ELECTOLITE

— A Journal of Electricity Supply and Utilization

IN THIS ISSUE :

Bhakra-Nangal Story
English for the Engineer
Industrial Instruments
&
Other Usual Features

Editorial Board:
H. K. RAMASWAMI
S. SANKARAN
P. P. VENKATASUBRAMANIAN
V. SESHAGIRI RAO
P. N RAMAN
Editorial Assistant and Advt. Manager:
V. RAMASWAMY

R. PARTHASARATHY, Editor

Electolite

Issued Quarterly by The South Madras Electric Supply Corporation, Limited.
TIRUCHIRAPALLI.

VOL. IV No. 1

TOWARDS DEVELOPMENT

FOR some time now, a lively discussion has been going on, in the correspondence columns of a British trade journal on all nationalized industries, in general, and the electrical industry, in particular.

Now, whilst one may or may not agree with nationalization, in principle, there can be no doubt, writes one correspondent, about some of its evil effects. Not the least of which, according to him, is the state of very slow motion which seems to afflict all nationalized concerns. Decisions to buy or not to buy, which used to be made on the spot, he bitterly continues, now take anything from six months to two years.

Referring specifically to the Electricity Boards, the correspondent complains that time is apparently of no consequence to them, and costs nothing.

Endorsing this view, yet another correspondent, writes that inertia and frustration are by no means confined only to ordering and purchasing procedure. The set-up of the nationalized electricity industry, he continues, tends to encourage inefficiency and delay.

A mains engineer who joins the fray confirms that the assumption in the original article that engineers' orders are mere bits of paper in headquarters clerks' baskets is, also, correct If senior engineers cannot make decisions—for, after all this is what they are paid for—why have such men, he asks.

One correspondent is particularly critical of the men on whom greatness has been thrust in nationalized industries. As he sees it, the main problem is the selection of the right men for the job. "Paper qualifications have become increasingly important

and personal attributes, which cannot be measured except in terms of output, of less importance. Again, once a position is filled, however unsuitably, the occupant remains, while a number of others suffer, including the public. In private industry, such a one would be quickly corrected or removed "

It is up to us in India to profit by the lessons learnt by the nationalized electricity industry in the United Kingdom.

The Madras State is committed to a programme of complete nationalization, to be completed by 1955-56, whilst the other States are as yet undecided, as to what they should do, to promote development.

It is, of course, generally realized that the field for electrical development, in the country, is vast. Quite a few hydro-electric projects are in actual execution, and some are under investigation.

The problem, in the main, is the utilization, to the nation's best advantage, of the energy that will be made available as a result of the completion of the projects. The benefits of electric supply have to be extended to thousands of villages. A vast governmental agency, with its inevitable red-tape, might not be quite equal to the task. What is probably indicated is a body which will be fully alive to the social and economic aspects of the supply problem.

The Electricity Supply Act was passed with the specific object of rationalizing electricity supply which is admittedly in an early stage of development. The Act envisages the formation of Boards, for each State—Boards that would be commercial in outlook and have the flexibility of privately-owned undertakings.

In the interests of development, we would urge the speedy formation of the Boards. We would go even further, and suggest that under the jurisdiction of the Boards, electrical districts should be formed. These districts might be charged with the tasks of distribution and utilization of power, in their confines, while the Area Board could be in charge of generation and main transmission, and could exercise general control over planning, standardization of construction methods, costing and tariff policies.

Site of the Bhakra dam (top view). This is one of the main features of this 156-crore-rupee project which brings hope to the parched earth and the tired cultivator.

At Bhakra in the rugged foot-hills of the East Punjab Himalayas, a river is being packed into two tunnels cut through impervious rock. Eight miles downstream at Nangal, one can walk in safety and comfort through an under-ground gallery, while the waters of the same river flow harmlessly overhead.

These engineering feats are but minor achievements in an unrelenting struggle against nature, in the form of mountain and river, that is slowly but surely compelling Himalayan potential into the service of man—for Food and Electricity.

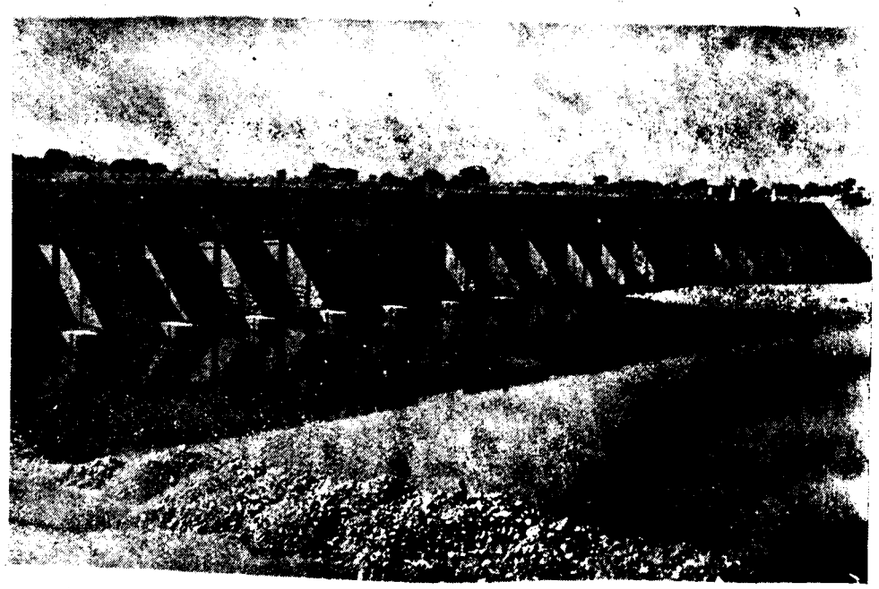
Bhakra lies 220 miles north of Delhi, at a point where the river Sutlej cuts through the last spurs of the Siwaliks, popularly known as the Naina Devi range, before descending into the Indo-Gangetic plain. There, a group of engineers are engaged in building the world's highest straight gravity dam—680 feet above the river's winding gorge and stretching 1,600 feet from mountain face to mountain face.

The Sutlej is a monsoon river. It is full during that period, but the flow tapers off considerably when the rains are over. The object of the Bhakra Dam and its extensive system of canals is to provide a perennial source of irrigation for food and cash crops, such as cotton, besides hydro-electric power to turn the wheels of industry.

To that end the waters are being pent up nearly 2,000 feet above sea level to form the country's largest artificial lake, 56 miles long, 4 miles wide at the maximum, 38,000 acres in area, from which 6½ million acres of Punjab (I), PEPSU and Rajasthan will draw the sinews of war against famine. Set amid purple-headed mountains, this river lake, on completion, bids fair to develop into an attractive recreational resort.

NANGAL DAM AND CANAL

The Nangal Dam and canal, which are the main features of this 156 crore-rupee multi-purpose project, are by no means the Project's only components. The Dam which has 26 bays and carries a road bridge will divert the already controlled waters of the Sutlej into the Nangal Hydel Canal, another important feature of the Bhakra Nangal Project. This Canal runs 40 miles across undulating country, taking in its stride two Power Houses, to the little town of Rupar from where the Project's main line of canals and a network of branches covering 540 miles with another 2,400 miles of minor channels will serve the far-flung and, often, near-desert regions of Punjab (I). Utilising the effect of a total fall of 170 feet in ground level (from 1,100 feet above sea level at Nangal to 930 feet at the proposed site of the second Power House), the canal will produce from its two Power Houses 100,000 kw out of the entire Project's 400,000 kw when fully developed.



A view of the Nangal Dam : It now awaits the installation of iron lock gates to register completion

CUBIC CONTENTS—TWICE OF PYRAMIDS

Bhakra-Nangal is a joint scheme of three Governments—Punjab (I), PEPSU and Rajasthan. Some idea of the magnitude of the Project may be obtained from the vast quantities of materials involved in the construction of the Bhakra Dam and its appurtenant works. The figures speak for themselves-excavation of rock, conglomerate and gravel—400 million cubic feet; excavation of earth 3,500 million cubic feet; concrete and masonry work 500 million cubic feet (this is more than twice the cubic contents of the seven great pyramids of Egypt); cement more than 1½ million tons (about 15 times the normal output of an average size cement factory); steel and steel bars 117,000 tons; timber—1,042,000 cubic feet; coal—253,000 tons; petrol-7½ million gallons; lubricating oil—1,800,000 gallons; high speed diesel oil—5,400,000 gallons; furnace oil—5,800,000 gallons; grease—1½ million lbs. In addition to these essential materials, large quantities of machinery, tools and special equipment, most of it imported, are needed.

INSPECTION GALLERY

Ninety feet high, the Nangal Dam—auxiliary to Bhakra—is primarily intended to feed the Nangal Hydel Canal. Waters of the Sutlej released from Bhakra 8 miles upstream, will be diverted by the dam into the canal. Each of its 26 bays is 30 feet in width and they are separated by 7 feet wide piers. Thus the overall length of the dam is 955 feet.

A unique feature of the dam is its electrically-lit, concrete inspection gallery which runs the entire length. The gallery will enable a watch to be maintained in the bed of the dam for cracks due to hydraulic uplift and seismic forces.

