG. 3

required to spark over the series gaps of the various rated arresters.

this curve it can be seen that the impulse level or lightning surge protection of a lightning arrester is approximately proportional to the power frequency voltage rating of the arrester. For maximum protection, a lightning arrester having the lowest power frequency voltage rating consistent with the system operating voltage should be selected.

The voltage rating of an arrester represents the maximum 60-cycle voltage at which that arrester is designed to operate. As a result, the minimum voltage rating of an arrester which can be used on a given system is determined by the maximum line-to-ground voltage that can occur on the system *even under abnormal and momentary or transient conditions*.

The voltage of any given system will vary from point to point due to regulation caused by load. The voltage at a given point on the system will also vary with time due to regulation. In addition, temporary overvoltages caused by system faults must be considered in arrester applications. The variations in line-to-ground voltage on a system due to regulation and faults are common to all systems and not out of the ordinary.

The line-to-ground voltage of a few individual systems may also be influenced materially by one or more of the following factors:

1—Induced voltage from unbalanced paralleled higher voltage circuits in close proximity

- 2—Contact with circuits of higher voltage
- 3—Generator over-speed due to sudden loss of load
- 4—Harmonic overvoltages
- 5—Loss of neutral connection to ground

Problems caused by these five factors, however, are not common to the majority of systems, and so will not be considered in this article.

SYSTEM OPERATING VOLTAGES

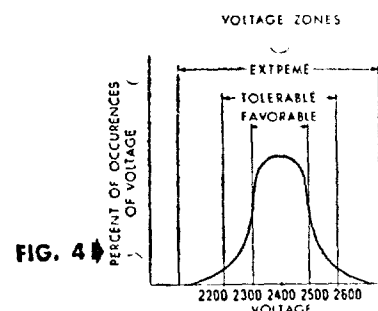
The various classes of systems are frequently referred to by various system voltages. As an example, one class may be referred to as 2200/3800Y, 2300/4000Y, 2400/4160Y, or 2500/4330Y. These various system designations have frequently caused considerable confusion.

In order to provide a more common basis for rating systems and equipment, a Joint Committee of the Edison Electric Institute and the National Electrical Manufacturers Association undertook a study of voltages which can occur on systems, and the voltages which are permissible on various types of equipment. The results of the study are published in a report entitled "Preferred Voltage Ratings for AC Systems and Equipment."* The Committee standardized on a single nominal voltage designation for each class

* The report, issued in May, 1949, is designated EEI Publication No. R-6 and NEMA Publication No. 117. Copies can be obtained from the Edison Electric Institute, 420 Lexington Avenue, New York 17, New York, or from the National Electrical Manufacturers Association, 155 E. 44th Street, New York 17, New York.

of system and equipment. These nominal voltages are based on an even multiple of 120 volts. In the example above, the designation therefore would be 2400/4160Y.

The Committee also made a survey of the various voltages existing on systems in this country. They found that the variation in voltage from point to point on a system and from time to time at a given point will be distributed in a manner similar to Figure 4. This distribution of voltages is characteristic at any



designated class of points such as points of utilization, points of service delivery, distribution transformers, and substation buses.

The distribution of voltages, as shown in Figure 4, has been divided into three zones. The Favorable Zone contains the greater part of the existing voltages. Systems will ordinarily be designed so that most of the operating voltages lie within this zone. The Tolerable Zone contains voltages which lie above and below the Favorable Zone. These necessarily result from practical operations under field conditions. They must be recognized as a normal part of the existing range of voltages, although not being those most desirable. Systems will

ordinarily be designed so that the frequency of recurrence of such voltages, both as to location and as to time, will be minimized. The Extreme Zone will include the relatively few extreme departures in voltages beyond the Tolerable Zone. Ordinarily such cases will be considered as temporary, and subject to improvement.

In the application of lightning arresters we are particularly interested in the maximum voltages that are liable to occur on a system. Listed in Table I below are the maximum Tolerable Zone voltages, at the primaries of distribution transformers and at substations, for the various nominal system voltages.

TABLE I
MAXIMUM ZONE VOLTAGES
Maximum Tolerable Zone Voltage

Preferred Nominal System Voltage	At Primary of Distribution Transformer	At Buses of Substations
2400	2600	2750
2400/4160Y	2600/4500Y	2750/4760Y
4800	5200	5500
7200	7800	8250
4800/8320Y	5200/9000Y	5500/9520Y
12000	13000	13200
7200/12470Y	7800/13500Y	7920/13700Y
7620/13200Y	8250/14800Y	8320/14500Y
13200	14300	14500
14400	15000	15500

LINE-TO-GROUND OVERVOLTAGES DUE TO SYSTEM FAULTS

Since the line-to-neutral voltage of a system should never even momentarily exceed the voltage rating of an arrester,

the line-to-ground voltages on the system during phase-to-phase and phase-to-ground short circuits are of particular interest. The magnitude of overvoltages due to these faults is dependent on the impedance from the system neutral to ground. Consequently, power system neutral grounding is a very important factor affecting the selection of arresters having the correct rating. The effect of system grounding on the magnitude of overvoltages developed during faults can be demonstrated by considering the action on solidly grounded and ungrounded systems as shown in Figures 5 and 6 respectively.

From Figure 5 it can be seen that a short circuit from feeder A to the neutral

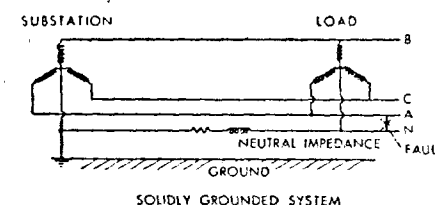


FIG. 5

N will cause an impedance drop across the neutral and shift the voltage of the neutral away from ground. Under these conditions, the voltage from feeders B and C to ground will be higher than that which occurs under normal steady operating conditions. The amount of shifting of the neutral will depend upon the impedance of the neutral and the short circuit current available in the system. When the system neutral is grounded at each transformer, the shift of the neutral

from ground is limited by ground resistance rather than by being dependent only on the impedance of the neutral. A fault on feeder A on the ungrounded system of Figure 6 effectively causes point A to be

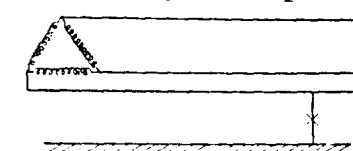


FIG. 6

at ground potential. As a result the voltage of feeders B and C to ground is then the system line-to-line voltage.

From the above, it will be apparent that the line-to-ground voltages on a system under fault conditions will depend upon the degree of grounding of the system.

The magnitude of line-to-ground overvoltages on a system, as a result of faults, can be calculated by the classical method of symmetrical components. In order to perform this calculation, however, the phase sequence components of the system impedances must be known.

The calculation of line-to-ground voltages for a large number of arrester applications becomes extremely laborious. To assist in the selection of arrester ratings, the EEI-NEMA Joint Committee has published in the report on "Preferred Voltage Ratings for AC Systems and Equipment" a tabulation which will permit the selection of arresters without the necessity of making the detailed calculations of line-to-ground voltage for

each installation. The systems have been classified into various types which depend upon limiting ratios of phase sequence components of system reactance and resistance. For convenience, the table listing the types of systems and the limits of system impedances for these various systems is shown in the appendix. Frequently, on distribution systems, the system impedances are not known and cannot be readily ascertained. As an aid in the selection of lightning arresters for these conditions, systems may be roughly classified, without resort to symmetrical components, as follows:

Type A — Multi-grounded neutral system. This system is specifically the usual grounded wye distribution system using distribution type arresters where the system neutral is solidly grounded at each distribution transformer installation.

Type B — Solidly grounded neutral system. The Type B system differs from the Type A in that the neutral is solidly grounded only at substations. Intermediate points on the system neutral are not grounded.

Type C — Impedance grounded neutral system. The neutral may be grounded at substations either through a resistance or a reactance to limit line-to-ground fault current. Systems having ground fault neutralizers are included in the Type C system.

Type D — Isolated neutral system This is the usual ungrounded type system.

The question of whether to use the system classification given above, the more exact classification based on system impedances set up by the EEL-NEMA Joint Committee, or to calculate line-to-ground voltages at the point of arrester application, depends upon the importance of the application and the economics of the installation. At large, high voltage substations on transmission systems, the calculation of line-to-ground voltages frequently can be justified. For smaller and lower voltage installations, the system classification, by phase sequence impedance ratios, will be entirely adequate. Arrester applications to distribution systems generally will be satisfactory if made according to the above classification which does not resort to the use of symmetrical components.

SELECTION OF ARRESTER VOLTAGE RATING

When the system classification has been ascertained for a particular arrester location, the correct arrester application becomes simple. For convenience Table II is given below, showing the maximum allowable line-to-line voltages, during normal operation of the system, for various arrester voltage ratings.

TABLE II
LIGHTNING ARRESTER APPLICATION TABLE

Lightning Arrester Voltage Rating Volts RMS	Maximum System Operating Voltage Line-to-Line (Upper Voltage Limit of Operating Range)			
	Type A Volts RMS	Type B Volts RMS	Type C Volts RMS	Type D Volts RMS (a)
650	650	650	650	650
1000	1000	1000	1000	1000
3000	4500	3750	3000	2700- 3000
6000	9000	7500	6000	5500- 6000
9000	12800	11250	9000	8200- 9000
12000	15000	11500	12000	11000-12000
15000	18000	18000	15000	13000-15000

(a)—The lower limit involves the least risk of overvoltage in excess of arrester rating. However, operating experience at the upper limit shows no undue risk.

As an example of the use of the information, given above assume that an arrester is to be selected for a nominal 2400/4160 multi-grounded wye system. Since the maximum voltage at distribution transformers on the system is not known, we must assume that the voltages can reach the maximum range of the Tolerable Zone as shown in Table I. This is 4500 volts.

Since the system has a multi-grounded neutral, it would be classed as a Type A. It will be seen from Table II that a 3000 volt arrester can satisfactorily be used on a Type A system having a maximum voltage of 4500. The arrester selected, therefore, would be of 3 kV rating.

ARRESTER INSTALLATION

The correct selection of an arrester for a particular location must be followed by

installation precautions. In general, there are two simple rules to be followed when installing arresters.

First, the arrester should be mounted as close as is practical to the equipment to be protected, and connections should be made to both the line and ground sides of the arrester with leads as short as possible. Since line and ground leads may produce high impedance values, impedance drops, due to the surge passing through line and ground lead impedances, can be minimized by reducing the length of these leads. The protection afforded by an arrester falls off rapidly as the distance of the arrester from the equipment increases and as the length of the ground leads increase.

Second, the arrester ground lead should be connected to the same grounded point

as the equipment being protected. In transformer protection this is accomplished by means of interconnection of the ground lead of the arrester with the tank and secondary neutral of the transformer.

It will be noted from Figure 7 that a surge current flowing from an arrester to ground through a high grounding resist-

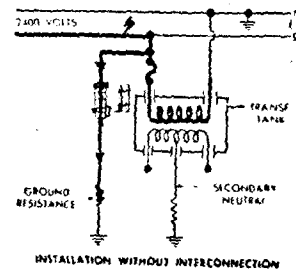


FIG. 7

ance and the associated IR drop will impress a high voltage on the primary winding of the transformer. Since the secondary winding and the tank of the transformer are essentially at ground potential, this will produce a large stress between the primary windings and secondary windings and between the primary windings and tank. The stress produced between the primary and secondary windings and primary in the tank and transformer can be reduced to

the value of the small IR drop, which is inherent in the arrester, by connecting the ground terminal of the arrester to the secondary neutral of the transformer as shown in Figure 8.

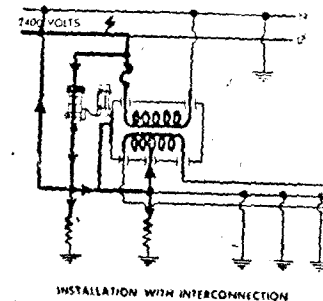


FIG. 8

SUMMARY

Correct lightning arrester operation insures maximum surge protection to the other equipment with little risk of arrester damage. Proper arrester application requires an intelligent consideration of the operating voltage range, and of possible over-voltages, other than lightning, which might be encountered. Among the factors affecting over-voltage conditions, the most predominant is system grounding and as a result must be thoroughly considered when applying arresters.

