

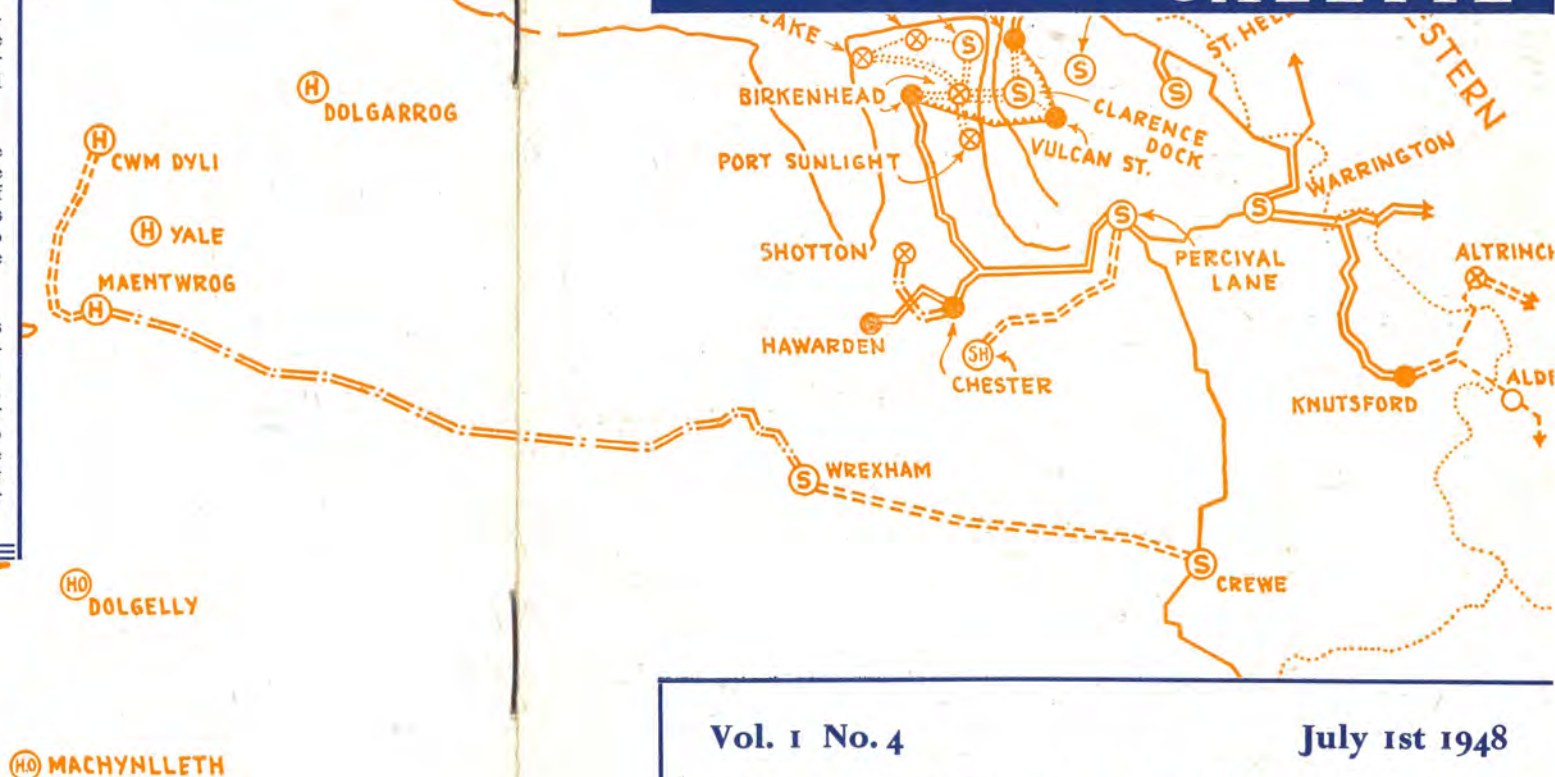
**D**ON'T FORGET the Arts and Crafts Exhibition (at Divisional Headquarters, Clarke's Gardens, Woolton, Liverpool) on the afternoon of Saturday, July 24th. Please inform your Senior Executive Officer what it is you intend to enter, as soon as possible. It is possible that the August issue of GRIDIRON GAZETTE may be a few days late, in order to cover this event.

