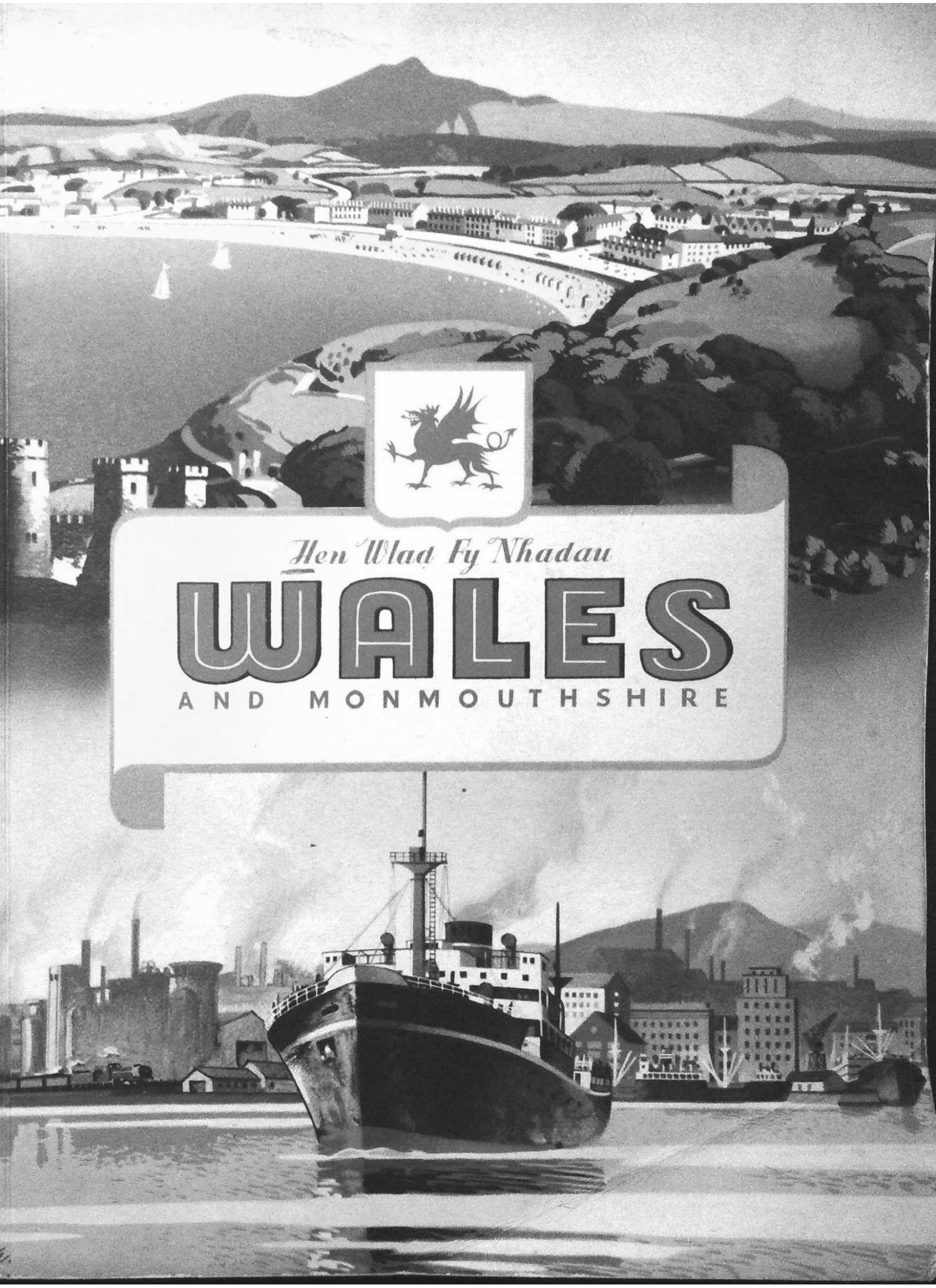
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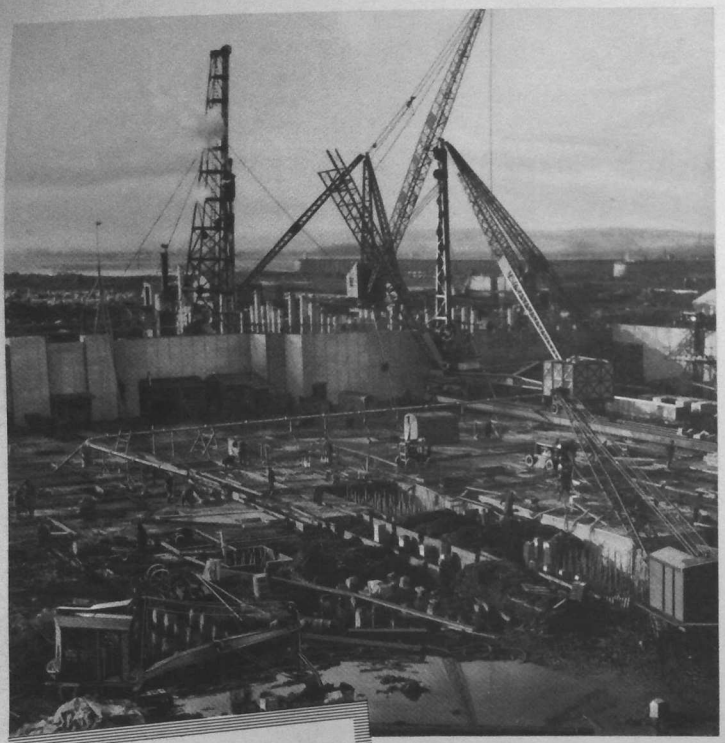