—Line

THOUGHTS FOR FOOD

It is more than four years since we achieved freedom from foreign domination. But political freedom has not brought us economic independence. In spite of four years of freedom we are still a poor nation; not that political freedom will convert overnight a poor country into an earthly paradise. The position so far as economic conditions go is worse than what it was in 1947. There is acute shortage of food, and famine stares us in the face. It is getting worse day by day though the Government, our own Government, is trying its best to meet the crisis.

FIRST FREEDOM

Freedom has no meaning unless there is security of life and property, and every man, woman and child is assured of the bare necessities of life—namely, food and clothing. On empty stomachs it is very difficult to appreciate the ideology of freedom. Famine and starvation will only lead to political discontent, and endanger the freedom achieved after considerable effort.

The food problem is engaging the serious attention of Government both at the centre and in the states, and also of

our eminent leaders. Still the problem remains unsolved. Government alone cannot do much without the willing co-operation of the people, in surmounting the difficulties which stand in the way of finding a practical solution to the problem.

P. P. VENKATASUBRAMANIAN*

A proper and correct diagnosis alone will lead to the complete cure of a disease; so also, it is necessary to find out the root cause for the present food crisis and then apply the necessary remedy. It leads us nowhere merely to preach from platforms that we should tighten our belts, grow more food, eat little, and waste less. No Act of Parliament or the strict enforcement of an Act would relieve the situation. Only a practical study of the actual situation and a commonsense approach can solve the problem. More of example than precepts.

Why do we have this food crisis? Before World War II, the food position was not bad. And the country was under British *Raj*. Even during the War, it was not as bad as it is now. But later controls were enforced and the rationing of food supply came into operation. After the cessation of hostilities, it

* Mr. P. P. Venkatasubramanian, M.A., is Secretary, Seshasayee Bros., Ltd., Managing Agents of this Corporation.

was expected that controls would be removed, and rationing would cease. But, contrary to expectations, controls and rationing continue still. Came political independence, and expectations rose sky-high that our own our national government will be able to realise for us all our cherished dreams. But the situation, worsened after 1947, and in 1950 the country had to face a food crisis of the worst type. We are still not out of the woods, although the position has improved greatly.

The present situation can be attributed to any or all of the following causes.

(a) Over-population. (b) Stoppage or restriction of imports of food-stuffs from abroad. (c) Failure of the monsoon and consequent shortage in the production of food grains in the country. (d) Legislations regarding land tenure (e) Failure in enforcing restriction and control. (f) Labour unrest.

(a) *Over-population* : Food production or food supply should keep pace with an increase in population. Otherwise, there will be famine and suffering. There has been a rapid increase in the population of India, but productive capacity has not kept pace. As a rule, we find that increase is more among the poorer sections of the people. I do not propose, in this short article, to go into the reasons for this increase. The increase may be of advantage to the so-called labouring classes in that they have more earning members than there are more mouths to feed. But as regards the lower middle

classes which form a major portion of the population, the increase is definitely to their disadvantage. In the lower middle-class family, there is, in almost all cases, only one earning member. An increase in the family brings misery and poverty, as income remains stationary while dependants increase. Unless he restricts the size of his family to approximate to his income, there would appear to be no salvation for him.

MORE PEOPLE—LESS FOOD

(b) *Imports* : An increase in population necessitates a proportionate increase in essential supplies including food and clothing. If a country is not able to produce its own requirements it is necessary to import from other countries. India has not been self-sufficient with regard to food, though it is mainly an agricultural country. During the British *Raj* and even under our own national government food has had to be imported from abroad, to meet the deficit. The import is now restricted for various economic reasons. A manufacturing country exports its finished goods and gets from other countries, its raw materials and food requirements. An agricultural country exports its surplus produce and gets in return manufactured articles from outside. India has unfortunately to get both food and essential articles from outside. It is industrially in its infancy and agriculturally too, it is backward with all its antiquated methods of cultivation. Until such time we are able to produce all our food requirements we have to get our supplies from abroad

to feed our people. All efforts should be made to bring the vast stretches of virgin and waste land, for the cultivation of food-crops, in the first instance, and then only of commercial crops—that is, when we have produced enough food. The present tendency is to grow commercial crops which will result in a quick and easy return. This tendency should be curbed by legislation, if necessary, and all encouragement and incentives offered to make use of every inch of available land for growing more food. There is no doubt that India can be self-sufficient as regards food, provided there is an intensive as well as an extensive programme for the development of all available land.

AGRICULTURAL GAMBLE

(c) *Monsoons* : The Indian agriculturist depends always on the monsoons. His is a gamble in the monsoon and failure of the monsoon results in the failure of his crop. The Indian peasant is very conservative and fights shy of all improvements, in methods of cultivation. His holding is very uneconomical and gets smaller and smaller when it is handed over from father to son. Such fragmentation of holdings should be stopped by state interference, if necessary. As it is unsafe to depend on the monsoon alone, the cultivator should have facilities to get water for cultivation from other sources. Government should build up dams and anicuts for diverting water from river for cultivation of land chiefly dependent on the monsoon. Thousands of acres can thus be

brought under cultivation. But this alone is not enough. Many more schemes have to be taken on hand and completed. Government are now giving loans for sinking wells to needy agriculturists. They are also extending electric supply to rural areas to make electricity available for lifting water for irrigation.

(d) *Legislation* : Profit motive has been and will, always, be an incentive for more production. A hard working agriculturist, when he is cultivating his own land, gives his best to produce more, tries to effect improvements and extend his holdings. Otherwise, he will become apathetic and will lose all enthusiasm. He must sure that what he has earned and saved by his sweat and labour, will not be snatched away from him by legislation. The State should give all encouragement to enthusiastic and hard-working agriculturists to acquire their own lands and enjoy the fruits of their labour in full. State legislation should be directed toward this end. While absolute landlordism and ownership of a vast area in the hands of a single person should certainly be discouraged, facilities and encouragement should be given to people to keep economic holdings—who should, besides, have complete freedom for the enjoyment of the land by themselves and their children.

(e) *Controls* : On account of the food shortage Government is led to the necessity of imposing restrictions and controls for the proper distribution of the available supply among its population. But unfortunately, Government is not able to enforce complete

control for want of co-operation from the people. Unscrupulous profiteers take advantage of the unhappy situation to exploit the needy by creating what has come to be called and—cheerfully accepted—as the black market. While under restrictions only a small quantity of food is available, for monied people there is always the black market from which any quantity is available, at a premium. Controls are imposed mainly to help the poor, but their object is defeated. More food-grain flows through the black market channel than through the controlled one. I, for one, think that by removing all controls and encouraging free movement of food stuffs, we will, to a great extent, be eliminating the black market. Food should be imported to supplement that produced in the country, until such time the country is self-sufficient. Government should have grain shops in each centre for catering to the poorer sections of the people at cheap rates and others should be allowed to buy in the open market.

LABOUR RELATIONS

(f) *Labour*: Labour unrest has also to some extent been responsible for the present food crisis. Whilst every one will

concede that the agricultural labourer should be paid adequately subject to a minimum wage, he should not be allowed to withhold co-operation or to strike work. Nowadays, we often hear of *kisan* troubles and local *fracas* between mirasdar or landlord and his labourer. The result of the quarrel is that lands are allowed to remain uncultivated, nobody being the gainer for it, neither the landowner nor the labourer. Only the nation suffers. State interference will be necessary in such cases to regulate the relationship between the landlord and agricultural labour. Legislation alone will not be a permanent remedy, but a better and sympathetic understanding between landlord and labour will go a long way in paving the way for a consolidated effort for producing more, in the larger interests of the nation.

Each individual man, woman and child has to contribute something towards the betterment of the nation as a whole. While a man should have the interests of his family first, he should also give some consideration for his neighbour, sacrifice something for the common good and give whole-hearted support to Government in its effort to build up this infant republic.

THE MULLIYAR PUMPING SCHEME

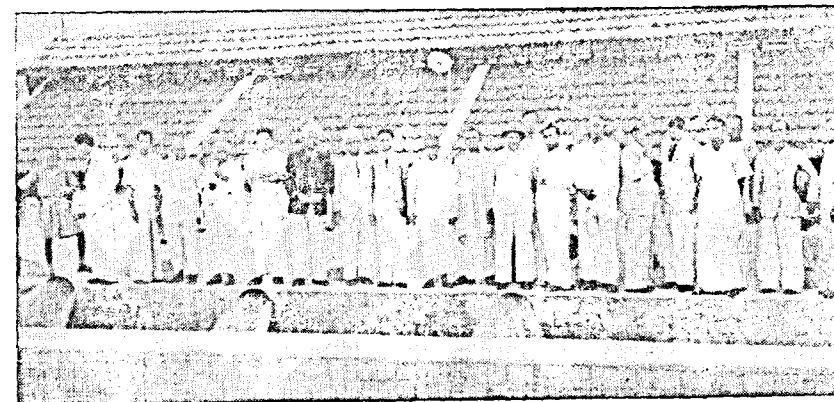
Of special interest to this undertaking is the inauguration of the Mulliyar Scheme which came off on August 1, 1951. The scheme is the logical corollary to the extension of electric supply by the South Madras Electric Supply Corporation, Limited, from Tiruthurai-pundi to Vedaranniyam.

Limited, which had come forward to complete rural electrification of its own accord, need not be taken over by the Government immediately as the Corporation itself is doing what Government proposed to do."

DETAILS

As Mr. M. Bhaktavatsalam, Minister for Public Works, Madras State, observed in inaugurating the scheme, "The rural electrification scheme carried out last year facilitated the present pumping scheme. With

The Mulliyar Pumping Scheme aims to bring into command of the Mulliyar river an area of 1500 acres of high level land with the help of four electric pumps raising the water of the river from a sump.



THE MULLIYAR PUMPING SCHEME

a view to extending rural electrification Government resolved to take over private and municipal electrical enterprises. The South Madras Electric Supply Corporation,

An important irrigation river of the Vennar system, Mulliyar branches off from the Korayar river at mile 76/0 and flows for a distance of about 24 miles

before it empties itself into the Manamkondanar. Running on a ridge, it irrigates about 24,000 acres on either side but after it crosses the railway line to Agasthiampalli, a change in the lie of the country is detected. There is a rise in the level of land and it ceases to be comandable. The tract covers an area of 30,000 acres, sandy, arid and grown with scrub jungle.

The Mulliyar Pumping Scheme was taken on hand with the object of reclaiming at least a part of this vast tract.

It was only last year that the benefits of the Mulliyar supply were extended to about 1000 acres by a scheme of flow irrigation. Of this area about 1000 acres were brought under irrigation in the last *fasli* itself. It is hoped that the remaining area will also be irrigated during the year. Another scheme for extending further the benefits of irrigational flow to an additional area of 1600 acres is also under consideration.

The land—beyond the area covered by these schemes—rises rapidly in level while the water level in the river continues to drop, so that further extension of supply can be made only by pumping.

The completion of the 23-mile, Tiruthuraipundi-Vedaranniyam line has rendered possible this scheme for pumping water to an extent of 1420 acres in the villages of Taguttur and Maruguterkusetti.

The supply to the project is by a tapping at the seventh mile on the Tiruthuraipundi-Vedaranniyam line by extending a spur line, a mile in length. A 100-kVA substation of the floor-mounted type meets the requirements of the pumping station.

The cost incurred by the South Madras Electric Supply Corporation, Limited, on the main line is Rs. 3.5 lakhs and on the spur line and substation another Rs. 15,000. The main line feeds a few villages *en route* and Vedaranniyam at the end.

Four pumpsets have been provided for normal pumping duty with one extra unit as stand-by. The pumps are all of the well-known "Sulzer" make and the motors "Brown Boveri"—supplied by Volkart Bros.

THE PUMPSETS

A brief note about the pumpsets will not be out of place, here. 'Sulzer' Helimax pumps (10" suction and 12" delivery—960 r. p. m. directly coupled to Brown Boveri slip-ring induction motors, drip-proof pattern A. C. 3-phase 400 volts, 50 cycles and rated for 35 h. p.) are made of cast iron, with a special arrangement for automatic oil lubrication. They are suitable for a total mano-metric head of 15 to 30 feet with a discharge capacity ranging from 2500 to 3500 gallons per minute.

