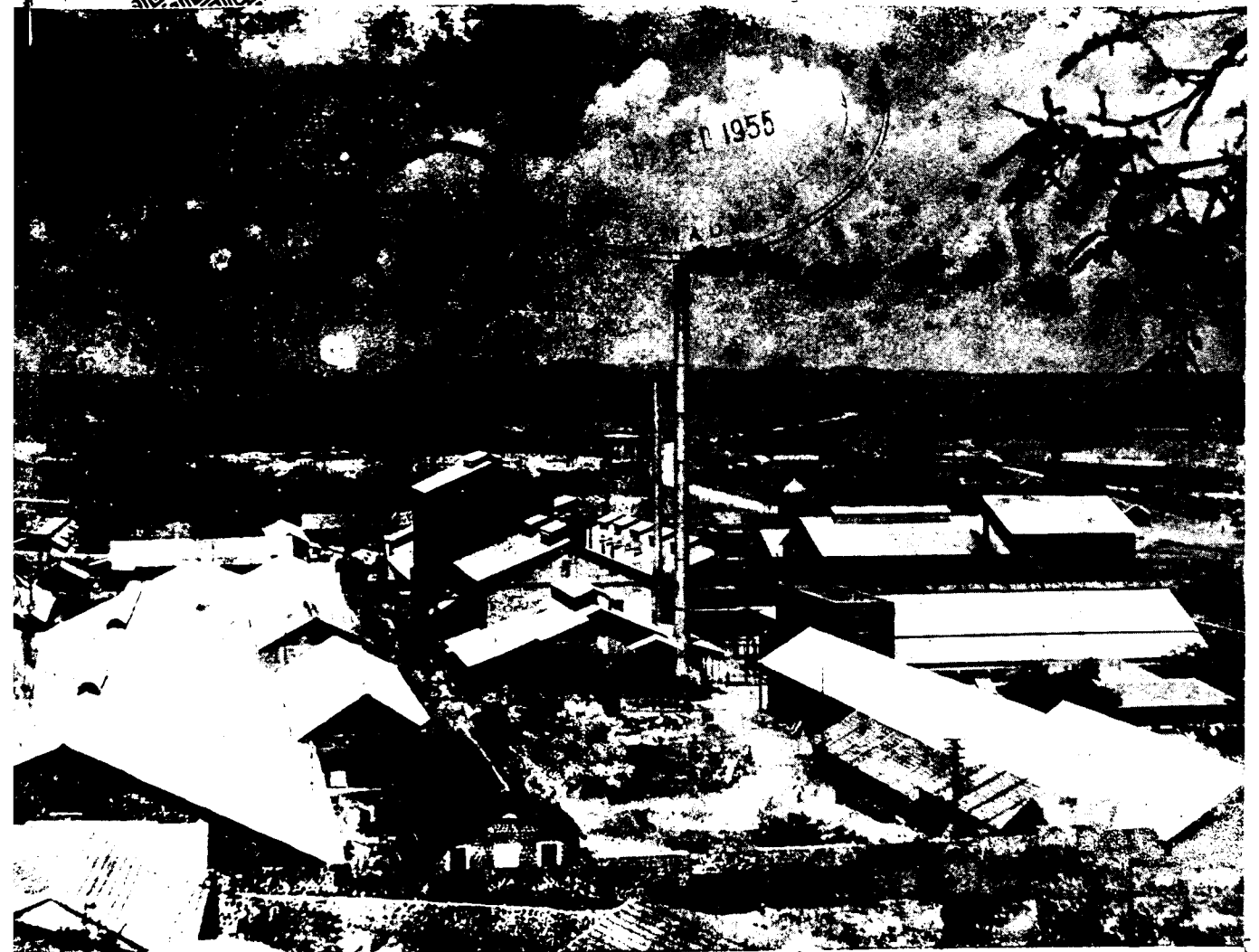


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In this Issue

WAR AGAINST PESTS ● BACK-PRESSURE POWER
IN INDUSTRY
AND
OTHER USUAL FEATURES.



Cover Photo

An aerial view of MCIC Ltd., Mettur Dam.



IN the time it takes to read this article, more than 500 people in the world will die from disease or starvation; countless others will take to sick and death beds for the same reasons. They are the victims in a deadly battle waged perennially between man and the pests that attack his body and his food supply.

In recent years two new weapons have been developed to fight this menace; these are aldrin and dieldrin which kill the enemy in his thousands and check his depredations more effectively than they have ever been checked before.

Aldrin and dieldrin are chlorinated derivatives of cyclopentadiene. They may be even called preventive medicines, for they do surely help to reduce the incidence of disease and food shortages. But it is no good going to a chemist's shop and asking for a bottle of aldrin or visiting a doctor in the hope of getting a prescription for dieldrin. They are not medicines in that sense; they are insecticides, or "bug killers".

Last year, more than 3 million people died of malaria, a disease borne by the female anophelene mosquito; throughout the world one person in every eight suffered from his disease. In the U. S. A. alone, agricultural losses due to pests and diseases run to over £1,000 million a year—enough to feed ten million people. Translate these figures into world totals and it can be seen the sums involved are truly enormous.

In making war on insects, one has to employ a pseudo-military type of strategy. As much as possible must be known about this enemy—where he lives, how he breeds, how he organises his forces—and one must discover his weak points, so as to know the best place and time to attack.

Modern scientific techniques—the microscope in particular—have provided the means to obtain this information. Many efficient insecticides have been developed—B.H.C and D. D. T. are well-known examples. But scientists never rest on their laurels and aldrin and dieldrin represent a further advancement in the progress of their research.

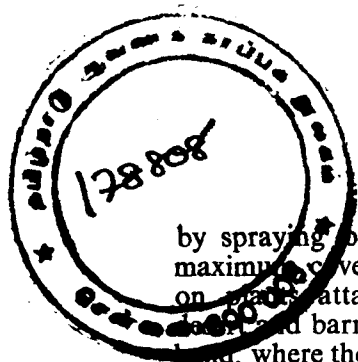
Aldrin and dieldrin are more potent—that is to say, they can be used at very low dosage rates, a feature which makes for economy, ease of handling and application. Moreover, they kill some pests for which no effective control has hitherto been found. And, they are lethal to more insects at the same time; their destructive power is more comprehensive.

Aldrin and dieldrin were originally developed in the U.S.A.

Some examples of the applications of these two outstanding products may be mentioned here.

ALDRIN

Aldrin has achieved its most spectacular success in the control of locusts and grasshoppers which, from time immemorial, have caused untold damage to crops in Africa, the Middle East and Asia. It acts more quickly as a stomach poison than as a contact insecticide and, where vegetation is abundant, it is more effectively used



2.

by spraying or dusting so that the maximum coverage can be obtained on crops attacked by locusts. In barren areas, on the other hand, where there is little or no vegetation, it can be used mixed with bran or rice husks as a bait or as a contact spray. In the present locust control campaign in India, aircraft spraying in Rajasthan using Aldrin as a contact insecticide has given 100 per cent kills. Another technique, first tried in India in 1953, is to spray locust egg beds with aldrin or dieldrin before hatching starts. The insecticide "stays put" and kills off the young hoppers as they emerge.

There is another class of pest against which aldrin is highly effective, the soil pest. He is a little-known fellow, because, living underground, he is "out of sight, out of mind". Nonetheless, he does a great deal of damage and, whether he be a grub, a maggot, a cutworm or a termite, there are few annual and biennial crops immune from his ravages. Cotton and cereals, vegetables, potatoes, beetroot and carrots, tobacco and onions are among the crops frequently attacked; while many perennials, like pineapple, sugarcane, strawberries, bananas, etc., are equally susceptible to his blandishments.

The main reason why the soil insect problem has received such little attention in the past is because, until recently, there has been no insecticide fulfilling satisfactorily the exacting requirements of pest control within the soil. Aldrin now fills the void. Due to its volatility, it has but brief persistency when applied to surfaces; but, in the soil, this volatility assists in even distribution and penetration and,

when used to a depth of 3-6 inches, it remains effective for periods of a year and upwards. Moreover, it does not taint crops, it does not affect seed germination and it does not harm earthworms and beneficial micro-organisms normally found in the soil. In other words, it winks out the bad bugs but leaves the good ones alone. Aldrin also kills larvae which, while harmless to crops while living in the soil, later develop into major pests of foliage and fruit.

The termite is probably the most important soil pest in India. Aldrin has proved effective against termites attacking both maize and sugarcane and protects the crop throughout its period of growth. In one sugarcane trial field, a yield increase of over 120 maunds per acre was achieved by the use of aldrin—a most important development when it is remembered that India, in spite of being the world's largest sugarcane producer, is still importing half a million tons of refined sugar this year.

DIELDRIN

Dieldrin could well be called public health friend No. 1. Experience over a number of years has shown that Dieldrin will control the following disease carriers:

Mosquitoes—which bring malaria, filariasis, yellow fever and dengue fever.

Assassin bugs—carriers of the dreaded Chagas disease in South America.

Houseflies—responsible for dysentery and similar diseases.

3

Fleas—vectors of plague and murine typhus.

Ticks—who bring relapsing fever and tick typhus.

Mites—vectors of scrub typhus in Northern India and Malaya.

Dieldrin controls also certain other insects, like cockroaches and bed bugs, which are usually regarded as nuisance pests, but which are suspect as possible mechanical carriers of disease.

Because of its low vapour pressure, it is extremely persistent—it stays put—a feature which makes it particularly lethal and well-suited for use in residual spray programmes. Another major advantage is that, unlike most other insecticides, it is potent against not one, but many disease carriers.

The widespread floods that occurred in East Pakistan in August this year caused an explosive outbreak of malaria and dieldrin, amongst other supplies, was flown out to help combat the disease.

The remarkable residual activity of dieldrin can have important indirect control effects. In East Africa, for example, a destructive pest of coffee plantations is the mealy bug. This insect, which lives in the branches of coffee plants, has a thick waxy coat protecting it from insecticides. It is, however, largely dependent upon ants for its survival. They feed on the sugary secretion from the body of the mealy bug and in return act as its

protectors. If the ants are destroyed or denied access to the coffee plants the mealy bug cannot fend for itself and becomes a prey to its natural enemies. When dieldrin is used to keep the ants away, therefore, the mealy bugs are destroyed and the coffee plants saved.

In India, although both mealy bugs and green bugs are found associated with ants and can be similarly controlled with dieldrin, the most important pest of coffee is the stem borer, a pest which tunnels up the main stem of the plant and can quickly devastate a fine plantation. A coating of dieldrin applied to the stems of the coffee plants gives effective protection against this pest for long periods.

Aldrin and dieldrin together have other applications. They control, for example, pests that attack timber and are consequently of importance in furniture protection.

Research scientists have recently developed a novel role for aldrin and dieldrin by incorporating them in a lacquer which, when sprayed on to areas infested by insects, particularly cockroaches, is deadly to them.

A leading Indian paint company is now developing lacquers of this type which are expected to have many important applications in India.

This brief summary will have shown some of the things that aldrin and dieldrin can do.

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BACK-PRESSURE POWER GENERATION IN INDUSTRY*

by

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IF industries which require steam are, also, to produce their own power, and others which have hot gases going to waste into the atmosphere, like cement kilns, blast, glass, and other similar furnaces, are also to recover the heat and to produce steam by the installation of waste-heat boilers and utilise the steam for the generation of power and/or process heat, power distribution from the public grid could be made much more widespread than it is at present. Large oil or gas engine installations may, also, utilise the heat in the exhaust, adopt the vapour-phase system of steam generation and thus produce power. To the extent power is produced by an industry on its own steam, a grid will be able to make it over to rural and other consumers who cannot generate their own power.