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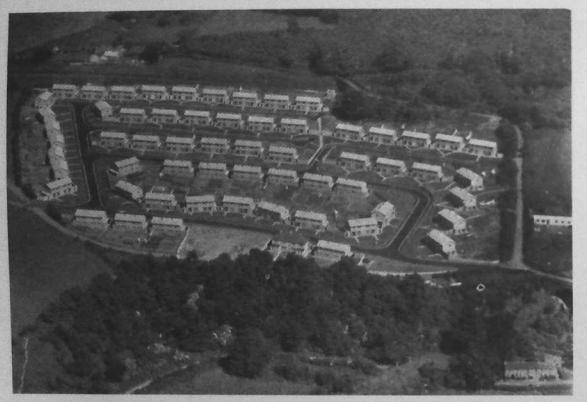

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WALES
AND MONMOUTHSHIRE

An Illustrated Review

Edited by D. J. DAVIES

The
OFFICIAL HANDBOOK
of
THE NATIONAL INDUSTRIAL
DEVELOPMENT COUNCIL OF
WALES & MONMOUTHSHIRE
LIMITED

PUBLISHERS · ED · J · BURROW & Cº Lᵀᵈ
CHELTENHAM AND LONDON

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Photo: Craely, Cardiff

Alderman GEORGE WILLIAMS, C.B.E., J.P.
Chairman of the National Industrial Development Council of Wales and Monmouthshire Ltd.
Lord Mayor of Cardiff, 1950/51

FOREWORD

By Alderman George Williams, C.B.E., J.P.

Chairman of the
National Industrial Development Council of Wales and Monmouthshire Ltd.

IT is with great pleasure I contribute this Foreword to the new and enlarged Edition of our Industrial Review of Wales and Monmouthshire.

"Hen Wlad Fy Nhadau" is near and dear to all Welsh folk, whether in Wales or in the far corners of the earth where they have carried their memories of the homeland.

In this volume we have recounted some of the industrial achievements and developments in Wales and Monmouthshire and a careful perusal will demonstrate the great advances which have been made during recent years in providing a balanced industrial programme. Wales and Monmouthshire through this diversity of industries can look forward confidently to steady progress and prosperity.

Through continuous propaganda by our Council also, the many attractions for the Tourist and Holiday-maker are becoming increasingly known and appreciated by the thousands who visit our seaside resorts, spas, and inland beauty spots.

Should you wish to know more about the industrial, scenic or cultural amenities of Wales and Monmouthshire, our Council will gladly place its services at your disposal.

"CROESO I GYMRU."

George Williams

Chairman.

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LOOKING AHEAD

THE NATIONAL INDUSTRIAL DEVELOPMENT COUNCIL OF WALES AND MONMOUTHSHIRE LTD. was inaugurated in August, 1932, by the various Local Authorities of Wales and Monmouthshire, supported by Local Development Committees, Employers' Organisations, Labour Organisations, Joint Stock Banks, Electric and Gas Undertakings, Chambers of Commerce, Chambers of Trade, Railway and Dock, etc., for the purpose of helping existing industries and the attraction of new ones. At that period the basic industries of South Wales and Monmouthshire were suffering severely from the effects of world-wide depression.

The Council fully realised the difficulties of the task confronting it, one needing the fullest co-operation of everyone interested in the welfare of the area.

Wales for years had been chiefly dependent upon its coal, iron and steel and tinplate industry so that when those great industries were under the cloud of " reduced trade " the whole area suffered.

The National Industrial Development Council therefore decided that future prosperity should not be looked for through the revival of those industries only, but that every effort should be made to encourage the building up of a system of light industries.

Whilst naturally depending to a great extent upon the great basic industries, Wales and Monmouthshire could boast of a variety of subsidiary industries whose activities gave employment to a large number. A much better balanced industry was necessary, however, in order to avoid future mass unemployment.

Prior to the war a number of light industries were settling on the Government-sponsored Trading Estate at Treforest, Glam., where factories were being erected to meet the demand. The war period naturally increased the flow of new industries into Wales and Monmouthshire. Many of these Government war factory estates have now been turned over to civilian goods production with the result that a large number of firms have become established at the Trading Estates at Hirwaun, Bridgend, Wrexham and the new estate at Swansea.

In addition to these Trading Estates large numbers of factories have been and are being erected in selected areas throughout the Principality, which when completed, and in production, will go very far to ensure employment for our people.

The firms now established in the Principality are producing an exceedingly wide range of products, some even new to Great Britain, and a fuller appreciation of the great variety may be secured by a perusal of our publication *Made in Wales*, a Classified Directory of Products and Manufacturers of Wales and Monmouthshire, copy of which may be obtained upon application.