THE EDITOR

# GRIDIRON

## GAZETTE

SCALE - MILES



**Vol. 1 No. 4**

July 1st 1948

**MONTHLY MAGAZINE OF THE MERSEYSIDE  
AND NORTH WALES DIVISION OF THE BRITISH  
ELECTRICITY AUTHORITY . . . Price Fourpence**

Published by the Divisional Controller's Office, Merseyside and North Wales Division, British Electricity Authority, (British Electricity House, Clarke's Gardens, Woolton, Liverpool), and edited, designed and produced by Garraway Ltd., 37A Kensington High Street, London W.8 (WESTern 8857). Printed by Stonebridges of Bedford.

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# GRIDIRON

GAZETTE

VOL. I

No. 4

JULY 1948

THE MONTHLY MAGAZINE OF THE  
MERSEYSIDE AND NORTH WALES DIVISION  
OF THE BRITISH ELECTRICITY AUTHORITY

BRITISH ELECTRICITY HOUSE,

CLARKE'S GARDENS, WOOLTON, LIVERPOOL - - - GARSTON 4981-5

## SUMMER IS I'CUMEN IN

SUMMER is i'coming in—summer, with its thoughts of hot, sultry beaches with lapping waves composing a pebbly symphony; with its prospect of river bank willows sighing as they hear the angler's gut whipping the water; with its enticement of the grey dusty band leading the cyclist over the plain, up the hill and right into the sky.

Summer has a different meaning for those of us who safeguard the supply of electrical energy. Although each of us has an individual release from duty for a reasonable span, in general, summer is the time for all good men to come to the aid of the maintenance party.

The more the general body of industrial workers desert their lathes, their looms, and their assembly lines to make high holiday, the more plant we can release to be revitalised before winter's grip tests its very soul—and its overload capacity. The brighter the sun, the softer the air—the more the Switch Family Robinson momentarily relax their inexorable demands, allowing us fleeting opportunities for an electrical wash and a mechanical brush-up.

This necessity for long hours of work while others play has bred in us a mentality in this respect which is not quite what it seems. On the surface, we are slightly bitter, and a little lower down envious of our neighbours in Acacia Avenue who, we think, were wiser men than us and chose to be insurance agents: but deeper than that there is a sense of service to the community. Returning home from the Power Station in the late dusk of a summer evening, tired and hot, one passes shuttered "Restawhyle" (three weeks at Torquay); quiet "Dunroamin" (caravan tour of North Wales); and senses the unnatural quiet at "Fir Tile" (seven children) (seven days at New Brighton); and one experiences a quiet pride that at least someone is carrying on life in the old Avenue.

We, we think, know our responsibility to the community. If the neighbours give us black looks next winter when a load shed becomes inevitable, we can at least say, "While you lazed on the sands, while your sole care was 'will Mrs. Brown put on the fried fresh hake again to-night?' we, at least, sweated and puzzled and contrived in the summer to make Britain a land (electrically) fit for the heroes of our winters."

## EAST is EAST and WEST is WEST— and William Heymer McCallum

### KNOWS THEM BOTH!

STATION Superintendent at Warrington Generating Station Mr. WILLIAM HEYMER MCCALLUM travelled around the world before he settled down again in his native Lancashire eighteen years ago. For nine years he was a sea-going engineer, during and after the first World War, going through the mill and sailing in cargo and fast passenger vessels to the Far East.

His sea service took him from fifth engineer to Second and Refrigerating engineer before he left the sea to take the post of Shift Charge Engineer with the Shanghai Power Company, formerly the Shanghai Municipal Electricity Department, at their Riverside Power Station, where the plant capacity was 161,000 kW.