CONDENSING POWER PLANT

An erroneous notion somehow persists that only modern power stations can produce power at the cheapest cost. This notion is, in the main, due to proper thought not having been

given to other methods of power generation. Low-cost power can, for example, be produced by what is generally known as back-pressure generation. The method consists of passing the live steam through a non-condensing turbine or engine which exhausts the steam at the pressure required for process purposes. The steam is made to produce power on its way to the process, which, therefore, is only a by-product of the industry. The machine acts as a reducing valve, and at the same time, produces power which is far cheaper than the cheapest power that can be produced in any power station. We will discuss this presently.

However efficient a condensing steam power plant may be, it cannot convert more than a third of the heat in the fuel into electrical energy. Even the most modern thermal power station with all its economising devices hardly achieves 40 per cent efficiency from coal to kilowatts. If the steam is passed through a turbine on its way to the heating process, a power station

in any large factory can generate power with only two-fifths of the quantity of coal used by an up-to-date condensing power plant. Even the modest steam engines in small factories will utilise only two-thirds the quantity of coal for the same power generation.

may be anything between this 28.7 per cent and 14.66 per cent, the latter being the efficiency of a typical old inefficient power station having low pressure boilers, turbines, etc.

PROCESS-STEAM UTILISING PLANT

The heat distribution in a modern condensing power plant is shown in Fig. 1. It has a steam cycle efficiency of 44.3 per cent. Assuming the turbine capacity as 50,000 kW with an efficiency ratio of 81 per cent, the net turbine efficiency will be 81×44.3 —that is, 35.9 per cent. The generator efficiency being of the order of 98 per cent and the boiler house efficiency about 85 per cent, the overall coal to kW efficiency will be $35.9 \times 0.98 \times 0.85$ —that is, 29.9 per cent. Out of this, 4 per cent may be assumed to be consumed by the power station and its auxiliaries. Thus, the net overall efficiency of the station will be 0.96×29.9 —that is, 28.7 per cent. However, if coal of calorific value 12,000 BTus/lb. were to be used in order to generate one kWh of energy at 28.7 per cent efficiency, we will need $\frac{3,415}{0.287} = 11,890$ BTus or 0.97 lbs. of

coal per kWh. Many stations are, of course, less efficient. But we all know that a modern power station is most efficient, which only means that it operates as efficiently as possible a fundamentally inefficient process. For, the heat in the low temperature exhaust is still wasted in the condenser cooling water. Taking the grid as a whole, all the thermal stations cannot be base load stations working on constant load. Hence the overall efficiency

In the case of a purely heating-steam-utilising-industry, the efficiency of the system will be quite high, the only waste being by radiation, distribution, leakage and chimney losses, which are inevitable ones. Fig. 2 shows a typical "Sankey" diagram for such a plant using large modern boilers with 83 per cent efficiency. The overall efficiency after these losses, computed on the heat delivered to the process and the heat contained in the coal, works out to 82 per cent. The loss of 18 per cent consists of 17 per cent in the boiler and 1 per cent in the auxiliaries. The 10 per cent of loss in the pipe lines or process is made up by condensate recovery.

A small inefficient process plant is shown in Fig. 3. The efficiency of this plant is 42 per cent, the main sources of loss being 50 per cent in the boiler and 6 per cent in the irrecoverable condensate waste and 2 per cent in the auxiliaries.

BACK-PRESSURE POWER GENERATION

Considering the case of a power generating set, loss of efficiency is due to one or more of the following causes :—

Friction, radiation, external leakage, piston and valve leakage in reciprocating engines, interstage leakage, tip

* From a talk to the Society of Technologists

* Heat equivalent of one kWh of electricity is 3,415 British thermal units

leakage, blade friction, gland leakage in turbines, and wire drawing in both. If the steam is used purely for power generation as in a thermal power station, the above losses are really irrecoverable ones. But if the steam is passed on to the process after generating power on its way, then only the first three are irrecoverable; the latter, though they constitute a loss to the power generation cycle, are recovered in the process cycle, as the lost heat is still in the exhaust steam, and is available for use in the process. Hence it matters very little as to how inefficient the power plant is, as all the heat in the exhaust steam is subsequently used up in process.

The inefficiency of an installation is shown by the heat rejected in the exhaust, which is almost nil in an ideal combined power and process heat cycle. Fig. 4 shows a typical combined power and heat cycle. Assuming the plant condition as higher boiler pressure and moderate back-pressure, so as to give 26 lbs. of steam per kWh produced and the heat in the steam at turbine stop valve as 1,300 BTus per pound,

$$\left. \begin{array}{l} \text{the heat utilised} \\ \text{in the generation} \\ \text{of power is} \end{array} \right\} \frac{3415}{1300 \times 26} = 0.1 \text{ or 10 per cent.}$$

Assuming the efficiency of the turbine to be 93 per cent and the loss due to friction and radiation as 7 per cent, the actual power generated will use 9 per cent of the heat. The auxiliaries consume about 1 per cent of the energy. Thus for a plant requiring 82 units of heat for the process as in a typical Process Steam Plant (as in Fig. 2), if the heat input required is raised to 111

units, the equivalent of 8 units of heat can be obtained as power.

$$\left. \begin{array}{l} \text{The effective gene-} \\ \text{rating efficiency} \\ \text{will be} \end{array} \right\} \frac{8}{11} \times 100 \text{—that is,} \\ 73 \text{ per cent.}$$

This is $\frac{73}{29}$ or 2.5 times as good as the big condensing thermal station efficiency. (Fig. 1)

$$\left. \begin{array}{l} \text{The coal consumed} \\ \text{per kWh can be} \\ \text{computed as} \end{array} \right\} \frac{3,415}{12,000 \times 0.73} = \\ 0.39 \text{ lbs/kWh.}$$

$$\left. \begin{array}{l} \text{The overall ther-} \\ \text{mal efficiency is} \end{array} \right\} \frac{(82+8) \times 100}{111} \\ = 81 \text{ per cent.}$$

The reason for the generating efficiency being lower than the overall efficiency is that the loss in the turbo-generator is debited to power generation which represents a much higher proportion of the same, compared with that of the overall losses to the total available heat in the coal used.

Similarly an inefficient, combined power and heating plant is depicted in Fig. 5. Assuming a requirement of 50 lbs. of steam per kWh in such a plant with 1,200 BTus per pound at the inlet, it can be calculated as before that three heat units can be converted into power, excluding the losses due to leakage, radiation, generator inefficiency, etc. Assuming these losses to amount to one unit, we shall get a net power output equivalent to 2 heat units.

Hence for the same 42 per cent of heat being available for process work as in the case of Fig. 3, six extra heat units will be required to be utilised,

for obtaining power equivalent to 2 units of heat.

$$\left. \begin{array}{l} \text{The efficiency of} \\ \text{the power gene-} \\ \text{ration in this} \\ \text{case is therefore} \end{array} \right\} \frac{2 \times 100}{6} = 33\frac{1}{3} \text{ per cent}$$

which is far better than that of any ordinary condensing power station.

$$\left. \begin{array}{l} \text{The coal equivalent is} \\ 12,000 \times 0.33 \\ = 0.86 \text{ lbs/kWh} \end{array} \right\}$$

$$\left. \begin{array}{l} \text{The overall thermal efficiency is} \\ (42+2) \times 100 \\ 106 \end{array} \right\} = 41 \text{ per cent.}$$

Of course, in all the foregoing cases the efficiency of utilisation of heat in the process steam is assumed to be cent per cent, which is often not true. A great deal of waste of heat takes place in the use of process steam, which brings down the overall efficiency by a considerable extent. Nevertheless, the efficiency of the power generation cycle remains unaffected.

The table below is a comparative study of all the facts about back-pressure power generation, stated already.

Comparative power generation efficiency

	Efficient condensing power plant	Inefficient and small combined power & heating plant	Efficient and large combined power & heating plant
Theoretical process efficiency	45 per cent	100 per cent	100 per cent
Boiler efficiency	85 per cent	50 per cent	83 per cent
Machine loss	5 per cent	30 per cent	10 per cent
Coal consumption	.99 lb/kWh	.86 lb/kWh	.39 lb/kWh
Generating efficiency		33 per cent	73 per cent
Overall efficiency	28.7 per cent	41 per cent	81 per cent

Comparing the above methods of power generation with regard to coal consumption per kWh, the following table will be revealing.

Approximate coal consumption of power generation by various methods

	Approx. lb. coal per kWh
Back-pressure - large, good	0.4
Back-pressure - small, bad	0.9
Public supply - at base load	1.0
Public supply - at average load	1.5
Public supply - at peak load	2.7
Large industrial condensing engine	3.2
Non-expansive non-condensing pump	14.0

COST COMPARISONS

The picture will not be complete unless a word about costs is also said. It would be clear from the foregoing that the real cost of power generation is dependent upon the heat equivalent of the kilowatts generated in this system. This will, of course, include the losses due to friction, radiation and external leakage and efficiency of the generator, as the other losses due to

the exhaust steam, are recovered by using it as process steam. It follows that for the assessment of the cost of heat utilised in power and process individually, the quality of the steam at various stages has to be taken into account. It is obviously wrong to base this cost on the adiabatic heat drop as found from the Mollier diagram, or as calculated.

We have seen that the back-pressure plant, large or small, utilises the least amount of coal per kWh produced. The charges on the additional capital investment required for the setting up of such a plant alone are to be added to its operational costs, since no extra running charges on any size of boiler plant will be involved. Taking the cost of coal at Rs. 40/- per ton, it may cost roughly 0.1 to 0.2 of an anna per kWh for coal alone. The costs as observed in two plants working on this back-pressure power generation are given in table below, from which it can be seen that the overall cost per unit is only 0.63 of an anna in the small station, and 0.27 of an anna in the large unit.

Back-pressure power costs

Size of plant - kW	350	4,000
Hours per week	70	140
Coal consumption-lb/kWh	0.6	0.4
Coal cost	0.15	0.10
Overheads and depreciation	0.26	0.09
Maintenance	0.08	0.03
Labour	0.12	0.03
Miscellaneous	0.02	0.02
As/kWh	0.63	0.27

It is good to remember that the cost of a back-pressure power plant is far

less than that of a condensing power plant for equal capacity, owing to the absence of the condenser and other attendant auxiliary equipment.

Comparing these figures with the costs of power generation in our thermal stations, it will be found that the cost of back-pressure power is hardly 30 to 50 per cent of the cost of power in a condensing power plant. But so far as the consumer is concerned, what counts for him is the cost of power at his premises. The real cost of purchased power must be worked out to a comparable basis. The maximum demand charge, surcharge, coal and power-factor charges etc., whether imposed as an inducement to use more power or as a discouragement to prevent overloading of the system, must be added to the cost per unit, based on total consumption over a period. In short, the real cost of power should be obtained by dividing the total money paid by the total units consumed.

It would be appropriate here to dispel a misconception that steam can be produced out of electricity as well. This is only practicable under special consideration. The heat equivalent of one kWh being 3,415 BTus, a pound of steam requiring about 1,200 BTus, will consume a third of a kilowatt. A quantity of 3 lbs. of steam only can, therefore, be produced out of a kWh under ideal conditions of efficiency. It can easily be imagined that to produce that steam coming out of one normal Lancashire boiler of 4,000 lbs/hour 1,300 kWh. will be required. It will be well-nigh impossible, therefore, to supply power for meeting the demands of industries using process

steam by any number of power stations.