Such large, low-lift pumpsets are in extensive use in the Travancore-Cochin

State for irrigation and dewatering purposes. But the present installation is the first of its kind in the Tanjore district, which has so far been dependent only on gravity irrigation.

The pumpsets now installed were the last few available with the firm and by a stroke of happy coincidence the Corporation was able to locate the sets and put the P. W. D. on their trail.

The performance of the sets is reported to be very satisfactory.

Following this scheme, a number of similar schemes are expected to come up on the Tiruthuraipundi-Vedaranniyam route. Indeed, the reason behind the choice of the apparently longer route to Vedaranniyam was dictated by the possibilities, rather, the certainties of more pumping schemes coming up.

Already, we are happy to note at Segal village, near Tiruthuraipundi, that a pumping scheme for irrigating 350 acres from the South Rejan Channel has been taken up. This, we are sure, will herald more such schemes.

OBITUARY

As we go to press, we learn with the deepest regret the sad and untimely demise of Mr. S. M. A. THANGAVELU PILLAI, one of our Directors. He passed away after a brief illness on Wednesday September 19. We tender our heartfelt condolences to the members of the bereaved family.

INTERNATIONAL HOUSE MAGAZINES EXHIBITION

UNDER the auspices of the Rotary Club of Tiruchirapalli, an International House Magazines Exhibition was held at the Power House, on July 22, Lt. Col. Swami Desikachari, Chairman, presiding.

Mr. M. Bhaktavatsalam, Minister for Information, Madras State, declared the Exhibition open.

A large gathering of officials, businessmen and staff of the Corporation was present.

Mr. R. Parthasarathy, our Publicity Officer, and Mr. Howard F. Needham, United States Information Officer, Madras, were the two principal speakers.

Mr. Parthasarathy said, in the course of his talk, that whether or not a person was known outside his company or works where his job lay, whether or not he had had his name mentioned in the "ordinary" press, he could still be a personality in print—thanks to a new force in industry—namely, the house magazine.

The speaker defined a house magazine as a publication produced by an industrial undertaking, a public service, a business house or a trade association for

the benefit of its employees/customers/members.

Continuing, he said that as a morale-builder, as a medium for dissemination of technical information and as a force for the promotion of worker-management accord, the house magazine was an invaluable tool.

Referring in particular to *Electolite*, Mr. Parthasarathy said that if it had succeeded in making even a small section of the public appreciate the romance behind that cheery little bulb—the incandescent lamp—that burned because of a fire that burned elsewhere, and their own staff realise that there was a medium which would "sit up and take notice" of their joys and sorrows, the Journal could not be said to have altogether fallen down on its mission.

Mr. Howard Needham followed Mr. Parthasarathy with a very informative talk about house magazines in the U. S.

Mr. Needham said that there were over 6000 company publications in America spending approximately \$ 35 million or Rs. 17 crores per year.

Continuing, he said that if a house publication were to function as a management tool, as a means of promoting

understanding and teamwork between employer and employee, it should be accepted by the employee. The surest way to win his acceptance of the publication—and through it his understanding



Mr. Howard Needham addressing Members

and his allegiance to his superiors—was to make him feel that the publication existed in his interest, and to recognize him as an individual human being, he added.

Mr. Needham further said that the most significant function of a house magazine was in its extension of recognition to individual employees and groups of employees.

"The Great One who made us all gave us one common trait. We all love to be appreciated. The alert, industrial editor will pass up no opportunity of extending recognition to employees and readers who merit it," he said.

Concluding, Mr. Needham observed that "feature stories" reporting the promotion of an individual, new production

goals achieved by a department or section, an excellent job attendance record by an old employee and other items of like nature were of extreme value in maintaining high morale among the employees, a friendly relationship between them and the management and the desire among the employees to gain similar recognition.

Inaugurating the Exhibition, Mr. M. Bhaktavatsalam said that the importance of the house magazine was being increasingly recognised in this country and that company publications were a most potent force in the promotion of worker-employer relationships.

A house magazine in addition to carrying technical information must seek to interest the lay consumer, he observed further.

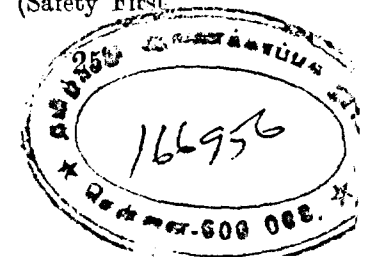
The Minister also made appreciative references to *Electolite*, the house magazine of the South Madras Electric Supply Corporation and *Metkem*, the journal of the Mettur Chemical and Industrial Corporation.

The Exhibition was held at the Assembly Hall, tastefully decorated with the national flags of various countries.

On display at the exhibition were house magazines from several countries including those of Australia, Belgium, Canada, India, Sweden, Switzerland, United Kingdom and the United States.

Indian publications on view included: *Tisco Review*, *Martin Burn House Magazine*, *Efficiency News* (Safety First

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Association) *Anandodhayam*, (B.&C. Mills) *Burmah-Shell News*, *Dunlop Gazette*, *Shalimar Standard*, *Firestone News*, *J. K. Review*, *Electolite*, *Metkem* and *FACT*.

Some of the foreign publications on display were :

Ford Times, *Philadelphia Orchestra*, *The Caterpillar Dealer*, *Martin Star*, *Walworth Today*, *The Pegasus*, *Horizons*, *Sperryscope*, *Boeing Magazine*, *Dupont*, *Better Living*, *Malcom Moore's News-Letter*, *Sabena Revue*, *Shawinigan Journal*, *Contact*, *Seaboard*, *British Electricity*, *Alchemist*, *Midlands Electricity*, *International Review*, *Gridiron Gazette*,

Ferod-gram, *Edgar Allen News*, *Sulzer* and *B.T. H. Activities*.

Mr. S. T. Acharya, Secretary of the Rotary Club congratulated Mr. Parthasarathy on the "very successful show" he had put up.

Later, there was a film show—"An Automobile Worker in Detroit"—thanks to the kind courtesy of the USIS.

The programme concluded with an austerity lunch at 1 P. M.

Special mention must be made in this account of the able assistance rendered by Messrs. V. Ramaswamy and S. Ramasubramanian of the Corporation, in organising this Exhibition.

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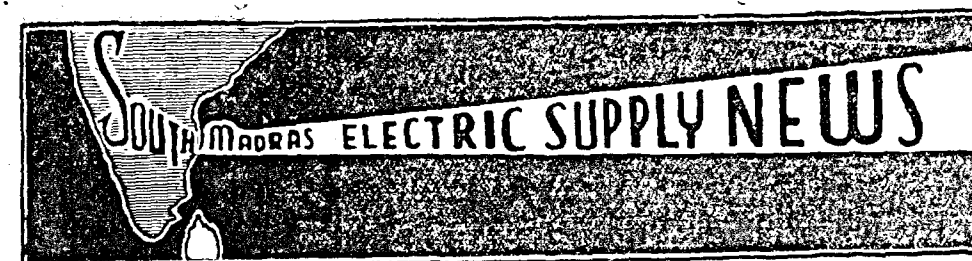
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New Supplies: DURING the period ending July, '51, supply was given to the following villages:

1. Kavalkarapalayam.
2. Megalathur.
3. Palaiyur.
4. Alangudi.

1. *Kavalkarapalayam*: This village was connected up on April 14. An extension of one mile of L. T. lines from the Srirangam substation was made. Mr. H. K. Ramaswami, our Deputy Chief Engineer, switched on the supply at a small function presided over by Mr. K. Vasudevan, Municipal Chairman, Srirangam.

2. *Megalathur, Kadamangudi and Marneri*: Megalathur is a small village in the Tanjore Taluk coming under the Trichy-Srirangam area of supply. An L. T. overhead extension for about a mile-and-a-half was made from the existing Kachamangalam substation, fed from the Dalmia south feeders. Supply to the village was formally switched on by our Deputy Chief

Engineer, Mr. H. K. Ramaswami, on April 21, at a function arranged in the compound of the local R. C. Church. In fact, supply was made possible to this village chiefly due to the efforts of Rev. Fr. Chinnaswamy.

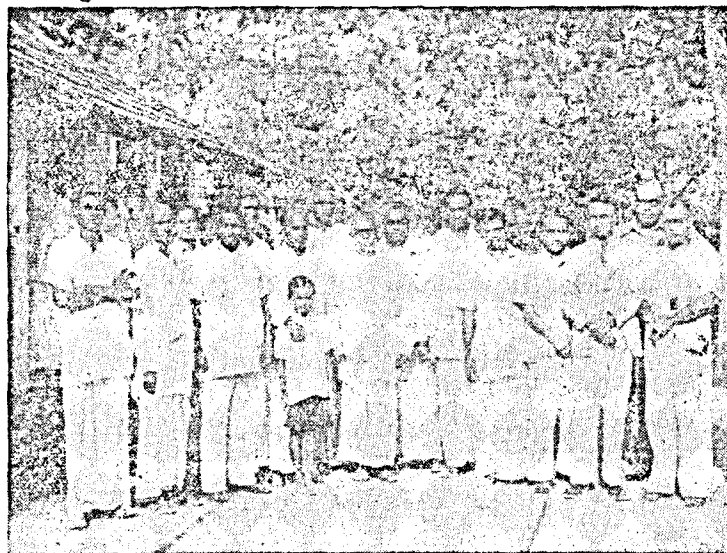
Supply was given to Kadamangudi in July and to Marneri in August. Aluminium cables have been used on this extension.

Tirukkatupalli staff were in charge of the construction.

3. *Palaiyur*: As a corollary to the supply of power to Edumalai, supply to this adjoining village followed. This is one of the villages covered by the Government loan of Rs. 8,26,700, sanctioned to the Corporation under the scheme of agricultural development for rural areas. Supply was switched on June 13, by Mr. Charles S. John, District Collector, Tiruchi. In the course of a very interesting address, Mr. John said that now that the "angels of prosperity"

were making a visit to their place in the form of electricity, it was up to the villagers to make the best possible use of their presence. He added that the residents of the village should make it a model village. The Collector's address, which was in English, was rendered into Tamil by Mr. R. Parthasarathy, our Publicity Officer.

4. *Alangudi*: This is a thriving town about 15 miles from Pudukottai. Both a ground-nut growing and marketing centre, the main industry of this place is oil-pressing.



Mr. M. BHAKTAVATSALAM, Public Works Minister at Alangudi.

Extension to Alangudi was under contemplation—in fact, some little work had also been done—even before World War II. When hostilities actually broke out, it was, of course, out of the question to take up the scheme.

In pursuance of the declared policy of the Government of Madras for providing electricity to rural areas, a loan of Rs. 3,11,000/- was sanctioned to the Corporation (GO. No. MS. 810 dd. March 12, '50) for supply to this place and the rural areas around.

An extension of 15.5 miles of 22 kV H. T. overhead transmission lines from Tiruvappur switching station at Pudukottai, the erection of two numbers of kVA transformer substations and a layout of 6.75 L. T. distributory mains are the chief features of this scheme.

Due to the acute scarcity and prohibitive prices of copper conductors, A. C. S. R. conductors for the H. T. line and all-aluminium lines for L. T. distribution were used.

Mr. M. Bhaktavatsalam, Minister for Public Works, switched on the supply for agricultural, street lighting and domestic purposes, at a special function held on July 22.

Mr. P. B. K. Rajachidambaram Reddiar, President, District Board, Tiruchi, presided.

Mr. L. A. Narayanaswami Chettiar, presented the Minister with a welcome address. Switching on the supply, Mr. Bhaktavatsalam said that supply of electricity to villages was a pointer to the trend of progress. He advised the villagers to harness power not only for irrigation but also to utilise it for small industrial units. He disclosed that despite financial stringency, Government had sanctioned a loan of Rs. 3,11,000 to the South Madras Electric Supply Corporation Ltd., as the expense was for agricultural purposes.