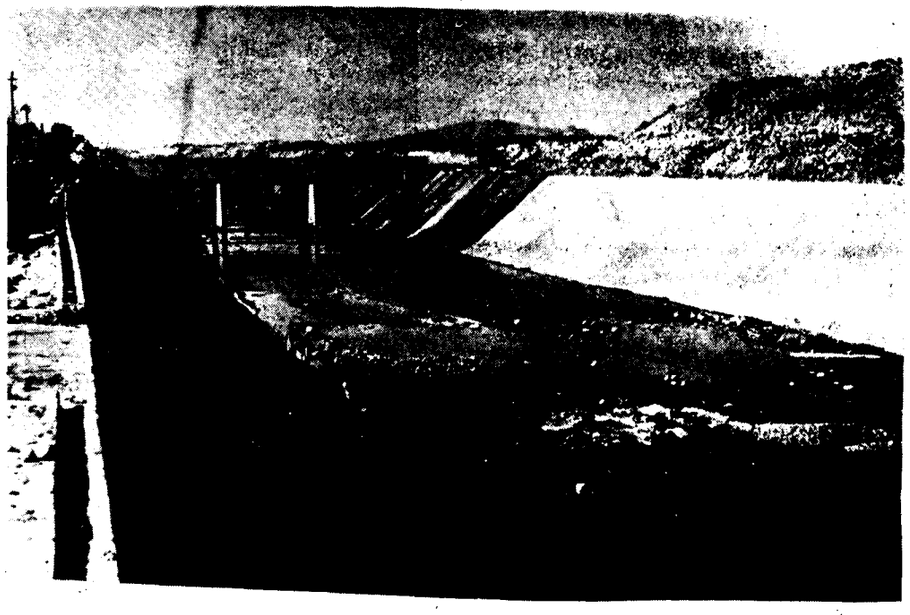
The Inspection Gallery

40-MILE CHANNEL

The Nangal Hydel Canal takes off from Nangal Dam and runs to Rupar—a distance of 40 miles. The country is rough and undulating, providing in plenty ground level drops which give the

necessary potential for hydro-electric development. Throughout its length, the canal is being lined with cement concrete, large slabs being neatly placed on bed and sides.

Of the Canal's two Power Houses, the first is well on its way to completion. Located 12 miles from Nangal Dam on the way to Rupar, Power House No. 1 is scheduled to provide Delhi with electricity by the end of next year. At this point the canal drops nearly 100 feet: Situated to take advantage of another natural drop, Power House No. 2 will be built between the 18th and 19th miles of the Hydel Canal. The maximum generating capacity of the two Power Houses is 144,000 kws.



A view of the Nangal Hydel Canal – an important feature of the Bhakra-Nangal Project.

BHAKRA'S TUNNELS

Upstream from Nangal Dam and reached by a winding mountain road—beauty and rugged grandeur taking admiration alternately—the location of Bhakra Dam is a narrow gorge or canyon 350 feet wide at the bed of the river with cliffs on each side rising at an angle of 60 degrees to a height of 2,800 feet. The dam is stated to be second only to the great Boulder Dam on the Colarado River of the U. S. A. for height.

Before the dam itself is constructed, the plan is to divert the river flow through two tunnels, one on the left bank and the other on the right bank of the Sutlej. Each tunnel is half-a-mile long and 50 feet in diameter.

The Road Bridge on the Nangal Dam

After the construction of the dam the tunnels will be used as escape outlets during high flood.

Bhakra Dam will have two Power Houses; the one on the left will be constructed along with the Dam and will comprise four units of 93,000 kw each. The Power House on the right will be constructed as and when load is developed. Both Power Houses will be earthquake-proof.

FOOD AND ELECTRICITY

Helping in the irrigation of an area of nearly 6½ million acres, the Bhakra canals may be expected to produce an extra 1.30 million tons of foodgrains. The waters of the canals will also be used to raise commercial crops.

As a generator of power, Bhakra Nangal is scheduled to produce 400,000 kw of electric energy. In the early stages power will be employed for lighting and heating and for the ordinary industrial loads of about 75 towns in the regions to be served, which are expected to consume 60,000 kw. In addition, Delhi State itself will take a fairly large slice. The main use is expected to come with the establishment of new enterprises.

And over the years, many new industries which can use fully the power produced at Bhakra are bound to come up.

*ENGLISH FOR THE ENGINEER**

by

R. PARTHASARATHY.

THE purpose of this paper is to help the engineer appreciate the need for better communication, especially when he is writing for conveying information to others. Its brief title can, perhaps, be expanded into: "The art of exposition in Engiish for the Engineer."

Once the terms of reference of the paper are thus defined, its restricted scope will, probably, be better understood.

No more is attempted in this paper than to call attention to the basic principles of good writing, in general, and to recapitulate the salient "findings" of experts, on technical writing, in particular.

More than the member of any other profession, an engineer should be able to express his ideas in correct and pleasing language. For one thing, he is trained in logical thought. For another, his training ensures for him a ready susceptibility to beauty in form.

Yet, alas, even in England, where English is the common vehicle of both spoken and written communication, the standard attained by engineers,technicians and scientists does not seem to be very high. This statement should, a little parodoxically, though, bring a feeling of comfort to engineers and scientists in this country!

For instance, one of the recommendations of the Institute of Physics on Post-War Education calls for more attention to the study of English language and literature, as part of the general education of physicists in order that they may learn to express themselves in clear, precise and attractive English.

Again, the Institution of Civil Engineers includes as a necessary part of a civil engineer's training, subjects like the organization and management of engineering works, human psychology and the relation of aesthetic considerations—all subjects, it will be agreed, which place emphasis on activities, in which powers of expression are important.

The Institution of Mechanical Engineers and the Institution of Electrical Engineers are other bodies which lay special stress on the need for training in clarity of expression, in both written and spoken English. "All would be better," says the Institution of Electrical Engineers, "for a broader scientific outlook, less specialisation, and a good knowledge of the English language."

*Being a paper presented to the Institution of Engineers, Tiruchirapalli, (Sub-Centre) on March 8.

"This Institution has, moreover, gone so far as to publish in its Journal, a paper on the *Presentation of Technical Literature* by G. E. Williams. This is all the more significant, as this Journal is otherwise used exclusively for the publication of papers on engineering subjects".

For all this information—as indeed to a good deal of the material contained in this paper—the author is indebted to an excellent volume called *The Presentation of Technical information* by Reginald O. Kapp, Dean of the Faculty of Engineering, in the University of London.

PRESS PROMOTION OF "QUALITY" ENGLISH

Again, abroad, not only do engineering institutions provide for the special study of English in their curricula, not only are authoritative books and papers, often, written for guiding the engineering student in the art of presentation of information, both technical and non-technical, but the trade and technical press, also, constantly goes on reminding him about the need for "quality" English—to borrow the idiom of business. For example, about a year ago, a British Scientific Quarterly referred somewhat sadly, "to the inability of scientists to write even a scientific paper, let alone, a popular article".

Reviewing recently, in its editorial columns, Sir Ernest Gowers's *A. B. C. of Plain Words*, the *Chemical Age* said .. "a scientist must make himself readily understood by plain people as well as by complex colleagues." "It is never enough", the article went on, "that scientists should understand other scientists. The application of new scientific possibilities or even their pilot-scale development, often, depends upon the verdict of non-scientists."

While on the subject of articles in British magazines, mention may be made of this fact–namely, that Kapp wrote at least two chapters of his book *The Presentation of Technical Information* for the Henley Company House Magazine, *Distribution of Electricity*.

Similarly, in the United States of America, too, a systematic attempt is made both on the platform and in the press to make engineers realise the need for speaking and writing better English.

In a paper presented before the American Institution of Electrical Engineers, not long ago, it was stated that no two engineers describing the same phenomenon, would give anything like the same description, and that it was due not so much to want of knowledge, as to inaccuracy of language.

An article in *Refrigerating Engineer* that appeared only in November last said, in effect, that the successful engineer, today, must express himself clearly and logically to enable others to understand his problems and accomplishments.

Chemical Engineering and Chemical Engineering News are other examples of American trade journals that often carry authoritative articles on the subject of effective English for the engineer.

DIFFICULT LANGUAGE

But, English is a notoriously difficult language. First the print script is different from the hand-written script. About the vagaries of English spelling, the less said, the better, although by a queer irony, as G. H. Vallins points out, in his provocative book *Good English—How to write it*, the most nearly standardized element in English, is its spelling. His explanation for most of the apparent aberrations of English is that words are spelt in modern English etymologically—that is according to their historical shape or form—not phonetically—that is, according to their sound.

If English is difficult enough for the native of England, it is even more so for the foreigner. And the trouble with this language is there is no such thing as 'standard English'. "There is, it is true, an accepted standard of pronounciation, of syntax, of punctuation, of sentence construction", as Vallins points out, "but that accepted standard is not fixed". No other language outpaces its grammarians and lexicographers as English does.