CHOICE OF POWER PLANT

And now, having discussed the advantages of back-pressure power generation, the question naturally arises as to the methods of adopting this in all industries utilising steam for process in good quantities. The choice of the power plant will depend upon the power requirements of the particular industry. The power that can be developed out of the entire quantity of the process steam may, in certain cases, be too much for use in that industry, in which case, the surplus power can be supplied to the grid for helping other industries. Otherwise the plant should have a pass-out turbine which will generate just enough power and release the steam at the low pressure required for process. Of course, this will not be as efficient and will constitute a waste of resources. On the other hand, if the power demand exceeds that produced from out of the process steam, the excess power can be purchased from the grid.

The choice of the back-pressure to be adopted is a matter for consideration. A study of Fig. 6, an ideal indicator diagram, will reveal that it is far more profitable to try and reduce the back-pressure of the exhaust than to increase the initial inlet pressure. Almost the same gains are obtained by reducing the back-pressure from 15 to 10 pounds per square inch as raising the initial pressure from 100 to 110 pounds per square inch. This is because the increase in the initial pressure works only on a quarter of the stroke of the engine or the small end

of the turbine, whereas the reduced back-pressure operates during the whole stroke of the engine or the larger end of the turbine.

Where the process calls for several pressures of steam for their different purposes, a decision has to be taken on the most suitable choice of the back-pressure set. In such a case, the intermediate pressure for the straight back-pressure set will be most suitable. The low pressure supply for process can be reduced from the back-pressure main and the high process pressure reduced from the high pressure main. It is for engineers-in-charge to choose the right plant most suited to the requirements of their particular industry.

The economy in the adoption of the system of back-pressure power generation in an up-to-date hydrogenation plant producing 15 tons of vanaspati per day can be worked out, basing on the existing conditions of low pressure steam generation for process and entirely purchased electric power. The existing conditions assumed are as follows :—

Two Lancashire boilers capable of producing 10,000 lbs. steam per hour are installed, of which 8,000 lbs. are used for the process. The working pressure is 100 lbs. per square inch and 2,000 lbs. of this is compressed in a steam compressor to 150 lbs. per square inch. The factory has a connected load of 1,000 kW, of which 700 kW is the steady demand on the supply. The alternative set-up recommended is the installation of a high pressure boiler of 10,000 lbs. per hour capacity at 400 lbs. per square inch working pressure, with a superheat of

100°F, and an economiser. In combination, a back-pressure turbine using all the 8,000 lbs. of steam at the higher pressure, exhausting at a back-pressure of 60 lbs. per sq. inch bleeding 2,000 lbs. at 150 lbs. per sq. inch gauge, as required for the process, is also suggested. This gives an overall saving of Rs 1,25,000 per year with an extra capital investment of only about Rs. 4,00,000. The economy of this method will be evident from the following table.

Working costs per year

In the existing set-up		In the changed set-up recommended	
	Rs.		Rs.
1. Fuel	1,60,000	1. Fuel	1,28,000
2. Purchased power	3,15,000	2. Purchased power	1,89,000
3. Interest and depreciation	5,000	3. Interest and depreciation	25,000
4. Salaries of operators, consumables etc.	10,000	4. Salaries of operators, consumables etc.	23,000
	4,90,000		3,65,000

Net saving per year = Rs. 4,90,000 - 3,65,000
= Rs. 1,25,000

(REFERENCE: Ministry of Fuel - Efficient use of steam.)

More and more can be said about the advantages of this system of back pressure generation. But suffice it to say that from the national point of view, to safeguard the limited fuel resources of our country and that of the needs of the industries with regard to power supply, every steam-using factory should, if possible, raise steam at such a pressure that the steam can first generate power before it is passed on to process. It will be seen that a 5 h. p. back-pressure engine is preferable from the coal and power saving

angle, to a 5 h. p. motor running off a condensing power plant or hydro-electric grid. Industries should think seriously of avoiding dependence on public supply for their power requirements.

In the new bifurcated State of Madras which cannot boast of many industries, not to talk of large-scale industries, it can be said without fear of contradiction that several among the existing industries utilise process steam

in a large or small measure. Immense are the possibilities of the adoption of this form of power generation in our State. From the existing medium and large-size installations using steam for process purposes alone, I have computed the possibilities of generating power out of steam.

Considering only the boilers of 1,000 to 2,000 lbs. per hour capacity, any inefficient, back-pressure engine using 50 lbs/kWh can produce 20 to 40 kW and more for each such boiler. The

other factories which have installed more efficient and larger boilers and which can afford to install back-pressure turbines working at higher efficiencies, consuming 30 to 25 lbs. kWh., much more power can be produced. On a conservative estimate, the amount of power generating capacity in this State will be roughly 47,600 kW., from out of boilers. Allowing for the stand-by plants and seasonal working of some of the factories, the State has a poten-

tial capacity of 25,000 kW and more in the existing process steam installations alone. If, therefore, steps are taken to go into this question for finding more power for industries in all earnestness, even smaller factories, having boilers of lower capacities using steam for process can be grouped into adjoining premises in each locality and the steam so generated pooled, to produce back-pressure power and still meet the needs of the processes. This can yield again another 25,000 kW.

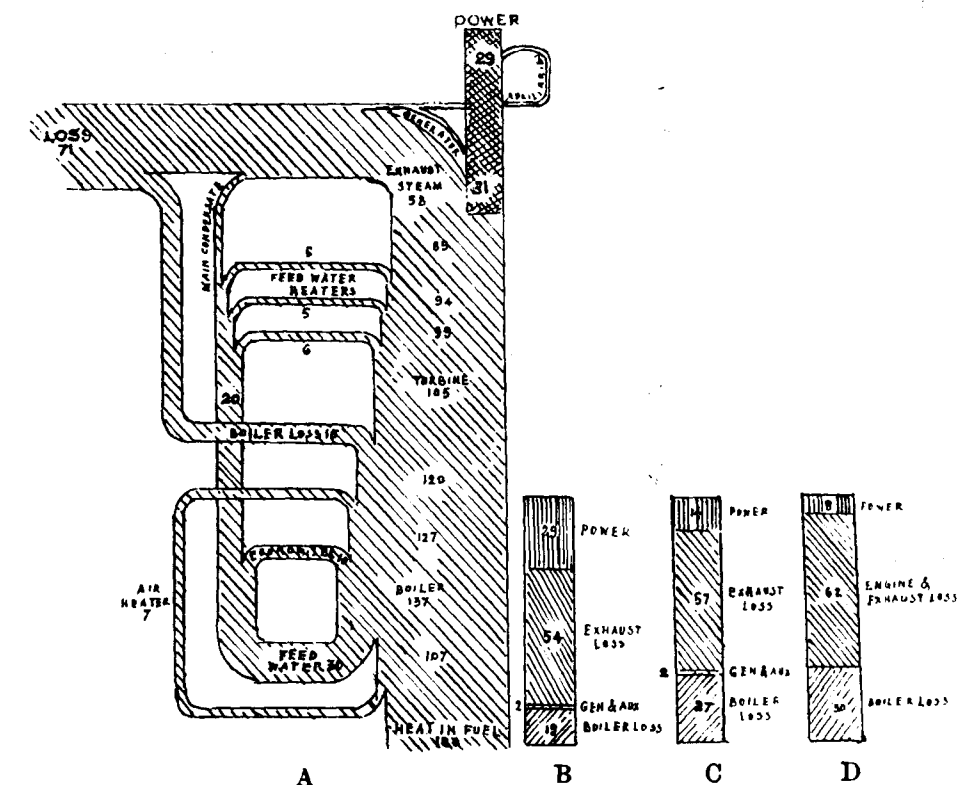


Fig. 1. ENERGY DISTRIBUTION IN MODERN CONDENSING POWER STATION

- A. Sankey diagram for energy distribution in a modern condensing power station.
B. Block diagram for energy distribution in a modern condensing power station.
C. Block diagram for part five power plant.
D. Block diagram for 1000 h. p. industrial condensing engine.

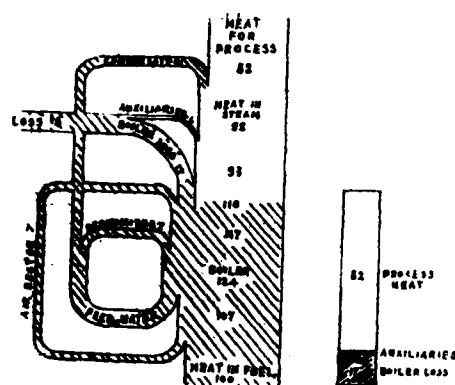


FIG. 2
LARGE EFFICIENT PROCESS
STEAM PLANT

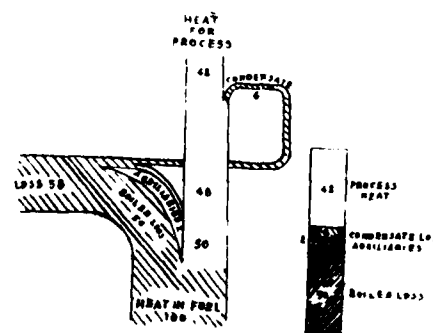


FIG. 3
SMALL EFFICIENT PROCESS
STEAM PLANT

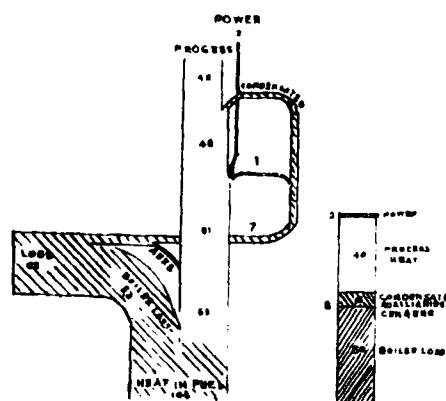


FIG. 4
SMALL INEFFICIENT COMBINED
POWER AND HEATING PLANT

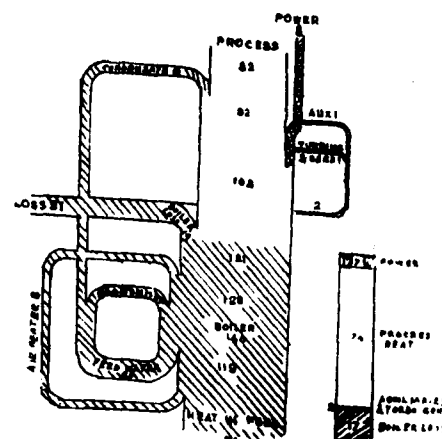


FIG. 5
LARGE EFFICIENT COMBINED
POWER AND HEATING PLANT

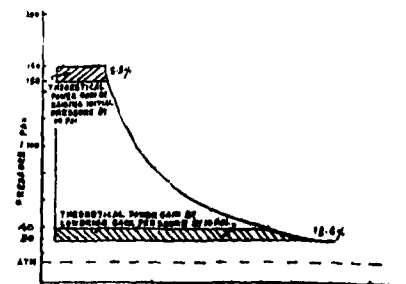


FIG. 6
VOLUME CU. FT.
COMPARATIVE GAINS BY ALTERING INITIAL AND EXHAUST PRESSURES

Reviews

CHEMICAL BUSINESS HANDBOOK: Prepared by a staff of specialists: John H. Perry, Ph. D., Editor-in-chief—McGraw-Hill Book Company, Inc., New York.

THIS volume fulfills the need that yet remained after the publication of the internationally famous *Chemical Engineers' Handbook* of which also Dr. Perry is Editor-in-chief. Together, these two "Perry" books constitute an invaluable set of reference books for men in chemical industries.