Mr. K. K. Raman, Director, Seshasayee Bros. Ltd., who also spoke, said that if the Corporation insisted on a minimum guarantee from consumers, it was because the Corporation had to discharge certain obligations, such as the payment of interest on loans, overheads, etc.

About 200 domestic lighting consumers, 150 street lights, 15 industrial consumers (rice-mills and oil expellers) and one cinema are expected to be served in the course of this year at Alangudi.

Stage two of this scheme is to extend our lines further to feed about 100 agricultural pumpsets for well irrigation

at Melathur, Keelathur and Rajaman-galam villages. This extension will be 4.75 miles of 22 kV transmission lines, two transformer substations of 100 kVA each and through 4.25 miles of L.T. distributory mains.

The total extent of area that will be irrigated by pumpsets at all the three places will approximately be 1000 acres. Extension of electric supply to these villages, it is hoped, will bring large tracts of waste land under the plough.

Kolakudi and Appanaliur: In connection with the extension of supply to these villages, Mr. H. K. Ramaswami well and truly laid the foundation stone on April 6. Mr. N. C. P. Swami, a leading *mirasdar* of Srinivasanallur presided at the function, organized by the village committee under the presidentship of Mr. N. Ramaraj. Extension to this village is covered by the loan of Rs. 5 lakhs made to this Corporation recently by the Government of Madras.

Total loads (both industrial and agricultural) connected during this period are as follows:—

Licence area.	Industrial	Agricultural
Tiruchi-Srirangam.	50 h. p.	120 h. p.
East-Tanjore.	37 „	30 „
East-Ramnad.	30 „	58 „

It is noteworthy that a total pumping load of 58 h. p. has been connected up in the East-Ramnad area, an area where only slender prospects exist for agricultural development.



A GUIDE TO THE PROPER TREATMENT OF FACTORY VISITORS: Issued by Tube Investments, Limited, Broadwell Road, Coldbury Birmingham.

WHEN Cleopatra entertained Mark Antony in regal splendour on the banks of the Nile, she was practising public relations. But the poor worm (which is modern English for Shakespeare's old-fashioned phrase, 'Serpent of the Nile') did not of course know it!

Although the Bard glamorized Cleopatra—to use Holywood's vulgarism—she was, at least, according to one authority, just a red-head with freckles.

For aught we know, she should have solely relied on her intuition, to put her through her paces as a hostess. A modern company, on the other hand, is better equipped to deal with its guests. It has, for instance, at its disposal an excellent and entertaining booklet issued by the Training Department of Tube Investments, Limited, on how to play the host and like it.

"Visits may be expected, or unexpected, welcome or the reverse, pre-arranged

or impromptu. They may be made by large parties or by an individual. They may be at any level from Royalty downwards...No matter who or how many the visitors are, the hosts must ensure not only that they are treated with courtesy but that the nature and scope of the treatment is custom-built and not reach-me-down."

In other words, a company must handle its visitors pretty much in the same manner Goldsmith's Village Preacher handled his vagrant train. The company must "*be pleased with its guests....and learn to glow.*"

Visitors can be classified according to this booklet into five types: (1) Customers (those who provide the Company's livelihood) (2) Salesmen (3) Officials (4) Associates and (5) Potential customers (The last title covers all visitors not covered by the other categories, and it may be any one from the Sultan of Zanzibar to a Sociologist investigating the incidence of sleepy sickness among office-boys!)

The booklet stresses, in particular, the importance of remembering a visitor's name and repeats Dale Carnegie's maxim: "The sweetest sound in any man's ear is the sound of his own name."

Notwithstanding all its injunctions, it is extremely doubtful if an Englishman or for that matter even an American will ever be able to "assimilate" a sesquipedalian Indian name like Varaha Narasimhaswami Iyengar!

Bantering apart, there is no gain-saying the fact that there is something gratifying about being addressed by one's correct name.

At the end of the booklet there is a useful summary of all that is preached earlier. Significantly enough, this summary ramifies itself into "Ten Commandments":

1. Meet your visitors with a welcome.
2. Don't keep them waiting if you can possibly avoid it.
3. Know what are you going to do together and have all ready beforehand.
4. See that your guests sit, eat, smoke and so on at least as well as you do.
5. Remember your visitor's name.
6. Organize the factory tour beforehand.
7. Let the foreman know who is coming.
8. Don't try to take more than five people round at once.
9. Have a seat ready after a tour as well as before.
10. Bid your guests goodbye yourself.

And then there are three little gems of appendices. The temptation to quote from Appendix I, especially, is too strong to be resisted.

"To the ideal receptionist a visitor is not an unwelcome interruption to the task of filling up the current foot-ball coupon, (In our own country, it is cross-word puzzles) but an interesting human personality needing help.

In large offices, it is worth while having one or more girl ushers. It is hardly necessary to give specifications of the qualities desirable in them, except to say that they are generally lacking in an office boy!

Gate keepers are not always selected either for appearance or manners and some trouble should be taken to improve any deficiency they may have in these attributes.

No man experiences his own company's reception except by calling on himself in disguise which is not recommended!"

A Guide to the Proper Treatment of Factory Visitors is in keeping with the high and—humorous—standard set up by its two predecessor booklets, *A Guide to the Writing of Business Letters* and *A Guide to the use of the Telephone in Business*. Our warmest congratulations to T. I.

— R. P.

THE POWER : A monthly journal edited and published by Mr. P. S. Pillai, M. A., for the Madras Electric Trades' Association, 296, Lingha chetty Street, George Town, Madras.

THIS journal has now completed one year of useful service and we should like to say to it: "Many happy returns". The September issue carries a very interesting article on the Diesel engine. The feature "Madras Market" is particularly a useful one, giving as it does, prices of electrical accessories and goods and names of dealers.

The Madras Electric Trades Association deserves congratulations for having its own trade paper.

—V. R.

AUTOCRASTINESS : A Dunlop House Publication. Dunlop Rubber Co. (India) Ltd. 57-B, Frere School St, Calcutta-16.

HEAVEN knows—it ought to—judging from the large number of people who should periodically be knocking at its gates for admission that our motorists require all the education they can get. And this book aims at providing them with a liberal education. If after imbibing it, they still confine themselves and their contraptions to the straight and the narrow, this book would certainly have been written in vain!

"To define a motorist simply as a driver is as illuminating as saying that a Comedian is a funny man. The motorist is a very very important life-giver—also life-taker.

If your car is in danger of having to stop because of traffic lights—rush through at full speed. If nothing happens

reverse and repeat. Do this several times. If nothing happens—go to Hollywood.

Skidding is one of the most intoxicating experiences since the discovery of fermentation. All you have to do is to select a bright, wet, concrete road and drive as fast as a creditor, or as if you were being chased by a creditor. Then jam on your brakes. Your car ought to slide sideways and do 33 pirouettes. The most intoxicating part of the experience, however, is the chloroform in the operating room."

Do you know why a self-starter is so-called? It is because it eventually gets the motorist to start the car himself with an amusing instrument called a crank, named possibly after its inventor!

"If your tyre appears to have lost weight it is suffering from under-inflation. Continual flexing of the tyre generates heat which eventually causes a breakdown of the tyre structure.

"If this state of affairs is allowed to continue then somebody sooner or later is bound to scream: 'Pardon me, but your rims are showing.' And he will not be referring to the circles under your eyes!"

These few excerpts should make motorists—and non-motorists alike—want to read the full book.

As humorous as a Wodehouse novel and as funny as a Laurel and Hardy film, *Autocrastiness* is delightful reading from its first page to the last. The value of its witty and sophisticated copy is greatly enhanced by much clever cartooning.

—R. P.

CEMENT : (Industries of India Series) Published by Burmah-Shell, All India Publicity Department, Exchange Building, Sport Building, Bombay.

CEMENT, that versatile construction material, forms the subject matter of the latest booklet of Burmah-Shell in their series, "Industries of India."

The account starts off with that beautiful poem, *The Lake Isle of Innisfree* by W. B. Yeats. Its relevance here is probably the line: "*And a small cabin (I will) build there of clay and wattles made*".

If Yeats sang of a "cabin," another poet—Coleridge—sang of a "stately pleasure dome," in that magnificent fragment of his, *Kublah Khan*.

From the rude cave of the primeval weakling to the dream-castle of "Mr. Blandings", the *motif* has always been the same—namely, man must have shelter against wind and weather, a place in which he can rest his weary limbs after the day's toil.

In making his home or as the English Civil Servant would have it, his "accommodation unit", Man has used through succeeding ages, barks, hides, rushes, stones, concrete, stucco and metals of different kind.

Cement is a comparatively new material. It is made of lime-stone, containing clay and sand into which mixture, a small quantity of oxide of lead is added.

Neither is the history of the cement industry in India very old. The first cement factory in India, it should particularly interest our readers in the Madras State to know, was opened in Madras in 1902. But only in the year 1923, cement became a popular building material. By 1930, however, cement was a major industry.

The year 1936 witnessed a great landmark in the industry when the Associated Cement Company, Limited, was formed. New ventures followed this, notably those of Seth Ramakrishna Dalmia who established factories in various parts of this country, including the one at Dalmiapuram—and to which—this undertaking supplies power.

All that one need to know about cement and the Indian cement industry is interestingly told in this potted story.

Speaking at the advertising exhibition organized by Burmah-Shell in Bombay during September 1950, Mr. I. W. H. Sitwell, the company's chief, said that the objective of all their advertising was to make their products "known, understood and appreciated."

Their current series of booklets should do a little more than this—it should oil—in fact, "shellubricate" the wheels of business for them.

—R. P.

Current Topics

KASHMIR DEVELOPMENT:

OVER 13 percent of the total government revenue of troubled Kashmir will this year be spent on the development of the State's electric power system. Work up to now has comprised the construction of a new power house, in the Sind Valley, which when completed, will harness the waters of the Sind river, a tributary of the Jhelum, to supply Srinagar and areas around, the digging of a ten-mile-long canal and the renovation of the Mahora power house near Uri. In order to overcome shortages in the Jammu Province the state government has arranged for the purchase of bulk supplies from Jogindernagar station in the Punjab.

BOMBAY STREET LIGHTING:

With the switching on recently of two street lighting installations in Bombay, comprising 175 G.E.C. "Diffractor" lanterns for 250 W vertical burning mercury lamps, the first part of a major lighting improvement scheme undertaken by the Bombay Electricity Supply Department has been completed. During

the past year approximately 500 similar lanterns have been installed on some 12 miles of main traffic routes in Bombay. The lanterns are mounted on tubular steel columns at a height of 25 ft. and spaced 135-140 feet apart. Control gear is accommodated in weatherproof boxes mounted on the columns. Major side roads in the city are being lighted with 80 W or 125 W mercury lamps in 450 G.E.C. small "Oxford" or "Wembley" lanterns.

Better lighting is to be extended to other parts of Bombay, and a contract has been placed with the G.E.C. for a further 250 "Wembley" and "Oxford" lanterns, 500 "Diffractor" lanterns, and 76 "Three-Eighty" lanterns for fluorescent lamps. All these installations are being planned and erected under the supervision of Mr. A. F. Lockley, district engineer to the Bombay Municipality.

ALUMINIUM PRODUCTION:

Development plans of the aluminium industry were considered at a meeting held at New Delhi by the Planning Commission with the representatives of the

industry. The manufacturers emphasized that future plans for the development of the aluminium industry should be based primarily on meeting the requirements of the domestic market because it would be difficult to compete with other countries in the export markets where costs of production were considerably lower. It was represented that the indigenous manufacturers of aluminium would have to be protected and subsidized for a considerable time. The question of establishing a large central alumina plant for providing cheap alumina to the virgin metal manufacturers was also discussed.

DRAFT STANDARD FOR COPPER WIRE:

The available quality and sizes of bare annealed copper wires, plain and tinned, of high conductivity, required for winding electrical equipment, are among the basic factors which determine their design and performance. The Electrical Conductors and Insulators Sectional Committee of the Indian Standards Institution has, therefore, brought out a draft Indian standard specification for bare annealed copper wires for electrical machinery and apparatus.