Vallins's thesis is that it will not do, if the student of English is merely a stickler for grammar—he must follow the custom of the language as it exists in his own time, and must be sensitive to its subtle changes. He does not understate the case for an adherence to the rules of grammar or the need for expressing one's meaning within the accepted framework, but his book is a reminder to the student that he can hope to write and speak good English only, if along with following the basic laws of a formalised grammar, he also follows current conventions of usage.

Careful English may often be irritating to read, although nearly not so irritating as an essay which abounds in "nominatives in vain search of missing verbs—verbs pursuing nominatives without success and plurals and singulars joined in ungrammatical wedlock."

LETTER-WRITING

"We are no longer", bewailed a letter-writer to the editor of *The Times*, "to be assured of best attention at all times; the favour of our esteemed command will no more be awaited. A curt, utility *you* is to replace the flattering, respectful warmth with which we have grown accustomed to being greeted as 'your good selves.' The guillotine awaits *re* and *per pro* and the three busy little brothers, ultimo, instant and proximo."

This letter was obviously inspired by such educative and entertaining booklets as the one issued by Tube Investments, Limited, London, on the subject of letter-writing. The T. I. Guide says, for example:

> "Your opening paragraph should make clear the reason why the letter is being written. If it is a reply to a letter, you acknowledge its receipt and unless you have given the subject in a heading, the first sentence should recall it."

"Thank you for your letter of 10th June about chromium plating"; not if you want to avoid being a murderer of English:

"Your favour of 10th inst. to hand re: chromium plating."

As an engineer advances in his profession, he will frequently find that his time is taken more and more by administrative duties, and that one of his chief responsibilities is to describe his work and that of those under him clearly, concisely and logically. (Which means, in brief, more writing and-less engineering!)

Official correspondence should be clear, polite and brief. Of course, it takes more time to write a clear, polite letter, which is also to the point, than to string together the usual assortment of *clichés*, but a good letter is worth all the time and trouble required to write one.

Bernard Shaw, it would appear, once apologised for the length of a letter by giving the typically Shavian excuse that *he had not the time to write a short one.* The overworked engineer has, probably, the same excuse to offer, but he should remember to pull himself up when his letter exceeds a set length. He should re-draft it, if necessary, for clarity of expression is of the utmost importance to him; he cannot simply afford to be misunderstood.

A common sin of commercial and official correspondence is vagueness. Supposing a Works Manager wrote in reply to an enquiry, "We are hoping to despatch a substantial percentage of your order at an early date", he was saying nothing of value to his correspondent. What he ought to have said was, "100 pieces (or whatever the number) will be sent on June 2nd' (or whatever the date) on which he hoped to fulfil the order (or part of it). Should the Works Manager have only added 'relatively' before 'substantial' and 'compartively' before 'early', his letter's value would indeed be more of a minus quality than it already was! As the T. I. booklet from which this example is borrowed neatly puts it: "All that the letter would have told its recipient was that the writer was a coward cowering behind verbiage"

"KNOW THYSELF"—AND THY READER

D. C. Brookes, Lecturer in the Presentation of Technical Information, University College, London, suggests that an engineer ask himself three questions before he connects pen with paper.

(1) Who am I for the purpose of this communication?

(2) Who are my readers?

(3) What is the subject?

An engineer may be writing as an employer or as an employee, as a contributor to the Journal of the Institution of Engineers, as the Secretary of the local branch of the Rotary Club or simply as a husband or as a father, but he must

maintain his selected personality for the duration of his written message, seeing, thinking, writing from that one point of view.

Question two is: 'Who are my readers?' The engineer's task is fairly easy when his readers are, also, engineers. He can then use to his heart's content the language of the select. He need have no qualms whatever about using technical jargon. His difficulties arise only when his readers are not trained in his special subject.

The answers to the first two questions determine for the engineer the two important characteristics of all writing—the *tone* and *technical* level of a communication.

The answer to the third question—'What is the subject?'—determines for the engineer his terms of reference. These define the limits of the subject and provide a criterion which enables the engineer to judge the relavance of the ideas that occur to him—what to select and what to reject.

As enunciated by Brookes, the first principle of clear statement is: '*Both author and reader must know at all times who is being addressed by whom, on what subject, and on what technical level.*'

Now, we shall pass on to technical writing as such.

Earlier, in this paper, mention was made of the rather low standard of technical writing, even in England.

Stating that British engineers and scientists had a special responsibility in the diffusion of correct English, Prof. Kapp says that to most foreigners normal English will, in the course of the years, cease to be the language of Shakespeare and of the translators of the Bible, but will only be a language in which the engineers and technicians will

'*I have undertaken the journey for the purpose of the interring of the deceased*'

be clothing their thoughts. According to him, it will be less painful to read a translation of Shakspeare either in Basic or Pigeon English, than in the technician's English. He gives in his book, *The Presentation of Technical Information*, an amusing example of how an engineer will render the opening lines of Mark Antony's Funeral Oration.

I come to bury Caesar—not to praise him.

"In this case, I have undertaken the journey, here, for the purpose of the interring of the deceased. From this point of view, I do not, however, propose putting anything on record in so far as praise is concerned."

Quiller-Couch long ago took a part of Hamlet's famous soliloquy and turned it into "officialese."

To be or not to be, that is the question.
"To be or the contrary: Whether the former or the latter be preferable would seem to admit of some difference of opinion".

Whether it is nobler in the mind to suffer the slings and arrows of outrageous fortune; or take arms against a sea of troubles, and by opposing end them.

In "official" English, Quiller-Couch turned this into: "The answer in the present case being of an affirmative or of a negative character, according as to whether one elects, on the one hand, to mentally suffer the disfavour of fortune, albeit in an extreme degree, or on the other, boldly envisage adverse conditions in the prospects of eventually bringing them to a successful conclusion."

Shakespeare goes on: *To die, to sleep no more.*

The awful version is: The condition of sleep is similar to, if not indistinguishable from that of death, and with the additional finality, the former might be identical with the latter."

To continue: Kapp devotes the best part of his book *The Presentation of Technical Information* to a discussion of what he refers to, as 'Functional' English. He uses the word 'functional' as opposed to 'imaginative'.

Functional English is the proper vehicle, according to Kapp, for a report to a superior or an instruction to a subordinate, for a paper to a learned society, for a lecture, or a book on any technical subject.

Kapp also gives a few useful suggestions on how to make a technical report easy to understand. Among other suggestions that he makes are:

1. Use comment words as often as necessary. Instead of writing 'the temperature is 750 deg. F write 'the temperature is 750 deg. F'. or 'as high as 750 deg. F' or 'unfortunately no more than 750 deg. F.' and so on and so forth.

2. Learn to use expressions like 'to sum up', 'in fact', 'thus', 'in short', 'let me repeat', etc. These phrases can serve as aids to the reader's memory.

3. Avoid as far as possible circumlocutions like, 'in the case of', 'from the point of view of', 'in regard to', 'in this direction', 'with reference to', 'in this respect', 'in so far as is concered', etc.

These phrases are usually starchy paraphrases of simple prepositions.

4. In describing mechanical devices, use all your inventiveness in the search

for common objects to which to compare the various bits and pieces. 'Diamond-shaped', 'lozenge-shaped', etc., are examples.

To sum up:

(1) The proper study of the Engineering student in addition of course to engineering–is a proper study of English.

(2) English is not only a very difficult language, but it is a living and changing language, and that for writing and speaking it well, a mere adherence to the rules of grammar will not do. The custom of the language, as it changes from time to time, should be followed.

(3) Both author and reader must know at all times who is being addressed by whom on what subject and on what technical level.

(4) Functional English is best suited for the purpose of the engineer.

Effective English is a necessary accessory to the engineer in his work, and the importance of an easy and competent language cannot be overestimated. In his off moments the least that an engineer can do will be to thumb through a classic. Curiously enough, the *secret* of good writing is–an open book!

DISCUSSION

In the discussion that followed Mr. M. R. VISWANATHAN (Engineer and Contractor) said that if the engineer allowed the poet in him to get the better of him, his professional work might suffer! Nevertheless, he agreed with the author that it was important that the engineer learned to express himself well both in writing and speech.

Mr. V. RAMIAH (Chief Engineer, Retired, Southern Railway) said that the author had illustrated in his own paper how a paper ought to be prepared and presented. Clarity was the chief requirement of any writing, technical or non-technical, and, in achieving clarity, the engineer, would do well to use the language of graphs, he added.

Mr. S. SANKARAN (Superintending Engineer, South Madras Electric Supply Corporation, Limited) Mr. M. R DORASWAMI IYENGAR (Municipal Engineer, Retired, Tiruchi,) and Mr. T. R. NARAYANASWAMI IYER, (Principal, Seshasayee Institute of Technology) were amongst others who participated in the discussion.

Winding up, the chairman, (Mr. S. C. NAYAK, Superintending Engineer, Highways) said that the more an engineer advanced in his profession, the greater frequently was his administrative work, and unless an engineer could express himself reasonably well — there need be no purple patches in his prose, but at least clarity should characterize his style —he would find himself severely handicapped in professional life.