A melancholy point of interest about the present volume is that as its pages were on the Press, Dr. Perry passed away. (December 19, 1953).

In twenty well-defined sections such as Business Finance, Management and Control by Cost Accounting and Planning, Commercial Chemical Development and so on, the book deals with all the different phases of business administration, and gives in a most lucid manner, precise and pertinent information tapped from sources normally inaccessible.

The different stages from preliminary research to the successful organization of an industry are dealt with in such a manner as to bring out all the "kinks" in different functions.

Besides discussing the way to promote an industry and the art of purchasing the requirements of an industry, the book treats thoroughly topics like Market Research, Industrial Purchasing Production, Traffic and Transportation, Sales and Industrial Advertising. The legal and financial

implications involved in sales are, also, discussed at length.

A business cannot be carried on without people. Of vital interest, therefore, is the chapter on Personnel Management contributed by Claude L. Peake.

The book also contains a wealth of production and sales data.

Robert L. Taylor, Director of Public Relations, Mathieson Chemical Corporation, gives a workmanlike definition of public relations in the useful chapter he contributes on Public Relations.

"Good public relations, in essence, is simply doing the right thing and letting people know about it. It is the conscious application to everyday business of the Golden Rule *plus* the Biblical admonition to let your light so shine before men that they may see your good works."

Presenters of papers and contributors to technical journals will be enchanted with the section on Reports and Report Writing and the practical counsel that this section offers to aspiring chemical authors.

Special mention should be made of the wealth of information that the book contains about the chemical industry in the U. S. and the many "forms" that it includes for an assessment of performance efficiency in various phases of working—and which can, with advantage, be adopted by the industry in our own country.

It is impossible not to go into raptures over this book which gives all the answers to chemical business questions. Whatever position a man may hold in the chemical industry, he will find much invaluable, and often indispensable, information about areas beyond his own speciality. This hand-book is a "must" for all people in the line.

—R. V. Ramani.

METKEM Miscellany

Society of Technologists: The state in which water is present in solids, liquids and gases, and the methods employed for estimating the water content of samples of materials, formed the subject matter of a paper entitled 'Methods for the estimation of water' which P. B. Srirangan, Senior Chemist, MCIC, gave at a meeting of the Society held on June 8.

On August 22, Mr. S. N. Mahalingam, B. sc., Chief Inspector of Steam Boilers, Madras, presented a paper on 'The place of back-pressure power generation in industry'. This paper is published elsewhere in this issue.

Mr. D. L. Battacharya of the Indian Institute of Science, Bangalore, gave a talk on 'Electron Microscopy' on August 25.

The lecturer traced the development of and discussed the principle behind electron microscopy.

Describing the parts and the working of the electron microscope, he outlined the procedure involved in the preparation and mounting of a sample for observation under the microscope.

On September 10, Mr. V. Ramakrishnan, Inspector of Steam Boilers, Coimbatore, gave a lecture on 'The

History of Boilers since the 18th century.' He said that the boiler industry had kept pace in development with the iron and steel industry from the 18th century onwards.

Tracing the growth of the boiler industry from its infancy to its present position, he described the various boiler-auxiliaries evolved from time to time in order to achieve greater and greater economies. He, also, stressed the need for efficient lagging, and suggested methods to avert possibilities of explosion.

Dr. E. Weingaertner, Head of the Department of Chemical Engineering & Chemical Technology, Indian Institute of Science, Bangalore, addressed the Society on September 18, on 'Present advances in Fischer-Tropsch synthesis'.

The lecturer said that though Fischer and Tropsch announced as early as in 1926 their synthol process, whereby they were able to effect the reduction of carbon monoxide with hydrogen to produce a mixture of alcohols, aldehydes, ketones and fatty acids, using alkalized iron fillings as catalyst, the commercial application of the process started in Germany only in 1938. He, also, discussed in detail, pressure and temperature conditions, the preparation of the catalysts, different types of convertors, and the various types of products obtained by the Fischer-Tropsch Process. He made particular mention of the manufacture, during World War II, of synthetic fats, including fats with an odd number of carbon atoms.

An interesting discussion took place after the lecture.

A general body meeting of the Society was held on October 30, when

the Annual Report and the audited accounts for the year 1953-54 were presented and adopted. The following members were elected to the Managing Committee for the year 1954-55:

K. Ramanathan, N. Kalyanam, K. Sampath, M. Padmanabhan, K. R. Venkataraman, T. P. Ramaswamy and A. Kannan.

At a subsequent meeting of the newly-elected committee, the following assignment of offices was agreed upon:

K. Ramanathan—*President*, N. Kalyanam—*Vice-President*, and M. Padmanabhan and K. Sampath—*Joint Secretaries*.

U. N. Fellowship: The Staff Association met K. Ramanathan, Works

Manager, MCIC, at tea on Nov. 6, 54, to felicitate him on the eve of his departure for Germany to study the chemical industry in that country. The project is under the auspices of the United Nations Technical Assistance Programme in the field of Economic Development. After tea, N. Krishniah, G. Natarajan, T. S. Subba Rao and K. Gopalan spoke, offering felicitations to Mr. Ramanathan and wishing him all success in his tour.

In a brief speech, Mr. K. K. Raman, Director, Managing Agents, also, wished *bon voyage* and god-speed to Ramanathan.

Replying, Ramanathan thanked members for their kind sentiments, and expressed the hope that on his return



V. Muthuswamy and other members of the Managing Committee of Staff Association on the eve of his departure from Mettur.

he would be able to share the benefit of his study with all his colleagues and contribute to improving the industry.

The party concluded with a vote of thanks by N. Sundaresan.

Weddings: We extend our congratulations to Mr. J. Arumugham, *Watch and Ward*, whose marriage with Miss Saroja was celebrated at Tiruchi on September 9.

Farewell: V. Muthuswamy, Chemist, left us on September 2, to join the Income-tax Department as an Officer. The Staff Association met him at a farewell dinner on September 25. Post-prandial, felicitatory speeches were made by N. Krishniah, T. S. Subba Rao, V. Vaidyanathasamy and N. Sundaresan.

In particular, Subba Rao made as fine an assessment of the excellent and noble qualities of Muthuswamy, as though he were Muthuswamy and the income of a tax-payer were at stake! He said that Muthuswamy had always shown a keen sense of devotion to duty and had been found to be very active and industrious in the factory.

In the field of sports, Muthuswamy played cricket like a typical Triplicane-wallah—he was equally good at volleyball. A good friend of all, Muthuswamy had always extended full and active help to members of staff in difficult circumstances.

Muthuswamy was an active member of the Bhajana Samaj and the Veda Class.



*J. Arumugham and his bride
D. Saroja.*

We wish Muthuswamy every success in his new appointment.

Films: Pictures screened in recent months included: *Lili, Lady without a passport, Trader Horn, Dream Wife, Father's little Dividend, Scaramouche, Million dollar Mermaid, Quiet Man; Streptomycin, Museum of Science & Industry, Hurricane Circuit, Fight for a fuller life and Goddess of Merchants.*

The following films were also shown:

Rock of Industry & I. C. I. Rubber Services (by courtesy of the Imperial Chemical Industries, Ltd.)

Corrosion in Action (by courtesy of the Mond Nickel Co.)

Obituary: We regret to record here the sad demise of two members of our staff—R. V. Ramiah, (38) Junior Engineer, and G. Krishnamurthy, (30) Assistant Time-keeper.



Party to engineers from Tiruchi.

The late Mr. R. V. Ramiah was a keen and conscientious supervisor. He was a good friend, and known to be of a very charitable disposition.

G. Krishnamurthy was also of a sweet and equable temperament. Between 1944 and 1948, he was on war service, and joined MCIC in 1948. He had pronounced histrionic talents, and took part in all our plays. His death has removed from our midst a good friend and a talented amateur actor.

To the members of the two bereaved families, METKEM extends sincere sympathy.

Institution of Engineers — Trichy Paper Centre: The Tiruchi Paper Centre of the Institution of Engineers (India) held its annual meeting for 1954 at Salem and Mettur Dam on September 4 and 5.

On September 5, we played hosts to the delegates. The visitors were shown round the works and there was a meeting afterwards in which Major N. B. Gadre spoke.

Several members took part in the discussions that followed the talk.

There was also a tea party in the evening.



CRICKET: The election of office-bearers for this year was a simple and quiet-affair.

At a meeting held on May 31, R. G. Raghavan, K. R. Ramakrishnan and T. G. Rangan were unanimously elected Captain, Vice-Captain and Nets Secretary respectively. A selection committee was constituted consisting of P. B. Srirangan and K. Ganesh as Members, besides the Captain.

Though we played as many as seven matches in the course of these two months, we have, alas, no proud record to boast of. Excepting for one drawn match, we lost or—rather as one of our friends would put it—the other teams won the remaining six!

The inaugural match of the season foreboded the shape of things to come. The Salem Cricket Club played a match with us on August 15, on the Little Flower High School grounds, and won by the big margin of 192 runs in what was practically a massacre of the innocents.

Put in to bat unaccountably on their home grounds after losing the toss, the Salem Club piled up a huge total of 248 for 5 wickets, declared. Their star batsmen K. Chandrasekharan and

R. T. Parthasarathy each hit up a century and they put on 148 runs for the 2nd wicket. The former's brilliant effort was accomplished before lunch in 102 minutes, while Parthasarathy took 120 minutes for his century. Our bowling wilted and drooped and was generally helpless before their terrific onslaught. And when we batted, our total of a paltry 56 stood out only as a piece of anti-climax. Adhyanthayya and D. Narayanan were right on top with their accurate bowling. A. Kolandaisamy and T. Anthony alone reached double digits.

Salem Cricket Club: 248 for 5 and declared (K Chandrasekharan 100 retired, R. T. Parthasarathy 100 retired, A. R. Venkamachar 24)

Chemicals: 56 (A. Kolandaisamy 13, not out, T. Anthony 11, B. S. Adhyanthayya 4 for 21, D. Narayanan 4 for 24)

We next played against the Sourashtra Cricket Club at Mettur on August 29. The match was drawn.

Batting first, our side mustered 145. Both K. R. Ramakrishnan and N. Narayana Rao played a fine innings, each. N. V. Balusamy took 4 wickets.

The Sourashtrians had to watch their batting carefully, as their wickets were falling at regular intervals, and when the seventh wicket fell at 91, visions of a victory for us loomed rather large on the horizon, but we had reckoned without the brave Sourashtrian hero S. Bhashyam who, playing a fighting innings of 49, not out, took the score to ten short of ours, when stumps were drawn.

Chemicals: 145 (K. R. Ramakrishnan 43, N. Narayana Rao 38, N. V. Balusamy 4 for 23)

Sourashtra Cricket Club: 135 for 8 (S. Bhashyam 43, not out, P. V. Narasimham 26, T. D. K. Sami 3 for 41).

The return match with the Salem Cricket Club played on our grounds on September 5, saw a better performance by us, but the net result was the same as the match played on their grounds.

Winning the toss, we elected to bat. N. Narayana Rao played a painstaking innings for his 39, while N. Krishnasami was not out with 20. The Adhyanthayya-Narayanan pair played havoc once again.

R. T. Parthasarathy, the rival skipper, opened their innings, and went into an attacking mood right from the word 'Play' went from the umpire. He retired after compiling another century against us in the record time of 75 minutes. He so dominated the batting that the next best scorer had only 14 to his credit! That he is generally in an irrepressible mood throughout this season was also evidenced by his recent century for the Districts against a strong City XI played at Pudukottah which fact is recorded here by way of consolation to the bowlers. The Salem club passed our total for the loss of 6 wickets.