Educated at Horwich Secondary School, and later attending Bolton Technical College, Mr. McCallum completed a six years' apprenticeship at the Lancashire and Yorkshire Railway Co.'s Locomotive Works at Horwich, near Bolton. After a further short spell on loco maintenance work he then joined the firm of Messrs. J. Robertson, Marine Engineers and Ship Repairers at Fleetwood, as a Marine Fitter.

His next post was in the machine shops of the English Electric Co.'s Dick Kerr Works at Preston, engaged in turbine construction and test bed work.

Then came nine years at sea, with Messrs. Alfred Holt and Company's Blue Funnel Line, Liverpool.

Mr. McCallum had his most lucky escape during a World War One voyage, when his ship was torpedoed off the Outer Hebrides. He had just gone off watch when the engine room received a direct hit, killing all five of his shipmates on duty there.

The crew managed to berth the ship in the remote Outer Hebrides and discharge the £2,000,000 cargo she was carrying.

In 1924, Mr. McCallum went out to Shanghai. Already familiar with the Far East—he had spent a two-year tour of duty in the Dutch East Indies—he stayed in Shanghai to complete his six-year contract

before returning to the United Kingdom to join the York Corporation Electricity Department as a Shift Charge Engineer in their Foss Island Generating Station.

Then, in 1933, came his final move, to the Warrington Corporation Electricity Department as a Shift Charge Engineer at the Howley Power Station. Serving as Clerk of Works for plant extensions from 1940 to 1943, he was appointed Power Station Superintendent in 1944.

Such is the bald record of a varied, interesting, and always worth-while career. At 56, Mr. McCallum looks back on a host of experiences, many pleasant, others not quite so cheerful, but all of them contributing to a storehouse of knowledge, technical and psychological, of immense value for to-day's job and the tasks of the future.

Mr. McCallum has a firm and unshakable belief in the future of electricity under the new set-up. "I believe we are in for far better times. The keynote of enthusiasm and interest is one of the most noticeable features in the Merseyside and North Wales Division," he says.

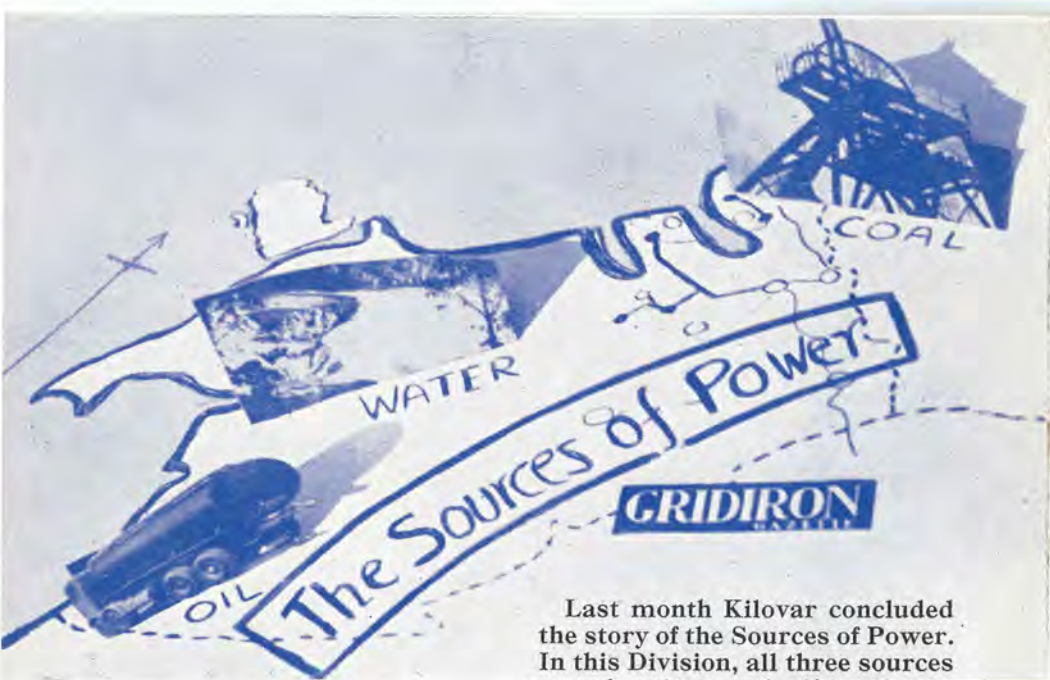
Mr. McCallum believes, too, that every man on the job should be made to realise that he is something more than a mere cog in the machinery. In occasional lectures to his men he has stressed that they are an important unit. A board outside his office shows leading stokers and stokers the performance of the Station and helps to create enthusiasm and competition. "Apart from being an engineer, you have got to foster personality and leadership," he adds.