Mr. NAYAK also, recalled the amusing story of how an Assistant Engineer had once written: "I have asked the Contractor to roll over the road"!

Mr. R. PARTHASARATHY briefly replied to the points raised during discussion.

NEW INDUSTRIAL INSTRUMENTS

At the 1952 British Industries Fair many new gadgets will be on show.

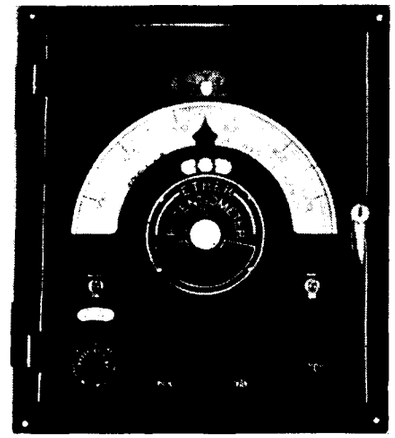
As in former years, engineering and hardware will be accommodated in Birmingham and other industries in London. The various industries, according to a correspondent, are all making a major effort for the occasion and the section dealing with industrial instruments is preparing, it would appear, the finest assembly of such instruments ever shown.

PRECISE HEAT CONTROL

Accurate use of heat in many industrial processes is now a most important factor in producing materials to precise specifications. For example, in the manufacture of moulds which are to be used later for casting steel blades for gas turbines, the greatest care has to be taken to ensure that they are dried at an exact temperature.

To exercise control over temperatures of the order of 800 degrees centigrade, an instrument has been devised by a Birmingham firm which reacts to changes of less than one degree centigrade. Called a potentiometer, the instrument is linked to a switch. If the temperature it is controlling rises by little more than half a degree the potentiometer switches off the source of heat. Conversely, it switches it on again if the temperature falls below.

The instrument, which will be exhibited at the Electrical Section of the Castle



This potentiometer reacts to changes of temperature of less than half a degree at 80 degrees centigrade.

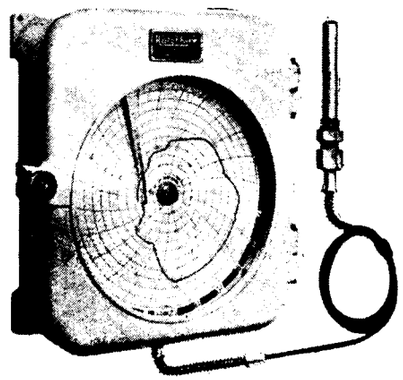
Bromwhich Centre of the fair, has a wide application in injection moulding machines which turn out plastic products.

TEMPERATURE RECORDERS

A section of industry will be devoted to temperature recorders, and at this year's Fair, a comprehensive range of thermometers for industrial use will be displayed.

Prominent among them will be the dial-type and mercury-in-steel thermometers, specially constructed to withstand heavy

and continuous vibration. Two millions of them are in daily use all over the world for registering the temperatures of



This temperature and pressure recorder can be supplied to operate on 12 hours 24 hours or seven days cycles. It is of immense value to the plant engineer who needs permanent records of the behaviour of his installations.

such diverse things as diesel engine exhaust gases, sterilizing chests bakers, ovens, bitumen tanks and oil-pipe lines.

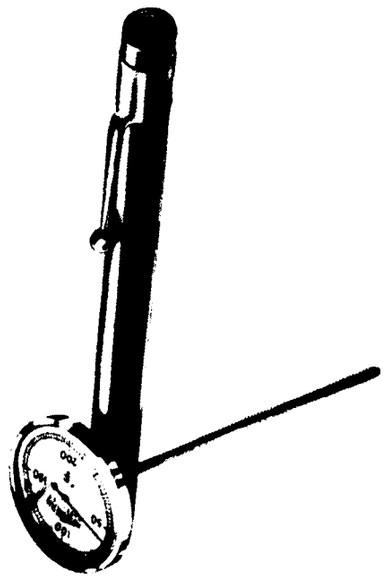
Where sustained accuracy is required, the mercury-in-steel thermometers are particularly suitable. Other exhibits of note include a pocket thermometer with a one-inch dial, laboratory thermometer and a chart recorder, arranged to rotate in 12 hour, 24 hour and seven-day cycles, suitable for recording temperatures in cold stores and hospitals.

HELPING PRINTERS TO COUNT

There are machines used in printing which would seem to have nothing to do with that trade, and yet without which printers would find themselves in difficulties. The machines are counters which automatically count the number of copies printed by a machine, the production of corrugated cardboard, the work done by guillotines, the products of bag-making machines, ticket printers, and so on.

One manufacturer of counting machines will be showing at the Scientific Instruments Section several types of counters adapted to the printing industry. One is a reset magnetic counter which is actuated through electro-magnets. It can be connected in series with any device having a contact arrangement. Maximum recommended speed for the machine is 800 counts per minute.

The general purpose counter is of four types: the ratchet, the rotary ratchet,



Specially designed for engineers and chemists is this compact pocket thermometer with easily-read dial and prominent scale markings.

the direct drive, and the revolution types. Maximum speeds of these types vary from 1,000 to 5,000 counts per minute. There is also a small reset counter in two types: the ratchet, and the revolution types, working at between 500 and 1,000 counts per minute.

ELECTRONIC INDICATOR

One of the latest electronic engine indicators, a two-channel, trolley-mounted equipment, can be applied to almost any problems likely to be met in an engine development or fuel technology laboratory.

A high quality double-gun cathode ray tube is used so that two simultaneous diagrams can be on the screen, and the exact relation of critical events in an engine cycle can be seen and examined in detail on a crank angle base. Adequate provision has been made to enable various pick-ups to be connected, and selector switches are provided to enable the operator to look quickly at one diagram after another.

A universal camera that takes either stills, or continous feed and drum records is incorporated, and the operator therefore has the widest possible choice of the type of record he wants to make.

A novel layout has been adopted. The tube is held in a hinged mount that can either be pulled forward, so that the operator sitting in front of the indicator has a close view of the screen, or the tube can be hinged back into the case for recording. A monitor tube can be added if required. All the controls are within easy reach and they are logically grouped so that their position and function are quickly memorised.

Interested readers may get the names and addresses of the manufacturers of the instruments by writing to the Editor.

I propose electrifying my house shortly. Could you tell me something about the various factors that make for good lighting.?

(N. R. V., Tiruvarur.)

THE importance of good lighting will immediately be realized once it is understood that 87 per cent of all impressions received are recorded by the eyes. Fortunately, good lighting can be made available with a few inexpensive fixtures.

Good lighting should meet certain fundamental requirements. It should be free from glare, well-diffused and the contrast should not be too great.

Glare is raw, irritating light that the eyes cannot use. Glare, whether it be direct or reflected, is hard on the eyes. One of the most common sources of glare is the unshaded lamp bulb.

Shaded lamps eliminate glare by diffusing the light rays of the bulb. Diffusion may also be achieved by reflecting the light against ceiling and walls. The amount of light reflected from the ceiling or the lighting unit depends upon the colour of the ceiling and the design of the fixture. It must be remembered that dark coloured surfaces absorb light rather than reflect it. Better illumination at less cost may be obtained with light-coloured walls and ceilings. Flat finishes for ceilings and walls are better than glossy ones.

Contrasted light results from using a bright light directed on books or other seeing tasks without provision for general illumination throughout the room. This causes strain to the eyes since they must be constantly adjusting themselves to bright light and then to darkness when glancing about the room. It is good practice to have at least one-tenth as much general illumination in the room as on the work.

Another source of eye strain and fatigue is insufficient light. Provision should be made for higher illumination for such visual tasks as require more light. Also, shadows on the work should be avoided by the proper location of floor and table lamps. Thus in the selection of all lamps and fixtures the primary emphasis should be on light—clear visibility. Decoration must be only a secondary consideration.

—T. R. R.

ELECTRIC CURRENT: by P. Dunsheath, (G. Bell & Sons Ltd., London—Price 18 sh. 6 d).

THIS book, which is the outcome of a course of six lectures delivered by the author at the Royal Institution during Christmas (1949-50) deals with Electric Current.

As the publisher's blurb has it, these famous Christmas lectures have produced many a master-piece of popular science from Faraday's *Chemical History of a Candle* to Sir William Bragg's *Concerning the Nature of Things* and Sir Lawrence Bragg's *Electricity*.

A characteristic feature of these lectures is the wealth of experimental demonstrations employed to present a subject in an attractive and interesting way.

This book, like its predecessor volumes, enables a larger audience—not necessarily juvenile—to experience some of the thrills of the lectures.

Dr. P. Dunsheath, the author, is Director and Consulting Engineer with the well-known firm of W. T. Henley's Telegraph Works Co., Ltd., Past President of the Institution of Electrical Engineers, Chairman, Convocation of London University and Member, London Electricity Board.

In every walk of life electricity serves humanity in a thousand ways, and it is no exaggeration to say that today our very existence depends on it. The versatality of the electric current is exemplified in ever so many ways—in the home, in street-lighting, traffic control, industry, commerce, entertainment, scientific research and flashlight photography. Perhaps, in no other way is the value of the electric current more strikingly illustrated than in what are called servo-mechanisms.