Chemicals: 128 (N. Narayana Rao 39, A. Krishnasami 24, not out, Adhyanthayya 4 for 35, D. Narayanan 3 for 37).

Salem Cricket Club: 146 for 6 declared. (R. T. Parthasarathy 100 retired, N. Narayana Rao 3 for 35).

Vivekananda College, Madras played a match with us here on September 26 and beat us by 54 runs.

The visitors rattled up a good total of 187 runs, aided by a fine unbeaten innings of 65 by C. V. Ranganathan and 32 by Jayanthkumar. N. Jayaraman bowled brilliantly to capture 5 wickets while N. Narayana Rao took 3.

When we batted, Anthony and Kalyanam slowly played themselves in and put on 79 runs for the 3rd wicket, but there was a collapse after the exit of these two, and the whole side was out for 133. V. V. Kumar and C. R. Bharathan, two of the promising leg spinners of Madras, took 3 wickets each.

Vivekananda: 187 (C. V. Ranganathan 65, not out, Jayanthkumar 32, C. R. Natarajan 24, N. Jayaraman 5 for 59, N. Narayana Rao 3 for 45.)

Chemicals: 133 (N. Kalyanam 41, T. Anthony 35, K. Sampath 20, V. V. Kumar 3 for 22, Bharathan 3 for 52.)

We had to concede victory even to the boys of the Christian College High School, Madras, in our match against them on our grounds on September 30.

Our side could collect only 105 runs, against the very accurate and steady bowling of Dharmalingam who captured 5 wickets for 21 runs.

The High Schoolers started with a debacle, 3 wickets going for 14 runs, but their skipper Jawad Hussain, who incidentally comes of an illustrious cricketing tradition, held the fort with a fighting knock of 40. Even their diminutive youngster Belliappa played a fine innings of 28, not out, and he was there still when our side's total was passed for the loss of 6 wickets.

Chemicals : 105 (K. Sampath 28, K. R. Ramakrishnan 20 N Kalyanam 23 Dharmalingam 5 for 21)

Christian College School : 113 for 6 (Jawad Hussain 40, Belliappa 28 N. O., T. D. K. Sami 2 for 21, N. Narayana Rao 2 for 40)

Jolly Brothers Cricket Club, Coimbatore, were our next conquerors, but oh, what a match it was!

Batting first, we reached a total of 116 runs, mainly due to the patient innings of 40 by K. R. Ramakrishnan who entering as 1 down carried his bat through the innings. K. S. L. Narasimhan and K. S. Ganapathi took 4 and 3 wickets respectively for the visitors.

When they batted, more surprises were in store. Their wickets were falling so quickly, that when the score board showed 31 for 5, our supporters automatically but subconsciously assumed an air of assurance and confidence. But their skipper K. S. Ganapathi (another District Player) and veteran P. S. Srinivasan stopped the rot and carried their score past ours without any further loss, putting on 87 runs for the unbroken 6th wicket. The former's 63, not out, was a real captain's innings and a treat to watch, while Srinivasan (25) gave him solid support by his unruffled innings.

Chemicals : 116 (K. R. Ramakrishnan 43 N. O., K. S. L. Narasimhan 4 for 23, K. S. Ganapathy 3 for 25.)

Jolly Brothers : 118 for 5 wickets (K. S. Ganapathi 63 N. O., P. S. Srinivasan 25, N. Narayana Rao 2 for 5 and N. Jayaraman 2 for 41)

Our side lost the next match to the United Gymkhana, Salem, played on our grounds on October 17, in a low-scoring match.

When three of their best batsmen Ramadurai, F. D. Babu and Shaukat Ali were dismissed for a mere 3 runs, our supporters went wild with joy. R. Srinivasan and Lakshmikantan, however, retrieved the position slightly for the visitors and brought the total to a respectable 111. K. R. Ramakrishnan, changing to bowling slows, took 4 wickets, while our veteran Ganesh took 3 wickets.

But if we had thought that we had won half the battle, we had a few guesses coming. A seasoned team like the Gymkhana never gives up the fight. Their pacemen Viswanathan and Shaukat Ali were in right earnest about their 'kill', and without much ado, they shot out our batsman for a mere 77. It was left to our veteran Ganesh to play a lone hand for 18, not out, while Kandasamy and Narayana Rao also played bravely for 14 and 12 respectively.

United Gymkhana : 111 (R. Srinivasan 36, K. Lakshmikantan 28, K. R. Ramakrishnan 4 for 28, K. Ganesh 3 for 35)

Chemicals : 77 (K. Ganesh 18 N. O., N. Viswanathan 4 for 29, Shaukat Ali 3 for 23.)

This series of defeats has not made happy reporting for your scribe any more than it would have made -happy reading for you. May the curtain rise (in our next issue) on better and brighter performances by our players!

One probable reason for the failure of some of our batsmen is that they were not nippy on their feet against good slow bowlers, and when a player goes forward with his right foot riveted to the popping crease, he is surely asking for his dismissal!

VOLLEYBALL : Under the dynamic captaincy of T. A. Javanthinathan, ably assisted by Vice-Captain A. P. S. Mani, the game has once again been kept on its feet, or should we say, hands? A series of practice matches among members is often arranged so that the present standard might improve.

Quite a few friendly matches were played with teams from Mettur Town and Salem Camp, and although the results were not always to our liking, it is becoming increasingly obvious that we are not such a bad lot.

BADMINTON : This is now virtually a Sunday morning game, but our team was able to beat the Pandyan Club, Mettur Dam, on the two occasions that we played fives matches against them.

TABLE TENNIS : This game seems to have lost much of its initial popularity. Attendance nowadays is very thin. The sports member who was forced to close the morning session some time back because of the high frequency of ball breakages, now proudly boasts of a ball lasting him for as long a period as 168 hours! Players should not take this slur on their ball-breaking ability lying down!

As we go to Press, the playing fields are a-hum with Staff Association tournament activity.



Short cut to ammonium nitrate

The Commercial Solvents Corporation has developed a new process for production of ammonium nitrate according to *Industrial & Engineering Chemistry*. Conventional ammonium nitrate plants carry out neutralisation of ammonia and nitric acid in solution. But in the new process the reaction takes place in the packed tubular reactor with no water added other than that contained in nitric acid. The molten ammonium nitrate collects on the packing, flows to the bottom of the reactor through a centrifugal separator whose bottom portion is filled with packing. Air blown through the material reduces the moisture content to any desired level. The molten nitrate is covered with a blanket of steam from the time it forms until it leaves the separator. The molten nitrate is then flaked. This process is said to be remarkable for its safety, simplicity and economy.

and replaces them with a pleasant, appealing scent.

Sand for glass

Sand suitable to glass industry to the tune of about 3 million tons is available near Kundi in the Kotah District, Rajasthan, according to investigations conducted by the Geological Survey of India. The total deposits are estimated at 5.3 million tons and allowing about 40 per cent as loss due to washing and screening, the reserve of sand suitable for glass industry works out to 3 million tons.

Process for making ceramic colours and glazes

Investigation at the Central Glass and Ceramic Research Institute, Calcutta, have led to the determination of conditions for the successful preparation of a wide range of colours suitable for decorating porcelain and earthenware.

About three dozen colours developed at the Institute have been tested for performance under actual factory conditions.

The chemicals and equipment required for the manufacture are easily available. However, rigid control over the distribution of the raw materials for the process is essential. The process could be taken up by pottery or porcelain manufacturers or organised

the Abu Road region, according to investigations conducted recently by the Geological Survey of India.

This area includes parts of the former Sirohi and Palampur States, at present merged in the Banas Kantha District of Bombay State. The object of the investigations was to assess the deposits and allot separate areas for different industrial uses.

All samples analysed excepting those from Mawal were found suitable for the manufacture of cement or lime. The best quality lime suitable for industrial or chemical lime is from Marthla, Kivarli and Akhra.

New blast furnace at TISCO

A modern blast furnace with a rated capacity of 1,000 tons per day recently went into operation at the Tata Iron & Steel Co., Ltd., Jamshedpur. The furnace, the biggest in Asia, has been designed and built in India.

Impressive indeed are the dimensions: height, 227 feet 6 inches, volume 32,064 cubic feet; hearth diameter 22 feet 6 inches.

Progress of the Five-Year Plan

The first three years of the first Five Year Plan have witnessed a

compared with 1949-50. The completion of the larger irrigation schemes has resulted in nearly 2.8 million acres being brought into cultivation while the minor irrigation works have added another 5.3 million acres to the total irrigated area in the country. Additional power generated during the period is 450,000 kW against the target increase of 1.2 million kW by 1955-56.

Industrial production has also shown a steady expansion. Commendable progress has been made by a number of industries in the public sector such as Chittaranjan Locomotive Factory, Sindri Fertilisers, Indian Telephone Industries, etc. In the private sector, industries such as cotton, textiles, cement, soda ash, caustic soda, bicycles, etc., have recorded a substantial increase in output. The percentage increase in output in industries in the last two years over that of the immediately preceding year is given below.

Industry	Percentage increase of production over the preceding year	
	1952-53	1953-54
Cotton	(i) Yarn 10.6	2.9
Textiles	(ii) Cloth 15.4	2.9
Cement	7.0	14.7

Gallery

"Close-up" of a cameraman: In a former issue of METKEM we did a hasty profile of K. Ramanathan, our Works Manager. The occasion now demands that we execute a full-length portrait of him—at least to the extent possible in the canvas of a column or two.

Ramanathan recently left for West Germany on a study tour of the chemical industry of that country under the auspices of the United Nations Technical Assistance Fellowship Programme in the field of Economic Development.

We got up a party in his honour and said all the nicest things that we could think of about him, and as there seemed to be practically no end to the list of his virtues, we had to clamp down the gavel on our rhapsodisation and content ourselves with a simple but sincere: "Bon Voyage".

Now K. Ramanathan is a distinguished alumnus of the Banaras Hindu University from which he took an engineering degree in 1938. He also took, while at the University, a 15-foot leap from the first floor of a building for a 15-rupee bet!

Shortly after leaving college Ramanathan joined the Government

Electricity Department, Mettur System. Serving first as an apprentice for a year or so, he was later posted as a Construction Foreman, and then transferred to the distribution and commercial sections.

In February 1941, Ramanathan joined MCIC and showed such pronounced abilities in the handling of men, machinery and equipment that he was promptly made the Assistant Engineer in charge of the Bleaching Powder Plant. Devolved on him soon afterwards the responsibility of the maintenance of the other sections also. In 1947, Ramnath was made Deputy Works Manager, and in 1949 Works Manager—which post he has been holding ever since with rare distinction. While engaged on a job of work, Ramanathan works himself to tatters and forgets just everything about himself, including his food. His gift of organisation is truly amazing. Expedition is his watchword, thoroughness with him is an article of faith, and perfection is the end product he hands you.

In the field of sports, again, Ramanathan is extra-ordinarily good. He



K. Ramanathan.

is an excellent tennis player, and while at the Engineering College was quite a champion, and wore the doubles crown in one year. Cricket and hockey are other games in which he was equally good in his undergraduate days—knee-trouble preventing his participation in these games at present.

And Ramnathan can play his cards well, too, whether it is bridge, rummy, or any other game—or none of these games!

