The ALIND Chronicle

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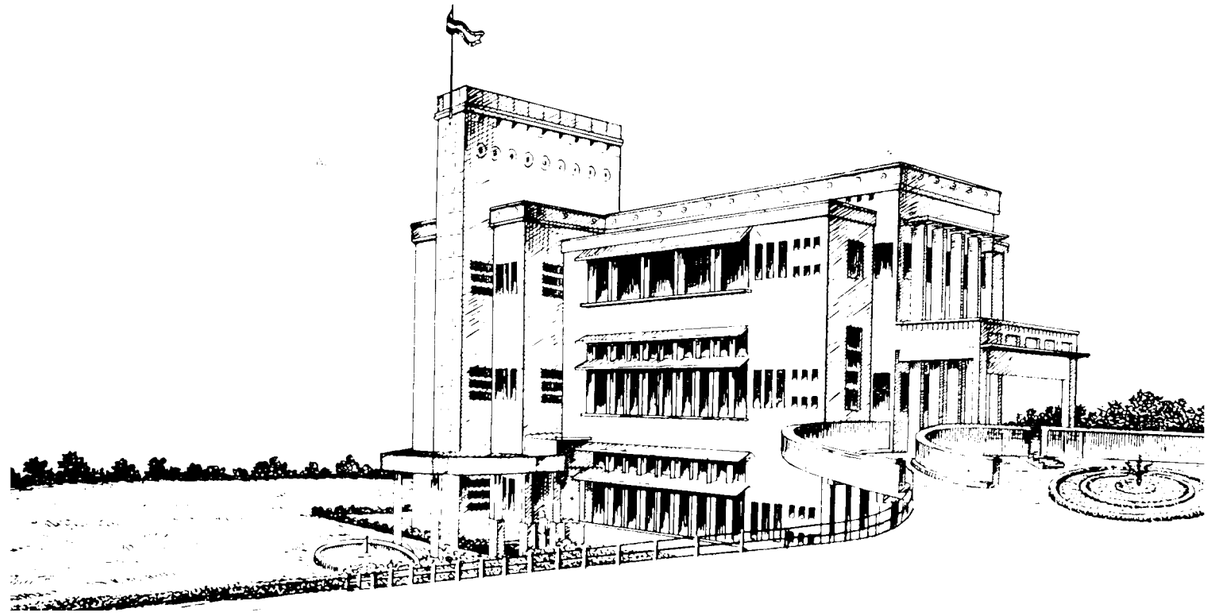


Use of Aluminium Conductors in Rural Distribution

Recreation Club — Annual Day

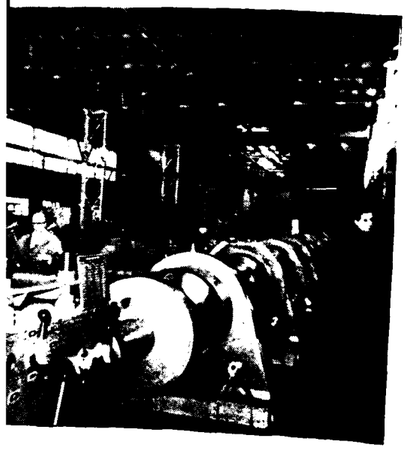
ALIND goes to Peking!

Tata Oil Mills Company Limited

Assam — Govt. Electricity Dept.

News in Pictures

Mr. Charles G. Gorton (right) took formal delivery of the stranding machine to be installed at our Hirakud Works from Mr. Joseph Muller (left). Below: a near close-up of the strander.



His Excellency Ellsworthy Bunker, United States Ambassador to India addressing the Rotary Club of Delhi. Next to him are (from left) Mr. Govardhan Kapur, President of the Club, R. Chakravarthy, our Delhi Representative, Hon. Secretary of the Club, and Mrs. Bunker.

Mr. Lomer Pellerin (Superintendent, Cable Mill, Alcan's Shawinigan Works), who was at Kundara at the time of commissioning of the Wire Mill, in 1950, was on a brief visit to India in June. In this picture (taken at Calcutta), he is seen third from left with V. G. G. Nayar. Others here are Mr. S. R. Given of Alcan's Vancouver plant, Mr. Y. K. Kaul of Aluminium Union Limited, Calcutta and Mr. R. C. Foss of the same company.

ALCOIND News & Developments

AUGUST 1958

No. 14

Editor: R. PARTHASARATHY

THE PURPOSES OF THIS PUBLICATION ARE:

(i) *To record the accomplishments and achievements of our employees, their joys and sorrows so that our other friends like our customers, shareholders and neighbours may get to know our family better;*

(ii) *To encourage in our employees pride in workmanship and the high quality of our products;*

(iii) *To help create and sustain amongst them a spirit of friendliness; and*

(iv) *To tell the story of our business and that of our customers and other friends so that mutual understanding and respect might be fostered.*

THE COVER: *An artist's impression of our new Administration Block.*

A GREAT EVENT IN THE INDUSTRIAL history of India was the golden jubilee of the Indian Steel Industry, celebrated at Jamshedpur on March 1. The Prime Minister Mr. Nehru inaugurated the event by declaring open a 200-acre park built at a cost of Rs. 15 lakhs for the benefit of the people of Jamshedpur, in commemoration of the jubilee. He also unveiled an impressive statue of the great founder of the Indian Steel Industry, Jamshedji Tata.

The Prime Minister spoke in glowing terms of the courage and vision of the founder. He stressed the role of steel in the industrial development of the country. He described Jamshedji as one of the founders of modern India, who by his courage and foresight, established the industry at a time when few in the country could have ventured to put their hand to such a costly, difficult and risky enterprise. Concluding, he expressed his determination to go through with the core of the Second Five-Year Plan largely comprising steel and power production.

Mr. J. R. D. Tata speaking at the ceremony also dwelt on the vision of the founder to think of such a bold scheme in those far-off, difficult days, when Indian industries had been ruined and Indian enterprise was at its lowest ebb. Although Jamshedji did not live to see his dream come to complete fruition, the achievement was essentially his. Mr. Tata touched upon the subsequent ups and downs of the industry, and the role of the Congress Party under the leadership of the late Pandit Motilal Nehru in securing protection for the industry between the two World Wars.

Among the 2,000 guests present on the occasion were the Governor and Chief Minister of Bihar, Mr. Morarji Desai, Sardar Swaran Singh, Lady Mountbatten and Mr. S. Takahata, Chairman of Nissho Steel Company of Japan.

Mr. Nehru spent an hour going round the entire blast furnace section.

Ganga Grid and Sharda Grid linked

The Ganga grid in U.P. was recently linked with Sharda grid by the construction of the longest power transmission line in the country, flung across without any intermediate supports. The line crosses Ramaganga River at a point where the normal width of the river is about half-a-mile and extends to over one mile during the rainy season. There are two crossing towers and two balancing towers carrying nine power conductors and two earth wires.

The 132-kV double circuit line and 66-kV single circuit line are of "Silmalec" conductors, and the earth conductors are of 37/.1020 size.

Ganga Grid has a generating capacity of 77,900 kW and Sharda has a capacity of 41,400 kW and the link has been designed to carry 20,000 kW either way, thus enabling to meet the acute power shortage in the Ganga Grid area.

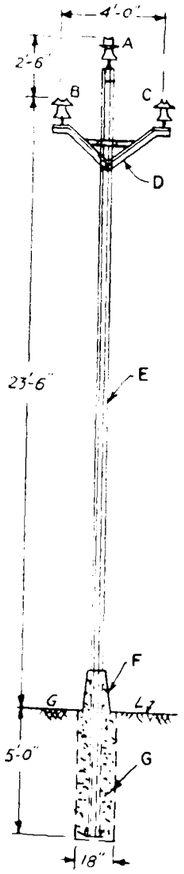
Alcoa's Davis

Arthur Vining Davis (the initial two letters of whose names have gone to make up the place name ARVIDA), 90, retired as Board Chairman of Aluminium Company of America in order to devote full time to his still expanding real-estate empire in Florida and the West Indies, says a report in FORTUNE. The September 1956 issue of this journal carried an article on him under the title "The man who is buying up Florida".

Davis had been with Alcoa since its founding in 1888, and though he has sold much of his stock recently, he is still the firm's second-biggest stockholder (9,36,824 shares). Since moving to Florida in 1948, Davis has been relatively inactive in the running of the company, but he is planning new ventures, some of which may take decades to pay off.

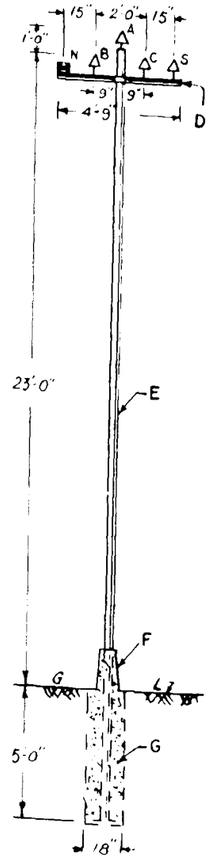
First Canadian President of ASM

Mr. G. Mac Donald Young of Montreal, technical director of Aluminium Company of Canada, is the first Canadian to become President of the American Society for Metals.



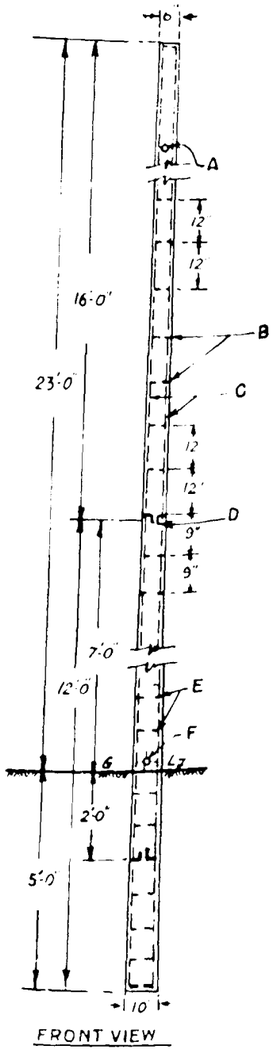
[A, B, C, three ACSR power conductors; D, 2 2 ¼ in. angle "V" bracket; E, metal post 5 3 in. R.S. joist or 45-50 lb. F.F. rail or RCC post 30 ft. long; F, concrete coping; G, stone jelly cement concrete 18 in. sq. in special locations]

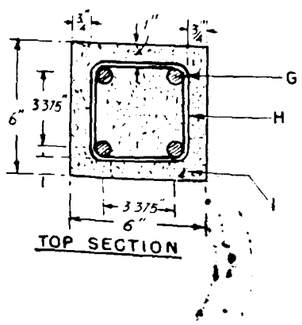
Fig. 1 — Standard design for H.T. line supports [max. span 350 ft.].

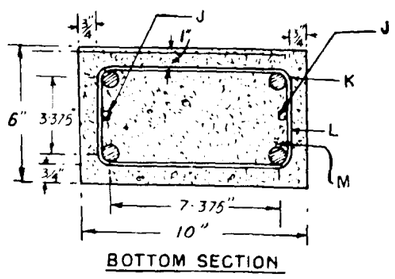


[D, four-wire bracket 2 2 ¼ in. angle overall length 4 ft. 9 in.; A, B, C, L.T. power conductors; S, street light main; N, earth neutral; E, metal post 5 3 in. R.S. joist or 45-50 lb. F.F. rail or RCC post 28 ft.; F, concrete coping; G, stone jelly cement concrete 18 in. sq. in special locations]

Fig. 2 — Standard design for L.T. line supports [max. span 200 ft.].







[A, earth bolt welded with reinforcement; B, all joints electrically welded; C, main members four ⅝ in. dia. MS rods (vertical); D, ⅜ in. dia. MS rod two extra vertical 9 ft. long; E, ¼ in. dia. MS rods stirrup 9 in. apart (cement concrete 1 : 1½ : 3); F, earth bolt with washer welded with reinforcement; G, main members four ⅝ in. dia. MS rods 28 ft. long; H, ¼ in. dia. MS rod stirrup 12 in. apart electrically welded at joints; I, ½ in. stone jelly cement concrete (1 : 1½ : 3) J, ⅜ in. dia. MS rods extra vertical; K, main members four ⅝ in. dia. MS rods 28 ft. long; L, ¼ in. dia. MS rod stirrup 9 in. apart electrically welded at joints; M, ½ in. stone jelly cement concrete (1 : 1½ : 3)]

Fig. 3 — RCC post 28 ft. long.

Technical Notes

Use of Aluminium Conductors in Rural Distribution

by S. Sankaran and P. N. Raman *

THIS PAPER DEALS WITH THE experience gathered over the past five years in the use of aluminium conductors—both ACSR and All-Aluminium—in electricity distribution in rural areas, and the recommendations made are based on this experience.

In future years, aluminium as an electrical conductor will assume even greater importance in India in view of the availability of vast resources of bauxite and the rapidly dwindling stocks of available copper in the world. Indeed, on its own technical merits, *aluminium* is gaining importance in the electrical field and its application to machinery windings, etc., —apart from its normal use in distribution networks – is engaging the attention of technical experts.

In electrical distribution, practically all the problems connected with the use of aluminium conductors would appear to have been solved, and there is, therefore, little or no justification for covering ground already well-trodden.

In rural electrification schemes, dealt with in India, load densities are low. The farmhouses or country dwellings have limited applications of electricity, and these requirements are confined, for the most part, to lighting, electric fans and small domestic pumps. The connected load of a dwelling house will rarely exceed one kilowatt and the utilized load will be less than 40 per cent of that of the connected load.

Rural industrial and agricultural loads too rarely exceed 25 h.p., the class of loads being mostly (*a*) agricultural pumps ranging from 3 to 7.5 h.p., (*b*) rice and flour mills from 7.5 to 25 h.p., (*c*) sugarcane crushers of 10 h.p. and (*d*) other unclassified small-scale industries rarely exceeding 10 h.p.

Having regard to this type of loads, we have found it adequate to confine all low tension distribution lines to the following three sizes of aluminium conductors :

(i) Main feeders of 7/0.1093 (equivalent to No. 4 copper) with an earthed neutral conductor of 7/0.0772 (equivalent to No. 8 copper) if the circuit is a three-phase one.

(ii) Branch feeders of 7/0.0975 or 7/0.0772 (equal to Nos. 6 and 8 gauges of copper, the section used being chosen in relation to the load dealt with).

(iii) In case of single phase extensions, the phase wire and the neutral are chosen as equal sections.