Outside working hours, and for his holidays, Mr. McCallum finds relaxation and a complete change from the intricacies and hum of machinery in the quiet of the countryside. For the past four years he has helped to gather in the harvest on a Lancashire farm, hard at work on his holidays from dawn to dark.

Married, he has a son following in his footsteps as a M.N. engineer, and a daughter now working as an horticulturalist after serving in the Women's Land Army.

## Who's Who? . . . . . No. 3





Last month Kilovar concluded the story of the Sources of Power. In this Division, all three sources—coal, water and oil—are employed, but coal supplies by far the largest proportion. **HOW DO WE BURN THE COAL?** An expert has been invited to discuss combustion.

At first sight the burning of coal appears very simple—you utilise paper and wood as an intermediary lighting system, apply a match, and soon we have a roaring fire. But although we have now got heat from our raw material, we still have to get power, and power means movement. In order to perform this translation of heat to motion, we need something which will expand or contract with the application of heat (we will ignore thermoelectricity for the moment). This, in the majority of cases, is water-vapour or steam, although other substances such as mercury vapour have been used. Steam generation is therefore among the most important technical processes of electricity generation, and an enormous amount of work has been done in recent years to ensure the correct combustion of every particle of coal entering power stations and to eliminate, as far as possible, all heat losses.

#### COAL HANDLING

Coal—which nowadays contains up to 25 per cent. of non-combustible matter—usually arrives by water or rail transport at the power station site. It is extracted from colliers and barges by grabs, or from railway wagons by tippers, weighed, and dumped on the stock pile to await use. In some cases these storage dumps are under water to avoid the danger of spontaneous combustion and to prevent dust, but in the majority they are merely open sites or large concrete hoppers. From the dumps the coal travels by conveyor belt systems or by bucket

systems to the top of the boiler-house—in the case of stoker fired installations—or to the grinding mills if pulverised fuel firing is being used.

#### TYPES OF FIRING

There are several ways of firing modern boilers; chain grate stokers, retort stokers, "Rotorgrate" stokers and pulverised fuel firing to name a few. Of these, chain grate and pulverised fuel are probably the most widespread, and it is with these that we are most concerned.

In essence, the chain grate consists of an endless belt made up of firebars with air spaces between them, which forms the floor of the furnace and moves from front to rear on the upper side. The coal descends from the boiler-house hoppers through long down-coming pipes which are flexibly mounted at the upper ends. The lower ends are moved slowly along the width of the grate to provide an even spread of coal across it at the front of the boiler.

On arrival at the front of the grate, the coal moves into the furnace owing to the continuous movement of the firebars and due to the already burning material within the furnace catches alight in its turn. As can readily be appreciated, the

**THIS** series of articles is not primarily intended for Engineers, but for the many members of the Divisional team who are not technical specialists but who wish to have some acquaintance with the fundamentals of our industry.—KILOVAR.

varying demands for steam by the turbines require the speed of the grate and the thickness of the coal layer entering to be adjusted so that the right amount of coal enters and also so that it shall all be burned by the time it reaches the further end. Another controlling factor in the burning rate is the quantity of air blown through the furnace by the forced and induced draught fans. Apart from these factors, the quality of the coal and the amount of carbon monoxide in the flue gases have to be watched as the former may lead to a rapid drop in steam pressure if a batch of low calorific value enters a furnace burning high quality coal, or may lead to high pressure and temperature should the converse occur, whilst the carbon monoxide represents waste calories going up the chimney. These, however, are only some of the major difficulties in obtaining efficient boiler performance, and due to the complexity and number of the variables involved, many new installations incorporate elaborate automatic control systems to eliminate, as far as possible, the human error.