The electric motor and the "Hoover" are all valuable servants, indeed, powerful slaves, but servo-mechanisms increase the strength of man himself a thousandfold and enable him to do powerful things, from a distance. A good example to illustrate the many applications of electric current through the servo-mechanism is the control of large guns on battleships.

In medicine, again, the electric current has found many uses. Apart from lighting, which is of course fundemental, electro-medical equipment is produced today for a wide variety of purposes. The electro-cardiograph is one of several examples to illustrate and dramatise the application of electric current in the medical field.

Some of the chapter headings in the book will give one an idea of its contents. (The Electric Circuit, The Electric Current through Space, Volts, Amps and Watts, The power station, Electric Cables and The Current in the Home.)

The value of this most fascinating book is greatly enhanced by a large number of excellent photographs and diagrams.

— S. SANKARAN.

LABOUR RELATIONS AND WORKING CONDITIONS IN GREAT BRITAIN: Issued by Reference Division, Central Office of Information, London.

THIS pamphlet is divided into two parts. Part I—Labour Relations—deals, among other things, with Employers' Organisations, Trade Unions, Negotiating Machinery and Conciliation and Arbitration. Part II—Working Conditions and Employees Services—deals with subjects like Protective Legislation, Working Conditions in Practice, Joint Consultation, Works Information and Personnel Organisation.

The worker in Britain is protected today from exploitation and evil conditions of work both by law and by agreements made on his behalf by powerful and well-organised Trade Unions. The structure of labour relations in Britain is established mainly on a voluntary basis and rests on the organisation of employers and workers into employers' associations and trade unions. Many employers in Great Britain are members of Employers' Associations —the central organ of which is the British Employers Confederation. This body is recognised by Government as the principal channel of consultations between Government Departments and representatives of organised employers as a whole.

Trade Unions as defined in British Law are associations of employers or employed whose principal objects are the regulation between workmen and masters or between masters and masters or between workmen and workmen or the imposing of restrictive conditions. Provided that these are their principal objects trade unions may engage in any other lawful activities and still enjoy the special status of trade unions.

The primary aim of a trade union is to protect and advance the interests of the workers who are its members. In pursuit of this aim the British Trade Union movement has found it necessary to take an interest in almost every aspect of economic and social policy, but the main energies of individual British Unions are concentrated on the direct negotiation of wages and conditions of employment, though many continue to provide educational and recreational facilities and certain friendly benefits, including Sickness and Unemployment Benefits in addition to those provided by National Insurance.

Before 1940, the whole system of collective agreements and the machinery for settling disputes rested entirely on the principle of mutual consent. Since that year, however, to prevent work stoppages dislocating war production, the Conditions of Employment and National Arbitration Order was made, requiring employers to observe terms and conditions of employment settled by collective agreements.

The most important subjects of negotiations between employers and trade unions are wages and hours of work. Other important subjects are demarcation of duties, apprenticeship and training, holidays and procedure for negotiations and conciliation. All the terms and conditions of employment in Great Britain are for, the most part, settled by collective agreements reached by voluntary methods without state intervention. Statutory regulations of wages and hours have been introduced in certain trades or industries to ensure adequate standards being observed in the trade or industry.

The principal Acts involved in enforcing minimum standards of safety, health and welfare are the Public Health Acts, the Shops Acts, the Children and Young Persons Act, 1933, the Factories Acts. the Mines and Quarries Acts, the Wages Council Act 1945, and the Holidays with Pay Act, 1938. Certain orders affecting welfare have also been made under these regulations.

In several British factories, arrangements obtain for joint consultations. Joint consultation implies willingness on the part of management to treat employees collectively as an intelligent and reasonable force.

The idea underlying joint consultations finds expression, in terms of publicity, in what is usually referred to as Works Information. Information is disseminated through various channels, such as posters, bulletin boards, works magazines, leaflets, etc.

Although the form of organisation of personnel departments varies from factory to factory, it is generally agreed that the personnel officer carries primarily the responsibility for the development of good industrial relations.

All those interested in knowing about labour relations in Great Britain will find this publication a comprehensive one.

—*P. P. V. S.*

OUTPUT (A Times of India Publication-Price Re. 1/-)

THE fifth issue of OUTPUT is true to *Times of India* "form(e)". Contents, layout, artwork and printing reach a very high standard. This issue is of special interest to all electricity authorities in that it carries a number of articles of an electrical interest.

Writing about the Power Generating Industry, Mr. K. G. Milne, Chairman, Federation of Electricity Undertakings, observes:

"There is undoubtedly a vast field for electrical development in this country in the future and given careful planning and co-operation between Government and business enterprise, there is no reason why the industry should not forge ahead to the benefit of the nation. A badly-needed step, however, in the direction of co-operation is the setting up of State Electricity Boards visualised under the Electricity (Supply) Act, 1948 in which, so far, local Governments have adopted a most dilatory attitude."

These are sentiments with which most electricity undertakings would cordially concur. —*R. P.*

SOUTH MADRAS ELECTRIC SUPPLY NEWS

Tiruchi-Srirangam Area: Supply to Kolakkudi and Appanallur villages (Musiri Taluk) was given on March 1. The formal "switch-on" ceremony was performed by Mr. V. Seshasayee. There was a small function at which Mr. Charles S. John, our popular District Collector, presided.

The electrification of the villages is covered by the five-lakh-rupee loan scheme of the Madras Government, sanctioned in their G. O. No. MS. 3893 of October 17, 1950.

An extension of a little over 7 miles of 11 kv H. T. overhead lines was tapped off the 11-kv lines at Thiruvengi Hills, close to Dr. T. S. S. Rajan's agricultural farm. The scheme is designed for four units of substation, having a total capacity of 375 kvA to feed 120 pumpsets of 470 h. p. load irrigating nearly 400 acres of land. Apart from this agricultural load, 80 domestic lighting services, 50 street lights and one industrial power service of 30 h. p. (a rice and oil mill) will also be connected.

Fifty pounds, second class rails, 30 feet long have been used for the main 11-kv H. T. line with three runs of ACSR "Gopher" conductor. For the L. T. lines, all-aluminium conductors have been drawn on girder posts. (5 in. by 3 in.) Work is in progress on the erection of two more substations, and the L. T. lines.

Although this big scheme has been on our anvil for over 10 years now, (the proposal was originally mooted in 1939) it materialised only in 1951.

Mr. V. Mallikarjun who was our Line Superintendent at Musiri from 1948 to 1951 played a notable part in bringing the scheme to fruition.

Mention should, also, be made of the efforts taken by the Kolakkudi-Appanallur Village Committee headed by Mr. N. Ramaraj for bringing the benefits of electric supply to these villages. The work was executed by the construction Department at H. O. under the able supervision of Mr. R. Rajagopalan, Junior Engineer, Musiri area.

Sittalarai: Supply to Sittalarai village was given on March 10. Mr. R. Varadarajan, Secretary, Managing Agents, switched on the supply at a formal function. Local residents availed the opportunity of the function for the presentation of a purse (Rs. 101) to the Seshasayee Institute of Technology. An extension of 11-kv H. T. overhead lines tapped off the Kolakkudi feeder was drawn for 5½ furlongs. A 50-kvA transformer substation was erected to feed 7 numbers of 5 h. p. agricultural pumpsets.

Sittalarai is one of the villages covered by the loan scheme of the Madras Government—by which a sum of Rs. 8,26,700 was sanctioned. (G. O. M. S. No. 971 dated. March 16, 1949). A sum of Rs. 47,400 was earmarked for this village.

Technical features of the Sittalarai work are the same as those of Kolakkudi and Appanallur.

East Tanjore Area: During this quarter, supply was rendered to the villages of Athikottai, Maligaimedu and Elaiyur.

Athikottai: A 50-kvA transformer substation was erected to feed an agricultural load of 2 h. p. to irrigate casuarina plantations.

Maligaimedu: Supply was rendered to this village (near Mannargudi) on January 10. An agricultural pumpset and a rice-mill were connected. A 11-kv H. T. spur line tapped off the main line to Pattukottai was drawn and a 50-kvA pole-mounted transformer substation was erected.

Elaiyur: Supply to this village was given on January 25. A small 11-kv H. T. spur line was drawn from the Melapalaiyur H. T. lines and a 5 kvA, pole-mounted transformer was erected. The load is chiefly domestic lighting. About 10 services are now fed.

Mr. R. Varadarajan (fourth from left) switched on supply to Sittalarai.

East Ramnad Area: The 22/33 kv transmission lines from Ramnad to Mandapam have been completed and energised to afford supply to the Ceylon Government Quarantine Camp, the Fisheries Department and the Marine Workshops at Mandapam.