(iv) As 7/0.0772 is marginal with respect to mechanical strength, under the requirements of the Electricity Rules and the practice adopted in Madras State, earth guards will have to be used with this section or alternatively the equivalent steel reinforced section 6/1/0.083 will have to be used.

The high tension supplies to distribution centres from the E.H.T. substations are now standardized more or less at 11 kV, but in scarcely populated areas (where villages are distributed far between) a 22 kV high tension distribution voltage has been found to be economical and useful. We have standardized on these two voltages.

The conductor sizes for high tension distribution can also with advantage be reduced to the following few specific sizes for all normal purposes, heavier sizes being called for only in extraordinary circumstances :

(i) 6/1/0·083 ACSR equivalent to 0·02 sq. in. copper section for lightly loaded lines ;

(ii) 6/1/0·093 ACSR and 6/1/0·102 ACSR for the heavily loaded areas, or main lines ; these sizes being equivalent to 0·025 and 0·03 sq. in. copper sections. (For details of characteristics see Tables I and II).

Limiting the sizes of conductors to the above-mentioned sizes results in considerable economy and advantage.

(*a*) The sizes of conductors to be stocked being limited, conductor fittings too would be of certain standard sizes and for these few sizes suggested, the fittings required are all common.

(*b*) The distribution supports can be standardized at 28 ft. long poles for low tension and 30 ft. for high tension with maximum spans of 200 ft. for low tension and 350 ft. for high tension lines. The pole sizes can also be limited to 45-50 lb. per yard relayable quality used rails of the flat-bottomed type, 5 × 3 in. × 11 lb. R. S. joists or spun or vibrated concrete poles of section 10 × 6 in. at bottom and 6 × 6 in. at top. These sizes of poles give the required factor of safety for the loading involved and are quite adequate for the work. (For designs of construction see Figs. 1, 2 and 3.)

From experience gathered in the actual installation and maintenance of these networks, we would like to

* Mr. S. Sankaran and Mr. P. N. Raman are with the South Madras Electricity Supply Corporation, Ltd., Tiruchirapalli.

This paper was presented at the All India Power Engineers' Conference held at Bangalore last January, and is reproduced here with acknowledgments to the authors and to POWER ENGINEER, in which journal, the article first appeared.

Aluminium has "reel" advantages

The use of metal cable reels is on the increase, as is the use of aluminium, the metal. Two recent orders completed by Argon Electric Welding Company Limited, Lachine, indicate the trend.

While it is still too early to draw up a complete comparison between metal and wooden reels, and between steel and aluminium, certain advantages and economies in favour of aluminium are apparent. The life of an aluminium reel should be almost indefinite, enabling it to be used again and again. Lighter weight means lower shipping and handling charges. The aluminium reel requires no painting.

The Lachine firm, a custom job shop specializing in heavy aluminium fabrication, has already made three hundred 84-inch-diameter aluminium reels. Each reel carries a 7,000-foot length of Alcan produced 1·38-inch diameter ACSR cable for the Hydro-Quebec Bersimis Project. Tension stringing will be employed in Canada for the first time on this job and metal reels were necessary. The complete reel dimension is 84 inches by 35 inches by 48 inches traverse, made from Alcan B548 alloy sheet with an Alcan 658T6 alloy I-Beam tire. The empty reel weight is approximately 300 pounds.

At the same time 33 larger reels, measuring 104 inches by 56 inches by 40 inches traverse, were made for Northern Electric Company Limited. These have a weight of 835 pounds and are of all-welded Alcan B5480 alloy sheet ½-inch thick for the flanges, Alcan B548H21 alloy 3 16-inch for the drum and a Tee tire of Alcan 65ST6 alloy extruded section. The comparable weight of a wooden reel would be 2,370 pounds. The much lighter aluminium reel enables Northern Electric to ship larger quantities of heavy power or telephone cable on each one. Metal reels also permit better construction, allowing greater flexibility of use.

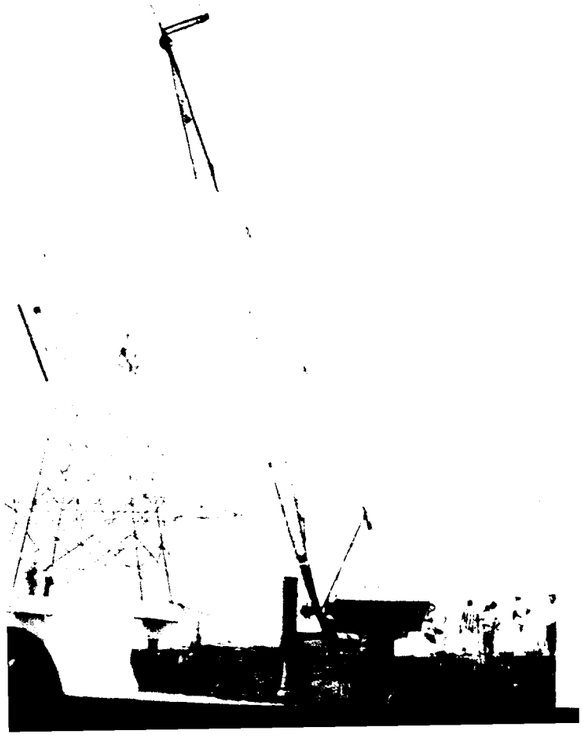
The more than adequate strength of the aluminium reel was revealed in tests on a prototype of the smaller size. Due to design changes the production run reel is even stronger.

American Utility's 230 kV line—some job this!

The shortest distance between two points need not necessarily be the easiest route to follow, especially if you are building a transmission line. For instance, an American Electrical utility Louisiana Power and Light worked to move large blocks of power from Snake Farm substation to Bogalusa substation, and although by looking at the map at bottom of this page you might think there was nothing to it, the matter was really not so simple. Running the transmission line around the edge of Lake Pontchartrain could not just be done for the reason the ground here is a combination of marshes and bayous in which it would be impossible to do an efficient construction job.

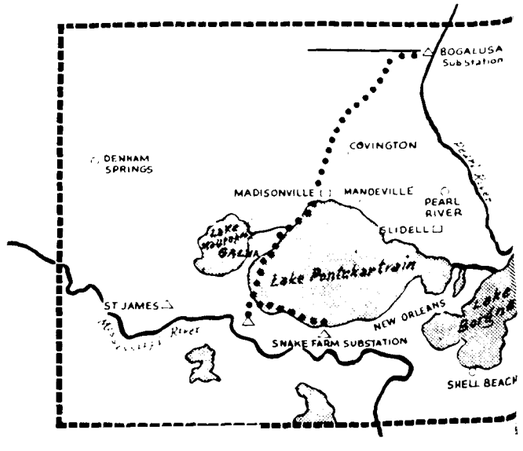
That left the lake as the only practical route for the transmission line. Although Lake Pontchartrain is shallow, its bed is muck which is a poor foundation. So, concrete piles of 54 inches overall diameter varying in length from 48 to 96 feet and with walls five-and-a-half inches thick were used.

Most of the line which will originally operate at 115 kV but is built for 230 kV, is single circuit. From Snake Farm substation to Lake Pontchartrain, it is partly triple circuit. The double and triple circuit portions constitute only 4.7 of the line's 75 miles.



As the bed of Lake Pontchartrain offered poor foundation, concrete piles of 54 inches dia. varying in length from 48 ft. to 98 ft. were used.

The dotted line shows the route of power from Snake Farm to Bogalusa.



Towers for the lake crossing and for the high land beyond the lake between Madisonville and Bogalusa were conventional design, with horizontal configuration. The triple and double circuit towers, however, were specially designed. The centre circuit on the triple circuit towers is suspended on two strings with fifteen 5¾ in. by 10 in., 15,000-round insulators in each string. They are mounted at an angle to restrain the movement of the centre circuit and are fastened to a yoke which supports the conductor.

The special towers which carry the double and triple circuit lines rise 116 feet above their foundations.

The standard type of conductors used in the lake and on the high land measure 75 feet above the foundation which in the lake is 15½ feet out of the water. The conductor clears the lake by a minimum of 40 feet. Spans between the 150 structures on the lake vary from 850 to 950 feet in length. On the high land the distance increases to 1,100 feet.

Conductors with special strandings designed specifically for the load and service conditions encountered have been used. The first fifteen miles from Snake Farm substation the conductor is 1,468 MCM, 48 7, 1,457 inches dia., ACSR, which electrically is the second largest transmission conductor in use in the United States, being exceeded only by the Bonneville 345-kV Line. The balance of the conductor is 1,027.4 MCM, 48 7, 1,220 in dia.

For this application, L P & L did not require extra strength but did want as much collectively as possible. Hence the 48 7 stranding.

The deadends on the triple circuit towers have two-inch IPS (iron pipe size) aluminium tubes through which the jumpers run. Aluminium tube was used for added rigidity in maintaining tower clearance. This was especially important on the middle circuit which runs through the centre of the towers.

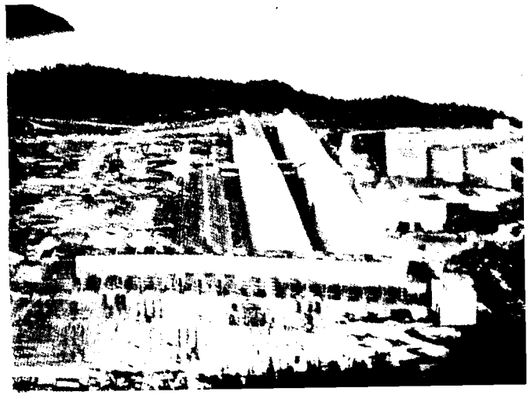
Since this is hurricane and lightning country, both were considered in designing the line. In the section in the lake where winds are usually stronger, the conductors are designed for 25 pounds per square foot of wind pressure at 60 degrees. Out of the hurricane area, the loading drops to 15 pounds. At suspension points the line has tapered armour rods, but no vibration dampers.

First Pour at Baie Comeau

News came to us recently that less than 20 months after work had commenced on clearing the site, the first metal was poured in December 1957 at the new Aluminium Smelter of the Canadian British Aluminium Company at Baie Comeau in the Province of Quebec on the north shore of the St. Lawrence River, 400 miles north of Montreal. One of Britain's most important investments in Canada in recent years, the Company is a subsidiary of the British Aluminium Company Limited, and has been formed in partnership with one of Canada's largest pulp and paper companies, the Quebec North Shore Paper Company. The event marked the completion of the first of four production stages of the £ 50-million plant which will eventually have an annual capacity of 160,000 long tons of virgin aluminium ingot. As an indication of the size of the smelter, this ultimate capacity represents two-thirds of the present annual consumption of virgin aluminium ingot in the United Kingdom.

Copper's costly capers

The red metal's forty per cent price dip to 27 cents a pound has failed to win back former users who have switched to aluminium, but it has helped to keep current customers in the fold. That is the conclusion reached by the WALL STREET JOURNAL survey. Iowa-Illinois Gas & Electric Co. said: "We'd never switch hundred per cent to copper lines, no matter how cheap it gets". Western Electric said that its standby method of making aluminium telephone cables "is a long range programme to keep the Bell System from being entirely dependent on copper". General Electric has "no intention of returning to copper in products (small motors, lamp bulb bases) where aluminium now is used instead". A major producer of metal screen cloth believes that the price drop "probably won't affect the trend towards aluminium in any serious way". Commonwealth Edison is now replacing 4000-volt copper distribution lines with 12,000 volt aluminium wire for "reasons of technical improvement, not thrift". However, many programmes aimed at further substitution have been stopped by copper's price drop. Westinghouse is now delaying some substitutions, preferring the red metal in generators, transformers and motors. Mc Cord's experimenter with aluminium car radiators, is "keeping our hand in aluminium field, but not pushing it". Chrysler has been considering aluminium radiators, but now this substitution is "not imperative". Even so, the JOURNAL points out, the trend to aluminium among automakers is dismaying to copper men. Conclusion: Substitute uses of aluminium for copper in the past one-and-a-half years have generally become permanent and, if copper prices head skyward again, additional substitution will take place—assuming aluminium keeps a price advantage. *Modern Metals.*



First two of the eight smelter bays at Baie Comeau. Each is one-third of a mile long. The building running across the fore—is the rectifier room.

TABLE I — ALL-ALUMINIUM CABLE

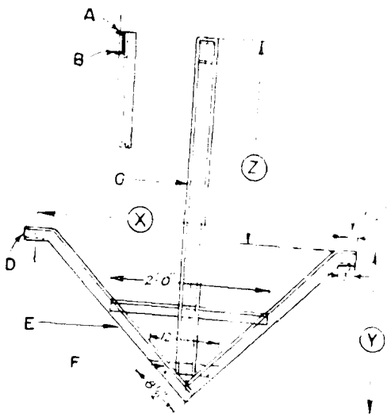
Table of Recommended Sizes

Code Word	Aluminium Area		Copper Equivalent	Nearest Copper Equivalent Standard Wire Gauge (SWG)	Stranding No. and Diameter of Strands in Inches		Diameter of Cable (in.)	Ultimate Strength (lbs.)	Ohms per Mile at 25° C	Weight per Mile (lbs.)
	B. & S. gauge or circular mils	Sq. in.	B. & S. gauge or circular mils		No.	Dia.				
Rose	4	0·0328	6	8	7	0·0772	0·232	938	2·22	205
Iris	2	0·0521	4	6	7	0·0974	0·293	1370	1·76	326
Pansy	1	0·0657	3	4	7	0·1093	0·328	1678	1·41	411

TABLE II — ALUMINIUM CABLE STEEL REINFORCED

Table of Recommended Sizes

Code Word	Standard Nominal Copper Area (sq. in.)	Stranding and Wire Diameter in Inches of Equivalent ACSR				Gross Area of Aluminium (sq. in.)	Diameter (in.)		Approx. Ultimate Strength (lbs.)	Ohms per Mile at 25° C	Weight per Mile (lbs.)
		Aluminium		Steel			Complete cable	Steel core			
		No.	Dia.	No.	Dia.						
Squirrel	0·020	6	0·083	1	0·083	0·0325	0·249	0·083	1320	1·35	300
Gopher	0·025	6	0·093	1	0·093	0·0408	0·279	0·093	2160	1·08	377
Weasel	0·030	6	0·102	1	0·102	0·0490	0·306	0·102	2548	1·145	454



[A, ⅞ in. hole for insulator; B, 4 × 2 in. channel piece welded; C, 3 × 1½ in. channel upright; D, 2 × 2 × ¼ in. angle piece welded; E, 2 × 2 × ¼ in. angle; F, Gusset plate ¼ in. MS]

For	11 kV	22 kV
X	3 ft. 6 in.	4 ft.
Y	2 ft. 1 in.	2 ft. 2 in.
Z	2 ft.	2 ft. 6 in.