#### PULVERISED FUEL

The practice of using pulverised fuel firing is generally gaining ground. There are many arguments for and against this form of firing, but the chief reasons advocated for its adoption are that it gives a higher gross efficiency, improved availability (as the air heaters and economisers do not suffer from corrosion as badly as with the stoker types) and better control of combustion. Against this is the fact that the ash is extremely finely divided and presents formidable problems both in preventing its going up the chimney and in normal disposal.

In this system the coal is fed to mills which grind it to a fine powder, and is then transferred through pipes with air to the burners situated in the sides and corners of the furnace space. There is no grate in the boiler, the heavier ash dropping straight down into the ash hoppers.

Various types of burners have been devised, most of them having an annular space around the nozzle through which primary air is blown, the required secondary air being induced into the furnace through the ports in the refractory wall of the combustion chamber by the suction provided by the induced draught fans.

#### GRIT DISPOSAL

In the stoker fired boilers, the grit subdivides into two types—clinker and large ash from the grate, and dust and light ash which is extracted by special hoppers and cyclone collectors in the flue gas circuit. The pulverised fuel type, however, possesses a much higher grit content in the flue gases than any other type, and the problem of eliminating this has resulted in the development of the electrostatic precipitator which uses the attraction of charged particles to a plate or tube of opposite charge to extract the grit. The process is somewhat similar to the phenomenon which occurs when one rubs a vulcanite pen and picks up small pieces of paper with it. With these precipitators, 97 per cent. of the dust and grits offered to them can be removed.

In conclusion, it should not be thought that because the overall thermal efficiencies of modern power stations are about 26-30 per cent. the boiler plant is the offender; even on the bad coal we are getting gross efficiencies up to 88 per cent. The loss lies in the steam cycle, but that is another story.

Next month, we consider the outlines of the modern boiler plant.



A Typical Chain-Grate stoker, under construction → (7)



Pleasant

## CHANGE HERE, FOR CREWE

(From Our Own Correspondent)

The Annual Outing of Crewe Undertaking took place on June 1st. Motor coaches conveyed the large party to Hereford. After lunch, the Cathedral and the river whiled away leisure moments, and then the tour was resumed through the glorious Wye Valley to Symonds Yat. Here the party took to the boats, to see the famous Yat Rock. A climb into the Malvern Hills followed, for tea at the British Camp Hotel.

Photographs were taken of the beautiful countryside, and the no less beautiful members of the party. (Editor's note.—We expect some Gridiron Guinea winners...)

On the way home, through Worcester and Kidderminster, and after stopping at Bridgnorth, a halt was made at Market Drayton, where, in the local, Crewe's crooners carolled cheerfully, to show that a 250-mile day *didn't* daunt.

## This month's winner of the GRIDIRON GUINEA

("A CORNER OF COCKINGTON" by  
Mr. FRANK ARDEN, RUNCORN)



# To the Editor, Dear Sir . . .

## Power Failure Prediction

"Your readers will have seen from the National Press," writes a correspondent from London, "that a widespread failure of electricity supply took place in the south-eastern districts of England on Sunday, May 23rd. The British Electricity Authority, at a subsequent Press Conference, said that the failure was due principally to shortage of plant, and that a large import to South-East England was taking place from the north, to permit the maximum amount of plant to be taken out of commission for maintenance."