The Council, by means of the Welsh Industries Fairs in Cardiff and London, by its Mobile Pictorial Exhibition and various other propaganda methods, renders great assistance in making Wales known and also the products which she can now supply.

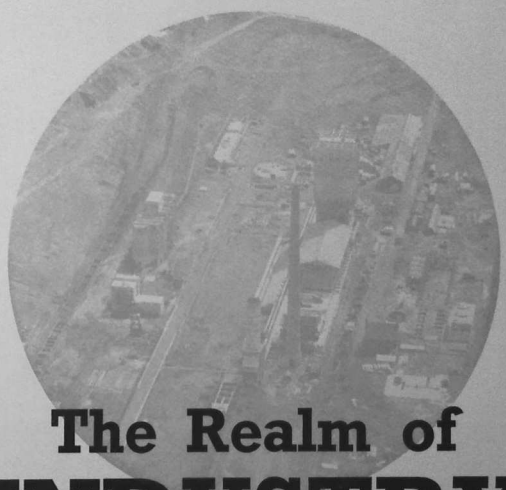
The transport facilities of the area are very highly organised both as regards rail, air and road, while the South Wales and Monmouthshire ports are favourably situated for overseas trade to and from the Midlands of England, the sea distance to the majority of ports being shorter (in many cases hundreds of miles less) than from other British ports, with regular and frequent direct lines of steamers to practically all parts of the world.

While much has been written about the industrial development, etc., there is another side to which attention should be drawn, namely, the appeal to the tourist. Here is a land of exquisite beauty and historic fascination with a panorama of lovely coastline and fine sandy bays. Every advantage has been taken of these natural beauty spots, which attract large numbers of visitors annually.

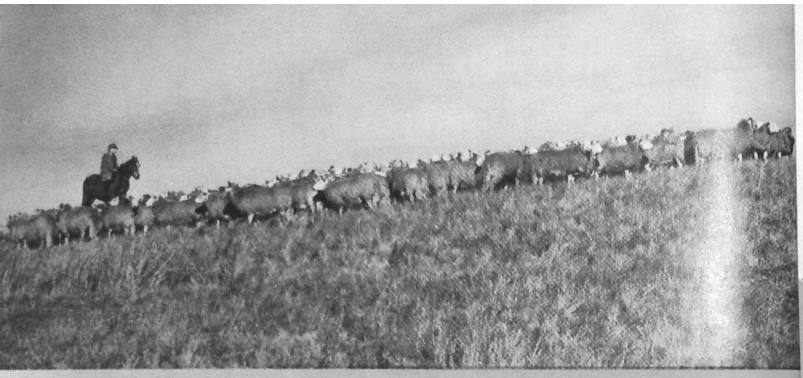
A new National Holiday Guide to Wales has been produced by this Council and a special Committee operates in order to " tell the world " of the wonderful attractions Wales offers the tourist and holiday maker.

A manufacturer seeking a suitable locality in which to expand his business will find in Wales and Monmouthshire every facility which he requires—*plus* that *extra* advantage not found elsewhere and which will make all the difference to his success.

There are profitable opportunities for additional manufacturing and distributing plants, and to concerns considering a location, the National Industrial Development Council of Wales and Monmouthshire will gladly furnish accurate surveys and information regarding the facilities afforded, while the unique local knowledge and services of our own industrial experts are also offered without charge for consultation and advice.