Fig. 4 — "V" cross-arm with channel upright in special location

For	11 kV	22 kV
X	3 ft. 6 in.	4 ft.
Y	2 ft. 1 in.	2 ft. 2 in.

Fig. 5 — "V" cross-arm without upright in ordinary location

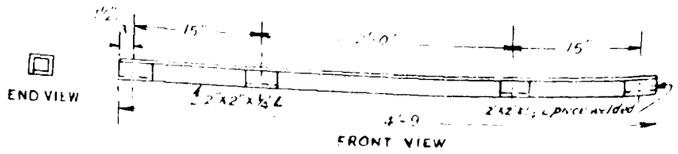


Fig. 6 — Four-wire L.T. bracket.

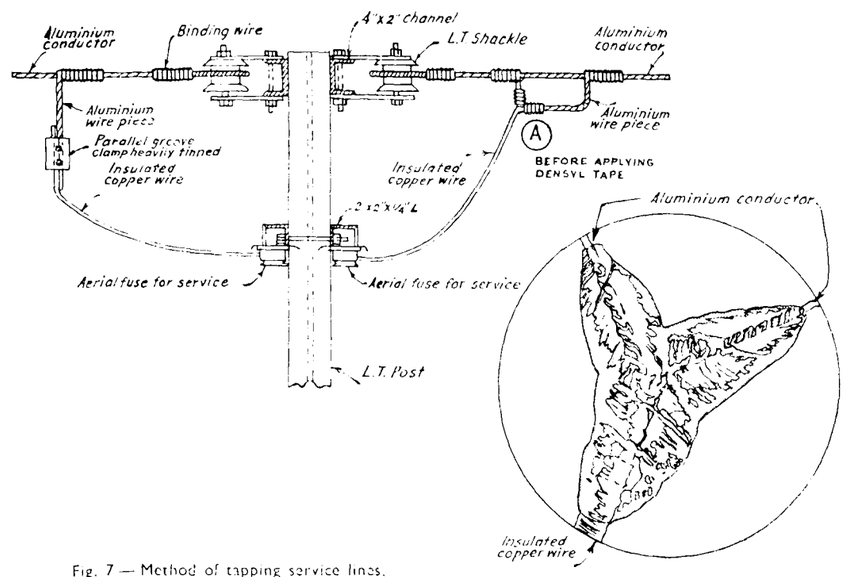


Fig. 7 — Method of tapping service lines.

make the following observations:

Poles. We find used, relayable rails as the most convenient form of support, from the point of view of storing, handling and erection. Due to the inherently heavy section and composition of the material, there is very little rusting, and painting is done to give the posts a good appearance rather than protection.

Joists though lighter are subject to severe corrosion at ground level and require careful maintenance in the form of painting and protecting the concrete mufflings at the base. They do not also stand up well to the extraordinary conditions created by cyclones and gales, which unfortunately occur frequently in many parts of the country.

Reinforced concrete poles have been tried by us only to a limited extent, but they are satisfactory in service. The two difficulties with these are weight and lack of adequate sources of supply. By their very nature, the manufacture of poles has to be controlled under strict supervision. If these facilities are created, they would form good substitutes for rail poles, which are tending to become scarce.

Wood poles have not proved satisfactory in areas subject to severe changes in atmospheric conditions and the use of these poles has often meant serious maintenance problems.

Brackets and erection of conductors: Horizontal configuration of conductors for low tension lines and the triangular disposition for high tension lines seem to be satisfactory from angles of both maintenance and economy.

The brackets for aluminium conductors have to be wider on account of the greater spacing of conductors (necessitated by the larger differences in sag conditions as compared with copper). Angle iron brackets (2 × 2 × ¼ in.) are sufficient and the high tension brackets of the V-type can also be fabricated out of the same material. (Bracket designs are shown in Figs. 4, 5 and 6.)

Joints and dead endings: The *bête noire* of the user of aluminium conductors has been the technique of jointing. Doubts have been expressed about the care that will be exercised by workmen on these jobs, as careless jointing would lead to high resistance points with attendant troubles.

We have had very few difficulties on account of bad jointing, and we have standardized now on the following types of joints:

(i) Two sleeves of oval aluminium tubing for making through joints on aluminium and ACSR conductors:

(ii) P. G. clamps of the single-bolt type for jumper joints:

(iii) Ordinary bindings for L.T. dead ends, the conductors being served with flat armour tape covering over the shackle groove:

(iv) Aluminium alloy dead end clamps for H.T. lines:

(v) Heavily tinned P.G. clamps for copper-aluminium junctions (avoiding bi-metallic clamps):

(vi) Use of special adhesive anti-moisture sealing tape to cover joints of copper-aluminium and using plain aluminium fittings—the sealing off of moisture prevents electrolytic corrosion. (See Figs. 7, 8, 9 and 10.)

In conclusion, we would recommend the restriction of conductors and accessories to the few limited sizes we have noted in this article, as we have found them adequate for rural distribution practice. The sizes of poles and brackets for use with these conductors could also be standardized on the lines indicated.

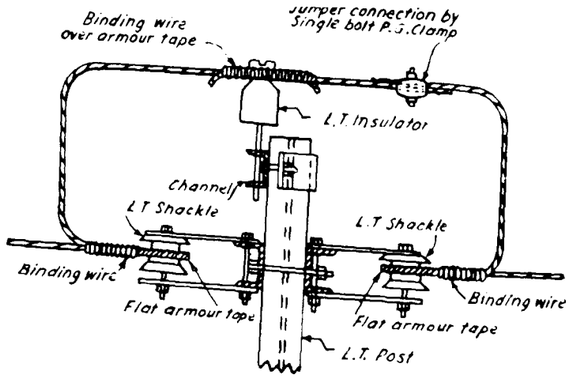


Fig. 8 — L.T. shackle points with jumper connections.

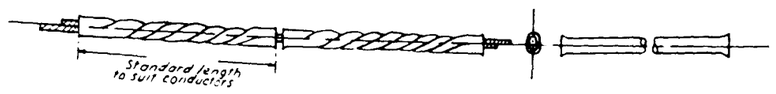


Fig. 9 — Sleeves (twisting) joint for aluminium conductors.

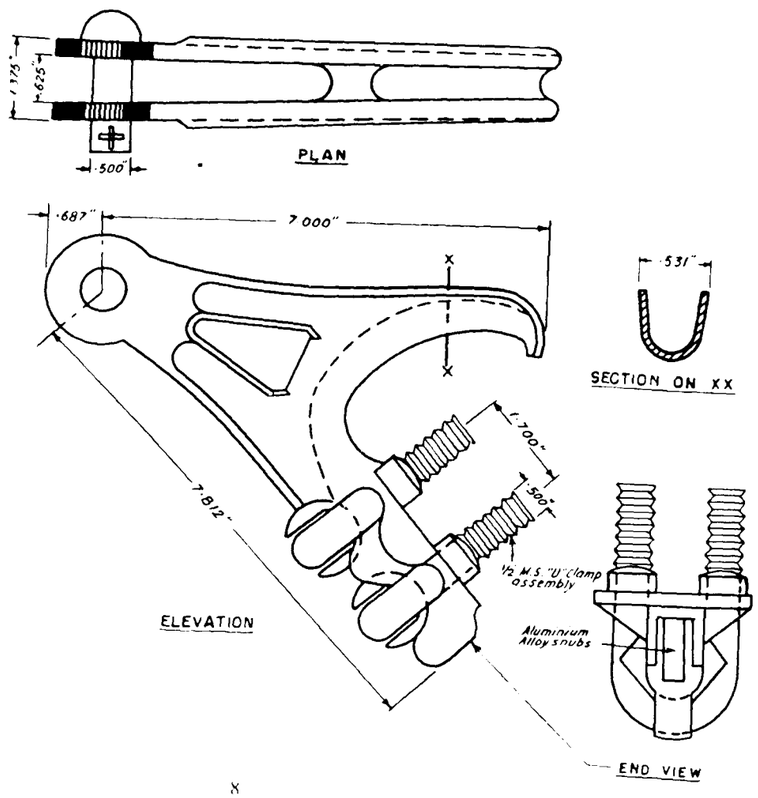


Fig. 10 — Aluminium alloy strain clamp.

The following loading calculations for H.T. and L.T. line supports will be of interest to transmission engineers :

Calculations for H.T. Line Supports

(1) *With 5 × 3 in. R.S. joists 30 ft. long*

Maximum span — 350 ft.
Wind pressure — 10 lb. sq. ft.
H.T. power conductors : three ACSR "Weasel" equivalent to 0·03 sq. in. copper
Wind load on H.T. conductors

$$350 \times \frac{0{\cdot}306}{12} \times 10 \times \frac{2}{3} \quad 59{\cdot}5 \text{ lb.}$$

Bending moment due to wind load on:
Top H.T. conductor
59·5 × 26 — 1547·0 ft. lb.
Bottom H.T. conductors
59·5 × 2 × 23·5 — 2796·5 ft. lb.
Pole

$$\frac{3}{12} \times 10 \times 25 \times \frac{25}{2} \quad 781{\cdot}3 \text{ ft. lb.}$$

Total bending moment — 5124·8 ft. lb.
Say 5125 ft. lb.
Section modulus — 5·47
Maximum stress

$$\frac{5125}{5{\cdot}47} \times \frac{12}{2240} \quad 5{\cdot}02 \text{ tons sq. in.}$$

Taking the ultimate stress at 28 tons sq. in. factor of safety = 28 5·02 = 5·58 — Say 5·6

Calculations for strength along longitudinal direction

Ultimate stress — 28 tons sq. in.
Factor of safety required — 2·5
Maximum working stress

$$\frac{28}{2{\cdot}5} \quad 11{\cdot}2 \text{ tons sq. in.}$$

The modulus of section of pole along longitudinal direction — 0·97 in units.
Hence the maximum bending moment that can be applied in the direction of the line

$$11{\cdot}2 \times 2240 \times 0{\cdot}97 \div 12 \quad 2028 \text{ ft. lb.}$$

Total bending moment required to be taken by the pole due to the loading along transverse direction — 5125 ft. lb.
One-fourth of the above is — 1281 ft. lb.
Hence the strength along longitudinal direction is more than one-fourth of the strength required along transverse direction.

(2) *With 45 lb. F.F. rails 30 ft. long*

Maximum span — 350 ft.
Wind pressure — 10 lb. sq.ft.
H.T. power conductors : three ACSR "Weasel" equivalent to 0·03 sq. in. copper (dia. 0·306 in.)
Wind load on H.T. conductors

$$350 \times \frac{0{\cdot}306}{12} \times 10 \times \frac{2}{3} \quad 59{\cdot}5 \text{ lb.}$$

Bending moment due to wind load on :
Top H.T. conductor
59·5 × 26 — 1547·0 ft. lb.
Bottom H.T. conductors
59·5 × 2 × 23·5 — 2796·5 ft. lb.
Pole

$$\frac{4}{12} \times 10 \times 25 \times \frac{25}{2} \quad 1041{\cdot}7 \text{ ft. lb.}$$

Total bending moment — 5385·2 ft. lb.
Say 5385 ft. lb.
Section modulus — 5·4
Maximum stress

$$\frac{5385}{5{\cdot}4} \times \frac{12}{2240} \quad 5{\cdot}34 \text{ tons sq. in.}$$

Taking the ultimate stress as 28 tons sq. in. factor of safety — 28 5·34 = 5·24
We get a factor of safety 5·24 as against 2·5 required.

Calculations for strength along longitudinal direction

Ultimate stress — 28 tons sq. in.
Factor of safety required — 2·5
Maximum working stress

$$\frac{28}{2{\cdot}5} \quad 11{\cdot}2 \text{ tons sq. in.}$$

The modulus of section of pole along longitudinal direction — 0·94
Hence the maximum bending moment that can be applied in the direction of the line with the required factor of safety

$$11{\cdot}2 \times 2240 \times 0{\cdot}94 \div 12 \quad 1965 \text{ ft. lb.}$$

Total bending moment required to be taken by the pole due to the loading along transverse direction — 5385 ft. lb.
One-fourth of the above is — 1346 ft. lb.
Hence the strength along longitudinal direction is more than one-fourth of the strength required along transverse direction.

(3) *With 50 lb. F.F. rail 30 ft. long*

Maximum span — 350 ft.
Wind pressure — 10 lb. sq. ft.
H.T. power conductors : three ACSR "Weasel" equivalent to 0·03 sq. in. copper
Wind load on H.T. conductors

$$350 \times \frac{0{\cdot}306}{12} \times 10 \times \frac{2}{3} \quad 59{\cdot}5 \text{ lb.}$$

Bending moment due to wind load on:
Top H.T. conductor
59·5 × 26 — 1547·0 ft. lb.
Bottom H.T. conductor
59·5 × 2 × 23·5 — 2796·5 ft. lb.
Pole

$$\frac{4}{12} \times 10 \times 25 \times \frac{25}{2} \quad 1041{\cdot}7 \text{ ft. lb.}$$

Total bending moment — 5385·2 ft. lb.
Section modulus — 6·7
Maximum stress

$$\frac{5385}{6{\cdot}7} \times \frac{12}{2240} \quad 4{\cdot}3 \text{ tons sq. in.}$$

Taking the ultimate stress at 28 tons sq. in. factor of safety — 28 4·3 = 6·5
We get a factor of safety of 6·5 as against 2·5 required.

Calculations for strength along longitudinal direction

Ultimate stress — 28 tons sq. in.
Factor of safety required — 2·5
Maximum working stress

$$\frac{28}{2{\cdot}5} \quad 11{\cdot}2 \text{ tons sq. in.}$$

The modulus of section of pole along longitudinal direction — 1·33 in. unit.
Hence the maximum bending moment that can be applied in the direction of the line

$$11{\cdot}2 \times 2240 \times 1{\cdot}33 \div 12 \quad 2781 \text{ ft. lb.}$$

Total bending moment required to be taken by the pole due to the loading along transverse direction — 5385 ft. lb.
One-fourth of the above is — 1346 ft. lb.
Hence the strength along longitudinal direction is more than one-fourth of the strength required along transverse direction.