As a photographer, he is a sort of male Margaret Bourke-White, only METKEM is not LIFE. He knows all the tricks of the trade...and then some—which the trade has not bargained for, such as an "exposure" of its low prices of photographic goods! Ramnath's wit is as penetrating and as pin-pointedly sharp as pictures on a Voigtlander camera.

Sometimes, he could pack so much of concentrated acid into his words as to make one look about as silly as a bad snapshot of oneself by someone else other than Ramnath, but he is quick to forgive and forget. Indeed, as a friend, he is as perfect as—as, shall we say, an Agfa Apotar 3.5 lens!

Fade-out of Culbertson: When some one remarked at the Club the other day "Culbertson is well and truly licked at Mettur", he took the words nearly out of our mouths. Which is precisely what P. A. Raghupathy Iyer does—he has no use for the Culbertson system—his system of bidding being gloriously his own to the utter dismay of his partner and opponents alike! And he takes the words out of our mouths—he is our Chief Stenographer. Before



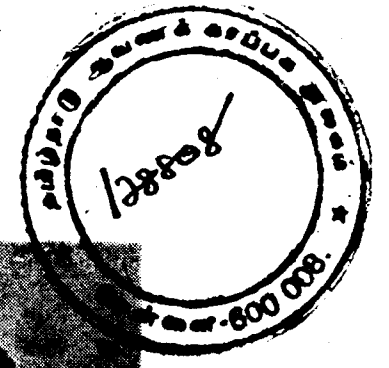
P. A. Raghupathy Iyer

coming to us he was with, among others, Shri. Sri Prakasa, at present Governor of Madras, and in the days Iyer knew him, Hon. Secretary of the Banaras Bank. Others for whom he has worked are: Tata Power Supply Co., Basu & Co., Solicitors, and Khanna & Co., Bankers and Merchants.

Iyer joined MCIC in 1937. Appearances may be deceptive in others, but not with Mr. Raghupathy Iyer. He is as abbreviated-looking as the shorthand he uses to such good purpose! Of simple habits and active disposition, Iyer is a friend whom it is a pleasure to know.

Raghupathy Iyer has a brilliant boy at college. In the Intermediate Examination of last year, this boy who bears the name of the hurdles-clearing god, Ganapati, scored marks like nobody's business and as though examinations were his own special business!

Radio Doctor: When our radio sets give out distress signals, grunt and





A. Kannan.

whimper and show a general disinclination to sing or speak, we turn to A. Kannan, Electrical Foreman, for advice and help.

Kannan joined us in 1941 as a winder in the Electrical Section. Prior to coming to us, he was serving in the H. E. D. Workshop, Mettur, which he joined in 1938, sometime after leaving school. During this period, he was qualifying himself in electrical and radio engineering.

At the re-winding of coils of motors of any type, Kannan is peculiarly adept. In this connection, special mention must be made of the extremely fine job that he turned out in the matter of the rewinding of the armature of a motor generator set. An intricate task, it called for the highest skill, but Kannan was equal to it.

It was in 1947, that Kannan was named Foreman of the Electrical Section. The Company's radio sets, film projectors, amplifiers, and other electrical and sound equipment are all his special responsibility.

In the evenings, Kannan relaxes, for a change, with electronics—improvising a crystal set or a tape recorder.

'Earnest', 'sincere' 'willing' and 'keen' are the adjectives we would choose to give you some faint idea of Kannan.

Fittest Fitter: It is only in the fitness of things that we conclude this column with a brief account of a worker to whom a holiday is a deprivation and a meaningless interruption—Fitter Ismail.

Ismail joined us in 1942, after seeing service with the Mysore Electricity Department and the Mettur Electricity Department. With us, as with these two Departments, Ismail's is meritorious record.

All the twelve years of his service with our Company, Ismail has been working in the Bleaching Powder Section, and oh, how well! In maintenance as well as in repair jobs, he is smart.

A most modest man, he won't speak about himself, but his good work speaks louder than words.



Sheik Ismail.



மூல ரசாயனப் பொருள்—ஹைட்ரோ குளோரிக் அமிலம்

கே. சம்பத்.

அமிலங்களில் முக்கியமான மூன்று மிக்க உபயோகமுள்ளவை. அவை யாவன: கந்தக அமிலம், நைட்ரிக் அமிலம், ஹைட்ரோகுளோரிக் அமிலம். இவைகளில் ஹைட்ரோகுளோரிக் அமிலத் தயாரிப்பு முறைகளையும், அதன் உபயோகங்களையும் இக் கட்டுரையில் விவரிப்போம்.

வரலாறு: முதன் முதலில் ஹைட்ரோகுளோரிக் அமிலத்தைத் தயாரித்தவர் ஜீபர் (Geber) என்ற விஞ்ஞானி என அவர் எழுதிய நூல்களிலிருந்து தெரிகிறது. ஆயினும் முற்காலத்தில் இந்தியர்களுக்கும் அரேபியர்களுக்கும் இதைத் தயாரிக்கும் முறை தெரிந்திருந்ததென்று பல புத்தகங்களின் மூலம் அறிகிறோம். அக்பர் அரசாட்சிக்கு முன்னரே இந்த அமிலத்தைத் தொழில் முறையில் உபயோகித்தனர் என்றும் தெரிகிறது. தமிழகத்தில் சித்தவைத்

தியர்கள் எட்டு எடை சாதாரண உப்புடன் ஆறு எடை சீனிக்காரத்தைக் கலந்து கொள்ளிலிருந்து தயாரித்த புளித்த தண்ணீருடன் இக்கலவையைச் சேர்த்துக் காய்ச்சி ஹைட்ரோகுளோரிக் அமிலத்தை வடித்தனர். 1644-ம் ஆண்டு பேசில் வாலண்டைன் என்பவர் உப்பையும் அன்னபேதியையும் (Green Vitriol) சேர்த்துக் காய்ச்சி இந்தத் திராவகத்தைத் தயாரித்தார். கல்லுப்பைக் கந்தக அமிலத்துடன் கலந்து காய்ச்சி அதனின்றி வெளியேறிய வாயுவைத் தண்ணீரில் கிரகித்து கிளாபர் (Glauber) என்பவர் இவ்வமிலத்தைத் தயாரித்தார். ஜோசப் பிரீட்டஸ்ட்ளி என்றும் விஞ்ஞானி ஹைட்ரோகுளோரிக் அமிலத்தின் வாயுவைப் பாதரசத்தின் மேல் சேகரித்து அதற்குச் "சமுத்திரத் திராவகக் காற்று" என்று பெயரிட்டார் (1772).

சம்பவம் : எரிமலையினின்று வெளிப்படும் அக்கினிப் பிரவாகத்தில் ஹைட்ரோகுளோரிக் அமில வாயு சிறிய அளவிலும், நமது இரைப்பையிலுள்ள ஜாடராக்னி ரீரில் (Gastric Juice) 0. 2 சத வீத அளவிலும் இருக்கிறது.

தயாரித்தல் : சிறு அளவில் பல முறைகளில் இந்த அமிலத்தைத் தயாரிக்கலாம். தொழில் துறையில் கையாளப்படும் முக்கியமான இரண்டு முறைகளை மட்டும் இங்கு குறிப்பிடுவோம்.

உப்புக்கட்டிமுறை (Salt Cake Process) : சாதாரண உப்பை (Sodium Chloride) கந்தக அமிலத்துடன் சேர்த்துச் சூடேற்றினால் ஹைட்ரோகுளோரிக் வாயு உண்டாகும்.

பெரிய இரும்புப் பாணிகளில் தேவையான அளவு உப்பைப்போட்டு அதன் மீது வீர்யமுள்ள கந்தக அமிலத்தை ஊற்றவேண்டும். உடனே ஹைட்ரோகுளோரிக் வாயு உற்பத்தியாகும். கலவையைக் கொண்டிருக்கும் பாணியைச் சூடேற்றினால் வாயு வெகு தீவிரமாக வெளிவரும். பாணியின் மேல்பக்க மூடியிலுள்ள ஒரு குழாய் வழியாக இவ்வாயு வெளிக் கொணரப்பட்டு சுட்ட மண்ணால் செய்யப்பட்ட குழாய்களின் வழியாகச் செல்லுகின்றது. அந்தக் குழாய்கள் தண்ணீரால் குளிரவைக்கப்படுவதால் வாயுவும் குளிர்கிறது. (படம் 1). பின்பு ஹைட்ரோகுளோரிக் வாயு, கிரகணிப் பாத்திரங்களுக்குச் (Cellarius Condensers) சென்று அங்குள்ள தண்ணீரில் விரைவில் கரைந்து அமிலமாக மாறுகிறது.

அமிலம் ஜாடிகளில் பிடித்து வைக்கப்படும்.

மீதமுள்ள வாயு கிரகணிப் பாத்திரங்களின் அருகில் நிறுவப்பட்ட, கரித் துண்டுகள் நிரம்பிய ஒரு ஸ்தூபியின் (Tower) அடிப்பாகத்தின் வழியாகப் புகுந்து மேலே செல்லும். மேலிருந்து மெதுவாகத் தண்ணீர் கீழ் இறங்கி இவ்வாயுவைக் கரைக்கும். இங்கு உண்டாகும் அமிலம் வீர்யம் குறைந்தது. இந்த அமிலம் கிரகணிப் பாத்திரங்களுக்குச் சென்று அங்கு வரும் வாயுவினால் அதிக வீர்யமடையும். ஸ்தூபியில் கரையாமல் நிற்கும் சிறு அளவு வாயு வெளியேற்றப்படும்.

மேற்குறித்த முறையில் 1 டன் ஹைட்ரோகுளோரிக் வாயு தயாரிக்க 1.01 டன் உப்பும், 1.34 டன் கந்தக அமிலமும் தேவையாகும். இரும்புப் பாணியின் அடியில் படையும் உப்புக்குச் சோடியம் சல்பேட் (Sodium Sulphate) என்று பெயர். சோடியம் சல்பேட் கண்ணாடித் தொழிலுக்கு இன்றியமையாத பொருள். உப்புக்கட்டி முறையில் தயாராகும் ஹைட்ரோ குளோரிக் அமிலம் 43 சதவீதம் வீர்யம் உள்ளதாயிருக்கும். ஆனால் அதில் சில அசுத்தங்களும் கலந்திருக்கும். அவைகளில் முக்கியமானவை கந்தகத் திராவகம், கந்தகத் துவிப் பிராணைஉப்பு (Sulphur Dioxide) முதலியன. இவற்றினின்று அமிலத்தைப் பிரித்தெடுத்தல் மிகவும் கடினமாகும். ஆதலால் சுத்தமான அமிலத்தைத் தயாரிக்கச் சுத்தமான பொருட்களையே உபயோகிக்கவேண்டும்.