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

Licence area	*Industrial*	*Agricultural.*
Tiruchi-Srirangam.	160 h. p.	230 h. p.
East Tanjore	112 ,,	30 ,,
East Ramnad	45 ,,	23 ,,

Strictly Personnel

IF the man from Madras is able to make his mark wherever he goes, it is because the process begins pretty early in his life. For one thing, the Madras boy is none of your whining type, creeping like snail unwillingly to school. He runs, before he learns to walk . . . to school. The school is a sort of home away from home for him. In the class room of any school anywhere in India, (north of the Vindhyas) if some boy's right arm goes up and down like a distracted semaphore, when teacher asks inconvenient questions, the chances are that the boy is from Madras!

All this rhapsodical outburst about the Madras School boy is occasioned by the news we have of N. Sriram, winner of the Seshasayee Prize for 1951, awarded by our New Delhi Representative and Liaison Officer, Mr. R. Chakravarthy.

The prize is awarded annually to the XI class boy or girl (in the Madras Education Association Higher Secondary School) who secures the highest total number of marks in the Science Group of subjects at the Public Examination (Matriculation).

Sriram is the son of Mr. R. Narayanaswami Iyer, Secretary, Ministry of Finance (Communications Division). One of New Delhi's most popular officials, Mr. Narayanaswami Iyer, is also at present the President of the South India Club.

Sriram is now a scholar at the St. Stephen's College, one of the constituent colleges of the Delhi University. His group is Physics (Honours) with Mathematics (Subsidiary).

We wish young Sriram every success at College, and we shall watch his future career with considerable interest.

N. Sriram, the Delhi Scholar

A word or two about the Madrassi Education Association School itself will not be out of place here. The strength

of the school is at 1200. Pupils hail from all parts of Madras—Tamil Nad, Andhra, Kannada and Kerala. A large contingent of boys and girls was sent up by the school for the Matriculation Examination last year, and the school scored a resounding success, securing the largest number of passes, classes and distinctions, in the whole of Delhi State.

Mr. V. P. Menon formerly Secretary, Ministry of States, (and who has now settled down in Bangalore) was throughout his stay in New Delhi taking the keenest interest in the school as the President of the Managing Committee of the Madrassi Education Association. To his zeal and devotion, much of the progress made by the school, is directly attributable.

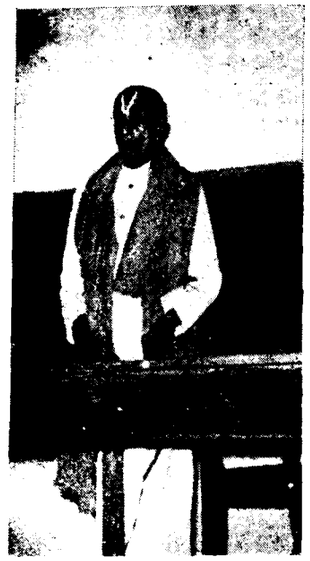
Mr. R. A. Gopalaswami Iyengar, I.C.S., is the present President of the Association.

SIT-ting Pretty:

Talking of schools, mention must be made in these columns of the inauguration of the Seshasayee Institute of Technology, Tiruchi, which took place on January 28. Dewan Bahadur S. Raghava Aiyangar, Chairman, Board of Directors, South Madras Electric Supply Corpn. Ltd., formally declared the Institute open.

Speaking on the occasion Mr. Raghava Aiyangar said that the students of the Institute had the shining example of Mr. V. Seshasayee—after whom the Institute had been named—before them for emulation. On the first few batches, he added, lay the great responsibility of setting up worthy traditions.

Instruction is at present offered at SIT for a few courses leading up to the A. M. I. E. diploma of the Institution of Engineers (India).



Dewan Bahadur S. Raghava Aiyangar

The energetic Secretary of SIT is Mr. H. K. Ramaswami, Our Deputy Chief Engineer. It will be no exaggeration to say that, but for his vision and enterprise, the Institute would not have been born, and be the sturdy, up-and-coming infant, that it now is.

Mr. R. Varadarajan, Secretary, Seshasayee Brothers, Limited, is the Hon. Treasurer. His enthusiasm for the Institute practically knows no bounds. He is often surprised—he raises a pair of callisthenic eyebrows—and pained—he puckers them then—that people should ever think of other causes for private

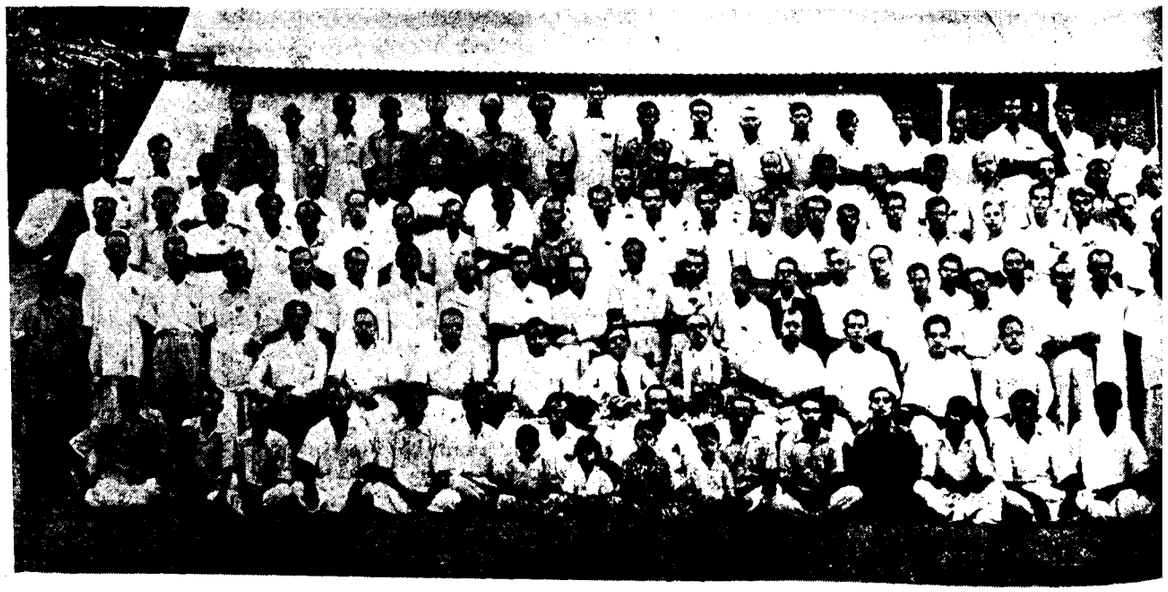
philanthropy, when they have before their eyes SIT needing all the support in the world.

Staff Association Diary: Md. Haniff and party, formerly of the troupe of "Gunboat" Jack, the well-known welter weight Negro boxer, gave a demonstration of physical feats on our grounds, on Janaury 15. Haniff's trapeze act was, in particular, most warmly applauded.

Film Shows: Not many pictures were screened during the quarter. On February 16, we had two documentaries lent to us by the United States Information Service—*Life in Metropolis* and *Principles of Electricity.*

Correspondence is in progress with producers of commercial films, and we hope to be able to exhibit some outstanding screen successes in the coming months.

While on the subject of film shows, we must not omit to mention the very fine function arranged by M. R. Subramaniam, our Engineer-in-charge, at Tiruvarur, on March 4, on the occasion of presentation of a 16 mm. projector to the station. Mr. V. Seshasayee made the presentation.



East Tanjore Area Staff: A projector was presented to Tiruvarur, headquarters of this area, on March 4.

After tea and a "group", Mr. A. Ganapathi Iyer, Director, South Madras Electric Supply Corporation, Limited, made a brief speech welcoming Mr. Seshasayee to Tiruvarur.

Mr. V. Swamy Iyengar, another of our Directors, was also present.

Mr. Seshasayee said that he had long been planning to make a visit to Tiruvarur, but somehow or other overriding considerations prevented him from doing so. He was, indeed, most happy to be with them that day, he said, and added that although he was physically removed from them by distance, they were constantly in his thoughts.

Mr. S. Thiagarajan, Head Lineman, said that they were all greatly honoured by Mr. Seshasayee's presence in their midst. On behalf of staff at Tiruvarur, he assured Mr. Seshasayee of their loyal cooperation. Mr. M. R. Subramanian proposed a vote of thanks.

With the screening of *The circus comes to Town*, the function came to a close.

Music: Mr. V. Narasimhan (of Ettayapuram)and party gave a musical performance at the Assembly Hall on March 24. Presiding at the harmonium on the occasion was Mr. J. Nagarajan, a member of our staff.

Mr. John Linton, Director, Far Eastern Programmes, B. B. C., visited the Power House on March 13.

Lectures: Mr. V. Seshasayee addressed Members on March 7. His subject was Public Relations. Mr. Seshasayee said that every member of the staff should so conduct himself in word and deed that credit would reflect on the organization to which all of them belonged.

Sport : Our Cricket Club was officially inaugurated by Mr. H. K. Ramaswami, Dy. Chief Engineer, on March 12. A large gathering of staff was present.

Mr. K.V. Mahalingam, Junior Engineer, (Maintenance) is the Captain. Mahalingam is a great performer both with the ball and the bat, and we are sure that, under his able leadership, the Club will register steady progress.

Visitors : A visitor whom we were most happy to welcome was Mr. John Linton of the B. B. C. Mr. Linton called on us on March 13. At the small function got up in his honour by the Officers' Club, Mr. V. Seshasayee was, also, present.