(4) *With RCC poles 30 ft. long*

Maximum span — 350 ft.
Wind pressure — 10 lb. sq. ft.
H.T. power conductors : three ACSR "Weasel" equivalent to 0·03 sq. in. copper
Wind load on H.T. conductors

$$350 \times \frac{0{\cdot}306}{12} \quad 59{\cdot}5 \text{ lb.}$$

Bending moment due to wind load on :
Top H.T. conductor
59·5 × 2·6 — 1547·0 ft. lb.
Bottom H.T. conductor
59·5 × 2 × 23·5 — 2796·5 ft. lb.
Pole

$$\frac{6}{12} \times 25 \times 10 \times \frac{25}{2} \quad 1562{\cdot}5 \text{ ft. lb.}$$

Total bending moment — 5906·0 ft. lb.
This is equivalent to a load of $\frac{5906}{24}$ — 246 lb. applied at 1 ft. from the top

The funeral procession of N. Gopalakrishna Pillai, Operator. (inset), who died as the result of an accident.

Death . . .

For the first time in its history, the Company has to record with deep regret a case of fatal accident, (Jan. 27) the employee concerned being N. Gopalakrishna Pillai, (26) Operator, Wire Mill. Baffling all statistical data regarding rate, nature, etc., absolutely unforeseen, defying all known calculations, it was an accident in every sense of the term. The machine and fittings – everything – was all right, but still the accident happened.

One of the wire guides fitted on to the wire strander sheered off the fastenings and hit the worker who was taking a spool along the passage near the machine.

It was such a pity, such a tragedy, that the icy hand of death should suddenly snatch away so promising a young man as Gopalakrishna, and our heart goes out in sympathy to his mother, wife, his two little kids and brothers.

A sum of Rs. 3,500 was paid by the Company to the family. Voluntary subscriptions by fellow-Alinders yielded another Rs. 4,000.

Gopalakrishna's younger brother has since been absorbed into employment.

Bereavement . . .

We extend deep sympathy to S. Ibrahim Kutty, Cashier, on the demise of his revered father Pareethukunju Vaidyan, 80, known as Kuripuzha Vaidyan. He was a well-known Ayurvedic doctor, and a great friend of the poor.

The late Mr. Pareethukunju Vaidyan, father of S. Ibrahim Kutty, Cashier.

P. BHASKARAN NAYAR — *Personal Assistant (Sales)*

'SILENCE IS THE ELEMENT IN WHICH great things fashion themselves', says Carlyle somewhere. Ah, that explains it! Some of the things we have done here at ALIND are verily the foster children of silence and stern duty – if P. BHASKARAN NAYAR, Personal Assistant to the General Manager (Sales), is a representative example. By comparison with him, a trappist monk who first becomes a free mason and then loses his voice is a garrulous chatterbox! But, then, he is one of those persons who frequently delight by their flashes of silence.

One of our first few recruits, Bhaskaran Nayar joined the Company back in 1948. His miscellania of qualifications include passes in Surveying and Levelling Examinations, Sanitary Inspector's Examination, Vaccination Test and Examinations in Hindi, but despite all this formidable equipment, he still found himself in the woods!

In any case, he was working for the Travancore Forest Department before he started working for us.

Joining as a Tracer, he reached his present height not by sudden flight, but by dint of sheer merit the successive metamorphoses he has undergone in our organisation being Draughtsman, Technical Assistant, Personal Assistant and Personal Assistant, Sales. From initial production planning to the preparation of the final bill, it is now his job to see an order through, and, by Golly, he sees it through, in a precise, painstaking, methodical manner. A martinet for discipline, he expects no more but no less from his men than that they work only as well and hard as he does, but outside working hours, he is a jolly good fellow, his grim mask goes, and he relaxes as well as the rest of 'em!

An agriculturist on the side, Bhaskaran Nayar's great interest lies in his land. Well, as Swift said long ago, 'whoever could make two ears of corn or two blades of grass grow on a spot of ground where only one grew before does deserve better of mankind', in any country: in India he does, indeed, yeoman service. For keeping himself physically fit, Bhaskaran Nayar performs *Surya namaskars*. His mental alertness, he owes to the reading of classics and historical romances.

Yes, Bhaskaran Nayar is somebody, because he serves a greatness not his own for neither praise nor pelf. He is content to know, and be unknown himself, but ALIND CHRONICLE can't obviously stand for the latter part!

Ultimate transverse breaking load applied at 1 ft. from top as per test conducted 1000 lb.

Factor of safety $\frac{1000}{246.4} = 4{\cdot}1$

We get a factor of safety of 4·1 as against 3·5 required.

Calculations for strength along longitudinal direction

Ultimate breaking load in the longitudinal direction applied at 1 ft. from top as per test conducted 403 lb.

One-fourth of the equivalent load is 246·4 = 61·5 lb.

With a factor of safety of 3·5 the strength required on the pole along longitudinal direction, i.e. 3·5 × 61·5 = 215·25 lb., is less than the breaking load in that direction.

Calculations for Standard L.T. Line Supports

(1) *With 5 – 3 in. R.S. joists 28 ft. long*

Maximum span 200 ft.

Wind pressure 10 lb. sq. ft.

Conductors :

Three all-aluminium 7/0·1093 equivalent to No. 4 copper (dia. 0·328 in.)

Two all-aluminium 7/0·0772 equivalent to No. 8 copper (dia. 0·232 in.)

Wind load on L.T. conductor all-aluminium :

Equivalent to No. 4 copper

$$200 \times \frac{0{\cdot}328}{12} \times 10 \times \frac{2}{3} = 36{\cdot}44 \text{ lb.}$$

Equivalent to No. 8 copper

$$200 \times \frac{0{\cdot}232}{12} \times 10 \times \frac{2}{3} = 25{\cdot}8 \text{ lb.}$$

Bending moment due to wind load on :

Top L.T. conductor all-aluminium equivalent to No. 4 copper

36·44 × 24 = 874·56 ft. lb.

Bottom L.T. conductor all-aluminium equivalent to No. 4 copper

36·44 × 2 × 23 = 1676·24 ft. lb.

L.T. conductor all-aluminium equivalent to No. 8 copper

25·8 × 2 × 23 = 1186·8 ft. lb.

Pole

$$3 \times \frac{23}{12} \times 10 \times \frac{23}{2} = 661{\cdot}25 \text{ ft. lb.}$$

Total bending moment = 4398·85 ft. lb.

Say 4400 ft. lb.

Section modulus = 5·47

Maximum stress

$$\frac{4400}{5{\cdot}47} \times \frac{12}{2240} = 4{\cdot}3 \text{ tons sq. in.}$$

Taking the ultimate stress as 28 tons sq. in. factor of safety $\frac{28}{4{\cdot}3} = 6{\cdot}5$

We get a factor of safety of 6·5 as against 2·5 required.

(2) *With 45 lb. F.F. rails 28 ft. long*

Maximum span 200 ft.

Wind pressure 10 lb. sq. ft.

Conductors :

Three all-aluminium 7/0·1093 equivalent to No. 4 copper (dia. 0·328 in.)

Two all-aluminium 7/0·0772 equivalent to No. 8 copper (dia. 0·232 in.)

Wind load on L.T. conductor all-aluminium :

Equivalent to No. 4 copper

$$200 \times \frac{0{\cdot}328}{12} \times 10 \times \frac{2}{3} = 36{\cdot}44 \text{ lb.}$$

Equivalent to No. 8 copper

$$200 \times \frac{0{\cdot}232}{12} \times 10 \times \frac{2}{3} = 25{\cdot}8 \text{ lb.}$$

Bending moment due to wind load on :

Top L.T. conductor all-aluminium equivalent to No. 4 copper

36·44 × 24 = 874·56 ft. lb.

Bottom L.T. conductor all-aluminium equivalent to No. 4 copper

36·44 × 2 × 23 = 1676·24 ft. lb.

L.T. conductor all-aluminium equivalent to No. 8 copper

25·8 × 2 × 23 = 1186·8 ft. lb.

Pole

$$4 \times \frac{10}{12} \times 23 \times \frac{23}{2} = 881{\cdot}7 \text{ ft. lb.}$$

Total bending moment = 4619·3 ft. lb.

Section modulus = 5·4

Maximum stress

$$\frac{4619}{5{\cdot}4} \times \frac{12}{2240} = 4{\cdot}478 \text{ tons sq. in.}$$

Taking the ultimate stress at 28 tons sq. in. factor of safety $\frac{28}{4{\cdot}478} = 6{\cdot}0$

We get a factor of safety of 6·0 as against 2·5 required.

(3) *With 50 lb. F.F. rail 28 ft. long*

Maximum span 200 ft.

Wind pressure 10 lb. sq. ft.

Conductors :

Three all-aluminium 7/0·1093 equivalent to No. 4 copper (dia. 0·328 in.)

Two all-aluminium 7/0·0772 equivalent to No. 8 copper (dia. 0·232 in.)

Wind load on L.T. conductor all-aluminium :

Equivalent to No. 4 copper

$$200 \times \frac{0{\cdot}328}{12} \times 10 \times \frac{2}{3} = 36{\cdot}44 \text{ lb.}$$

Equivalent to No. 8 copper

$$200 \times \frac{0{\cdot}232}{12} \times 10 \times \frac{2}{3} = 25{\cdot}8 \text{ lb.}$$

Bending moment due to wind load on :

Top L.T. conductor all-aluminium equivalent to No. 4 copper

36·44 × 24 = 874·56 ft. lb.

Bottom L.T. conductor all-aluminium equivalent to No. 4 copper

36·44 × 2 × 23 = 1676·24 ft. lb.

L.T. conductor all-aluminium equivalent to No. 8 copper

25·8 × 2 × 23 = 1186·8 ft. lb.

Pole

$$4 \times \frac{10}{12} \times 23 \times \frac{23}{2} = 881{\cdot}7 \text{ ft. lb.}$$

Total bending moment = 4619·3 ft. lb.

Section modulus = 6·7

Maximum stress

$$\frac{4619}{6{\cdot}7} \times \frac{12}{2240} = 3{\cdot}693 \text{ tons sq. in.}$$

Taking the ultimate stress at 28 tons sq. in., factor of safety $\frac{28}{3{\cdot}693} = 7{\cdot}582$ or say 7·6

We get a factor of safety of 7·6 as against 2·5 required.

(4) *With RCC pole 28 ft. long*

Cross-section at bottom 10 × 6 in.

Cross-section at top 6 × 6 in.

Conductors :

Three all-aluminium 7/0·1093 equivalent to No. 4 copper (dia. 0·328 in.)

Two all-aluminium 7/0·0772 equivalent to No. 8 copper (dia. 0·232 in.)

Span 200 ft.

Wind load on :

All-aluminium equivalent to No. 4 copper

$$\frac{0{\cdot}328}{12} \times 10 \times \frac{2}{3} \times 200 = 36{\cdot}44 \text{ lb.}$$

All-aluminium equivalent to No. 8 copper

$$\frac{0{\cdot}232}{12} \times 10 \times \frac{2}{3} \times 200 = 25{\cdot}8 \text{ lb.}$$

Bending moment due to wind load on :

Top L.T. power conductor

36·44 × 24 = 874·56 ft. lb.

Bottom L.T. power conductor

36·44 × 23 × 2 = 1676·24 ft. lb.

Bottom street light and neutral wires

25·8 × 23 × 2 = 1186·8 ft. lb.

Poles

$$6 \times \frac{23}{12} \times 10 \times \frac{23}{2} = 1322{\cdot}5 \text{ ft. lb.}$$

Total bending moment = 5050·1 ft. lb.

This is equivalent to a load of $\frac{5060}{22} = 230$ lb. applied at 1 ft. from top

Ultimate breaking load applied at 1 ft. from top as per test conducted 1000 lb.

Factor of safety $\frac{1000}{230} = 4{\cdot}35$

We get a factor of safety of 4·35 as against 3·5 required.

Our Family

We said welcome to . . .

P. Sundaram Pillai (Genl. Office).

Unpaid apprentices **N. Ayyappan Pillai, A. M. Mathew and R. Ravikumaran Nair.**

We said farewell to . . .

J. F. Morris (Construction Foreman),
N. Stensilavose (Reel Shop), and
N. Sreedharan Nair (C.C. Plant).

They were married . . .

B. V. B. Menon, Chargeman, Lab., with Miss Kochammini.

M. Shahul Hameed, Civil Works, with Miss Subaida Beevi.

M. M. Hanfeefa, Wire Mill, with Miss Jameela Beevi.

P. Madhavan, Foreman, C.C. Plant, with Miss Chandramati.

K. Shams, Sales, with Miss Nafeesath Beegam.

M. N. Vasudevan Nair, Foreman, Wire Mill, with Miss Radhamoni.

G. D. Rozario, Wire Mill, with Miss Hazel.

K. G. Yatheendran, Chargeman, Rod Mill, with Miss Leela.

S. Gopalakrishnan Nair, Wire Mill, with Miss Bharathy Kunjamma.

M. Shanmuga Das, Supervisor, Mechanical, with Dr. (Miss) Savithri.

M. I. Thomas, Tool Room, with Miss Ammini-kutty.

K. V. Lawrence, Machine Shop, with Miss Telma.

George Joseph Fernandez Sandow, Wire Mill, with Miss Mary Carmel.

T. K. Ramakrishna Pillai, Wire Mill, with Miss Padmavathy Amma.

K. Thomas Muthalaly, Chargeman, Rod Mill, with Miss Thankamma.

C. K. Koshy, Rod Mill, with Miss Thankamma.

N. Sadanandar, Chargeman, Mech. Maintenance, with Miss Sathyabhama.

N. Ayyappan Pillai, Wire Mill, with Miss Saradamma.

Births . . .

Mrs. Grace Fenn a daughter ; and

To the wife of :

P. Ramachandran Nair a daughter ; **K. Karunakar** a daughter ; **K. Ramachandran Nair** (Sales) a son ; **C. Gopinathan Nair** a son ; **K. R. Balakrishnan Pillai** a daughter ; **T. M. Souri** a son ; **K. Padmanabha Pillai** a son ; **K. Chellappan Pillai** a son ; **G. K. Warrior** a son ; **K. N. Kumaraswami Pillai** a daughter ; **A. T. Cherian Panicker** a son ; **N. Joseph** a son. **V. G. G. Nayar**—a daughter and **K. Rama Rajan**—a son.