The wires in the draft specification are of 110 specified sizes, classified into 30 primary sizes, 28 secondary sizes and 52 sizes not recommended for general purposes. The secondary standard sizes are meant for adoption when primary sizes do not meet the need, while the group not recommended for general use includes

certain sizes the possession of which by the general public is forbidden under the Telegraph Wires (Unlawful Possession) Act No. LXXIV of 1950.

As regards the quality of wires, the coefficient of linear expansion, the density and resistance at 60 deg. F of standard annealed copper have been prescribed in the draft specification, and the values of resistance of the copper conductor at different temperatures between 40 deg. and 130 deg. F. listed in a table along with temperature coefficients. In another table, the calculated sectional areas, the weights and the resistances of both the plain and the tinned varieties have been set out against their respective sizes.

RIVERS IN THE SERVICE OF MAN.

In a broadcast from the Delhi Station of All India Radio, on June 29, 1951, Mr. A. N. Khosla, Chairman, Central Water and Power Commission and Additional Secretary to the Government of India, Ministry of Natural Resources and Scientific Research, spoke of Government's plans for the harnessing of the water wealth of the country.

A point made by Mr. Khosla was: "The development of thermal power is being integrated with that of hydro-power to obtain maximum economy and efficiency. The availability of low cost power is essential for industrial as well as agricultural development. In agriculture, the biggest and most promising fields are

the manufacture of fertilisers and the development of irrigation by pumping water from underground sources by means of tube wells and from deep set rivers".

TIRUCHI MUNICIPALITY ADOPTS S.M.E. SUGGESTION:

At a meeting of the Tiruchi Municipal Council held on August 29, among the resolutions passed was one to the effect that a central broadcasting unit with a number of loudspeakers should be set up at various places in the municipal area. An estimate of Rs. 29,650/- was drawn up for this purpose by the South Madras Electric Supply Corporation, Limited. The plan now is to set up loudspeakers at four different places in the municipal area.

RURAL ELECTRIFICATION IN S. A. DISTRICT:

To serve the villages of Tiruvathi, Sundaravandi, Perumalnaickenpalayam,

Arungunam and Palur, the South Arcot Electricity Distribution Co. have recently put up a duplicate 22 kV feeder from Panruti to Cuddalore via Palur for a length of 12.75 miles. Supply was inaugurated when Mr. M. Bhaktavatsalam switched on this feeder on September 6. Large tracts of land are now expected to be brought under irrigation as power to lift water would now be available to these villages. The Government of Madras have also assisted the Company by giving it a loan of Rupees 7 lakhs to finance the extension of supply to these and other villages in its area of licence.

The South Arcot Electricity Distribution Company has also plans for extending supply to several other villages in the near future and they expect that this would be possible as soon as their demands for additional power are granted by Government.

Strictly Personnel

ONE difficulty in preparing this feature, in the past, has been—let us admit it frankly—lack of news. But what is news? News, according to Webster, is report of a recent event. 'When a dog bites a man, it is not news, but when a man bites a dog, it is news,' Lord Northcliffe improved on Webster.

But news in an employee publication is not quite the same as news in a daily or even a weekly. The company publication, is, fortunately, "different". It does not cover murders, scandals, or distant disasters. It rarely concerns itself with political events. Its chief purposes are to help create a well-informed group within and also—if possible—without, and to help create goodwill throughout the organisation.

Furnishing information and creating goodwill—there you have house magazine philosophy in a nut-shell.

Indeed, good old Webster's definition of news suits us even better than does Lord Northcliffe's dictum.

News in a company publication is just a report of a recent or future event that is of special employee interest or significance.

Should this orthodox definition be accepted, we have plenty to report, this quarter.

All because members of our Staff Association started "kicking around," after three years of "masterly inactivity." The "inactivity" part of it was all too obvious, but how precisely it was "masterly" is more than we can say.

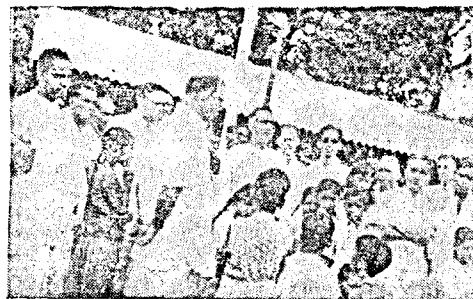
Seldom have our playing fields presented such animated scenes as now. The volleyball court, in particular, is a magnet of attraction, and draws quite a crowd of players, good, bad and indifferent.

Neither is our reading room ever wanting in patrons! The new carom board is a plausible, but not, the full explanation. Sometimes the number of magazine-browsers runs to as high as two figures!

During June and July, film shows were practically a weekly feature, although in August, scarcely a single picture was shown. This was because we had fixed our Staff Day for August 15, and meanwhile much preliminary work had to be got through.

Among the pictures shown were at least two that dealt with electricity subjects. For example, the theme of "Power Lines," a British Information Service documentary was cable manufacture. What the REA (Rural Electrification Authority) has been able to accomplish in America was graphically portrayed in the USIS film, "When Good Neighbours Meet."

We had a vintage Laurel and Hardy, too, ("Their First Mistake") but age does not somehow wither the attractions of these two prize lunatics of Hollywood. Several local Rotarians were present for this show.



Mr. K. K. Raman addresses Staff.

Frivolous we may appear on the surface, but deep down, we are serious types.

For instance, when Swami Chidbavanandha of the Ramakrishna Mutt addressed a meeting on June 14, the hall was packed to over-flowing. The subject-matter of his discourse was the hazardous journey he and a party of the members

of the Ramakrishna order had undertaken, a few years ago, to Mt. Kailas in the Himalayas. As thrilling as a chapter from James Hilton's best-selling novel "Lost Horizon," it is little wonder Swamiji's lecture made a profound impression on us. As one reviewer said of Hilton's book, so could it be said of this lecture that it was a "lyrically compelling defence of the contemplative life."

On July 24, we met again to say "Au Revoir" to Mr. V. Seshasayee on the eve of his departure to Europe and America. Mr. Seshasayee said that the primary purpose of his projected trip was to find a solution to the critical sulphur position in the fertiliser factory at Alwaye.

One gratifying bye-product of the revival of activities has been the unearthing of a wealth of latent musical and histrionic talent. At this point, the temptation to blow off a couple of lines of Thomas Gray, the graveyard poet, is, indeed, very strong, but it is being bravely resisted. It is also suddenly realised that the lines are of doubtful appositeness.

To resume: a crowded house was treated to two hours of classical and light music on June 29. It need hardly be added that the artists were all members of our staff: M. S. Ramachandran (Vocal)

M. A. Sonndararajan (Violin) S. Radhakrishnan (Mridangam) B.V. Kuppuswamy (Kanjeera), J. Nagarajan (Bulbulharang).

On August 15, the historic day of Indian independence, came off our Staff Day.

In the morning, Mr. K. K. Raman, Director, Seshasayee Bros. Ltd., hoisted the tri-colour to the accompaniment of national songs, beautifully rendered by M. S. Ramachandran.

In a brief speech, Mr. Raman exhorted staff to rededicate themselves to the service of the nation.

An exciting item of the morning programme was the musical chairs event for employees' children. Fathers appeared to be even more excited than their—often—refractory offspring. In the boys' section, T. Ramachandran, son of M. Thiagarajan (Revenue) knocked off the first prize. The girl's section prize went to K. Kamala, daughter of B. V. Kuppuswami (Revenue).

With the distribution of sweets to children, part one of the programme came to a close.

Part two got a good start-off with Tea in the evening, quickly followed, rather overtaken, by Fancy Dress. V. Ramaswamy (Establishment) was a realistic enough fisherman. As a madcap, K. R. Vijayam Pillai was the last lunatic outpost. A panel of judges (Messrs. S. T. Acharya, C. Ramanathan and P. V. Kuppuswamy) certified these two as winner and runner-up.

J. Gopalan, (Bills) Jt. Secretary of the Association then presented an interim report for the three months ended July—from the date he took over. The credit



"Fisherman" Ramaswami

for reviving the activities of an Association, very nearly moribund, chiefly goes to Gopalan and V. Sivaswami.

Replying, Mr. K. K. Raman assured staff of all possible support on his side.

Mrs. Akila Raman distributed the prizes to the various successful competitors (See full list attached).

No fewer than six items comprised the Variety Entertainment held later: (1) Musical Prelude, (2) Physical feats and Yoga Asanas (3) Ottan Thullal (4) Monoacting and (5) A play—Mythili.

Contributions to item no. (1) were made by specialists in their different

"lines"; for instance, M. A. Soundarajan (our draughtsman) was pretty good on the violin. M.S. Ramachandran did two delightful song-hits. V. Somayajulu did another. J. Nagarajan was simply grand on the harmonium. S. Subramanian, played like a virtuoso on that classical Indian instrument, *Veena*. S. Radhakrishnan hit away on the *mridangam* like one inspired. Altogether, our boys gave an extremely fine account of themselves. Our congratulations to all.

P. S. Vemban (Revenue) bent and broke French nails as though they were mere straws. A. V. Rajaraman, our bills section Samson, bent a length of 3/8 inch rod with his bare neck.

An item extremely well-received was K. R. Vijayam Pillai's *Ottan Thullal*, the dance-form peculiar to Kerala.



Vijayam Pillai—"Ottan Thullal"

The *piece-de-resistance* was, of course, *Mythili*, a play by Devan, the well-



Vittal Ram (*Mythili*)
and R. Vaidyanathan (*Chellamoni*)

known Tamil writer and assistant editor of *Ananda Vikatan*, the popular Madras weekly.

Weak in construction, the strength of the play lay in its witty dialogue. The lines sparkled, indeed, even more than the ear-rings of PATNAM PANJU, the *Bhagavathar* in the play!

Where every one acted well including those who made their "maiden" appearance it would not perhaps be fair to individualise. Nevertheless, it should be mentioned that T. S. Somasundaram gave a most spirited impersonation as SRIMATHI.

R. Vaidyanathan, who directed the play in addition to taking on the role of the hero, deserves the warmest congratulations both for his own creditable performance and that of his hand-picked cast.



T. S. Somasundaram as *Srimathi*

Farewells :

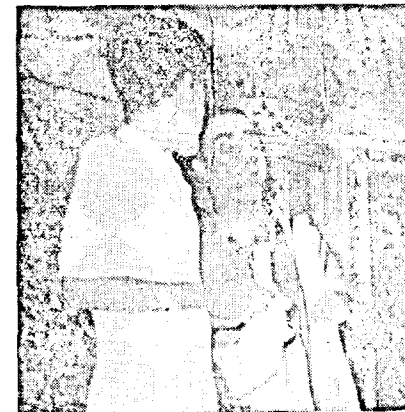
Mr. K. Venkataraman, Head Clerk, Office of the Superintending Engineer, resigned his position with effect from June 16, to take up an appointment with the Madhya Pradesh Electricity Board, Nagpur. He has a service record of 15 years and six months with this Corporation.

Alert, able and hardworking, Venkataraman will be greatly missed in the S. E.'s office.

At the function got up in his honour on the eve of his departure to Nagpur a well-deserved tribute was paid to him by Mr. T. S. Raju Iyer, now Resident Engineer, Srirangam—then Personal Assistant to the Superintending Engineer.

Under less happy circumstances two more employees had to resign their appointments recently. They are J. Renga Iyengar, Line Supervisor, Srirangam and R. Bhujanga Rao, Lineman, Thuraiyur. Both resigned for reasons of health.

Renga Iyengar has a service of 15 years to his credit and has been greatly responsible for load-building in Srirangam.



R. Santanam (*Mantharesan*)
and V. Ramaswamy (*Amma Gondu*)

Bhujanga Rao who has put in a service of a little over 13 years is now undergoing treatment in a hospital for suspected pleuritic infection.

Our sincere wishes go to them for their restoration to health and happiness.

—R. P.



"MYTHILI"—THE HAND-PICKED CAST

PRIZE-WINNERS



BADMINTON - FIVES

Winners.