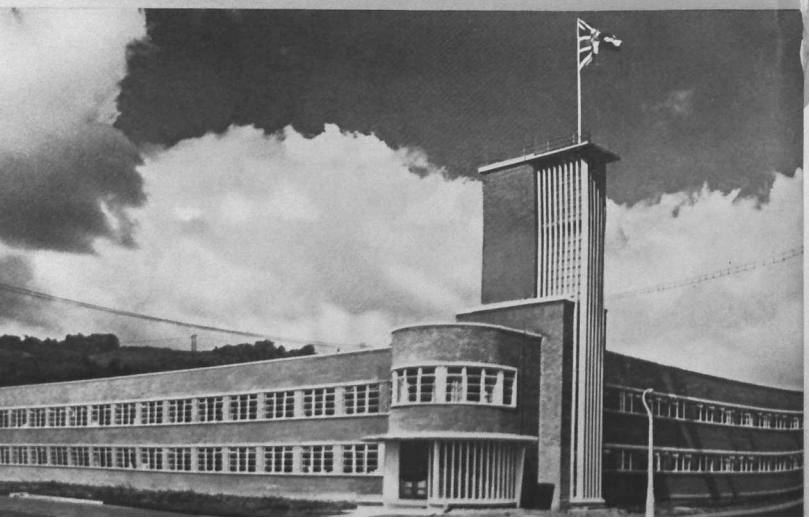


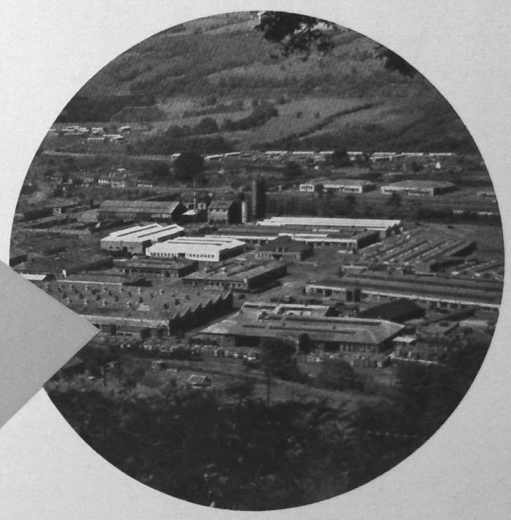
The Realm of INDUSTRY



THE NEW OUTLOOK

for Wales





Wales has to-day a brighter outlook than at any time in the present century. Its problems are by no means all solved, but a great reconstruction has taken place and industry as a whole now has firm foundations. There are opportunities still in Wales for new Industry.

THE NEW OUTLOOK FOR WALES

AS we enter the second half of the twentieth century it is instructive to look back over the last 100 years of industrial development in Wales. As the Great Exhibition of 1851 opened, Wales was moving rapidly along the road that was to lead to a highly specialised industrial economy, enjoying an immense but illusory prosperity. In the first three-quarters of the ensuing century all went well. A vast population concentrated upon the coalfield of Glamorgan and Monmouthshire, and to a lesser degree upon the smaller coalfields of Flint and East Denbigh, or in developing industrial areas based upon slate quarries in Caernarvon and slate mines in Merioneth. Within these industrial areas, employment opportunities were almost equally concentrated. As late as 1923, for example, two-thirds of the working population of South Wales were engaged in the production or transportation of coal, steel and tinplate. Moreover, production was for a few specialised markets and at the mercy of changes in international demands.

World Trade Contracts

The last quarter of the century opened disastrously. The export industries were burdened by an over-valued currency. Markets lost through the interruptions of the First Great War were never regained. World trade became choked by tariffs, quotas, currency blockings and other restrictions bred of growing economic nationalism. Welsh coal suffered successively from the competition of Reparations, fuel oil, and the subsidised exports (and low wages) of European coal producers. More overseas markets were lost through the General Strike, foreign developments in hydro-electric power, and technical improvements in coal burning. In South Wales, exhaustion of the older mines, closure of others for financial reasons, and the movement of steel works towards tidal water, left whole communities without alternative employment. The tinplate industry experienced a concentration movement that left many of the older works idle. In North and Central Wales a painful contraction of the slate industry was enforced by the competition of cheap imported slates, the vagaries of building policy, and the rise of substitute building materials.

In such circumstances, a short post-war boom which broke in 1923, was inevitably followed by a period of chronic depression which lasted almost to the Second World War. Over the whole of Wales, three workers out of every ten (in places as many as six out of every ten) remained unemployed for years on end.

In 1931 the Board of Trade requested the University College of South Wales to conduct an Industrial Survey, the results of which showed that survival as an economic entity demanded the introduction of entirely new industries that would not only absorb the existing unemployed but make future depressions less probable by building up a more diversified industrial structure. It was, however, to the National Industrial Development Council of Wales that the task of pioneering fell. Formed in 1932 by the association of some of the principal local authorities for the purpose of self-help, the Council gradually broke down much of the prejudice against Wales as a location for new industries, by vigorous propaganda, by guidance to prospective industrialists, by co-operation with and pressure upon Government Departments.

A special investigation by the late Lord Portal, and further public agitation, led to the passing of the Special Areas Act in 1934 whereby certain rather arbitrarily selected parts of South Wales were placed under a Commissioner, charged with their social improvement and economic development. This Act, however, did not become really effective until amended in 1937. "Even then," to quote the Report of the Welsh Reconstruction Council, "important industrial areas in the North and West, whose need was almost equally great, remained excluded from its benefits, as were all rural areas." Nevertheless, for those areas to which the legislation applied, it brought about the beginnings of a new, diversified industrial structure.

The Council co-operated with the Commissioner throughout the currency of the legislation. At his request, the "Second Industrial Survey of South Wales" was undertaken under the auspices of the Council; the possibilities of producing oil from coal were examined; and by radio, magazine and industrial exhibitions, the potentialities of the Special Areas were brought to the notice of industrialists at home and abroad.

The Advent of Light Industry

It was during this period that the Commissioner

decided to use the powers conferred by the 1937 Act to erect factories with State finance, principally by the establishment of the Treforest Industrial Estate. About seven miles from Cardiff, at a point where the Taff valley broadens out, he built (through the agency of a Government Industrial Estate Company) a group of modern factories, attractively laid out, with roads, railway, water, gas, steam, adjacent power station, canteens, restaurant, garage, post office and banks. It was felt that the opportunity to save capital by renting a factory rather than locking up resources in its purchase would prove a powerful inducement to the industrialist to locate himself here. Later, the provision of such Government-built factories was slowly extended to a small number of individual sites in the Special Areas.

"Priming the Pump"

By the outbreak of war in 1939, more than 50 new firms had been settled at Treforest Estate and were employing some two thousand workers. By itself this would have been of little consequence. What did matter was that they had introduced new processes and products hitherto unknown to this country and trained Welsh workers to entirely new crafts. Their function was to "prime the pump"—to get a flow of new enterprise *started* in South Wales. The Council and its advisers knew that once this was done, the rest would follow. That faith has proved to be well-founded.