G. J. F. Sandow-Carmel.

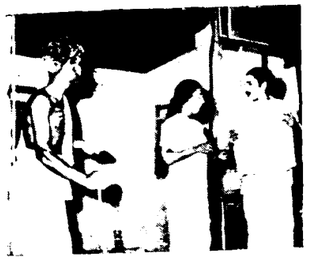
G. D. Rozario-Hazel.

Farewell to Morris: A "group" taken on the occasion.

V. Paramoo was recently posted on project duty at Hirakud. This picture taken on the occasion of the send-off given to him shows him in the centre.

Mrs. Marikar who gave away the prizes.

'Singing Foreman' Sitaraman essays a new role as a Bhagavatar !



A moment from one of the two one-act plays staged on "Club Day".

Kainikkara Govinda Pillai in "Man and Beast".

Now, in its

ARC has automobile magnate

AN ENGINEER BY QUALIFICATION, A BUSINESSMAN BY choice, past Rotarian Governor, a witty and fluent speaker, Mr. Hasan Marikar is a well-known and well-liked personality in local, national and international circles. And we were all really very pleased to have him for our chief guest at the seventh anniversary function of Alind Recreation Club held on Republic Day. We don't know what got him whether it was the feminine prefix of *Radha*monic's name or his dulcet tones on the telephone that did the trick honestly, we don't know, but whatever it was, come Mr. Marikar did, and he was welcome! We thoroughly enjoyed his presence and that of his gracious wife with us even as perhaps they enjoyed their brief Alind interlude.

Touching on the role of clubs in the West, Mr. Marikar said that over there clubs shaped the destinies of men, gave them a sort of gloss and polish, streamlined them, however rough-hewn they might be before joining.

Continuing, he said that to-day there were not only clubs of professional men, clubs for recreation and relaxation, but there were service clubs like Rotary, actuated by loftier motives.

A club like the Alind Recreation Club, Mr. Marikar went on, could do much to round off a person's angularities and could turn its members into veritable social assets. The world would be a much sweeter place to live in, if more people were clubmen, he declared.

Mr. Marikar had this counsel to offer to our members. 'Be light, but strong; be soft, but firm; smile—the whole world smiles with you. Take life seriously, but avoid *looking* serious.'

Highlights of the Secretary's Annual Report were :

(1) The library has now 1,200 books (both English and Malayalam) and before the year ended, the Club hoped to add another 1,000 books. Early in 1957, the library—which is run on modern lines adopted, like the bigger libraries, the card index system.

(2) The reading room is probably the finest in the whole district. Practically all the leading dailies and periodicals in Malayalam and English published in the country are there on the table.

(3) Discussions and lectures by eminent visiting personalities have been regular features.

(4) Three excursion trips were arranged in the year.

(5) The standard attained in football and basketball is very high ; in the latter game, especially, not a club in the jurisdiction of Quilon District Athletic Association is a patch on our Club!

(6) Our volleyball team too has been coming down on opposing teams like a wolf on the lamb !

seventh year!

for guest at annual function

The club's calendar of events contained, also, these entries.

Date	Subject	Speaker
January 1	*Yoga Asanas*. (Demonstration and discourse).	Mr. Kaladi Ananthan Pillai
January 13	Reception to Mr. Thakazhi Sivasankaran Pillai, celebrated writer and novelist, who had received the *Sahitya Akademi* award for his book *Chemmeen*. Mr. M. P. Balakrishnan Nair and Puthussery Ramachandran of Sree Narayana College (both well-known writers) spoke on the occasion.	
January 26	.....	Club Day.
June 25	Symposium on "Cashew Industry".	Mr. G. Sadasivam Nair, Adocate. Mr. P. J. Varghese, Businessman.

Dr. K. C. Chacko, Principal, Sree Narayana Polytechnic, Quilon, and Mr. K. Balakrishnan, Editor, *Kaumudi*, were two other guest speakers at this function. Dr. Chacko announced that his subject, was "Moment of Inertia", and members pricked up their ears in anticipatory delight, to listen to what they hoped would be a talk on "Idle Moments at the Club" or something like that, but the learned doctor went full blast on how matter continues in its existing state of rest or uniform motion in straight line, and so on. That he was still heard with rapt attention shows that frivolous as we might be on the surface, basically, deep down, we were serious scientists!

Mr. Balakrishnan declared that of late the tendency was discernible among some men to look at everything from the standpoint of their politics. "Personal life and politics must be kept distinctly apart. To enjoy the good things of life, to be human, to evaluate works of art, one should rather think as a man than as a political animal", he said.

Mrs. Marikar gave away the prizes.

With a vote of thanks proposed by K. Rama Rajan, the meeting part of the programme terminated.

At 9 p.m., we had a delightful variety show which included a musical discourse, a musical fantasy, mono-acting, tableaux, and two one-act plays.

Mr. Hasan Marikar, motor magnate, who was chief guest on "Club Day".

Dr. K. C. Chacko and (below) *Mr. K. Balakrishnan — two other speakers on "Club Day".*

G. Kesavan Nair.

A. T. George Panicker.

N. Vasudevan.

Alinders

He keeps wagons moving

GO WHERE YOU WILL IN THIS LAND OF OURS FROM KASHMIR to Comorin, you will find Alind lines criss-crossing the skyscape. All because G. KESAVAN NAIR, Chargeman, Shipping, has been giving our reels a few pats or shoves on their backs! Of him, it can truly be said that he keeps the wagons moving! His trouble is that there are not enough wagons to go around.

An E.S.L.C. from Craven High School, Quilon, Kesavan Nair has also passed examinations in Hindi (*Rashtrabasha*) and Sanskrit. (*Savri*)

A fine badminton player, he annexed the first prize for this event in the Factory Day Tournament of 1953. He is a good footballer too.

Kesavan Nair possesses a considerable histrionic talent, but it is in fancy dress, he is at his creative best.

Good as he is at getting a move on, he still thinks that there is no frigate like a book to take him to lands far away!

* * *

A footballer with a different kind of kick!

A. T. GEORGE PANICKER, Chargeman, Progress, joined ALIND back in 1949. He has passed the Malayalam Higher and E.S.L.C. examinations.

Keen on football, he actually gets a bigger kick out of trying his hand at solutions for complicated problems!

A devout churchman, he is still a cosmopolitan, free from petty limitations and prejudices.

Modern short stories and Malayalam films are his other chief interests.

George is quite good at his work.

* * *

Staunch trade unionist

N. VASUDEVAN, Junior Mechanic, has been with us for ten years now. Like several of our senior men, he too came to ALIND from FACT.

A staunch trade unionist, he has always been active in affairs affecting Alinders. He is at present Joint Secretary of the Employees' Union.

Well-read and well-informed, he is liked and admired even by those who hold views diametrically opposite to his.

Kumaran Asan is Vasudevan's favourite author.

Shy and retiring by disposition, he is a man who can still show courage — the courage of his convictions — can even show pugnacity where this is called for. Small wonder, even opponents scarce forbear to cheer him!

Answer to visitors' prayers

If you don't think of P. RAGHAVAN PILLAI, Welfare, as "Guest House" Raghavan Pillai, well, you sort of reckon without your host! For, he has all these several years been in charge of our home away from home!

A super type of Jeeves, he would materialise from nowhere and do his chores ever so unobtrusively, ever so efficiently. Indeed, life at our compact caravanserai has not been the same since he went over to General Office.

Raghavan Pillai came to us from FACT about eight years ago.

His chief off-work interest is kitchen gardening. He is also quite good at indigenous games.

A willing worker, diligent, smart and self-effacing, Raghavan Pillai is a favourite alike with visitors and fellow-Alinders.

* * *

A man with a civic sense

Another ALINDER who has the same off-work interests as Raghavan Pillai is K. NARAYANA PILLAI, General Office. Before coming to us, he was an operator with Peirce Leslie, and before that, he was working at the English High School, Paravur.

Narayana Pillai is a popular personality of the locality, is active in Kundara's civic affairs.

A devout and religious type, Narayana Pillai says his ambition in life is to become a *sanyasi* (on retirement) so that he may forget the weariness, the fever and the fret of life.

* * *

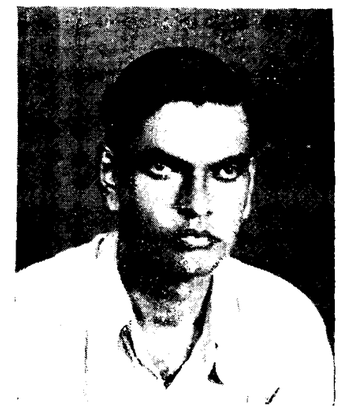
Motor Mechanic

Before joining us in 1948, R. MADHUSOODANAN NAIR, Wire Mill, was working as a mechanic with the Ford Motor Company, Trivandrum. And while there every one from the Mechanical Engineer downwards agreed that he was just wonderful. Indeed, Madhu prizes the testimonial given him by his Ford boss as one of his most cherished possessions.

His hobby? An unusual one — making toy balloons from rubber rejects.

An efficient worker, a really good mechanic, and a budding *entrepreneur*, Madhusoodanan Nair is quite a friend-in-need.

P. Raghavan Pillai.



K. Narayana Pillai.

R. Madhusoodanan Nair.

CLUB DAY TOURNAMENTS

PRIZE-WINNERS

Badminton : (*Singles*))
Winner—
K. B. Pillai.
Runner-up—
C. G. Balakrishna Pillai.

Badminton : (*Doubles*)
Winners—
N. N. Iyer and O. C. Chacko.
Runners-up—
C. G. B. Pillai and E. P. Radhakrishnan.

Table Tennis : (*Singles*)
Winner—
K. B. Pillai.
Runner-up—
K. Sitaraman.

Table Tennis : (*Doubles*)
Winners—
T. G. Paul and K. R. Sankaranarayan.
Runners-up —
P. K. Chandrasekhar and M. Srinivasan.

Ring Tennis : (*Singles*)
Winner —
P. Sukumar.
Runner-up —
Reghunandan.

Ring Tennis : (*Doubles*)
Winners—
Radhamonie and T. V. Ramachandran.
Runners-up—
Sukumar and Reghunandan.

Football :
Rajan Philip's and Tommy's Team bracketed.

Basketball :
Winners —
T. G. Paul.
S. N. Nayar.
C. G. Krishnan Kutty.
C. G. Madhavan Pillai.
P. Sukumar.
P. K. Chandrasekhar.

Volleyball :
Winners —
C. K. Koshy's Team.

Caroms : (*Singles*)
Winner —
K. S. Kalyana Krishnan.
Runner-up —
A. K. T. V. Nair.

Caroms : (*Doubles*)
Winners
Rajan Philip and P. G. D. Panicker.
Runners-up —
M. K. Varughese and K. Sitaraman.

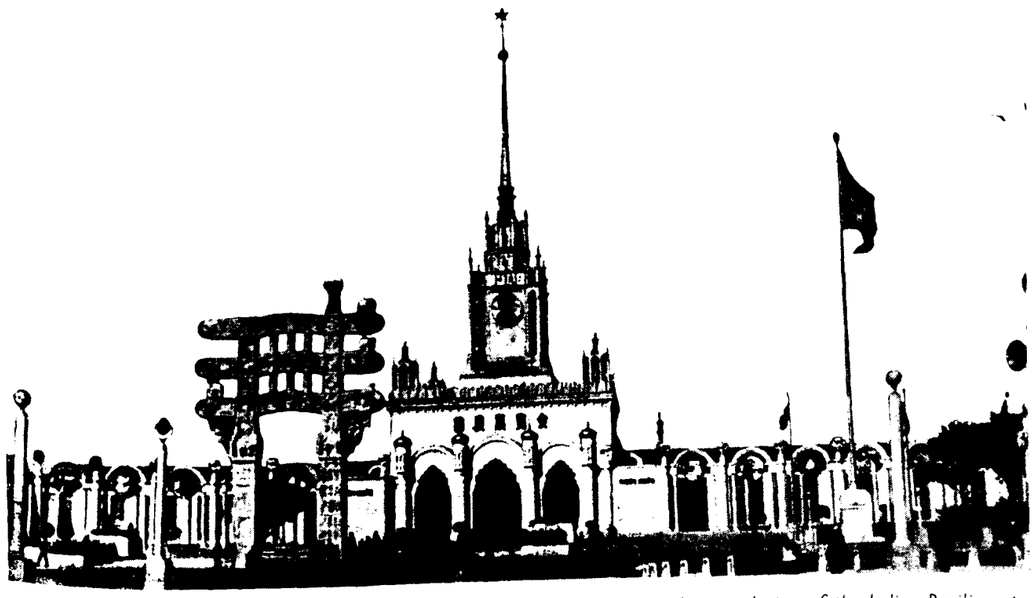
Supervisory Study Group Meetings

In the last issue of the CHRONICLE we gave a *resume* of the activities of SSG up to end of December 1957. Meetings held since are :

Date	Subject	Speaker
February 13	*Statistical quality control*	Dr. A. K. Gupta, Asst. Director, Statistics, ISI.
February 25	*Plant Lubrication*	Mr. Harish Bhargava of Burmah Shell.
April 11	*Symposium on Grievances Procedure*	P. A. Ibrahim, N. K. B Nair, V. O. Mathew.

Two send-off parties were also got up under the auspices of SSG in honour of members who proceeded on project duty to Hirakud. Aundi Pillai, Electrical Foreman, and M. P. Aravindakshan Nair, Mechanical Draughtsman were *feted* in the month of March.

V. Paramoo, General Foreman, Mechanical, who has since been named Assistant Engineer, Hirakud Project, was the guest of honour at a party got up on May 23.



A general view of the Indian Pavilion at the Exhibition held in Peking.

Below : *Reels of aluminium conductors sent by* ALIND *on show.*

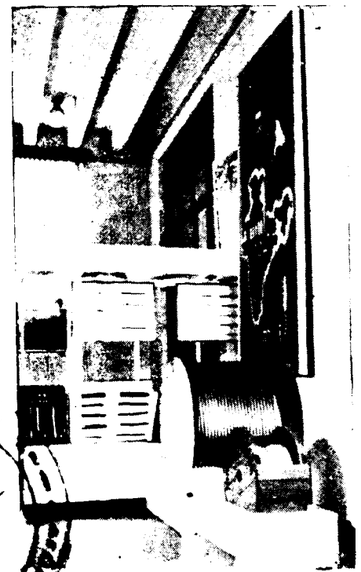
Alind goes to Peking!

ALIND PARTICIPATED IN THE "WHOLLY INDIAN" Exhibition held in Peking, China, in September 1957, the photographs of which have just now been received.