Mr. Linton, who is Director of Far Eastern Programmes on the B. B. C., came to this country, to ascertain at first hand, Indian reactions to the language broadcasts of the B. B. C.

A point of interest to local residents is that Mr. K. P. Rangachari, formerly of All-India Radio, Tiruchi, is now with the B.B.C., handling its Tamil programmes.

Obituary : It is with deep regret that we record the death of the following members of our staff :

1. S. Abdul Rahiman, Lorry Driver (March, 5.)
2. P. Md. Kasim, Attender, (March, 22.)
3. S. Muniyandi, Asst. Lineman, (March, 18.)

Rahiman had put in a service of 18 years and four months and died suddenly of cerebral haemorrhage. Mr. Seshasayee made a feeling reference to his demise at the meeting he addressed on March 7.

Md. Kasim has a service record of over 13 years. A most conscientious and willing worker--and extremely silent—our Despatch Section misses him greatly.

S. Muniyandi was with us for a little under four years. His engineers are all quite warm about his work.

To the members of the bereaved families, we tender our deepest sympathy.

—*R. P.*

Current Topics

THE face of a third of Madras State comprising eight districts out of a total of 24 beginning with West Godavari district in the north down to South Arcot in the Tamil Nad will be entirely changed by the great multi-purpose Krishna–Pennar Project which will ultimately irrigate 3·6 million acres producing 1·6 million tons of rice and one lakh tons of millets valued at Rs. 53 crores, enough to tide over the rice deficit of the Madras State. The project will, in addition, develop 120,000 kw of continuous and 240,000 kw and of seasonal power for the benefit of an area industrially backward and will cost over Rs. 130 crores and Rs. 94·20 crores less betterment fee.

Special significance attaches to the scheme because, for the first time in India, perhaps, in the whole world, two large reservoirs on two important rivers are to be linked, and the water thus conserved utilised to the best advantage, both for irrigation and power development.

ELECTRICITY BOARDS

The Government of India in the Ministry of National Resources and Scientific Research has extended the time limit within which State Governments are to constitute Electricity Boards up to 31st March 1953.

COTTAGE INDUSTRIES

The Madras Government has sanctioned the establishment of a cottage industries research institute in the State. The institute will mainly concentrate on the development of 15 cottage industries by designing new appliances or by suggesting improvements on existing ones. The cottage industries include, among others, carpentry, blacksmithy, metal works, fibre extraction, rope making, rice pounding, handloom weaving, distillation of essential oils and *gur* making. The institute will also conduct experiments and research on mechanical treatment of raw materials used in cottage industries.

LINE ERECTION BY HELICOPTER

A British trade journal recently carried the story of an unusual operation of line erection by the Midlands Electricity Board. To avoid cutting down a large number of trees in a densely wooded area, the Board employed a helicopter for the erection of a 66 kv line for a span of 1280 ft.

Although, in this pioneer effort, the use of a helicopter was more costly than

employing a normal method, enough experience was gained, it would appear, to show that in certain circumstances, the use of a helicopter could be advantageous.

It is generally well-known that helicopters are used in U. S. for line patrol work.

The line was constructed by the Board's own staff, and apart from the aircraft, the only other equipment obtained from outside sources was an ex-W.D. winch lorry fitted with a balloon cable which was provided by the British Insulated Callender Construction Co., Ltd., and which considerably speeded up the pulling of the conductor. Three 0·1 sq. in. ACSR steel-cored aluminium conductors were required to be strung over the valley between two 50 ft. "H" poles which were 1,280 ft. apart. The poles were so sited that the conductors, when strung, were well above the dense wood covering the valley, and no tree lopping was necessary for line clearance purposes.

HIRAKUD SCHEME

Having completed its enquiry into certain financial and technical difficultics encountered in the administration of the Hirakud Dam scheme, the special committee appointed by the Government of India is now preparing its report. Meanwhile there has been a considerable change in the construction programme. Construction has been divided into three stages. The first, to be completed by 1955–56, includes the main dam and four power units totalling 50,000 kw. In the second stage, spread up to 1960–61, the dam will be completed and power supply raised to 85,000 kw. The third will see the scheme brought to its full output of 200,000 kw. In the revised scheme, it will be seen, the main dam will provide flood protection as well as irrigation to about two million acres of land earlier, besides giving hydro-electric power, although the availability of power will be delayed by about two years.

ELECTRICAL EQUIPMENT FOR TIBET

Machinery, part of a water turbine generating set which will provide Lhasa, the capital of Tibet, with its first public supply of electricity, has left the makers' works in the U. K. on the first stage of its long and difficult journey. It is a 36-inch spiral bevel gear unit and is the last of three such units ordered.

Like the two gear units previously despatched, this unit has been sent by sea to Calcutta where it will be handed over to representatives of the Tibetan Government. The equipment will then travel by rail to Darjeeling, from where it will be carried in sections by mule and yak, over the Himalayas to Lhasa, 12,000 feet above sea level.

The plant was specially designed to meet Lhasa's requirements.

சில முக்கிய நீர்ப்பாசன, மின்சார உற்பத்தித் திட்டங்கள்

பி. வி. லலிதா

பாரத நாட்டில் ஜனசக்தி, நிலம், நீர் அனைத்தும் இறைவன் அருளால் ஏராளமாக உண்டு. இவைகளை விவேகமாக உபயோகித்தால் நம் நாட்டிலுள்ள 35 கோடி மக்கள் அனைவருக்கும் போதுமான உணவும் உடையும் கிடைக்கும்.

ஆனால் நம் நாட்டின் தற்போதைய நிலைமை என்ன? குறைந்த பக்ஷம் நமக்கு 40 லக்ஷம் டன் உணவுப் பொருள் பற்றுக் குறையே இருந்து வருகிறது. பருவ மழை தவறிவிட்டாலோ நிலைமை இன்னும் மோசமாகிறது. நம்முடைய பற்றுக் குறையும் 40 லக்ஷத்திலிருந்து 60, 70 லக்ஷமாகிவிடுகிறது.

நம் நாடு இந்த துர்ப்பாக்கிய நிலைமையை அடைந்ததற்கு காரணங்கள் பல. முதலாவது, பாரத பாகிஸ்தான் பிரிவினைக்குப் பின்னர் பாகிஸ்தானுக்கு நீர்ப்பாசன வசதி அதிகம் கொண்ட நிலம் சேர்ந்தது.

இரண்டாவது, நம் நாட்டின் ஜனத்தொகை பெருக்கம். பாகிஸ்தானிலேயோவென்றால் பிரிவினைக்குப் பின்னர் முன்னையைவிட ஜனத்தொகை குறைந்தது. ஏராளமான ஜனங்கள் வெளியேறிவிட்டார்கள்.

நம்முடைய உணவு நிலையை சமாளிக்க 1943-ம் ஆண்டிலிருந்து நாமும் ஏதேதோ பிரயத்தனங்கள் செய்துகொண்டுதான் வருகிறோம். முன்னையைவிட அதிக நிலங்களை பயிரிடுகிறோம். நல்ல விதைகளை வழங்குகிறோம். நல்ல எருக்களை உபயோகிக்கிறோம். மேலான விவசாயக் கருவிகளையும் உபயோகிக்கிறோம். இருந்தாலும் இவை மட்டும் உணவுப் பற்றுக்குறை பிரச்னையைத் தீர்க்கா. நமக்கு முக்கியமாக வேண்டியது நீர்ப்பாசன வசதியே.

பருவ மழையை சேமித்து வைத்தல்

நாம் நாட்டு நதிகளில் ஓடி சமுத்திரத்தில் விழும் தண்ணீர், இரண்டடி ஆழத்திற்கு நாடு பூராகவுமே மூழ்விக்க வல்லது. இருந்தாலும் பதினைந்தில் ஒரு பங்குக்கு குறைவாகவே நதியின் நீரை நாம் உணவுக்கும் மின்சார உற்பத்

திக்கும் பயன்படுத்துகிறோம். சேமித்து வைத்த நீரை பருவ மழை தவறிய காலத்தில் பாசன வசதிக்கு மட்டும் பயன்படுத்துதல் சிக்கனமான முறையாகாது. தேக்கிய நீரை மின்சார உற்பத்திக்கும் உபயோகப் படுத்திக் கொள்ளவேண்டும்.

நம் நாட்டின் அபிவிருத்திக்காக சர்க்கார் ஐந்தாண்டுத் திட்டம் ஒன்று போட்டிருப்பது அனைவருக்கும் தெரிந்த விஷயமே. நீர்ப் பாசன மின்சார அபிவிருத்திக்காக 500 கோடி ரூபாய் செலவிட திட்டமிட்டிருக்கிறார்கள். மொத்தம் பெரிதும் சிறிதுமாகக் கலந்து 70 திட்டங்கள் நிறுவ முடிவு செய்திருக்கிறார்கள். முக்கியமான சில திட்டங்களை மட்டும் கவனிப்போம்.