Those pioneer industrialists, British and foreign, who "risked" locating their new factories in South Wales, were surprised and delighted at the excellent performance of Welsh labour which had never before worked in factories. The skill, energy and character of the people of Wales was clearly an unsuspected capital asset of the highest value. At Treforest they tackled the production of articles so varied as zipp-fasteners, gloves, butterscotch, carbon paper, metal alloys, roller skates, hairdressing equipment, abrasives, flexible tubing, cigarette papers, varnish, watch straps, lock-knit fabrics, switchgear, chrome leather, silk-printing, brushes, mineral waters, manicure sets, silk shawls, music strings, bedding and artificial flowers.

At Dowlais they produced wood buttons and hosiery. High in the Rhondda valley they turned to clothing manufacture on a large scale. On the borders of Monmouthshire it was biscuit-making and light engineering. At Aberdare ex-miners turned successfully to the production of cables, and at Pontypool they produced plate glass.

Outside South Wales progress was small except on Deeside, where vast new enterprises were being built up, based on the rising popularity of rayon.

With rearmament getting into its stride, developments entered their second phase. Influenced partly by labour and partly by strategic considerations, more and more English firms became interested in new factories in Wales. The Government itself began the erection of Ordnance and "shadow" factories. After the outbreak of war, it was only the absence of modern factory premises in an area devoted in the past to a few simple heavy industries, and inability to erect new premises in wartime conditions of scarcity, that prevented Wales from having even more war factories than it actually did. Even so, at the war production peak in 1943 there were at least 130,000 people at work in entirely new industries connected with the war.

Some of the new concerns were destined to close eventually, but a new generation of factory workers was being trained, a new range of skills acquired, and the process of bringing the women of Wales into industry went rapidly forward. Welsh workers showed that they could produce vital raw materials, such as aluminium, magnesium, ammonia and carbide. They were equally at home on high precision jobs, ranging from teleprinters to radar. They made explosives, guns, mines, and torpedoes; they assembled trucks and aircraft; they equipped the assault forces with everything from parachutes to landing-craft.

Moreover, this wartime phase of industrial development was not confined to the south. Practically every sector of Wales that was physically suitable for industry played its part.

All this was a substantial achievement, but carried within itself certain future dangers. In particular, it was a development as one-sided as anything that had happened in the past. Something like 70,000 of the workers in new industry went into simple explosives manufacture, compared with about 38,000 in general engineering and less than 20,000 in motors and aircraft. Inevitably, with the coming of peace, this explosives work disappeared, and to switch such factories and workers *quickly* to suitable alternative employment was a task of great magnitude.

From War to Peace

The difficulty was increased because the sudden collapse of the Japanese war removed the "cushion" effect which a tapering end to hostilities would have given. Nevertheless much was done to consolidate the wartime gains, although a considerable volume of transitional unemployment was inevitable, and made worse by the prolongation of shortages of essential materials, power, and skilled labour, which it was hoped would pass away with the war.

In 1945 responsibility for industrial reconstruction in the whole of Wales passed to the Board of Trade, and the Special Areas legislation was replaced and extended by the Distribution of Industry Act. Although still difficult, the task was lightened by the fact that, in the immediate post-war years, there was a flood of new industrialists willing to go to Wales, because they were unable to get labour and building facilities in the English industrial centres they had once favoured, and because they now *knew* that they could find in Wales production resources equal to those of any part of the Kingdom.

Help from the Treasury

The Board of Trade sought to make good the shortage of industrial premises by many means:

(*a*) conversion of the two largest R.O.F.s to Industrial Estates;

(*b*) allocation of smaller Government factories to private firms;

(*c*) building of a new Industrial Estate;

(*d*) construction of new factories with Government finance on individual sites;

(*e*) encouragement of privately financed new building;

(*f*) maximum utilisation of existing private space, even to the extent of pressing into industrial use old social clubs, cinemas, market halls, schools and workhouses.

(*g*) Moreover, in areas which threatened heavy unemployment but were relatively unattractive to industry, a proposal made years ago by the Industrial Development Council was put into effect, namely the erection of about 50 factories, with Treasury finance, *in advance of demand* from any definite tenant. Under existing conditions of demand for space, it was hoped that when complete, the mere presence of modern ready-to-occupy factories would be both an inducement to the outside industrialist and a challenge to local enterprise.