The Exhibition was opened by Mr. Chy Teh, Vice-Chairman of the People's Republic of China in the presence of Dr. S. Radhakrishnan, Vice-President of India and several distinguished personages including Mr. Chou En Lai, Prime Minister and Vice-Premiers Mr. Chen Yun, Mr. H. O. Lung and Mr. Chen Yi. Mr. R. K. Nehru, the Indian Ambassador in China, was warmly congratulated by Chinese leaders on the impressive show put up by India.

In a letter to ALIND, Mr. B. S. Gidwani, Deputy Director of Exhibitions, said : "The great success of this Exhibition, which has been one of the biggest organised by India, consisting as it did of five main partitions and a semi-circular frontage covering an area of one lakh twenty-thousand square feet, is in no small measure due to your kind and active co-operation in furnishing us with impressive exhibits".

'Thank you, Mr. Gidwani. It's nice of you to have troubled to write to us'.



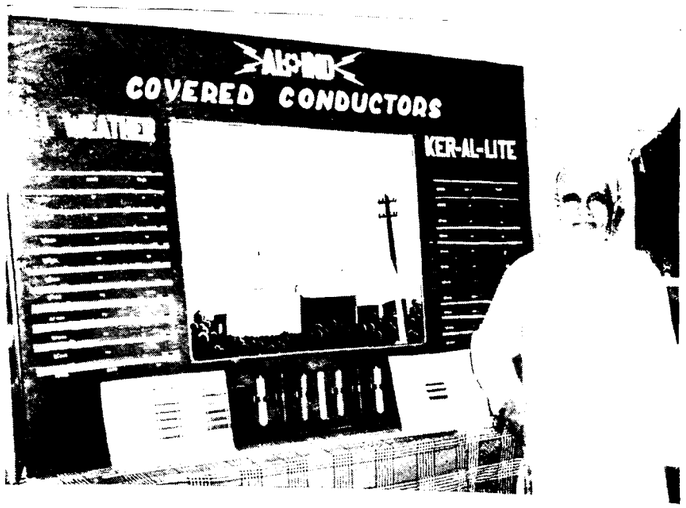
Alind annexes trophy at Trivandrum show

ALIND ANNEXED A 'GOLD MEDAL' CERTIFICATE AND A trophy at an All-India Exhibition held at Trivandrum in April-May. The exhibition was organised as part of the ceremonies held for the official opening of Mahatma Gandhi College by Pandit Jawaharlal Nehru, Prime Minister, on April 24.

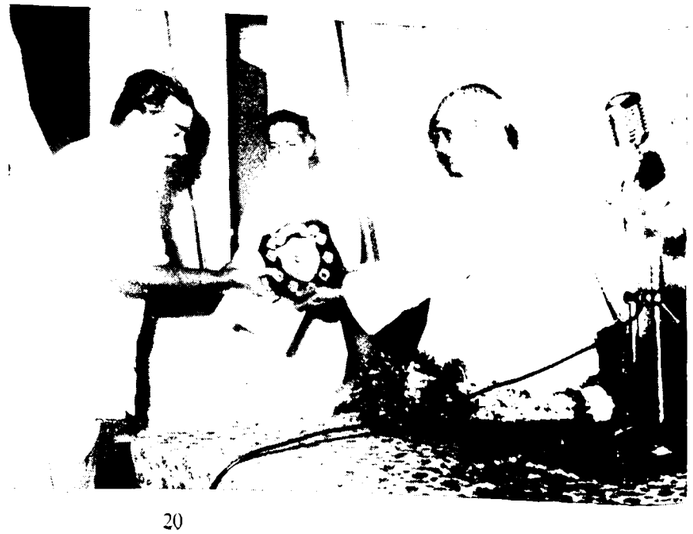
Sponsored by the Nair Service Society, called for short N.S.S. (of which Mr. Mannath Padmanabhan is the spearhead) the College is a standing monument to his dedicated life.

The ALIND stand was a "prefab", aluminium house, wired completely with KER-AL-LITE, building wire. On display at our stand were: a dummy reel wound with the biggest-size aluminium conductor ever manufactured in the country, (the size supplied to Koyna) an accessories board, and sample boards showing different sizes of ALL-WEATHER and KER-AL-LITE.

Congratulations to N. K. B. Nair on the good show he put up.



M. G. College Exhibition at Trivandrum : Picture shows Mr. Mannath Padmanabhan of NSS at our stand.



ALIND *put up an impressive show at the Trivandrum Exhibition. Picture shows N. K. B. Nair, Welfare Officer, receiving on behalf of the Company a "gold medal" certificate and trophy from Mr. Mannath Padmanabhan.*

ANNUAL GENERAL MEETING OF INSTITUTION OF ENGINEERS

THE 38TH ANNUAL GENERAL MEETING of the Institution of Engineers (India) was held at Lucknow from the 15th to the 18th of February 1958. Mr. V. V. Giri, Governor of Uttar Pradesh, inaugurated the session and Mr. D. P. R. Cassad, presided.

Commending the work of the Institution in advancing the different branches of engineering and in maintaining high standards for the profession, Mr. V. V. Giri said: "The role of an engineer in such an ever-growing technological age hardly requires any stress: especially in a developing economy like ours, engineers have a wide and rich field for applying their knowledge, skill and ability. Ever since the country attained political independence, it has been increasingly felt that the economic position of the people should be raised so as to free them from the clutches of want, poverty and squalor. This could be done only by bringing to our people the fruits of science and technology."

Continuing, the Governor declared: "The success of our planning, a mighty venture, therefore, depends, to a very large extent, on engineers, the zeal and enthusiasm with which they could put their shoulders to the various tasks confronting our nation at this crucial juncture. Great and far-reaching progress has been made in the last ten years. The construction of the river-valley projects, Bhakra Nangal, Hirakud, Maithon, Tillaiya, Konar, Lower Bhavani and Tungabhadra, to name some, have entirely changed the face of our country."

Making a plea for engineering research Mr. Giri said: "It may not be possible for professional engineers to devote much time to research. Therefore, an institution of your character should undertake this work and have a separate department which can collect and supply to members up-to-date information."

Mr. D. P. R. Cassad, President, reviewed briefly the work and the progress of the Institution since its inception in 1919. He, also, referred to the phenomenal increase in membership from 1,262 in 1935 to 18,045 on 31st August 1957.

Emphasising the growing need for establishing new technical institutions and universities throughout the country for bridging the wide gap in the country's requirements of engineering and technological personnel in the years to come the president said: "There is a strong feeling amongst members that it is unrealistic for the Institution to function under a Royal Charter following the declaration of India as a Republic in early 1950 and the consequent Constitutional amendments. The Government of India are hesitant to consider our request for statutory incorporation, and it is not understood why our own democratic national Government should not confer a mark of distinction on an Institution which fulfils one of the most vital needs of the country. The Council of the Institution has already expressed its view that it will be in the best interests of the engineering profession to promote unity and co-ordination between different branches of engineering through a central authority with the maximum degree of autonomy for each of the different branches of engineering."

Continuing, he observed: "The country has entered into the great enterprise of building itself up, and to-day, it is in dire need of an adequate supply of qualified engineers. Nineteen existing engineering colleges and 41 polytechnics are being expanded to provide 2,458 additional seats for degree courses and 4,370 additional seats for diploma courses. This is in addition to the provision already made in the Second Five-Year Plan for the establishment of five new engineering colleges, 21 polytechnics, and three higher technological institutes. The role of the engineers in the life of the nation and its development is an important one with the ceaseless growth of engineering science, as it has to deal with the growing masses of materials and plant and machinery. Our Prime Minister has paid glowing tributes to the country's engineers on many occasions and times out of number. In the present world of rapidly changing ideas, the importance of sound engineering training knows no bounds, and the most important factor in achieving economic and national success is the provision, in full measure, of adequate training to students. It cannot, therefore, be overemphasized that without filling the wide gap in training personnel, the problems with which we are grappling will remain unsolved. From available statistics, it is found that there are about 72,000 engineers of various kinds in the country, but in the very near future, say, by the end of the Third Plan, India will require something like five hundred thousand engineers. There is, therefore, need to give top priority to the opening of more technical institutions in the coming years, to meet the country's growing need of engineers and technological personnel.

"As the followers of the great science of engineering in all its branches, let us unite in a common cause of applying the forces of nature to the service of mankind, and make life less laborious, more safe, more productive, more effective, and more happy", he concluded.

Copper and Aluminium Conductors

Protection to continue for three more years

THE GOVERNMENT OF INDIA HAS decided to continue, as recommended by the Tariff Commission, protection to electrolytic copper rods, bare copper conductors and aluminium conductors steel reinforced (ACSR) at the prevailing rates of duty for a further period of three years, that is, up to the end of December 1960. It has also decided to accord protection to all-aluminium conductors irrespective of their conductivity in terms of copper wires, the rate of protective duty being the same as that on the ACSR, namely, 35 per cent *ad valorem* ; the higher rate of duty has already been brought into force with effect from Dec. 2. The Government has agreed to take action in due course on the following three suggestions put forward by the Commission :

(i) Both electrolytic aluminium ingots bars and rods used in the manufacture of ACSR should be subject to a uniform concessional duty of 15 per cent *ad valorem*.

(ii) Manufacturers of all aluminium conductors should be allowed to import electrolytic aluminium ingots bars and rods at the concessional rate of duty recommended for ACSR.

(iii) Steel wires with carbon content between 0·5 and 0·6 per cent should be exempted from such of the duty as is in excess of what is payable under Indian Customs Tariff No. 63 (32), unless there are special considerations in favour of the present definition.

(Government has since implemented all recommendations save that relating to equalisation of duty. Manufacturers' organisations like Indian Electrical Manufacturers' Association and statutory bodies like the Development Council for Heavy Electrical Industries have all recommended equalisation.—*Ed.*)

As regards the Tariff Commission's plea for lifting the existing ban on exports of bare copper conductors and cadmium copper conductors, Government says that it will take such suitable action as may be possible. The same holds good in the case of three other suggestions. First, the Development Wing of the Union Ministry of Commerce and Industry must take, in consultation with the Development Council for Heavy Electrical Industries, steps to reassess and accurately determine the capacity of individual units manufacturing bare copper and aluminium conductors. Secondly, the Iron and Steel Controller must make arrangements for speedy issue of import licences for steel wires required by the manufacturers of ACSR. Thirdly, the Indian Posts and Telegraphs Department should examine further the possibility of using ACSR, all-aluminium conductors (AAC) and cadmium copper conductors which are locally available, in the place of copper weld wires.

Protection to electrolytic copper rods, electrolytic copper bare wires and cables, and ACSR was granted with effect from 24th September 1948 on the basis of the recommendation made by the former Tariff Board in October 1946. The period of protection was extended from time to time in consultation with the Tariff Board or, as the case was, the Tariff Commission. The current period of protection, which was due to expire at the end of this month, has since been extended, as stated at the outset, by a further period of three years.

The chief consideration which seems to have weighed with the Tariff Commission in recommending continuance of protection to electrolytic copper rods, bare copper conductors and ACSR is that the indigenous industry is still not in a position to withstand competition from the low-priced imported products.

I. E. M. A. Tenth Annual Meeting

"ALLOWING IMPORTS OF GOODS THAT CAN BE HAD indigenously should, as far as possible, be avoided. It affects the industry adversely and costs valuable foreign exchange. Although the attitude of the D G S & D and Stores Purchase Departments is generally helpful to the industries concerned there are occasional lapses which should be taken care of," declared Mr. N. R. Banerjee, Chairman, Indian Electrical Manufacturers' Association, at its Tenth Annual General Meeting held at Calcutta on February 24.

Mr. Banerjee cited in this connection the example of an order from one State for ACSR conductors going to importers on the grounds (*a*) that the transaction did not involve foreign exchange and (*b*) that the prices quoted were cheaper although the enquiry had originally been marked only for Indian manufacturers.

"Order for supplies of materials which can be had indigenously should not go abroad so long as prices quoted by Indian manufacturers are reasonable," pleaded the Chairman.

The Chairman also said that during the year under review manufacturers of house service meters, ACSR conductors, winding wires, insulated cases and flexibles and electrical steel stampings and laminations had registered notable progress in production, despite difficulties due to import restrictions.

"Some of the industries have already achieved the targets of capacity aimed at under the Second Five-Year Plan," he said.

Mr. S. K. Patil, Union Minister for Power and Irrigation inaugurated the session.

Mr. S. Peer Mahomed, Works Manager, represented ALIND at this meeting.

Our Friend-The Customer

GOVERNMENT ELECTRICITY DEPARTMENT, ASSAM

Mr. G. C. Goswami.

"ASSAM" IS A CUSTOMER WHOSE story is overdue in these pages at least by a year. On July 9, 1957, the State's first hydro-electric project Umtru (rhymes with "it's true") was officially switched into commission.

Despite being the richest in hydro-electric potential, Assam has the poorest *per capita* consumption of electricity, the figure being as low as 0·74 kWh. Back in 1947, this State, with its population of seven million had only 2233 kW of *installed* capacity, generation (diesel) and distribution vesting in the hands of seven private licensees. And electricity was used for lighting purposes only in some of the larger towns. It was the late Lokapriya Gopinath Bardoloi, the first Chief Minister of Assam (after Independence) who called upon the small Electrical Inspectorate of those days to find out quickly a source of cheap electric power for the development of the town of Gauhati where he had already laid the foundations for a University, an AIR station, a High Court and other institutions. Comparative studies were made of a diesel station at Gauhati, a medium-size steam turbine station at Pandu and the Umtru Hydel Project at Burnihat. Reconnaissance and surveys carried out pointed to Umtru as being the most suitable. But it was only in the year 1952 that the Umtru Project Report was accepted by the Government of India. In passing, it must be recorded that the Umtru dream dates back to the early 20's, for mention is made of the river as a potential source of electric power in the Triennial Report of the Hydro-Electric Survey of India by Mr. J. W. Meares published in 1922. Mr. A. B. Blenkinsop, Chief Engineer, Public Works Department actually surveyed the site and recorded that the two series of rapids on the Umtru River on the northern slopes of the United Khasi and Jaintia Hills, overlooking the Gauhati plains could be developed for generation of hydro power, the upper rapid for 548 kW and the lower rapid for 2914 kW.