"What GRIDIRON GAZETTE readers may not realise, however," he continues, "is that the inherent risks of this type of failure occurring when operating with small plant margins were predicted by your Divisional Controller, Mr. A. R. Cooper, in a paper which he read before the Institution of Electrical Engineers on March 18th last. In an abstract given in the B.E.A.M.A. Journal, he says, 'The difficulties of operating the National Grid system are accentuated by the fact that there are only two inter-connectors between the north and south of the country and all out-of-balance transfers between two groups of plant, each of roughly 500 MW., have to be taken over these two lines. If the system were solidly connected and heavy transfers were occurring in the same direction over the two north-south inter-connectors, the loss of one line would be followed, almost inevitably, by the loss of the other, as the load interrupted on the first line would be diverted over the network and added to the transfer on the second line and would be liable to cause it to trip on overload.'" "Basically," concluded our correspondent, "a similar set of circumstances was responsible for the widespread power failure on May 23rd."

*Editor's Note. The Divisional Controller's paper has now been read in many Institution centres up and down the country, and has excited very favourable comment. In a subsequent issue we hope to publish an abbreviated version of Mr. Cooper's address, as the operation of the Grid System as a whole will probably be of interest to our readers.*

## OIL ENGINE GENERATION

I welcome GRIDIRON GAZETTE. Ours is only a small station, relying on Diesel power, and we have never previously formed part of a large organisation, so we are quite anxious to know something of our new colleagues, and what plans are being made for our future.

Why not a frank article about oil-engine generation? It might give us a few ideas on efficiency, as well as letting the steam and hydro people get an idea of some of our difficulties.

"JUST AN ENGINE-DRIVER."

[EDITOR'S NOTE.—What about our correspondent himself writing the article?]

\* \* \*

## LISTER DRIVE LAMENT

Capt. Thompson of Lister Drive sends us this touching ode:—

### Shift Engineer's Lament

For fifty-three years I've been poorly,  
And suffered most horrible pains,  
I've had every ailment imaginable  
From "Cooking Figures" to Varicose Veins.

Neuritis with me is a hobby,  
I've got bunions and corns on my feet,  
And I seem to turn out for the night shift  
With a head like a block of concrete.

The "Steam" and the "Speed" always haunt me  
"Shift Rotas" are my fearsome dread—  
(And the Super tells those in his Office,  
"It's time that old Humbug was dead.")

(The Editor has added a final verse, which he hopes Capt. Thompson will take in the spirit in which it is intended.)

But now I'm the Rep. for the GRIDIRON  
I've no time to ponder or pine,  
I'm busy bombarding the Editor  
With these epic poems of mine.

Capt. Thompson, in a scintillating letter which is too long to quote here, parodies the Official General Weather Forecast, and ends by adding, "... and in the areas of Merseyside and North Wales, there will be no deep depressions to-day or at any time."

Following the Editor's suggestion in the last issue, he sends us a selection of likely horses to follow: Pictus, Welsh Honey, Cul de Sac, and Katsu. He concludes, "Afraid I can't compete for the GRIDIRON GUINEA... if thaa thinks Lady Thompson an me go abaot on wer hollidas gallivantin on sunny beaaches... thaa't mistaken. Who's to look after t'lotment? Ger away wi thaa—wer might goa tur our Lizzie's, i Morcam, if ther's a hawf day trip."

Capt. Thompson also sends an article which deals, in the main, with Boiler House efficiency, and if space permits this will be summarised in a future issue.

\* \* \*

## HELP FROM TOWYN

The Senior Executive Officer at Towyn, Mr. A. G. Jones, kindly offers advice and help in securing accommodation for any GRIDIRON GAZETTE reader who wishes to spend a holiday in Towyn or Aberdovey. Please write direct to Mr. Jones.

## WARRINGTON NOTES

The Warrington Social and Benevolent Fund is on a voluntary basis, and employees may contribute at the rate of 3d. per week. Cases of sickness and hardship are dealt with through a Committee elected by members. Occasional outings, particularly centering on bowling and fishing, are held, while indoor functions such as dances and such occasions are also part of the programme. The present Honorary Secretary is Mr. W. Jerams, and the Honorary Treasurer is Mr. R. Evans.

Last season's football team played with borrowed equipment, with a borrowed ball, on a borrowed ground but without borrowed players, and did quite well.