G. A. Sivaswami
V. Balasubramaniam
M. A. Soundararajan
S. Sundaram
M. S. Ramachandran

Runners-up

R. Vasudevan
A. V. Rajaraman
T. V. Subramanian
A. Sundaram
S. Jayaraman



BADMINTON - DOUBLES

Winners

P. S. Vemban
R. Vasudevan

Runners-up
K. S. Ramakrishnan
J. Mahalingam



BADMINTON - SINGLES

Winner

J. Natesan

Runner-up

R. Vasudevan



VOLLEY BALL

Winners

N. Kesavan
Sreedharan
Rajamanickam
S. Gopalan
B. S. Ganapathi

Prize Winners—Contd.

K. R. Swami
R. Santhanam
S. Ramaswami
W. Subramaniam

Runners-up

P. S. Vemban
V. G. Ramaswami
S. Ramamurthi
S. Srinivasan
T. V. Muthukannu
K. R. Vijayam Pillai
K. Balakrishnan
V. Jayaraman
A. S. Vasudevan

SHOT PUT

I Prize—P. S. Vemban
II Prize—S. Sundaram

HIGH JUMP

I Prize—R. Govindarajan
II Prize—Rajamanickam

LONG JUMP

I Prize—M. Paramasivam
II Prize—K. R. Vijayam Pillai

SLOW CYCLE RACE

I Prize—T. R. Rajah
II Prize—A. N. Rangarajan

TUG OF WAR

Winners

K. V. Mahalingam
D. Vaidyanathan
S. Jayaraman
R. Sreenivasan
N. R. S. Mani
Abdul Sukkur
K. Sreenivasan
Md. Kasim
A. N. Rangarajan

Runners-up

S. Raman
V. G. Ramaswami
K. R. Vijayam Pillai
K. Ramaswami
A. Rangaswami
M. Subramaniam
L. R. Venkataraman
M. Thangian
Parameswaran

CAROMS DOUBLES :

Winners

N. Seetharaman
R. Vasudevan

Runners-up

S. Rangarajan
S. Kandaswami

SINGLES

Winner

V. V. Sarma

Runner-up

V. G. Ramaswami

எலக்ட்ரோஸ்ட்

தமிழ் அறிவுபந்தம்

மடல் 3

ஜூலை—செப்டெம்பர், 1951

இதழ் 2

சென்னை மாகாணத்தில் மின்சார அபிவிருத்தி

V. P. அப்பாதுரை முதலியார்

வாழ்வை வளம்படுத்த எழுந்த விஞ்ஞான ஆராய்ச்சியின் விளைவு மின்சாரம். இதை உற்பத்தி செய்வதில் சென்னை மாகாணம் இந்தியாவிலேயே மூன்றாவது இடத்தை பெறுகிறது. நீர்வீழ்ச்சியால் மின்சாரம் உற்பத்தி செய்வதில் பம்பாய் மாகாணத்திற்கு அடுத்தபடியாகவே சென்னை மாகாணத்தை குறிப்பிடலாம்.

நம் மாகாணத்தில் உபயோகப்படும் மின்சாரத்தில் 100க்கு 76 பங்கு நீர்வீழ்ச்சியாலும் பாக்கி நிலக்கரி, எண்ணெயாலும் உற்பத்தி செய்யப்படுகிறது.

இங்குள்ள மின்சார நிலையங்களில் மொத்தம் 1,87,000 K. W. வரையில் உற்பத்தி செய்யக்கூடிய சாதனங்கள் இதுவரையில் சர்க்காரால் அமைக்கப்பட்டுள்ளன. 1950-51-ம் ஆண்டில் மார்ச் மாதம் முடிய 69 கோடி யூனிட்டிகள் உற்பத்தி செய்யப்பட்டு இருக்கின்றன.

1908-ம் ஆண்டு வரையில் மின்சாரம் ஒரு சில தேயிலை தொழிற்சாலைகளில் மட்டுமே உற்பத்தி செய்யப்பட்டு வந்தது. பொதுமக்கள் உபயோகத்திற்காக முதலில் 1909-ம் ஆண்டில் சென்னை நகரத்திலும் பிறகு 1925-ம் ஆண்டில் உதகமண்டலத்திலும் சர்க்கார் அனுமதி பெற்று மின்சாரம் உற்பத்தி செய்யப்பட்டது. 1925-ம் ஆண்டில் சர்க்கார் மின்சார இலாகாவை ஏற்படுத்தி பைகாரா நீர்வீழ்ச்சி திட்டத்தை (Pykara Hydro-Electric Scheme) துவக்கியதும் தான் மின்சார உற்பத்தியில் முக்கிய முன்னேற்றம் ஏற்பட்டது. இந்த பைகாரா மின்சார திட்டத்தை 1933ஆம் பிறகு மேட்டூர் மின்சார திட்டத்தை 1937ஆம்

மூன்றாவதாக பாபநாசம் மின்சார திட்டத்தை 1944ஆம் கட்டிமுடிக்கப்பட்டது. இதன் நடுவில் 1938-ல் விசாகப்பட்டினத்திலும், 1939-ல் விஜயவாடாவிலும் நீராவியால் மின்சார உற்பத்தி செய்யும் நிலையங்கள் அமைக்கப்பட்டுள்ளன. 1947-ம் வருஷத்திலிருந்து சென்னை நகரில் பேஸின் பிரிட்ஜிலுள்ள மின்சார நிலையம் சர்க்கார் நிர்வாகத்தின் கீழ் கொண்டுவரப்பட்டது.

நமது மாகாணத்தில் 100க்கு ஒரு பங்கைத் தவிர மின்சாரம் பூராவும் சர்க்காரால் உற்பத்தி செய்யப்பட்டு வருகிறது. உற்பத்தி செய்யப்பட்ட மின்சாரத்தை 70 சதவிகிதம் சர்க்கார் மின்சார இலாகாவாலும் மீதி நகரசபைகளாலும் 43 கம்பெனிகளாலும் பங்கிட்டு செய்யப்பட்டு வருகிறது. இந்த நகரசபைகளும் கம்பெனிகளும் சர்க்காரிடமிருந்து மின்சாரத்தை மொத்தமாக வாங்கி அவரவர்கள் அனுமதிக்கப்பட்ட இடங்களில் வீடுகள், கடைகள், தொழிற்சாலைகள், விவசாயத்திற்காகவும் விநியோகித்து வருகிறது.

நமது மாகாணத்தில் நீர்வீழ்ச்சியால் மின்சாரம் உற்பத்தி செய்யக்கூடிய இடங்கள் அதிகமாக இருந்தாலும், வங்காளத்திலோ பீஹார், பஞ்சாபிலோ உள்ள இயற்கை வசதிகளுக்கு ஒப்பிட்டு பார்த்தால் நம் மாகாணத்தில் இருப்பது மிகக்குறைவே. நம் மாகாணத்தில் நீர்வீழ்ச்சியால் உண்டாக்கக்கூடிய ஆதாயங்கள் பழனி, நீலகிரி முதலிய மலைச்சாரல்களில் அநேகம் உள்ளன. இதுவரை நடத்திய ஆராய்ச்சியிலிருந்து குறைந்தது 10,00,000 K. W. மின்சார சக்தி இந்த ஆதாயங்களிலிருந்து உண்டாக்கக்கூடும் என்று நிர்ணயிக்கப்படுகிறது. இது தவிர இனி நிர்ணயிக்கப்படும் நீர்ப்பாசன அணைகளிலிருந்தும் மின்சாரசக்தி உண்டாக்கக்கூடும். நமது மாகாணத்தில் எண்ணை சுரங்கங்கள் கிடையாது. தற்போது எண்ணை வெளிநாடுகளிலிருந்துதான் இறக்குமதியாகிறது. சமீப காலம் வரையில் நிலக்கரி சுரங்கங்களும் இல்லை என்றே எண்ணி வந்தோம். ஆனால் சில வருஷங்களாக தென் ஆற்காடு ஜில்லாவில் பண ருட்டி க்க ரு கி லு ள்ள நெய்வேலி என்ற இடத்தில் நிலக்கரி சுரங்கங்கள் இருப்பது கண்டு பிடித்து அதில் ஆராய்ச்சியும் நடந்து வருகின்றது. இந்த நிலக்கரியை லாபகரமாக எடுத்து உபயோகப்படுத்த முடியுமானால் இந்த ஜில்லாவிலேயே நீராவியினால் இயங்கும் மின்சார நிலையம் ஏற்படுத்தி மற்றபாகங்களிலிருக்கும் நீர் வீழ்ச்சி மின்சார நிலையங்களுடன் இணைத்து நமது மாகாணத்தில் என்றும் மின்சாரத்திற்கு குறைவில்லாமல் ஏற்பாடு செய்யமுடியும். தற்சமயம் நமக்கு தேவையான நிலக்கரி ஹைதராபாத்திலும், மத்திய பிரதேசத்திலும், வங்காளத்திலிருந்தும் வருகிறது.

நமது மாகாணத்தில் தென்பகுதியிலுள்ள நீர் வீழ்ச்சி மின்சார நிலையங்களை ஒவ்வொன்றாக ஆராய்வோம்.

1. பைகாரா நீர்வீழ்ச்சி மின்சார திட்டம்: (Pykara Hydro-Electric Scheme) இது நீலகிரி மலைச்சாரலில் அமைக்கப்பட்டிருக்கிறது. பைகாரா என்றும் நதியை தடுத்து அணை கட்டி அந்தத் தண்ணீரை 2 மைல்நீளமுள்ள குழாய்கள் மூலம் 3080 அடி உயரத்திலிருந்து வீழ்ச்சி செய்து சிங்கார மலைச்சாரலின் அடியில் மின்சார நிலையத்தை அமைத்து 43,000 K. W. வரையில் மின்சார சக்தி உண்டாக்கப் படுகிறது. சென்னை சர்க்காரால் முதலில் எடுத்து 1933-ம் வருஷம் பூர்த்தி செய்யப்பட்ட திட்டம் இது. இதுதான் ஆசியா கண்டத்திலேயே அதிக உயரத்திலிருந்து தண்ணீரை வீழ்ச்சி செய்து மின்சார உற்பத்தி செய்யும் நிலையங்களில் முதன்மை பெற்றது. இங்கு உற்பத்தியாகும் சக்தியை 110,000 Volt கம்பிகள் மூலம் கோயமுத்தூருக்கு கொண்டு சென்று அங்கிருந்து நீலகிரி, மலையாளம், கோயமுத்தூர் ஜில்லாக்களில் விநியோகிக்கப் படுகிறது.

2. மேட்டூர் திட்டம்: (Mettur Hydro-Electric Scheme) செலம் ஜில்லாவில் காவிரி நதியை தடுத்து கட்டப்பட்ட மேட்டூர்

அணையைப்பற்றி எல்லோரும் கேட்டிருப்பீர்கள். உலகத்திலுள்ள மிகப் பெரிய அணைகளில் இது ஒன்று. இதன் நீளம் 5,300 அடி, உயரம் 176 அடி. இது முக்கியமாக விவசாயத்திற்காக கட்டப்பட்ட அணை. விவசாயத்துக்கு உபயோகப்படும் தண்ணீரால் மின்சார சாதனங்களை ஓட்டி, மின்சாரம் உண்டாக்கப்படுகிறது. மின்சார நிலையம் அணையின் கீழ் பாகத்தில் அதன் அடியிலேயே அமைக்கப் பட்டிருக்கிறது. இது 1937ம் வருஷம் கட்டி முடிக்கப்பட்டது. 40,000 K. W. வரையில் இந்த திட்டத்திலிருந்து மின்சாரம் உற்பத்தி செய்யலாம். செலம், வட ஆற்காடு, தென் ஆற்காடு, திருச்சி, தஞ்சை, செங்கல்பட்டு, சித்தூர் ஜில்லாக்களுக்கு இந்த நிலையத்திலிருந்து மின்சாரம் வழங்கப்படுகிறது.

3. பாபநாசம் மின்சார திட்டம்: (Papanasam Hydro-Electric Scheme) இது சென்னை சர்க்காரால் மூன்றாவதாக கட்டப்பட்ட திட்டம். இந்த நிலையம் 1944லிருந்து மின்சார உற்பத்தி செய்யப்பட்டு வருகிறது. இது திருநெல்வேலி ஜில்லாவில் அம்பாசமுத்திரத்திற்கு 8 மைல் தூரத்தில் தாம்பிர பரணி நதியில் பாபநாசம் நீர்வீழ்ச்சிக்கு அருகாமையில் அமைக்கப்பட்டிருக்கிறது. இதில் 330 அடி உயரத்திலிருந்து தண்ணீரை குழாய்கள் மூலமாகவே கீழே வீழ்ச்சி செய்து 28,000 K. W. வரையில் மின்சாரம் உற்பத்தி செய்யப்படுகிறது. இதிலிருந்து மதுரை, திருநெல்வேலி, ராமநாதபுரம் ஜில்லாக்களுக்கும், திருவாங்குருக்கும் மின்சாரம் வழங்கப்படுகிறது.