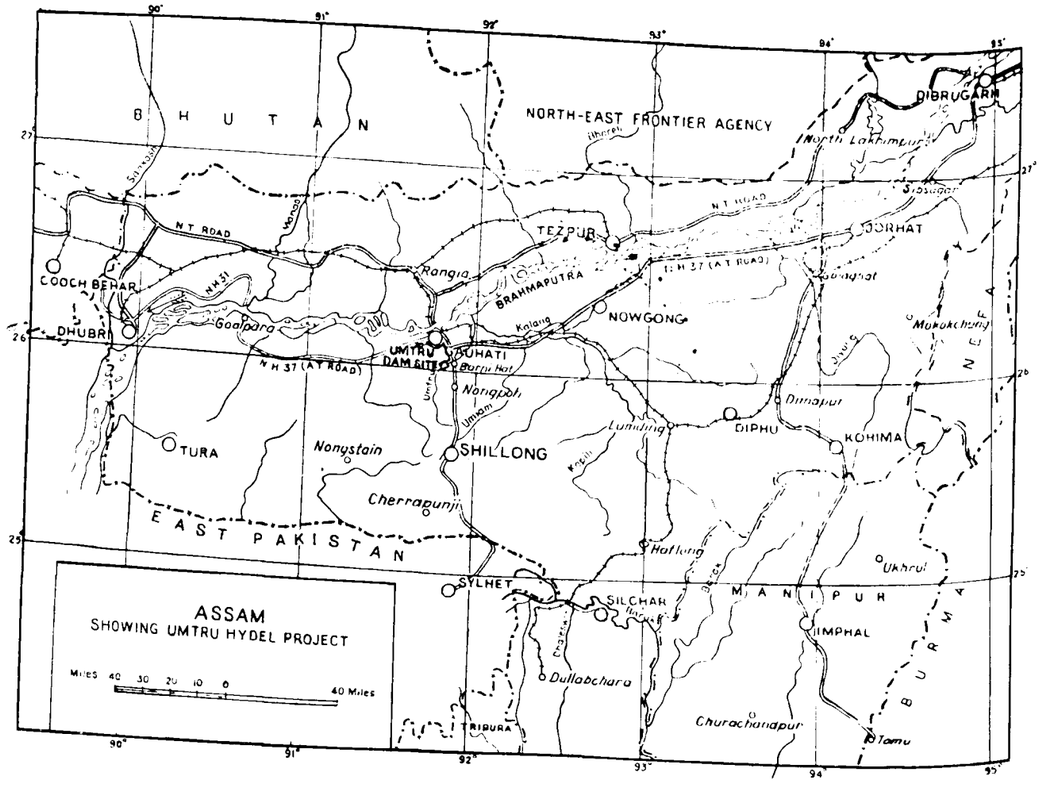
But to revert to the present project: for a time it looked as though the project would be shelved for lack of finance, and then came Canadian aid, thanks chiefly to the interest shown by Mr. Escott Reid, High Commissioner for Canada, and Mr. Nik Cavell, Colombo Plan Administrator.

Construction work actually commenced in November 1954. Work on the tunnel and the power house, and some little work on the weir was continued during the monsoon of 1955 and 1956, although the normal fair-weather working season in Assam is from five to six months in a year. Equipment started arriving from Canada in March 1955 and erection work started in right earnest from June 1956, despite a high flood, unprecedented in living memory, occurring in the month and causing a serious setback to progress. And then there were the "routine" difficulties like scarcity of construction material cement, steel and blasting material and inadequate transport.

The River

The Umtru River rises in the united Khasi and Jaintia Hills, in the north of Shillong. A tributary of the Kalang, the river is known as the Digaru river in the plains. It crosses the Gauhati-Shillong road once at mile 47 and again at Burnihat, 16 miles from Gauhati. Five miles upstream from the wooden bridge at Burnihat, where the river has a series of rapids, it has been utilised for generation of power of 8400 kW in three hydro-electric generators of 2800 kW each. The drop of the river at the site is 170 feet. A weir to collect the water for use of the water wheels at the power house has been constructed at the head of the first series of rapids. The flow of water on the river varies from 140 cusecs in dry season to 70,000 cusecs in the monsoon, the high flood discharge being estimated at 150,000 cusecs. The small reservoir at the head of the rapids is intended to provide sufficient storage of water to meet any shortage in the supply of water to the turbines in the power house, during the dry months of April and May. The weir has been designed to carry the flood discharge of 150,000 cusecs over the spillway section which is 350 feet in length. This is a straight gravity type dam with a spillway of ogee overflow type. The down stream apron of the spillway is laid on masonry with energy dissipation blocks built in reinforced concrete at the bottom. The height of the dam is 78 feet under the non-flow section which is 26·5 feet higher than the overflow section. Length of the non-overflow section is 75 feet on the left bank and 60 feet on the right bank. The intake gate to the water conduit system is under the left abetment. A sluice gate provided adjacent to the intake gate keeps the river bed in front of the gate free from silt deposit.

The Power House, founded on rock, has an uncommon feature. To avail of the maximum possible head, it had to be designed as an almost submerged structure, the entry inside being provided through the roof. The walls of the power house, built in reinforced concrete have been made fully waterproof by coppe



sheets at every construction joint having been provided, and by adequate quality control of the concrete used. Rigorous water-proofing specification for the roof had also been adopted.

The three turbines installed are Francis reaction type 37 in. dia., 3,500 BHP., 500 r.p.m. vertical type, operating under 175 ft. of a net effective head and manufactured by Canadian Vickers, Canada. The generators are 2,800 kW, 500 r.p.m., 3,500 volts, air-cooled type, manufactured by Canadian General Electric Company. The aggregate machine capacity of 8,400 kW generated at 3·3 kV, 50 cycles, 3-phase, is stepped up to 34·5 kV in a bank of three singlephase transformers of 3,500 kVA each, delta star connected, and conveyed through a 33-kV transmission line having *Sal* wood supports of 35 to 40 ft. long over a route length of approximately 20 miles to the Gauhati terminal station.

ACSR conductors with a normal span ranging from 300 to 350 ft. have been used. A second transmission line with a bigger size conductor in ACSR is being laid parallel to the first line.

At Gauhati sub-station, power is being tapped off at 11 kV and 3·3 kV for various load centres like State Electric Supply, Gauhati University, AIR, air-field, Palasbari, etc.

The most important feeder in the system is the Gauhati city feeder line where about 25 per cent of the entire generating capacity will be used. Three transformers, each having a capacity of 666 kVA, have been installed to meet a load demand of 2,000 kVA for the city of Gauhati. Three 33·3 kVA single-phase transformers have also been installed in this sub-station to meet a load demand of 1,000 kVA for other load centres. A similar bank of transformers of 4,000 kVA capacity will be provided on the third high tension-line from the Gauhati Terminal station to the north bank of the Brahmaputra river. The location of the crossing of the river Brahmaputra has been fixed on two small hillocks on either side of the river at Pandu. The towers for these cables will be 100 ft. high, and a clearance of 70 ft. will be provided between the high flood water and the overhead cables crossing the river for the passage of steamers, boats etc.

The Conduit

The conduit system consists of two tunnels 2,730 ft. and 828 ft. long connected by a steel pipe line 701 ft. long, and a 347 ft. long high pressure steel penstock running from the second tunnel to the Power House. In No. 2 tunnel a 116-foot high surge tank, is located, having an internal diameter of 32 ft. The tunnels are horse-shoe shaped with a diameter of 9 ft. 9 inches. No. 1 tunnel is lined with concrete throughout while No. 2 tunnel is partly lined with concrete and partly with a steel liner in addition. The steel pipe line has a diameter of 9 ft. 9 in. The high pressure penstock has a diameter of 8 ft. and branches into three 4-foot diameter pipes, each feeding a turbine. All steel pipes are made of half-an-inch thick boiler plates.

Utilization

Power from the Project will be supplied to the greater Gauhati area to meet the growing demands of the town, the Railway, AIR, airport, the University, the Engineering College and various industrial establishments.

Apart from meeting the urban load in and around Gauhati, the Umtru power station will cater to the following classes of load in semi-urban and rural areas :

(i) In suitable areas, pumping of water from *bheels* (water-logged areas) for cultivation of *boro* (spring) paddy and, if possible, *rabi* crops like potatoes, pulses, etc. ; (ii) Sugarcane crushers for manufacture of *gur* during the winter season ; (iii) Production of milk products in dairies ; (iv) Fruit preservation in squash factories near fruit growing areas ; (v) Weaving (power looms) and reeling of silk yarn ; (vi) Brass Industries and smithies ; (vii) Pottery ; (viii) Road metal working crushing of stone in quarries ; (ix) Carpentry small saw mills and plywood factories ; and (x) Rice and oil mills.

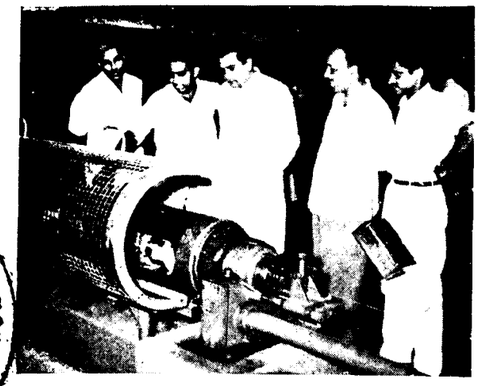
All these small-scale units already exist in the area, but it will be necessary to introduce electric drive. The overall area to be served is about 1,000 sq. miles.

The cost of the Project including transmission up to Gauhati area will be Rs. 212·06 lakhs. The cost of generation on full development is estimated to be one anna per unit at Gauhati.

The translation at last into concrete terms of a dream dreamt as far back as the twenties is certainly something of which the State of Assam and the Government Electricity Department headed by Mr. G. C. Goswami could well be proud. By rainfall and topography, all the rivers of Assam are capable of hydro-electric development. Actually, experts have estimated that 1·5 million kWh of continuous power in the State can be produced by developing nearly a dozen sites on Assam's riverine system. Even by developing three or four of the smaller rivers, most of the present power needs of the State can be met.

Here's hoping that the Umtru Project is but a precursor of other projects to follow, not in the too distant future!

(In the preparation of this article the writer has drawn from literature made available by the Government Electricity Department, Assam.)



Mr. Moinul Huq Chaudry, Minister for Agriculture, Assam Static at the Covered Conductors Plant.

Sending end substation with power house in the background.

Government of India's Scientific Policy Resolution

THE KEY TO NATIONAL PROSPERITY, apart from the spirit of the people, lies, in the modern age, in the effective combination of three factors, technology, raw materials and capital, of which the first is perhaps the most important, since the creation and adoption of new scientific techniques can, in fact, make up for a deficiency in natural resources, and reduce the demands on capital. But technology can only grow out of the study of science and its applications.

The dominating feature of the contemporary world is the intense cultivation of science on a large scale, and its application to meet a country's requirements. It is this, which, for the first time in man's history, has given to the common man in countries advanced in science, a standard of living and social and cultural amenities, which were once confined to a very small privileged minority of the population. Science has led to the growth and diffusion of culture to an extent never possible before. It has not only radically altered man's material environment, but, what is of still deeper significance, it has provided new tools of thought and has extended man's mental horizon. It has thus influenced even the basic values of life, and given to civilization a new vitality and a new dynamism.

It is only through the scientific approach and method and the use of scientific knowledge that reasonable material and cultural amenities and services can be provided for every member of the community, and it is out of a recognition of this possibility that the idea of a welfare state has grown. It is characteristic of the present world that the progress towards the practical realisation of a welfare state differs widely from country to country in direct relation to the extent of industrialisation and the effort and resources applied in the pursuit of science.

The wealth and prosperity of a nation depend on the effective utilisation of its human and material resources through industrialisation. The use of human material for industrialisation demands its education in science and training in technical skills. Industry opens up possibilities of greater fulfilment for the individual. India's enormous resources of man-power can only become an asset in the modern world when trained and educated.

Science and technology can make up for deficiencies in raw materials by providing substitutes, or indeed, by providing skills which can be exported in return for raw materials. In industrialising a country, a heavy price has to be paid in importing science and technology in the form of plant and machinery, highly paid personnel and technical consultants. An early and large-scale development of science and technology in the country could therefore greatly reduce the drain on capital during the early and critical stages of industrialisation.

Science has developed at an ever-increasing pace since the beginning of the century, so that the gap between the advanced and backward countries has widened more and more. It is only by adopting the most vigorous measures and by putting forward our utmost effort into the development of science that we can bridge the gap. It is an inherent obligation of a great country like India, with its traditions of scholarship and original thinking and its great cultural heritage, to participate fully in the march of science, which is probably mankind's greatest enterprise to-day.

The Government of India have accordingly decided that the aims of their scientific policy will be :

(i) to foster, promote, and sustain, by all appropriate means, the cultivation of science, and scientific research in all its aspects pure, applied, and educational ;

(ii) to ensure an adequate supply, within the country of research scientists of the highest quality, and to recognise their work as an important component of the strength of the nation ;

(iii) to encourage, and initiate, with all possible speed, programmes for the training of scientific and technical personnel, on a scale adequate to fulfil the country's needs in science and education, agriculture and industry, and defence ;

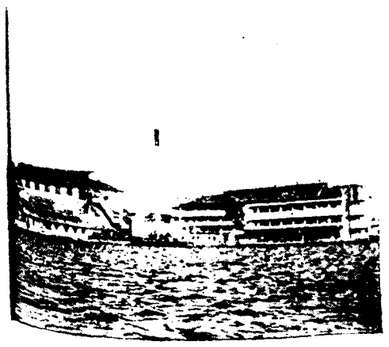
(iv) to ensure that the creative talent of men and women is encouraged and finds full scope in scientific activity ;

(v) to encourage individual initiative for the acquisition and dissemination of knowledge, and for the discovery of new knowledge, in an atmosphere of academic freedom ;

(vi) and, in general to secure for the people of the country all the benefits that can accrue from the acquisition and application of scientific knowledge.

The Government of India have decided to pursue and accomplish these aims by offering good conditions of service to scientists and according them an honoured position, by associating scientists with the formulation of policies, and by taking such other measures as may be deemed necessary from time to time.

Mr. T. A. K. Nair,
Manager, TOMCO, Ernakulam.



A general view of TOMCO—
from the backwater.

General Office block.

Below : A view of staff at work inside.

Our Neighbours...

THE TATA OIL MILLS COMPANY LIMITED

'TATA HISON HIT CALCUTTA', SO WENT the headline of a recent newspaper ad. By the same token, an advertising copywriter would not have been far wrong if, way back in 1917, he had used the caption 'Tata's strike oil in Cochin !'. For, it was in this year THE TATA OIL MILLS COMPANY put up its first factory at Ernakulam, the capital of what was until recent years known as Cochin State.