The cricket team have entered the J. E. White Knock-Out Cup. The Honorary Secretary is Mr. D. Green, who is also the Captain. As no ground is available, only away fixtures can be arranged. Any other part of the Division who can raise a team is hereby challenged.

D. GREEN,  
HON. SEC.

\* \* \*

## IS FOURPENCE TOO MUCH?

Electricity House,  
Wallasey Road,  
Wallasey.

If I may be permitted to pass a personal opinion, I would say that I consider the charge for GRIDIRON GAZETTE excessive. I am aware, of course, that 4d. per month is negligible but if it would be possible to distribute the magazines free of charge, it would have a wider circulation and reach all employees.

The cost of publication could be met by advertisements.

Yours sincerely,

C. E. BROWN,

(Local Correspondent, Wallasey).

[Editor's note.—We do not quite follow our correspondent's argument. If fourpence is "negligible," how can it be "excessive"?

\* \* \*

## WHISPERS MADE IN THE MOUNTAINS

Bryn Crafnant,  
Trefriw.

Thank you for your kind invitation, in the last issue, to come closer and whisper. I assure you, Sir, there is a whispering campaign going on in North Wales. Maybe you know about it, maybe not. Still, it's here—mind you, as yet it's only a whisper. M.P.s and Councillors are whispering about a Welsh Parliament, or some form of decentralisation, or a Welsh Secretary of State. They want to keep their drinking water and their "hydro-electric water," plus what they get from the Grid (excuse me, B.E.A.), for Wales.

"Hands off Wales," is whispered everywhere, and it has been taken up in the remotest parts. A sheep farmer from the Eryri mountains whispered to the wireless bloke who charged his accumulator: "Mind you fill it right up, man—and for Heaven's sake put more Welsh in it!"

Yours faithfully,  
J. P. OWEN,  
Shift Engineer, Dalgarrrog.



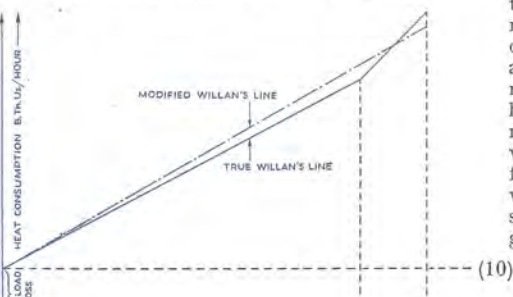
We "look forward," this month, to higher efficiencies. Although our Hydro and Diesel stations contribute a valued proportion of the Division's output, it is to the thermal stations that we must look for the largest share of "kWh sent out." How is their efficiency measured and judged? An expert tells us something about Performance Factors.

It is impossible for a station with old and inefficient plant, however well run, to obtain the thermal efficiency figures of a large modern station and a scheme of estimating "Performance Factors" has been developed to show the quality of the performance of each station whatever the type of plant installed. At the same time the "Overall Heat Rate" of each set, (i.e., the total quantity of heat which has to be supplied to the set and its associated boilers to generate a unit of electricity) is obtained and this is used, together with the cost of heat at the station, to provide the Control Engineers with the generation cost on each machine so that they can load the stations economically.

## Performance Factor

The "Performance Factor" of the station is simply the ratio, as a percentage, between the calculated minimum heat requirements of a station to carry out (under the best conditions) a month's generating programme, and the quantity of heat which was actually supplied.

To calculate the heat requirements of each set, use is made of a simplified "Willan's Line," as shown in the figure. The "true" line shows the relation between the total heat required by the set, and the load carried; and it will be seen that the heat to be supplied consists of a constant amount, the "no load loss," and a variable amount which depends on the load on the set. (Due to the changing slope of the line, we should need to know the number of units generated at each particular load



to calculate the total heat required by the set to carry out a given programme and so a simplified line, of constant slope, is used.) The error thus introduced is small and, once basic figures have been agreed for each set, all we need to know is the hours run by the set and the units generated. The heat required by the set to generate its programme is then simply the "no-load loss" times the hours run, plus the units generated times the additional heat required to generate each unit, which can easily be derived from the diagram.