பாக்ரா-நங்கல் அணைக்கட்டு

கிழக்கு பஞ்சாப்பில் சட்லெஜ்நதி தீரத்தில் பாக்ரா-என்னும் கிராமத்திற்கு அருகில் 680 அடி உயரத்தில் ஓர் அணையை இப்பொழுது கோலுகிறார்கள். நம் நாட்டு அணைக்கட்டு களிலேயே இதுதான் மிகவும் பெரியது. 36 லக்ஷம் எக்கர் நிலங்களுக்கு இதனால் நீர்ப்பாசன வசதி கிடைக்கும்.

இங்கிருந்து 8 மைல் தூரத்தில் நங்கல் என்று ஒரு கிராமம் உளது. அங்கே நீர்த் தேக்க அணைக்கட்டுவேலை முடிந்து விட்டது. இதன் முக்கிய நோக்கங்கள் பாக்ரா மின்சார உற்பத்தி நிலையத்திற்கு மின்சாரம் குறைந்த போது தன்னுடைய நிலையத்திலிருந்து தருவது. அம்மாதிரித் தேவை எழாத சாதாரண சமயத்தில் ஏராளமான தண்ணீரை விவசாயத் திற்கு அளித்தலுமேயாகும்.

மொத்தம் மூன்று இடங்களில் 1,64,000 கிலோவாட்டுகள் மின்சாரம் உற்பத்தி செய்யப்போவதாக திட்டமிடப்பட்டிருக்கிறது. முதலாவது மின்சார நிலையம் கட்டத் தொடங்கிவிட்டார்கள். இவ்வாண்டிற்குள் இது முடிந்துவிடும். நங்கலிலிருந்து டெல்லி வரை மின்சாரக் கம்பிகள் இழுக்கப்பட்டு விட்டன. 1953-ம் ஆண்டில் இப்புதிய நிலையத்திலிருந்து டெல்லிக்கு மின்சாரம் வழங்கப்படும்.

தாமோதர நதிப் பள்ளத்தாக்கு திட்டம்

பீஹார் வங்காள பிரதேசத்தில் தாமோதர் என்று ஒரு பிரம்மாண்டமான நதி ஒன்று ஓடுகிறது. பருவக் காலத்தில் இந்நதி கரை புரண்டோடும். மக்களுக்கும், பயிருக்கும் பயங்கரமான சேதத்தை விளைவிக்கும்.

அமெரிக்காவில் டென்னஸ்ஸி பள்ளத்தாக்குத் திட்டம் என்று ஒன்று உண்டு. அதைப் போலவே உயரிய முறையில் தாமோதர நதியின் வெள்ளவேகத்தைத் தடுத்து நீரைத் தேக்கி மக்களுக்கு பயன்படும் முறையில் செய்யவேண்டுமென்று அரசாங்கத்தார் ஓர் திட்டம் வகுத்திருக்கிறார்கள். தாமோதர பள்ளத்தாக்கு திட்டத்தை நடத்துபவர்களுக்கு பூரண அதிகாரம் உண்டு. இந்தத் திட்டமே பார்லிமெண்டு அங்கீகாரம் பெற்றது.

பீஹார், மேற்கு வங்காள மாகாணங்கள் இத்திட்டத்தினால் பெரிதும் பயனடையும். நதிதீரத்திலும் மலைகளிலும் குறுக்கே இயன்ற இடங்களெல்லாம் அணைகள் கட்டப் படும். முதலில் நான்கு இடங்களில் அணைகள் கட்ட உத்தேசம். நீர்த்தேக்க விஸ்தீரணம் 24 லக்ஷம் எக்ராக்கள். அணை கட்டப் படும் நான்கு இடங்களிலிருந்தும் மின் உற்பத்தி செய்யப்படும். மொத்தக் கிலோவாட்டுகள் 1,24,000. இதோடு வரண்ட காலத்தில் நிலைமையை சமாளித்துக்கொள்ள, நீராவி, எண்ணை, இயந்திர சாதனங்களால் 20 லக்ஷம் கிலோவாட்டு மின்சாரம் உற்பத்தி செய்ய பொக்காரே என்னுமிடத்தில் ஒரு நிலையத்தையும் ஸ்தாபித்துக்கொண்டிருக்கிறார்கள்.

துங்கபத்ரா அணைக்கட்டு

மதராஸ் சர்க்காரும், ஹைதராபாத் சர்க்காரும் சேர்ந்து துங்கபத்ரா நதியின் குறுக்கே ஒரு அணை கோலுவதற்கான ஏற்பாடுகளை செய்து வருகிறார்கள். நதியின் வலது கரையிலிருந்து செல்லும் கால்வாய் சென்னை ராஜ்யத்தில் 2,50,000 எக்ரா நிலத்திற்கு தேவையான நீர்ப்பாசன வசதியை அளிக்கவல்லது. இடது கரையிலிருந்து செல்லும் கால்வாய், நிஜாம் ராஜ்யத்தில் 4,50,000 எக்ரா நிலத்திற்கு தண்ணீர் தரும். இன்னும் சென்னை பிரதேசத்தில் 45,000 கிலோவாட் மின்சார உற்பத்தியும், ஹைதராபாத் பிரதேசத்தில் 1,10,000 கிலோவாட் மின்சார உற்பத்தியும் செய்ய இது பயன்படும். 1953-54 ஆண்டில் இது கட்டி முடிக்கப்படும்.

கீழ் பவானி திட்டம்

காவேரியின் உபநதியான பவானியின் குறுக்கே 1,500 அடி நீளமும் 200 அடி உயரமும் உள்ள அணைக்கட்டு ஒன்று கட்டப்படுகிறது. இவ்வணையினால் தேக்கப்படும் தண்ணீர் மின்சார உற்பத்திக்கும் நீர்ப்பாசனத்திற்கும் உபயோகிக்கப்படும். 120 மைல் நீளம் கொண்ட கால்வாய் ஒன்று வலது கரையிலிருந்து 2,67,000 எக்ரா நிலத்திற்கு நீர் பாய்ச்சும். இங்கு 10,000 கிலோவாட் மின்சார சக்தி உற்பத்தி செய்யப்படும். இவ்வணைக் கட்டு வேலையை 1938-ம் ஆண்டிலிருந்து செய்து வருகின்றனர்.

நம் திட்டங்கள் எல்லாம் கட்டி முடிந்த பின்னர்—அதாவது ஐந்தாறு ஆண்டில்—நம் நாட்டை விட்டு பஞ்சப்பிணி அறவே அகலும் என்று எதிர்பார்க்கப்படுகிறது.

குடில்: (தில்லித் தமிழ்ச் சங்கத்தாரின் வெளியீடு. விலை: 12 அணா.)

"என்னகம் உன் சுடரால்
பொன்னகம் ஆச்சுதடி" என்று குத்து விளக்கின் சுடரைப் பற்றிப் புகழ்ந்து பாடியிருப்பது போலவே தில்லி தமிழ் சங்கத்தாரால் வெளியிடப்பட்டிருக்கும் "சுடரும்" பிரகாசிக்கின்றது. குத்து விளக்கின் சுடர் புற இருளைப் போக்கும். இச்சுடர் அக இருளை அறவே போக்கி இலக்கிய ஒளியை வீசச் செய்கின்றது.

பெயருக்கு ஏற்ற உருவம் தாங்கி ஓர் அகல் விளக்கின் ஒரே சுடர் தாங்கிய ஓவியம் ஒன்றினால் முகப்புப்படம் காட்சி அளிக்க, ராஷ்ட்ரபதி ராஜேந்திரப் பிரசாத் அவர்களின் நல்லாசியுடனும், ராஜாஜி அவர்களின் சிறிய கட்டுரையுடனும் சஞ்சிகை தொடங்குகிறது. தமிழ்நாட்டின் சிறந்த எழுத்தாளர்களான தேவன், பாஸ்கரத் தொண்டைமான், தூரன், கந்தா முதலியோர் கட்டுரைகள் எழுதியிருக்கிறார்கள். இன்னும் தில்லி எழுத்தாளர்கள் பலர் இலக்கிய மணம் கமழ எத்தனையோ கட்டுரைகள் உதவியுள்ளார்கள். கண்ணைக் கவரும் ஓவியங்கள் "சுடரை" இன்னும் பொலிவுடன் திகழச்செய்கின்றன.

கூறமுற வேண்டுமெனில் தெருவெலாம் தமிழ் முழக்கத்தை ஒலிக்கச் செய்ய வேண்டுமென்று பாரதியார் அன்று ஆணையிட்டார். இன்று தமிழ் எவ்வளவோ வளர்ச்சியுற்றிருக்கிறது. தமிழை மறக்காமல், என், தமிழை வளர்க்க அரும்பாடு படும் தில்லி தமிழ்ச் சங்கத்தாருக்கு எமது மனமார்ந்த பாராட்டுதல்கள்.

—எஸ். சுப்பையா

ELECTOLITE Printed at the Tuchinopoly United Printers Ltd., Tiruchirapalli.
Edited and Published by R. Parthasarathy, M.A.,
for the South Madras Electric Supply Corporation Ltd., Tiruchirapalli.