சேர்க்கை முறை (Synthetic Process) : மேட்டூர் ரசாயனத் தொழிற்சாலையில் சேர்க்கை முறையில்தான் ஹைட்ரோகுளோரிக் அமிலம் தயாரிக்கப்படுகிறது. சாதாரண உப்பு நீரை மின்சார விபாக அறைகளில் செலுத்தி “நேர் மின்சார”த்தை அதனுடே பாய்ச்செய்கின்றனர். இதனால் ஹைட்ரஜன் வாயு, குளோரின் வாயு, சோடாக் காரத்திரவம் ஆகிய மூன்றும் உண்டாகின்றன. குளோரின் வாயுவும், ஹைட்ரஜன்வாயுவும் குழாய்கள் மூலம் ஹைட்ரோகுளோரிக் அமிலம் தயாரிக்கப்படுமிடத்திற்கு மாற்றப்படுகின்றன. முதலில், ஹைட்ரஜன் வாயு ஒரு எரி அடுப்பிற்குள் (Combustion Chamber) செலுத்தப்பட்டு அங்கு காற்றில் கொளுத்தப்படுகிறது. (படம் 3) அப்போது அது சாதாரண நெருப்புச்சுடர்போல் எரியும். பின்பு குளோரின் வாயு, ஹைட்ரஜன் வாயு வரும் குழாயைச் சுற்றியுள்ள மற்றொரு குழாயின் வழியாக மெதுவாக எரி அடுப்புக்குள் செலுத்தப்படுகிறது. உடனே சுடர் நீல வர்ணமாக மாறும். இவ்விரு வாயுக்களும் சேர்ந்து ஹைட்ரோகுளோரிக் வாயுவாக மாறி (Hydrogen Chloride) குழாய் மூலம் கிரகணிப் பாத்திரங்களுக்கு மாற்றப்படும். உப்புக்கட்டிமுறையைப்போல் இம்முறையிலும் இந்த வாயு குளிராக்கப்பட்டு தண்ணீரால் கிரகிக்கப்படுகிறது. ஸ்தூபியின் அருகில் உள்ள “ஆகர்ஷிக்கும் வீசிறி” வீரேஷ அடுப்பில் உண்டாகும் வாயுவை ஸ்தூபியின் பக்கம் இழுக்க உதவும். இங்ஙனம் செய்யாவிடில் அடுப்பில் வாயுவின் அழுக்கம் (Pressure) அதிகரித்து அதனால் சுடர் அணந்துவிடலாம்.

இந்த முறையில் எளிதில் 36 சதவீதம் வீர்யமுள்ள சுத்தமான ஹைட்ரோகுளோரிக் அமிலம் தயாரிக்க இயலும்.

குணங்கள் : தொழிற்சாலையில் தயாராகும் ஹைட்ரோகுளோரிக் அமிலம் சிறிது மஞ்சள் நிறமுள்ளதாகவும், நெடியுள்ளதாயும் இருக்கும். சுரக்காற்றில் புகையும். மற்ற அமிலங்கள் போல் நம் உடலின் மேல் பட்டால் புண்ணுக்காது. புளிப்பு ருசியாக இருக்கும்.

உபயோகங்கள் : ஹைட்ரோகுளோரிக் அமிலம் அனேக தொழில்களிலும், தயாரிப்புக்களிலும் உபயோகிக்கப்படுகிறது. அவைகளில் முக்கியமானவைகளாவன :—

1. சாயங்கள் தயாரிக்க; துணிகளுக்குச் சாயமேற்ற; துணிகளின் மீது வர்ணங்கள் முதலியன ‘பிரின்ட்’ செய்ய.

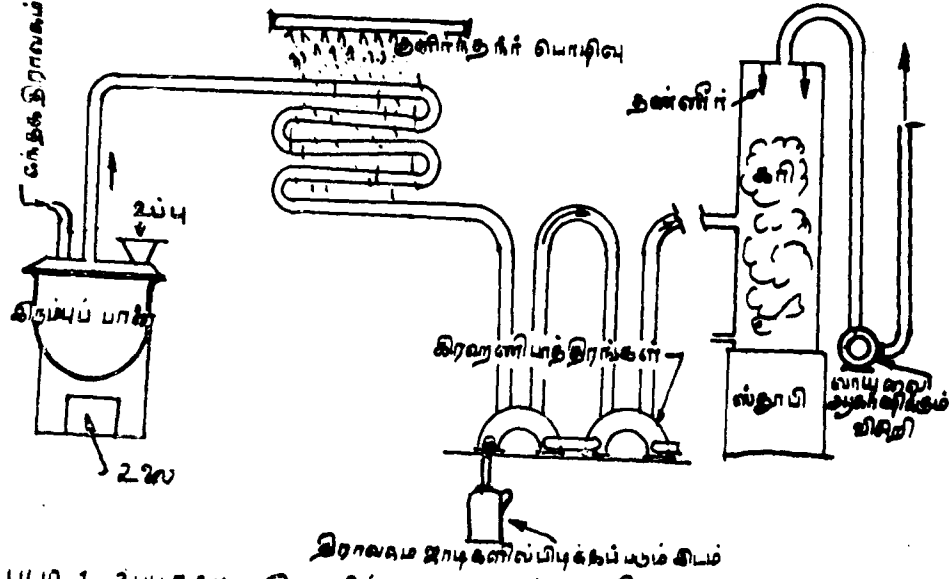
2. ‘காடா’ துணிகளை நன்றாகச் சலவை செய்ய; மில் துணிகளை ‘மர்சிரைஸ்’ செய்ய.

3. தோல் தொழிலில் குரோம்தோல் பதனிட.

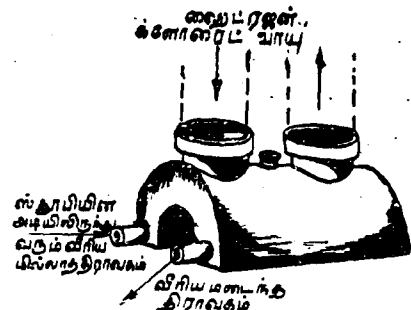
4. அனேக குளோரைடு உப்புக்கள் தயாரிக்க; (அமோனியம் குளோரைடு என்னும் நவச்சாரம் ஒரு சிறந்த ரசாயன எரு).

5. உலோகக் கனிகளிலிருந்து (ores) அசுத்தங்களைப் பிரித்தெடுத்து உலோகத்தை அடைய.

6. வச்சிரம், ஜிலெடின், முதலியன தயாரிக்க.



படம் 1. 2புக்கட்டி முனையில் ஹைட்ரோக்ளோரிக் திரவகம் தயாரிப்பு.



படம் 2. கிரவுஸ்டிரங்குள்.

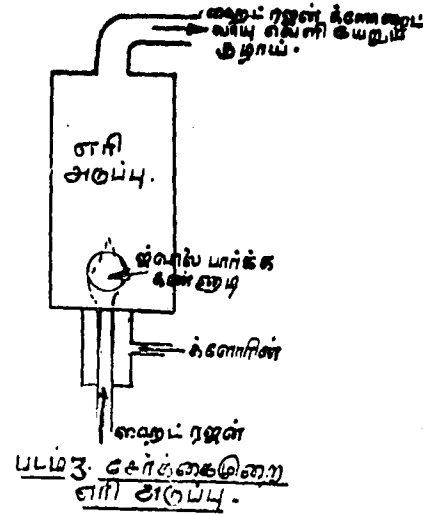
7. கண்ணாடி, சுட்டமண் இவைகளில் இல் பொருட்கள் தயாரிக்கும் போது இரும்பை நீக்கி, மண்ணையும், மணலையும் சுத்தம் செய்ய.

8. சர்க்கரைத் தொழில் ஆலைகளில் கரியைச் சுத்தமாக்க.

9. போட்டோத் தொழிலில்; பிளாக் குகள் (Blocks) தயாரிப்பதில்; டிஸ்கள் மீது வர்ணங்களினால் 'பிரின்ட்' செய்ய.

10. சயம் பூசவும் சயப்பற்று வைப்பதற்கும்; இரும்புத் தகடுகள் மீது துத்தாகம் பூச.

11. நைட்ரிக் அமிலத்துடன் கலந்து ராஜத்திரவகம் (Aqua Regia) தயாரிக்க (தங்கம், பிளாடினம் ஆகிய உலோகங்கள்).



படம் 3. செர்க்கைடுறை எரி அடுப்பு.

கங்கள் இந்த ராஜத்திரவகத்தில் மட்டுமே கரையும்).

12. இங்கு (பேனா மை), பெயிண்ட் குக்குத் தேவையான வர்ணங்கள், காகிதம் முதலியன தயாரிக்க.

இவற்றுக்கும், இன்னும் பல தொழில்களுக்கும் மிக்க அவசியமான ஹைட்ரோக்ளோரிக் அமிலம் ஒரு மூலரசாயனப் பொருள் என்பதில் சிறிதும் ஐயமில்லை.

மெட்கம் செய்திகள்

கெமிகல் பள்ளி நிகழ்ச்சிகள்:

செகண்டரி பள்ளியின் முதல் ஆண்டு விழா :- கெமிகல்ஸ் பள்ளி, செகண்டரி பள்ளியாக மாறி ஓராண்டு பணியாற்றிய பின் இரண்டாம் ஆண்டின் வேலையை ஜூன் மாதம் 16-ம் தேதி தொடங்கியது. இக்காலனியிலும் சுற்றுப்புறங்களிலும் உள்ள சிறுவர் சிறுமியர்களுக்குச் சிறந்த முறையில் கல்விகற்பித்துவரும் இந்த ஸ்தாபனம் பல துறைகளிலும் முன்னேறி வருவது குறிப்பிடத்தக்கது. சென்ற ஆண்டு ஐந்து வகுப்புப் பிரிவுகளும் சுமார் 200 பிள்ளைகளுமிருந்த இடத்தில் இந்த வருடம் ஏழு பிரிவுகளும் சுமார் 250 பிள்ளைகளுமாக அதிகரித்திருப்பது பள்ளியின் அபிவிருத்தியைக் காட்டுகிறது. அது மேலும் மேலும் வளர்ந்து உயர்நிலைப் பள்ளிக்கூடமாகும் நாள் சமீபத்திலேயே உள்ளது என்பதில் ஐயமில்லை.

செகண்டரி பள்ளியின் முதல் ஆண்டு விழா ஜூலை மாதம் 9-ம் தேதியன்று, ஸ்ரீ K. ராஜகோபால், இஞ்சினீயர் குபரின்தென்டெண்ட், M. C. I. C., அவர்களின் தலைமையில் நடந்தது. தலைவர் பள்ளிக்கூடத்தின் வேலையைப் பாராட்டிப் பேசியபின், பிள்ளைகளுக்கு மிட்டாய் வழங்கப்பட்டு, கொண்டாட்டம் இனிது நடந்தேறியது.

செகண்டரி பள்ளி புதிய கட்டிடத்திற்குப் பிரவேசித்த வைபவம் :- செகண்டரி ஸ்கூல் அபிவிருத்தி அடைந்துவரும் நிலைமையில், எலிமெண்டரி பள்ளிக்கூடமும், செகண்டரி பள்ளிக்கூடமும் சேர்ந்து இருக்கப்போகிற இடமில்லாததால் கெமிகல்ஸ் மாணேஜ்மெண்டார் மனமுவந்து அளித்த புதிய கட்டிடத்

திற்கு ஆகஸ்ட் மாதம் 12-ம் தேதி செகண்டரி பள்ளி மாற்றப்பட்டது. இந்த வைபவம் அக்னிலேஹாத்ரம் ஸ்ரீ ராமானுஜ தாத்தாச்சாரியார் அவர்களின் தலைமையில் நடைபெற்றது. ஸ்ரீ தாத்தாச்சாரியார் அவர்கள் கெமிகல்ஸ் மாணேஜ்மெண்டார் செய்துவரும் மிகச் சிறந்த இந்த வித்யாதானத்தைப் பாராட்டிப் பேசினார்கள். தொடர்ந்து ஸ்ரீ R. நடராஜன் அவர்கள் இப்பள்ளிக் கூடத்தின் அபிவிருத்தியைப்பற்றி பேசினார். தலைமையாசிரியர் ஸ்ரீ ஏ. ஸ்ரீநி



கெமிகல் பள்ளி பாடிப் பரிசுப்போட்டியில் வெற்றிபெற்ற மாணவ மாணவிகளுக்கு ஸ்ரீ S. ராமாமி பரிசுகள் வழங்குகிறார்.