## Calculating the Heat

We can thus calculate for the whole station the heat which was theoretically required by all the sets to generate the actual programme and if this total is divided by an agreed figure for the efficiency of the associated boilers when in a clean condition, we have the total heat required by the station to generate the specified output under the best conditions. This, however, takes no account of the heat which is lost by "banking" boilers or bringing them up to pressure before they are put into service and, based on experience, fixed amounts have been agreed for these items depending on the size of the boilers and the time involved. Adding these allowances to the figure already calculated gives the calculated minimum heat requirements of the station, and the ratio of this figure to the actual heat supplied to the station, which is available from the station records, is the "Performance Factor" for the month. If the basic data is correct there is no reason why the "Performance Factor" of the older and smaller stations should not equal that of modern stations.

In making these calculations we have already gone some way towards finding the "Overall Heat Rates" of the individual sets as we have obtained, for each machine, the heat theoretically required during the month. By adding these figures, of course, we can find the heat required by all the sets in the station to generate the month's programme. If, from the total heat supplied to the station during the month, obtained from the station records, we now deduct the calculated allowances for boiler banking, etc., already estimated, we obtain the actual heat supplied to the station which was directly required for generation. We therefore know the ratio

# LOOKING

# FORWARD

between the heat theoretically required by the sets and the heat actually supplied to them, together with their boilers, directly for the generation of electricity during the month; if we now multiply the agreed heat consumption of each set alone at M.C.R. by this ratio, we get the "Overall Heat Rate" of the set. This figure has been calculated for practically every set in the country and the results obtained are far more consistent than the figures originally used which were variously based on guarantee figures, test results or estimates.

The limitations of the scheme are known, but a quick method of reaching a reasonably accurate result was preferred to a detailed calculation which, due to the inaccuracy of some of the basic data, might give results of no greater value.

The main purpose of the scheme is to enable a running check to be kept on the performance of each station—and the first step towards remedying any deterioration is to know that it is taking place. Excessive consumption in connection with



the banking of boilers should also be revealed, and this should lead to the adoption of the most efficient methods at each station. Finally, the scheme should give some encouragement to the operator of an old station with inefficient plant which always appears near the bottom of a list of station thermal efficiencies, but which may, in fact, be as well run as the station at the top.

## Odd Interview

I can hardly describe how annoyed I was that Saturday afternoon. I'd already worked on until 5 o'clock and my girl was waiting to be taken out.

And now the Electrical Superintendent said he would like me to get all the relays checked over while No. 4 set was "off the bars!" I told him what I thought of the idea.

I worked on. My thoughts were pretty far from negative phase sequence relays until I found one with a defective contact. Just then the Divisional Controller appeared at my elbow.

"I've been talking to the Electrical Superintendent," he said, "and he told me you'd agreed to stay and check over the protective gear on No. 4. Now I only want . . ." I broke in. "That's all very well, Sir, but you see . . ." He smiled. "Just a minute. I only want to say this. In this Division we want to be at the top of every tree—and one of them is the percentage of faults cleared correctly by the protective gear. Now it's only by the aid of chaps like you, who have the interest of the job at heart, that we shall

## The Late Mr. W. J. Green

In our last issue, we briefly mentioned the death of Mr. W. J. Green, who had been employed as a telpher operator at Percival Lane Power Station.

Mr. Green was 61, and had suffered a long and painful illness. He was born in Runcorn, and in his younger days was a cycling enthusiast of more than local fame. His earlier working life was spent at Runcorn Docks, while he had been at the Power Station for some six years. He leaves a widow, two daughters, who are married, and four sons. The funeral took place at Runcorn Cemetery on May 5th, 1948, and among a large company at the graveside were Messrs. Robinson, Thompson, Ellis, Sheen, Rands, Owen and Thelfall, from the former Mersey Power Company.

make sure of achieving our target . . . but you were going to say . . . ?"

"Well," I said, "it's . . . it's . . . turned out nice again, hasn't it?"

O. V. ERLOAD.