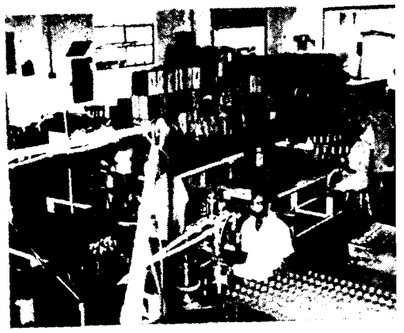
Early History

During World War I, Cochin cocoanut oil had earned an international reputation for its fine quality. And Cochin was the hub of the cocoanut oil export trade.

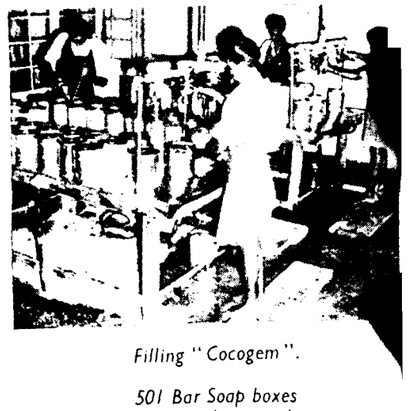
Operations in the factory commenced in 1920 ; but unfortunately business did not get off to a good start, and the Company had more than its quota of teething troubles. For one thing, America which had until then been a large user of cocoanut oil from India clamped down a prohibitive import duty on copra and cocoanut oil from other countries, because of her interest in the newly-founded cocoanut oil industry of the Philippines. For another, war time boom had petered out, and there was a big drop in world prices of oil. This formidable combination of circumstances would probably have deterred lesser men, but not the Tata's who are made of much sterner stuff.

They quickly realised that for the survival of the company, it must from then on concentrate on the processing of the crushed oils. So, in 1923, the factory came out with COCOGEM, a high-grade refined and deodorised edible cooking oil. The first boiling of soap was inaugurated in April 1927, and it is nostalgic satisfaction to recall that the first batch of soap issued by the company was manu-

Main gate of TOMCO works.



Filling and packing of Tata's hair oils.



Filling "Cocogem".

501 Bar Soap boxes
being conveyed to warehouse.

Analytical Laboratory
—analysts at work.

factured by Mr. P. T. John, then a Chemist, now the company's Deputy General Manager. The year 1929 saw the launching of 501 WASHING SOAP bars.' Encouraged by the success that greeted this laundry effort, the company came out with toilet soaps in 1932. About half a dozen varieties were introduced. But HAMAM was adjudged easily the most popular; and even to-day HAMAM is a leading seller. Other toilet brands that the company now makes are MOTI, a large-size bath cake and EAU-DE-COLOGNE, glamour-wrapped in gold aluminium foil, NAHAN, a medicated soap, and JAI about which A. F. S. Talyarkhan often has a good plug in his Radio Ceylon sports commentaries. But the company's lines go beyond soaps and vanaspati. Hair oils, shampoo, eau-de-cologne, glycerine and treated cashew shell liquid are some of the other products made.

Location

The factory is located about two miles from Ernakulam on a 52-acre site (bounded by back-waters on its three sides) now known as Tatapuram. The setting is most picturesque with tall cocoanut palms dotted all over the place. It is impossible not to be impressed by the vast layout of the works, the diversified lines of the company's manufacturing activity and its general air of neatness and good house-keeping.

The availability of raw material was what made the Tata's "fall" for Ernakulam, but the location has other advantages, too, such as the facility of water transport and the facility of entrance to Cochin Harbour. And then Cochin is a rail terminus (The Company has its own private railway siding.)

The Company was launched with a capital of Rs. 1 crore, but with drastic alterations of original plans, and losses every year, it was written down to Rs. 25 lakhs in 1928. When a second factory at Sewri (Bombay) went into operation in 1939, this reduced capital of Rs. 25 lakhs was found to be hardly adequate for the expanding activities of the company. The authorised capital was, therefore, raised to Rs. 2½ crores in 1946 of which the present subscribed capital is nearly 1 crore.

Installed capacities of the different plants (per month) are as follows :

Laundry soap 750 tons ; Toilet soaps 455 tons ; Hydrogenated oil 180 tons ; Toiletries 96 tons ; Glycerine 80 tons ; Crushing mills 3,250 tons ; Tin can 167 tons.

Welfare Activities

Jamshedji Tata, the original founder of the House, was a dreamer and a revolutionary. What the Factory Act has made obligatory for industrial establishments to-day, the great humanitarian had provided for in the third quarter of the last century. Vast recreation grounds, reading rooms, libraries, and creches, are with Tata's a tradition and heritage.

There are playgrounds for football, hockey, basketball, volleyball, etc. At Tatapuram, employees (workers 966, other staff 320) enjoy several amenities. The Jal Nowroji Memorial Welfare Institute (named after one of the Managing Directors of the Company) has a well-stocked library, a good reading room and a small gymnasium. Arrangements also exist for indoor games like table tennis, caroms, etc.

The Institute's open air theatre always draws good crowds, particularly of the youngsters in the township. Feature films in English, Hindi, Tamil and Malayalam as well as educational films are shown. The Company has a special scheme of hospitalisation of its T.B. patients. Since 1945, when the scheme started, about 100 employee patients have taken advantage of this scheme. And it is gratifying to record that all save four have returned to work

Wrapping of
'Eau-de-Cologne' soap.

perfectly rehabilitated. With the coming into force of the Employees' State Insurance Scheme, the Company's own scheme has been withdrawn.

There is a "Children's Club" where employees' children are taught games like table tennis. This game is played both by boys and girls and they have to their credit several prizes in State tournaments. Recently one of them was selected for the International Table Tennis Tournament held at Colombo after having been given special training in Madras by the celebrated Barna himself.

"Founder's Day" is the occasion for employees and members of their families to come to Tatapuram. Highlights of the day's programme are a luncheon at which retired employees are also guests, and a dramatic performance at night which attracts well over 5,000 people.

Aspirants to literary fame find a "local habitation" in the Tatapuram *Kalasamithi* of which Mr. Sukumaran, a well-known name in Kerala literary circles, is the Secretary.

The Tata Oil Mills Company Limited is an organisation of which not only the House of Tatas but the whole country may well be proud.

(For permission given to go round the works and for other help given in the preparation of this article, the writer wishes to render grateful thanks to Mr. P. T. John, Dy. G. M., and Mr. T. A. K. Nair, Manager, and other officers of the organization.)

FORM IV

Rule 8

As prescribed in the Registration of Newspapers (Central) Rules, 1956)

Statement about ownership and other particulars of

THE ALIND CHRONICLE

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2. Periodicity of its publication	..	Quarterly
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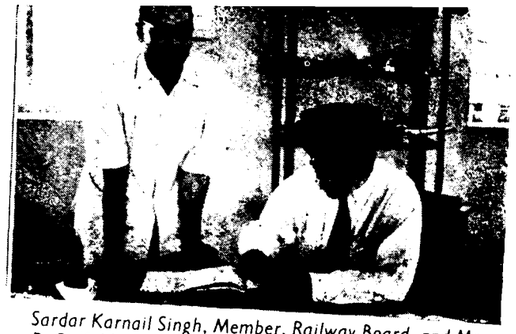
6. Names and Addresses of individuals who own the newspaper	..	The Aluminium Industries Ltd., Kundara (Trav.), Kerala *Managing Agents :* Seshasayee Bros. (Trav.) Private Limited.



Sardar Karnail Singh, Member, Railway Board, and Mr. D. R. Kohli, Chief Engineer, Southern Railway, Madras.

Mr. Bradbury-Pratt of English Electric Company and Mr. M. V. Paul of Binny & Co. (Madras) Limited.

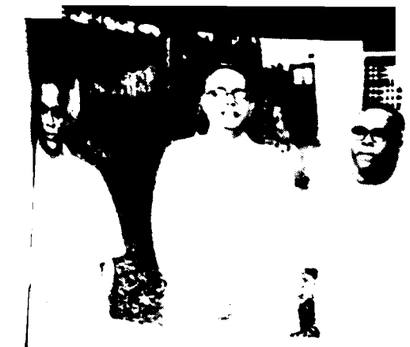
Left to Right:—Mr. K. K. Rajah, Jt. Director of Industries and Commerce, Kerala, Mr. A. G. Sivaramakrishnan, Dy. Development Commissioner, Small Scale Industries, Southern Region, Government of India, Ministry of C. & I., New Delhi with R. Parthasarathy.

Mr. K. P. U. Menon, I.A.S., Chairman, right, and Mr. N. J. Balani, Engineer Member, Rajasthan Electricity Board, Jaipur.

TO THE MANY FRIENDS WHO took time off to pay a visit to our works in recent months, may we say through this Journal how very pleased we were to have them? Here's a simple, but sincere, 'Thank you' for all of them.

Mr. Ratilal O. Zatakia of Shanta Brothers Limited, Bombay.

Mr. Vans Echols, Managing Director, Indian Aluminium Company Limited.



Mr. G. D. Nair, Executive Engineer, Kerala State Electricity Board, Quilon, Mr. K. M. Subramoniam, Member, Kerala State Electricity Board, Trivandrum and Mr. T. Velu Pillai, Auditor.

Seen second from left is Mr. Morris Hadley, (Consultant to Aluminium Group of Companies of Canada), and to his right is Mrs. Hadley, Mr. P. M. Menon, Works Manager, Indian Aluminium Company, Alupuram Works can be seen in the rear (second) with V. G. G. Nayar.

Mr. S. R. Given of Aluminium Company of Canada Limited, Montreal.

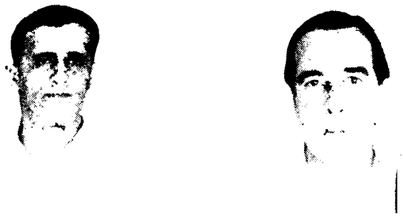
Mr. T. R. R. Bettley of Aluminium Company of Canada Limited, Shawinigan Works, Canada.

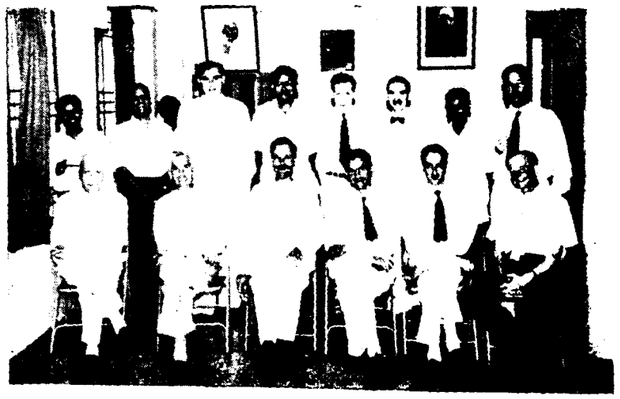
Engineers from the Indian Aluminium Company Limited, Alupuram Works.

Mr. Moinul Huq Chaudry, Minister for Agriculture, Assam State, with V. G. G. Nayar.

Mr. V. R. Narayanan Nair, Retd. Director of Health Services, Trivandrum, and Mr. N. Chandrasekharan Nair, IPS (Retd.), (formerly Inspector-General of Police, Kerala State), Chairman, Kerala Service Bank Limited.

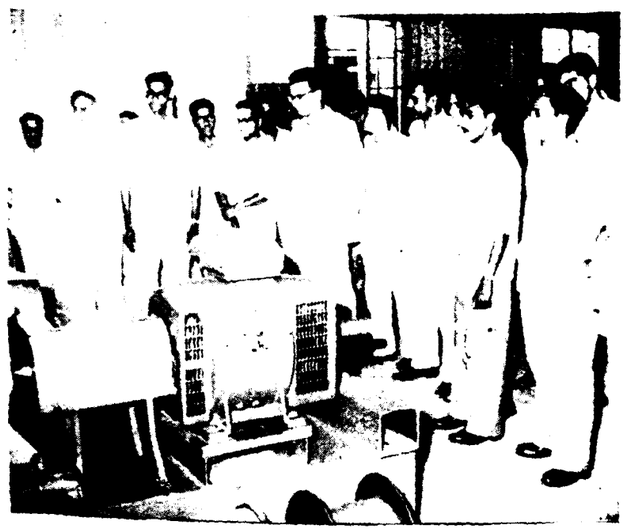
With B. V. D. Menon is seen Mr. R. T. V. Hay of Marshall-Richards Machine Co., Durham, England.





A farewell party was given to Mr. N. W. Wilson of Harrisons & Crosfield Limited and Mr. Girhardson of Indo-Norwegian Foundation, seen seated in the centre.

From left to right are: S. N. Nayar, Asst. Works Manager, Mr. C. S. Padmanabha Iyer, Chief Construction Engineer, Kerala State Electricity Board, S. Peer Mohammed, Works Manager, Mr. K. K. Kartha, Retired Chief Engineer, P.W.D., Kerala State (at present Adviser and Consulting Engineer to the Government of Orissa), and Mr. A. O. Oommen, Chief Engineer, Kerala State Electricity Board.



Members of the Kerala State Electricity Board Engineers' Association at the Covered Conductors Plant.

Printed by Mr. A. Sendall at the Associated Printers (Madras) Private Limited, 165, Mount Road, Madras-2
and Published by Mr. R. Parthasarathy for the Aluminium Industries Limited, Kundara.

22,000 million kilowatt-hours

—but they are not sleeker!

You can't go ga-ga over a kilowatt-hour!
One kWh is exactly like another. The 22,000
million kWh of the Second Plan —
each one of them—will be so monotonously
like the 11,000-million kWh of the First Plan.
No, the new kilowatt-hours are not
sleeker models, incorporating added features!

A kilowatt-hour may not be bought on impulse,
say, like a *sari*, but, still, bought it is,
and bought it will be.

And wherever in this far-flung land of ours,
a kilowatt-hour is bought,
you'll find ALIND delivering the goods.

For the benefit of those who are not *hot* on electricity matters, may we explain? A kilowatt-hour is the equivalent of one hour's use of 1000 watts or one kilowatt. For example, a 100-watt lamp burning for 10 hours. Watt—unit by which rate of use of electrical energy is measured, named after its inventor, *Watt*.

ALIND

THE ALUMINIUM INDUSTRIES LIMITED, Kundara, Kerala
Managing Agents: **SESHASAYEE BROS. (TRAV.) PRIVATE LIMITED**