வாசராகவன் வந்தனோபசாரம் கூறிய பின் தேசிய கீதத்துடன் விழா சிறப்பாக முடிவடைந்தது.

சுதந்திர தினம் :— வழக்கம்போல் சுதந்திர தினம் ஆகஸ்ட் மாதம் 15-ம் தேதி ஸ்ரீ N. ராஜகோபால், பள்ளிகரஸ்பாண்டென்ட், அவர்கள் தலைமையில் விமரிசையாகக் கொண்டாடப்பட்டது.

பாரதியார் தினம் :— அமரகவி பாரதியார் தினம் செப்டம்பர் 11-ம் தேதி வெகு சிறப்பாக ஸ்ரீ எஸ். ராமஸ்வாமி, ப்ரொடக்ஷன் குபரினென்டென்ட், M. C. I. C., அவர்கள் தலைமையில் கொண்டாடப்பட்டது.

பாரதியார் பாட்டுப் போட்டியில் கலந்து கொண்ட மாணவர்களில் T. S. ரகுநாத ராவ், K. சந்திரசேகரன் இவர்களுக்கும், மாணவிகளில் T. R. சரோஜா, R. சுசீலா ஆகியோருக்கும் பரிசுகள் வழங்கப்பட்டன.

ஸ்ரீ R. நடராஜன் அவர்கள் பாரதியாரின் பெருமையைப் பற்றி பேசி ஒவ்வொருவரும் பாரதியாரின் பாடல்களை அவசியம் கற்க வேண்டுமென வற்புறுத்தினார். “கண்ணன் - என் சேவகன்” என்ற பாட்டை அவர் பாடி, அது பாடுவதற்கும் சசிப்பதற்கும் எவ்வளவு எளிதாக இருக்கிறது என்பதை எடுத்துக் காட்டினார்.

ஸ்ரீ வைத்தியநாதஸ்வாமி அவர்கள் தொடர்ந்து பேசினார். இறுதியில் தலைவர் பேசுகையில் பாரதியாரின் தேசபக்தியைப் புகழ்ந்து நாட்டுக்குப் புத்துயிர் கொடுத்த பெருமை அவரையே சாருமெனக் கூறினார்.

தலைமையாசிரியர், ஸ்ரீ ஏ. ஸ்ரீநிவாஸராகவன் அவர்கள் பாரதியார் தமிழ் மொழிக்குச் செய்துள்ள சேவையைப் பாராட்டிப் பேசி, தமிழ் மொழி உள்ளளவும், ஒவ்வொரு தமிழன் உள்ளத்

திலும் என்றென்றும் அவர் வசித்து வருவார் என்றும் அதனாலேயே அவர் அமரத்துவம் பெற்றுள்ளார் என்றும் குறிப்பிட்டு வந்தனோபசாரம் கூறினார்.

ஐக்கிய நாட்டு ஸ்தாபன தினம் :— ஐக்கிய நாட்டு ஸ்தாபன தினக் கொண்டாட்டம் நவம்பர் மாதம் 1-ம் தேதி மேட்டூர் அரசியலார் போதனா முறைப் பள்ளிக்கூடத்தின் தலைமையாசிரியர் ஸ்ரீ K. கோபாலன் M. A., M. Sc., B. T., அவர்கள் தலைமையில் நடந்தது. அவர்கள் மிக எளிய முறையில் இந்த ஸ்தாபனம் உலக சமாதானத்துக்காகவும், சமூக முன்னேற்றத்துக்காகவும், ராஜ்யம், கலாசாரம் போன்ற பல துறைகளில் அபிவிருத்திக்காகவும், அகதிப் பிரச்சனை போன்ற பல சிக்கல்களைத் தீர்க்கவும், பஞ்சம், நோய் முதலியவைகளைத் தவிர்க்கவும், ஆற்றிவரும் பல தொண்டுகளைப் பற்றி விரிவாகப் பேசினார். மேலும் அதன் வேலை பூரண வெற்றி பெறவில்லையானால் குற்றம் ஸ்தாபனத்தில் இல்லை எனவும், அதைச் சார்ந்த சில தேசங்களின் குறுகிய மனப்பான்மையே ஆகுமெனவும் கூறி, ஐக்கிய நாட்டு ஸ்தாபனத்தின் உயரிய நோக்கமான அகில உலகமும் ஒரே சமூகமாக வாழும் நாள் வெகு தொலைவில்லை எனத் தாம் நம்புவதாகக் கூறினார்.

பற்றி நினைக்கிறேன் :

உபன்யாஸங்கள் :— கெமிகல்ஸ் பஜனை சமாஜத்தின் ஆதரவில் ஜூலை 19 முதல் ஆகஸ்ட் 11 வரை கும்பகோணம் ப்ரம்ஹஸ்ரீ அக்னிஹோத்ரம் ராமானுஜ தாத்தாச் சாரியார் அவர்களால் ஸ்ரீமத் ராமாயணம், ஸ்ரீமத் பகவத்கீதை, உபநிஷத்துகள், இவைபற்றி உபன்யாஸங்கள் நிகழ்த்தப்பட்டன.

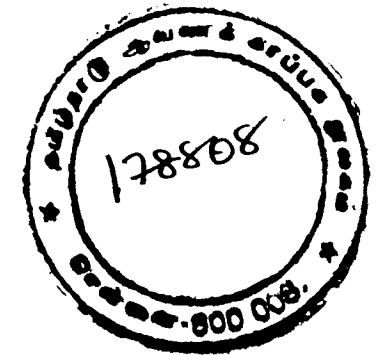
செப்டம்பர் 28 முதல் அக்டோபர் 8 வரை ப்ரம்ஹஸ்ரீ பழுவூர் S. V. சுப்ரமணிய சாஸ்திரிகளால் ‘ஸ்ரீ தேவீ பாகவதம்’ உபன்யாஸிக்கப்பட்டது.

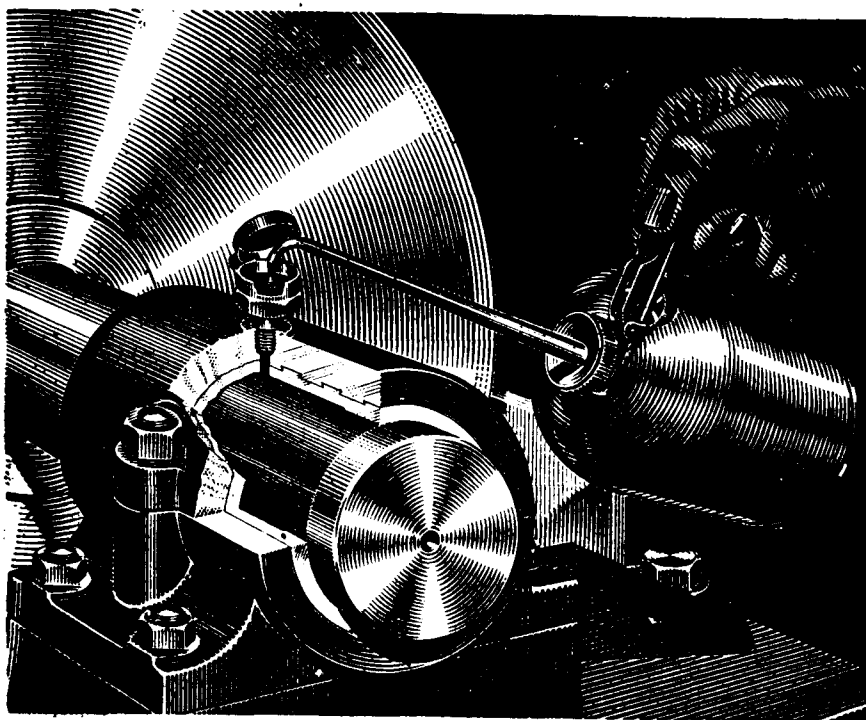
சங்கீதக் கச்சேரி :— கெமிகல்ஸ் உத்தியோகஸ்தர் சங்கத்தின் ஆதரவின் கீழ் அக்டோபர் 7-ம் தேதியன்று கெமிகல்ஸ் பள்ளிக் கட்டிடத்தில், திருக்கோவிலூர் சகோதரிகள் ஸ்ரீமதி அலமேலு, குமாரி புஷ்பா அவர்களின் இன்னிசைக் கச்சேரி, தக்க பக்க வாத்தியங்களுடன், சிறப்பாக நடந்தது. கெமிகல்ஸ் சிப்பந்திகள் அனைவரும், மேட்டூரிலிருந்து பல பிரமுகர்களும், நண்பர்களும் வந்திருந்து, கச்சேரியை நன்கு ரசித்துப் பாராட்டினார்கள்.

ஸ்ரீ கே. ராமனாதன் அவர்களின் ஜெர்மனி புறப்பாடு :—

மேட்டூர் கெமிகல்ஸ் ஓர்க்ஸ் மானேஜர் ஸ்ரீ கே. ராமனாதன் அவர்கள் ஐக்கிய நாட்டு ஸ்தாபனத்தின் தொழில் நுட்பப் பயிற்சித் திட்டத்தின் கீழ், ஜெர்மனியில் உள்ள ரசாயன தொழிற்சாலைகளுக்குச் சென்று தொழில் நுட்பங்களைக் கற்பதற்காக, ஜெர்மனிக்குப் புறப்பட்டுச் சென்றிருக்கிறார். இவர் மேட்டூரிலிருந்து நவம்பர் மாத ஆரம்பத்தில் புறப்பட்ட போது, கெமிகல்ஸ் உத்தியோகஸ்தர்களும், மற்ற சிப்பந்திகளும் கூடிப் பாராட்டி அனுப்பினர். அது சமயம் மின்சாரப் பகுதி குபர்வைஸர் ஸ்ரீ கோபாலன் அவர்கள் சில வார்த்தைகள் பேசிவிட்டு, அவரால் இயற்றப்பட்ட ஓடப் பாட்டு ஒன்றை பாடி, ஸ்ரீ கே. ராமனாதனுக்கு, தம் பாராட்டையும் தெரிவித்தார்.

எங்கள் துரை ராமனாதன்
ஏகுமின்றார், ஏலேலோ.
எங்கள் நிலையம் ஏற்றமுறப்
போகுமின்றார், ஏலேலோ.
ஏரோபிளேன் ஏறி மிக
லாகவமாய், ஏலேலோ,
இடர் ஒன்றும் இல்லாமலே
ஜெர்மனி சேர்வார், ஏலேலோ.
திட்டமுடன் திறமையாக
ஏலேலங்கடி, ஏலேலோ,
திரளான தொழிற்சாலைகளைப்
பார்வை இடுவார் ஏலேலோ.
தொழிலாக்க வேலைகளைத்
துரிதமாக ஏலேலோ,
நுட்பமுடன் கற்றிடுவார்
சுத்தமாக ஏலேலோ,
கற்ற பின்னே கணமேனும்
தாமதியாமல் ஏலேலோ,
கடுவேகமாய் வந்து சேர்வார்
கண்ணன் போலே ஏலேலோ.
கற்றதனைக் காரியத்தில்
காட்டிடுவார், ஏலேலோ,
அதன்காரணமாய் தொழிற்சாலை
ஏற்றமுறும், ஏலேலோ.
இதன் காரணமாய் அவரை வாழ்த்தி
அனுப்பிடுவோம், ஏலேலோ,
இறைவன் அருள் பூரணமாய்
நின்றிடுக, ஏலேலோ.





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