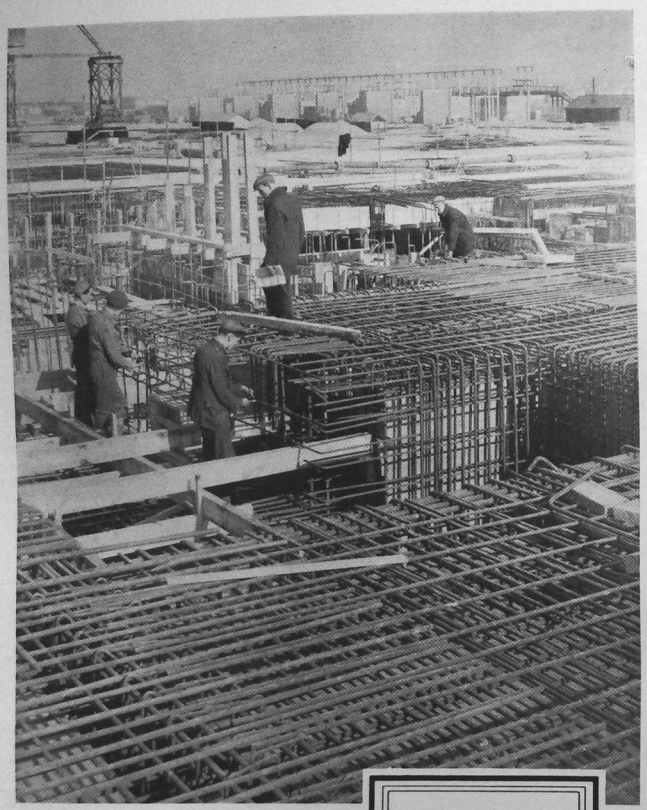
Let us now attempt a rapid tour of inspection of the *new* Industrial Wales. The picture which presents itself at the opening of the second half of the twentieth century is something like this:

In the Western Anthracite area, wartime establishments producing heavy chemicals and steel pressings have been retained together with a thousand workers servicing the Fleet Air Arm. New factories opened since the war are turning out hosiery, upholstery springs, wooden furniture, welding studs, leather travel goods and cycle accessories, metal bottle-caps, and optical lenses, while others are undertaking the printing of textiles, the welding of agricultural tractors, or will service the giant new tinplate and sheet rolling mills of Margam and Trostre.

At the top of the Swansea Valley, three new units will be making watches, clocks and clock movements; another will be producing cycle coaster hubs; and a third will specialise in dresses. Smaller units are engaged in wagon repairing, fancy dress stitching, electrical equipment repairs, general founding and the production of light alloy traffic signs. Lower down the Valley the wartime light alloy factory has been continued and joined by new firms producing castings, furs, pen nibs, adhesive tape, zipp-fasteners, bathroom fittings, joinery, potato crisps, synthetic sponges, asbestos panels, agricultural implements, stained glass windows, aluminium houses and wire. At Fforestfach, near Swansea, an entirely new Government Industrial Estate is arising with factories devoted to the production of clothing, metal toys, dental burrs, switchgear, steel strapping, brushes, machine tools, fire extinguishers, and possibly other lines later.

Incidentally, Smiths Potato Crisps Ltd. pay tribute to the help given them by the authorities when establishing their Swansea factory in 1948. Even though the industry caters for the home market only, a special quota of oil was granted, which, although not enough to satisfy demand, enables the firm to employ a staff of about 130.

In the neighbourhood of Aberdare the pre-war cable works has added an engineering branch, and small new units will be found producing ornamental glassware and bus and coach seats. The Hirwaun R.O.F. has been converted into an Industrial Estate housing about 30 firms. It is impossible to mention more than a fraction of the many interesting items produced: concrete lamp columns, glass containers, electric meters, cameras, radio and television equipment, printing machines, optical instruments, and small tools. In the Neath Valley the refining of petroleum products has been extended and new units are engaged in the production of water meters, hollow-ware, clothing, aluminium sheet and foil, motor coach bodies, and cardboard boxes. At Port Talbot, apart from vast developments in the steel and tinplate industries, wartime production of calcium carbide continues, and new lines will include steel ceilings, bakers' machinery, structural engineering in light alloys, chemicals, and plaster boards. Not far away, at Cymmer, a large new factory is devoted to the production of artificial jewellery. In the Llynfi Valley a new mill will be



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Construction of heavy reinforced concrete foundations for the Cold Reduction Plant at Abbey Works for the Steel Company of Wales Limited.

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producing tissue paper. In addition there will be factories making cosmetics, cosmetic containers, bedroom furniture, and ladies gowns. In the Ogmore Valley it is hoped to have a substantial unit on production of cardboard containers.

In the neighbourhood of Bridgend, new firms will be producing tiles and prefabricated concrete products. The huge R.O.F. site, that during the war years employed 35,000 workers on shell filling, has been ingeniously converted into a Government Industrial Estate that will house nearly a hundred different manufacturers. Here again, only a few interesting examples can be given, taken at random from the list of products: vacuum flasks, furniture, collar studs and cuff-links, concrete waterproofers, metal plating, coachbuilding, hardware, knitted outerwear, drugs, wax substitutes, plastic fancy goods, footwear, electrical transformers and switchgear, automobile engineering, maltose confectionery, electric light fittings, steel shelving, welding electrodes, oilskins, electric motors, and handbag mirrors.

A Changed Outlook

A new era of prosperity for Merthyr Tydfil has been ensured by extensions to the " Special Area " factories making buttons and hosiery; by new factories to make washing machines, ceramics, electric lamps, thermostats, glassware, confectionery, cardboard containers, underwear, and bus bodies; as well as by wartime factories converted to the production of mechanical toys, agricultural implements, and chemicals.

Not far away is Mountain Ash, till recently a purely coal-mining area, but now the proud possessor of new factories making radio cabinets, metal shop fronts, frocks, carpets, upholstery, hand-woven ties, and table jellies.