மேற்சொன்ன பைகாரா, மேட்டூர், பாபநாசம் மூன்று நீர்வீழ்ச்சி நிலையங்களும் சென்னை நீராவி நிலையமும் ஒன்றுடன் ஒன்று இணைக்கப்பட்டிருக்கின்றன. ஒரு நிலையத்தில் ஜலக்குறைவினால் மின்சார உற்பத்தி தடைப்பட்டாலோ, தேவைக்கு குறைந்தாலோ, மற்றொரு நிலையத்திலிருந்து போதிய அளவுக்கு அனுப்ப இந்த இணைப்பினால் சாத்தியப்படுகிறது. சென்ற 4 வருஷங்களாக மேட்டூர், பாபநாசம் இரண்டு இடங்களிலும், மழைக்குறைவினால் போதிய தண்ணீர் இல்லாமல் மின்சார உற்பத்தி குறைந்துபோன சமயங்களில், பைகாரா சென்னை நிலையங்களிலிருந்து மின்சாரத்தை குறைவாக உள்ள இடங்களுக்கு அனுப்பப்பட்டது.

நீராவியினாலும், எண்ணெயினாலும் உற்பத்தி செய்யும் நிலையங்களை இனி கவனிப்பீர்கள்.

போம். இதில் எல்லாவற்றிலும் பழைய தும், பெரியதும் ஆன நிலையம் சென்னை நகரத்தில் இருக்கிறது. இது ஒரு ஆங்கிலேய கம்பெனியின் ஆதிக்கத்தில் 40 வருஷ காலம் இருந்து 1947-ம் வருஷம் சர்க்காரால் எடுத்துக்கொள்ளப்பட்டது. இந்த நிலையம் பேஸின் பிரிட்ஜ் ரயில்வே ஸ்டேஷனுக்கு அடுத்தாற்போலிருக்கிறது. இந்த நிலையத் திலிருந்துதான் சென்னை நகருக்கும் அருகா மையில் தாம்பரம், பூந்தமல்லி முதலிய இடங்களுக்கும் மின்சாரம் அளிக்கப்படுகி றது. இதில் 46,500 K. W. உற்பத்தி செய்யக்கூடிய சாதனங்களிருக்கின்றன. மேலும் 2 X 15,000 சாதனங்கள் அமைக் கும் வேலைகள் மிக துரிதமாக நடந்துகொண் டிருக்கின்றன. இவை 1952-ல் ஒன்றும், 1953-ல் மற்றொன்றும் உபயோகத்திற்கு வரும்.

இதற்கு அடுத்தபடியாக உள்ளது விஜயவாடாவில் இருக்கும் நிலையம். இதில் 6,000 K. W. வரையில் நீராவினால் மின்சார உற்பத்தி செய்யலாம். இந்த நிலையம் விஜயவாடா டவுனிலேயே இருக்கிறது. இதிலிருந்து கிருஷ்ணா, குண்டூர் ஜில்லாக்க ளுக்கு மின்சாரம் வழங்கப்படுகிறது. 2 X 3,000 K. W. மின்சாரம் உற்பத்தி செய்யக்கூடிய இயந்திரங்கள் கூடுதலாக இங்கு நிர்மாணிக்கப்படுகின்றன. அவை கூடிய சீக்கிரத்தில் உபயோகத்திற்கு வரும். விசாகப்பட்டினத்தில் உள்ள நிலையத்தில் 3,000 K. W. வரையில் மின் சாரம் உற்பத்தி செய்யலாம். 2 X 1500 K. W. மின்சாரம் உண்டாக்கக் கூடிய சாதனங்கள் இங்கு கூடுதலாக நிர்மாணிக் படுகின்றன. அவை இன்னும் சில நாட் களில் உபயோகத்திற்கு வரும். இங்கு உற் பத்தியாகும் மின்சாரம் விசாகப் பட்டினம் ஜில்லாவிற்கு பயன் படுகிறது.

இந்த மூன்றையும் தவிர வடக்கே நெல்லூரிலும், தெற்கே மதுரையிலும், இரண்டு மின்சார நிலையங்கள் புதிதாக கட்டி சமீபத்தில் உபயோகத்திற்கு கொண்டு வரப்பட்டன. நெல்லூரில் எண்ணையை உபயோகப்படுத்தி 5,000 K. W. வரை மின் சாரம் உற்பத்தி செய்யும் யந்திரங்களும், மதுரையில் நீராவினால் 4000 K. W. வரை மின்சாரம் உற்பத்தி செய்யப்படும் இயந் திரங்களும் உள்ளன. மதுரைக்கு மேலும் ஒரு 10,000 K.W. இயந்திரம் வாங்குவதற்கு ஏற்பாடாகி இருக்கிறது. இது 1952 முடிய உபயோகத்திற்கு தயாராகிவிடும்.

1951ம் வருஷம் மார்ச் மாதம் முடிய 141 நகரங்களுக்கும் 1816 கிராமங்களுக்கும் மின்சாரம் வழங்கப்பட்டு வருகிறது. இந்த இடங்களில் 2,75,000 குடும்பங்களுக்கு மின் சார வசதி அளிக்கப் பெற்று வருகிறது.

உற்பத்தியாகும் மின்சாரத்தில் 100க்கு 80 பங்கு ஆலைகளுக்கும், தொழிற்சாலைகளுக் கும், விவசாயத்திற்கும் பயன் படுத்தப் பெற்று வருகிறது. 60க்கு மேற்பட்ட துணி மில்கள், தேயிலை தொழிற்சாலைகள், 5 செமண்ட் மில்கள், 2 இரும்பு தொழிற் சாலைகள், சென்னையிலுள்ள டிராம்வே, மின்சார ரயில்வே இவைகள் எல்லாம் தற் போழுது மின்சாரத்தினால் வேலை செய் கிறது. இயற்கை நீர்ப்பாசன வசதி இல் லாத இடங்களில் கிணறுகளிலிருந்து தண்ணீர் இறைத்து உணவு உற்பத்தி செய்ய மின்சாரம் உதவுகிறது. இது வரை யில் 16,500க்கு மேற்பட்ட பம்புகள் விவ சாயத்திற்காக மின்சாரத்தினால் வேலை செய்து வருகின்றன.

கிராம மின்சார அபிவிருத்திக்காக சென்னை சர்க்கார் அதிக கவனம் செலுத்து கிறார்கள்.

நம் மாகாணத்தில் பயன் படுத்தப்படும் மின்சாரத்தில் ஆறில் ஒரு பங்கு கிராமங் களில் பயன்படுத்தப் படுகிறது. கிராமங் களுக்கு மின்சாரம் வழங்குவதில் சர்க்கார் லாபத்தை கருதாமல், மின்சாரத்தில் இந்த கிராமங்கள் அடையும் நன்மைகளையே முக்கியமாகக் கருதி, அதற்கு ஆவன செய் கிறார்கள். கிராம முன்னேற்றத்திற்கு காக நமது சர்க்கார் 1945ம் வருஷம் 25 பீர்க் காக்களை பொறுக்கி எடுத்தார்கள். ஒவ் வொரு பீர்க்காவிலும் 20—25 கிராமங்கள் உள்ளன. கிராம முன்னேற்றத்தின் முக்கிய அம்சமான சப்ளை இந்த பீர்க்கா அபிவிருத்தி திட்டத்திலுள்ள எல்லா கிராமங்களுக்கும் ஏற்பாடு செய்யப்பட்டு வருகிறது. டெண்ட் லார் பீர்க்கா, கடம்புலியூர், திருவள்ளூர், நகரி, திருமங்கலம், மல்லி என்னும் பீர்க்காக் களில் வேலை மிக துரிதமாக நடைபெற்று வருகிறது. இந்த பீர்க்காக்களில் மின்சார சப்ளை செய்வதற்கு வேண்டிய மூலதனத் திற்கு சர்க்காரின் விதிகளின்படி வரவேண் டிய லாபம் வரவிட்டாலும் ஹரிஜன முன் னேற்றத்திற்காக ஒதுக்கப்பட்ட பணத்தி லிருந்து உதவி செய்து இந்த திட்டங்கள் பூர்த்தியடைய சர்க்கார் ஏற்பாடு செய்திருக் கிறார்கள்.

இதுவரையில் நிறைவேற்றியுள்ள திட்டங்களை கேட்டார்கள். இதோ எங்கள் வருங்கால திட்டங்கள். சென்ற யுத்த கால மாகிய 1939லிருந்து 1945-ம் வருஷம் வரை யில் மின்சார துறையில் அதிக அபிவிருத்தி செய்யப்படாமலிருந்தது. 1939க்கு முன், ஆரம்பித்த வேலைகளை மாத்திரம் வெகு கிரமப்பட்டு மேற்கொண்டு நடத்தி முடிக் கப்பட்டது. யுத்தம் முடிந்து மாகாணத் தில் மக்களாட்சி ஏற்பட்டவுடன் சர்க்கார் ஒரு 5 ஆண்டுத் திட்டம் வகுத்து அந்த வேலைகளை துரிதமாக நடத்த ஏற்பாடுகள் செய்தார்கள். இந்த 5 ஆண்டுத் திட்டத் தின் கீழ் மச்சுண்டி, மொயார், மதுரை, நெல்லூர் என்ற 4 புது மின்சார திட்டங் களும் தற்போழுது வேலை செய்துகொண் டிருக்கும் பைகாரா, பாபநாசம், சென்னை முதலிய நிலையங்களில் கூடுதலாக மின்சார சக்தி உற்பத்தி செய்யக்கூடிய உபரி சாத னங்கள் அமைக்கவும் 1650 மைல் மின்சார லைன்கள் அதிகமாக கட்டவும் ஏற்பாடு செய் யப்பட்டது. இந்த திட்டங்களினால் இப் பொழுதிருக்கும் 1,80,000 K. W. ஐ விட 1,80,000 K. W. கூடுதலாக மின்சாரம் உற்பத்தி செய்யலாம். சுருங்கச் சொன்னால் இந்த 5 ஆண்டுத் திட்டம் பூர்த்தியானவுடன் மின்சார உற்பத்தி 2 பங்கு அதிகமாகும். இந்த திட்டத்தை பூர்த்தி செய்ய 30 கோடி ரூபாய் சிலவாகும். இந்த திட்டத்திலுள்ள எல்லா பகுதிகளிலும் வேலைகள் துரிதமாக நடந்துகொண்டிருக்கின்றன. 1953 முடிய இவை முடிவடையும் என எதிர்பார்க்கப் படுகிறது.