Nowhere will the changing face of South Wales be more apparent than in the Rhondda Valley, once famous for its collieries on which it was completely dependent, but now fast becoming a centre of numerous other industries. In the Greater Rhondda the visitor will not fail to be attracted by the expansion of the Treorchy clothing factory, the wartime radio valve factory now engaged on electrical equipment and dry batteries, and new units producing concrete reinforcement, structural steelwork, cycles, furniture, hospital equipment, tube-making machines, seating and motor springs. Crossing to the smaller Ferndale-Porth Valley it will be possible to see the production of moulded rubber parts, cellulose finishes, mattresses, and bookbinding; and extensions for the manufacture of zipp-fasteners, tinsel, artificial flowers, and milk processing.

In the lower Taff Valley new extensions to the clothing and leather goods factories will be found at Pontypridd, as well as new firms in old premises producing potato crisps, watch straps, spectacle frames, scientific glassware, and table jellies once again! At Treforest Estate there will be few completely new factories, although notable additions since the war will be rubber tyre re-treading, furniture veneers, zipp-fastener machines, radio, plastic boxes, and non-ferrous castings. Finally, at the foot of the Valley, engineering units expanded during the war will be retained and supplemented by small new firms in existing premises producing, for example, packing cases and pre-cast concrete goods.

It is not possible to absorb the whole of the Rhondda's working population within the Valley, owing to shortage of suitable sites, and provision has therefore been made in the Llantrisant and Tonyrefail areas by the introduction of factories to produce furniture, special chemicals, pencils and leads, gloves, concrete products, electrical ceramics, spectacle frames, and musical instruments.

The coastal towns of industrial South Wales are now so popular with industrialists that new jobs are in sight far in excess of the numbers likely to be available to fill them. At Barry, for example, there have been important developments in the plastic chemical industry by a world-famous concern, together with newcomers producing underwear, lifting gear, and gloves. The prosperity of the City of Cardiff will be ensured by the continuance of the R.O.F. on Government work, by new buildings and conversions, by expansion of existing firms and the fullest utilisation of existing buildings. To increase the flow of building materials, new units will be producing metal windows, hinges, aluminium rainwater goods, structural steelwork, joinery and prefabricated houses. Engineering products will include bearings, open-cast coal machinery, aero test-benches, photographic equipment, engineers patterns, automobile engineering, electric motors, sheet metal work, coachbuilding, chains and sprockets, saws, and metal finishing. Well-known English firms are producing consumers' goods such as biscuits, shoes, wood and rubber furniture, dresses and canned foods; another has brought to the area the production of silk and nylon yarns.

The Invasion Continues

In the Rhymney Valley new factories will produce paints, clothing, cycle bells, bus bodies, toy motor cars, rubber goods, metal furniture and woven wire work. Converted war factories will continue with the production of mining equipment and woodworking machinery; while new firms placed in existing premises are turning

out artificial jewellery, footballs, artificial flowers, gloves, rubber clothing, straps and buckles.

Crossing to Newport and the Monmouthshire Valleys we reach the most popular of all areas from the point of view of incoming industries. Here the developments are so great that there is every prospect of a labour shortage. In Newport, further extensions to existing industries will provide an increasing flow of castings, water-heaters, steel sheets, brattice-cloth; while newcomers to the district will add hand tools and heavy batteries, clothing, straw boards, and chemicals. Nearby at Rogerstone, there will be substantially increased capacity for aluminium sheet and rod production, as well as new factories devoted to aluminium ladders, and clocks. The R.O.F. at Newport has turned to the production of cables, and the assembly of telephone apparatus.

At the tops of the Monmouthshire Valleys there will be much of interest, e.g. jointing material production at Abergavenny, toys and hand tools at Crickhowell; corsets in the great steel town of Ebbw Vale, and wheelbarrows at Abertillery. A special effort will be made to cater for the hard-pressed areas of Brynmawr and Blaina, by a large new rubber plant, by extensions for the existing bootmaking industry, and by the introduction of industrial felt and brassware. Further south, electric lamp fittings are produced in an old brewery, and haberdashery, metal toys, and telephone apparatus in new buildings at Newbridge Abercarn. Near Blackwood an interesting block of development is centred around the new factory now producing electrical apparatus, which is being extended and supplemented by new factories for production of corsets and bedroom suites.

Northwards again to Pontypool, on the edge of the coalfield, we are brought to the largest single development in Wales, the new factory of two million square feet devoted to the production of Nylon yarn. Nearby, the old R.O.F. at Glascoed will be retained on Government work. In the same district a new factory is making plush toys and the plate glass works has been extended.

A New Town Project

Between Pontypool and Newport lies another substantial block of development, so great that all available labour resources are mortgaged. Metal box factories, biscuit-making, foundries and brickworks are all being extended; the huge war factory that once produced aircraft turrets is making chassis components for a well-known English firm. New factories will produce dairy equipment and brass fittings. So great have been the developments and the consequent need for housing in this area, that it will contain the only New Town project in South Wales, namely Cwmbran.

Finally, even the inaccessible Blaenavon will have at least one new factory and an existing brewery converted to auxiliary production connected with the Brynmawr rubber developments.