மச்சுண்டி நீர்வீழ்ச்சி மின்சார திட்டம் : 5 வருஷ திட்டத்திலேயே இதுதான் முக்கிய பகுதி. ஒரிசா மாகாணத்தை யும், நம் மாகாணத்தையும் பிரிக்கும் எல்லை யில் ஓடும் மச்சுண்டி என்னும் நதியில் அணை கட்டி ஓடுமா நீர்வீழ்ச்சிக்கருகில் மின்சார உற்பத்தி செய்யப்படும். இந்த திட்டத்தை நம் மாகாணமும் ஒரிசா மாகாணமும் சேர்ந்து ஒரு ஒப்பந்தப்படி நடத்தி வருகி றார்கள். இதன்படி ஒரிசா மாகாணம் 30 சத வீத சிலவை ஏற்றுக்கொண்டு, உற் பத்தி செய்யும் மின்சாரத்தில் 30 சத வீத பங்கை அடைகிறது. 1,00,000 (ஒரு லட்சம்) K. W. வரையில் உற்பத்தி செய்யக்கூடிய சாதனங்கள் அமைக்கவேண்டிய இடத்தில் முதலில் 51,000 K. W. உற்பத்தி செய்யக் கூடிய சாதனங்கள் அமைக்கப்படுகின்றன. ஓடுமா நீர்வீழ்ச்சிக்கருகில் அமைக்கப்படும்

இந்த மின்சார நிலையம் விசாகப்பட்டினத்தி லிருந்து 125 மைல் தூரத்தில் இருக்கிறது. ரயில் பாதை வசதிகள் கிடையாது. வேலைக்கு வேண்டிய எல்லா சாமான்களும் இந்த 125 மைல் தூரம் மேரட்டார் வண்டிகளில்தான் எடுத்துச் செல்லப்படு கிறது. இந்த திட்டத்திற்காக 1300 அடி நீளம் 134 அடி கிளம் 80 அடி உயரத் தில் மற்றொரு அணையும் கட்டப்படுகிறது. இதில் தேக்கப்பட்ட தண்ணீரை 4000 அடி நீளமுள்ள கால்வாயின் மூலம் கீழே விழச் செய்து மின்சாரம் உற்பத்தி செய்யப்படும், இங்கு உற்பத்தியாகும் மின்சாரத்தை விசாக பட்டினம், கோதாவரி, கிருஷ்ணா, குண்டூர் முதலிய ஜில்லாக்களில் விநியோகிக்கப் படும். 1953ம் வருஷம் இந்த திட்டம் முடிவடையும்.

மொயார் மின்சார திட்டம் : 5 வருஷ திட்டத்தில் மச்சுண்டிக்கு அடுத்தபடி யாக மொயார் மின்சார திட்டம். இது மாகாணத்தின் தென்பாகத்தில் 4வது நீர் வீழ்ச்சி மின்சார நிலையமாக விளங்கும். இப்பொழுது பைகாரா மின்சார நிலையத்தில் மின்சார உற்பத்தி செய்ய உதவும் தண்ணீ ரைக் கொண்டே மறுபடியும் மின்சாரம் உற்பத்தி செய்யும் திட்டம் இது பைகாரா நிலையத்திலிருந்து 9 மைல் தூரத்தில் அமைக் கப்பட்டிருக்கிறது. பைகாரா நிலையத்தில் உபயோகப்பட்டு வரும் தண்ணீரை கால் வாயின் வழியாக 9 மைல் தூரத்திற்கு கீழ் எடுத்துச் சென்று மொயார் மின்சாரத்தில் 1280 அடி உயரத்திலிருந்து குழாய்களின் வழியே கீழே விழச் செய்து மின்சாரம் உற் பத்தி செய்யப்படும். இதில் வேலை 1945ம் வருஷம் தொடங்கி இதற்கு வேண்டிய அணைகள், கால்வாய்கள், கட்டுவது, குழாய் களும், இயந்திரங்களும் பொருத்துவதும் அனேகமாக முடியும் தருவாயில் இருக் கிறது. 1951ம் வருஷத்திற்குள் ஒரு இயந் திரம் பூர்த்தியாகி மின்சார உற்பத்தி செய்ய ஆரம்பிக்கும். இந்த திட்டத்திலிருந்து 27,000 K. W. மின்சாரம் உற்பத்தி செய்து மேட்டூர் பைகாரா நிலையத்துடன் இணைத்து விநியோகிக்கப்படும்.

இவைகளைத் தவிர தற்போழுது உப யோகத்திலிருக்கும் நிலையங்களில் கூடுதலாக உற்பத்திசெய்ய கீழ்க்கண்ட அளவுக்கு சாத

ளங்கள் அமைக்க வேலைகள் துரிதமாக நடந்து வருகின்றன.

1. பைகாரா:—27,2000 K. W. இது 1953ம் வருஷத்தில் உபயோகத்திற்கு வரும்.
2. பாபநாசம்—7000 K. W. இந்த வேலை முடிவடைந்து விட்டது.

3. மதராஸ்—30,000 K. W. இதில் 15000 K. W. வரை உற்பத்தி செய்யும் 1952ம் வருஷத்திற்குள் முடிந்து விடும். பாக்கி வேலைகள் 1953ல் முடிவடையும்.

ராயலசீமாவிலுள்ள ஜில்லாக்களில் உபயோகத்திற்காக மின்சார லைன் சாதனங்கள் அமைத்து மைசூர் சர்க்காருடன் ஒப்பந்தம் செய்து அவர்களுடைய ஜோக் மின்சார நிலையத்திலிருந்து 4,000 K. W. மின்சாரம் இந்த ஜில்லாக்களில் விநியோகம் செய்யப்பட்டு வருகிறது. துங்கபத்திரா மின்சார திட்டம் உபயோகத்திற்கு வரும் வரையில் இந்த ஏற்பாடு அமுலில் இருக்கும். இதைத் தவிர கர்நூல், அனந்தப்பூர், கடப்பை, நந்தியால், தாத்தப்பிரி முதலிய இடங்களில் எண்ணையினால் ஓடும் டீசல் என்ஜின் மின்சார இயந்திரங்கள் பொருத்தி அந்தந்த இடங்களுக்கு மின்சாரம் விநியோகிக்கப்படுகிறது.

ஆனாலும் மின்சாரத்தின் உபயோகத்தை வெகுவாக அறிந்துகொண்ட மக்களின் முழு தேவையையும் பூர்த்தி செய்ய இவைகள் போதாது. அதிகமாகக்கொண்டு வரும் இந்த பொதுமக்கள் தேவையை பூர்த்தி செய்யவேண்டி திட்டங்கள் வகுக்கப்பட்டு வருகின்றன.

துங்கபத்திரா அணைக்கட்டினால் 30,000 K. W. வரை மின்சார உற்பத்தி செய்ய பூர்வாங்க ஏற்பாடுகள் பூர்த்தியாகி வேலை சீக்கிரத்திலேயே தொடங்கப்படும்.

மைசூர் சர்க்காருடன் ஒப்பந்தப்படி காவிரி நதியில் மேகதாது நீர்வீழ்ச்சியிலிருந்து உற்பத்தி செய்யப்போவதில் 13,000 K. W. வரை நம் மாகாண உபயோகத்திற்கு கிடைக்க பேச்சுவார்த்தைகள் நடந்துகொண்டிருக்கின்றன.

இதைத்தவிர மைசூர் சர்க்கார் ஜோக் (Jog) மின்சார நிலையத்திலிருந்து 6,000 K. W. மின்சாரம் வாங்கி தென் கன்னடா ஜில்லாவில் விநியோகம் செய்வதற்கு வேண்டிய பேச்சுவார்த்தைகள் நடந்துகொண்டிருக்கின்றன.

திருவாங்கூர் - கொச்சி சர்க்காருடன் ஒப்பந்தம் செய்துகொண்டு பெரியார் ஏரி ஜலத்திலிருந்து 1,00,000 K. W. மின்சார உற்பத்தி செய்யவும் ஆராய்ச்சிகள் முடிந்து பூர்வாங்க ஏற்பாடுகள் செய்யப்பட்டு வருகின்றன. இதுதவிர நீலகிரியில் குந்தா நதியில் தண்ணீரை குழாய்கள் மூலம் விழச் செய்து, எமரல்ட், அவலான்சி நதிகளில் அணைகள் கட்டி 1,25,000 K. W. வரை உற்பத்தி செய்ய ஆராய்ச்சிகள் நடந்துகொண்டிருக்கின்றன.

தற்பொழுது நம் மாகாணத்தில் மக்கள் தொகையையும், மின்சார உற்பத்தியையும் ஒப்பிட்டு பார்த்தால் ஒவ்வொருவருக்கும் சராசரி ஒரு வருஷத்தில் 6.5 யூனிட்கள் தான் கிடைக்கிறது. இந்த எண்ணுக்கு ஆங்கிலத்தில் Per Capita Consumption என்று சொல்லுவதுண்டு. ஒரு நாட்டில் செல்வாக்குக்கு இந்த எண்ணான் ஒரு அடி கோலாகும். அமெரிக்கா (1960), இங்கிலாந்து (770), ஸ்வீடன் (2030), ஏன் நம் நாட்டிலேயே பம்பாயில் தலைக்கு 49 யூனிட்களும், மைசூரில் 38 யூனிட்களும் உபயோகப்படுகிறது. நம் மாகாணத்தின் மின்சார இலாகாவின் நோக்கம், ஒவ்வொருவருக்கும் வருஷத்திற்கு 50 யூனிட்கிடைக்கச் செய்வதேயாகும். இதை சீக்கிரமே அடைய ஏற்பாடாகி வருகிறது.

முன் சொன்னபடி மின்சார உற்பத்தியில் 100க்கு 99 பங்கும், விநியோகத்தில் 100க்கு 70 பங்கும் சர்க்கார் மேற்பார்வையில் இருக்கிறது. மற்றவை தனிப்பட்ட கம்பெனிகளாலும், முனிசிபாலிட்டிகளாலும் மேற்பார்வை செய்யப்பட்டு வருகிறது.

ஒரு சில கம்பெனிகள் நகரின் முன்னேற்றத்தையே முக்கிய கோளாக கருதி கிராமங்களுக்கு மின்சார வசதிகள் அளிப்பதில்லை. கிராமந்திர முன்னேற்றத்தைக் கருதி சென்னை சர்க்கார், மின்சார உற்பத்தியையும், விநியோகத்தையும், தாங்களாகவே மேற்கொண்டு நடத்த திட்டம் வகுத்து அதை நிறைவேற்றி, அதை அமுலுக்கு கொண்டு வருகிறார்கள். இந்த திட்டத்தினால் மின்சார அபிவிருத்தியில் நம் மாகாணத்திலுள்ள எல்லா கிராமங்களும் முன்னேறி சிங்கார சோலைகளாக திகழும் என்பது உறுதி.

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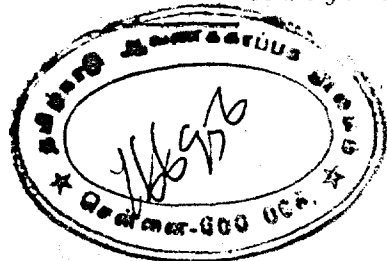
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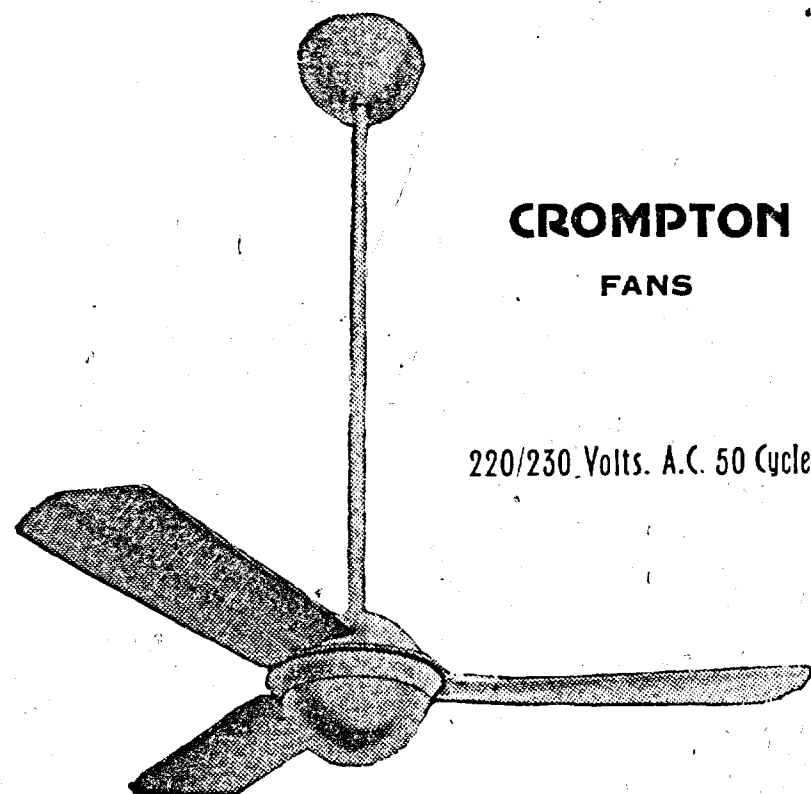
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