The reader will by now be impatient to learn something of what the future holds for the large area of Wales that lies off the South Wales coalfield. Although less spectacular, the introduction of new industry is making progress here. In the Chepstow area, for example, the Admiralty's wartime explosives factory is continuing, and wartime manufacture of brushes and brush-making machinery grows apace. In Pembrokeshire the wartime mine depots are being retained on a small scale. New light engineering works at Pembroke Dock will offset the closing of the Naval Repair Base; and promising industries for the manufacture of handkerchiefs, scarves, and woollen tweeds have been established.

Agriculture and Industry

In all the rural areas the greatly increased mechanisation of agriculture during the war is now leading to the establishment of substantial servicing stations. Milk processing and treatment plants, too, have been set up in many areas.

During the war existing premises even in remote agricultural areas were pressed into industrial use, and it has been possible to retain a few even in peacetime; for example, precision instrument works at New Quay, die-casting and the extraction of vegetable drugs at Presteigne.

In the Severn Valley lowlands, wartime clothing and leather-goods industries show every prospect of expansion as the material situation improves. The large new tube factory has passed to an associated concern producing bicycles. Toolmakers coming from Birmingham under the pressure of war have no intention of leaving the area of their adoption. At Welshpool, a noteworthy piece of local initiative has secured the erection of two small factories devoted to sheet metal work and biscuit-making.

There are, of course, areas of relative failure, of which Merionethshire is perhaps outstanding. Geography and geology have here proved a difficult combination to overcome, and an effective substitute for the decaying slate industry has still to be found; although small units have been introduced to make carpets and ladies' clothing at Blaenau Ffestiniog, cardboard boxes at Trawsfynydd, seed-packing at Dolgelley, printing and cosmetics at Barmouth, and refrigerator parts at Towyn. There is also a prospect

of some expansion of rural industries with the help of the Development Commission.

The island of Anglesey, although predominantly agricultural, has secured some permanent industry. The clock factory has been extended at Holyhead and joined by an engineering firm and a manufacturer of hand tools. At Amlwch plans to extract chemicals from sea-water will provide much-needed employment. The flying-boat base at Beaumaris has been retained for the production of bus bodies.

Caernarvonshire, too, has its black spots, where slate has decayed and is (as yet) not replaced; but even here a contribution is expected from the advance factories in the Nantlle Valley, for which special exemption from the building ban has been granted. The same district, too, has promising small developments for the production of slippers and terrazzo tiles. The wartime industrial diamond industry at Bangor remains, and there, too, the wartime aero-engine factory has been switched to the production of electric motors, and a new foundry is being established. In Caernarvon town, new manufacturers of corsets, plasticised cloth, and electric light fittings have been attracted. Wartime boat-building is going on at Pwllheli, which also retains the production of textile machinery. A wartime petrol-can factory near Caernarvon is making concrete products, and at Bethesda a new factory has been built for an old-established Midland manufacturer of metal fittings.

So on to the coalfield areas of the North. In Wrexham new firms have established themselves in existing buildings to make clothing, commercial appliances, and leather goods. The pre-war milk-processing factory has been extended, and a huge new factory built during the war for light alloy work has been allocated to a famous Midland group of steel equipment producers. The most important development in North Wales, however, is taking place near Wrexham, on the site of the Marchwiel R.O.F. Most of this is to be utilised by a noted firm of toilet requisite manufacturers and for the establishment of a large new unit in the rayon and plastics industries, giving work to 4,000 people; but buildings have also been allocated to smaller firms making malleable iron castings, electrical condensers, fine chemicals, etc.

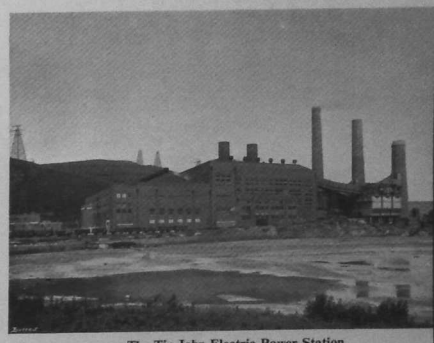
The Magnificent Civic Centre of Cardiff.

Photograph by Aero Pictorial Ltd.

On the outskirts of the coalfield area at Ruabon, continuous development is going on by a famous American firm producing pharmaceutical chemicals. Near Mold, in Flintshire, a large agricultural engineering business has been built up, and the old tinplate works will make formaldehyde. Other developments in Flintshire include a large new cement works, continued expansion and modernisation of the great steel undertaking at Shotton, and the rayon factories at Flint and Holywell. In the latter place, the largest unit in the Welsh textile industry is expanding. The making of spun-glass decorations has been introduced at Saltney; while the large aircraft factory at Broughton continues under the direction of a different firm.

Finally, there is the fringe of holiday resorts, stretching from Rhyl to Llandudno. There are small industrial developments here, even though the tourist trade remains paramount. Rhyl, for example, has small units engaged in the production of clothing and radio sets. Colwyn Bay has small concerns producing diamond tools, harmonicas, and rugmaking machines. At Llandudno Junction, one of the biggest wartime aircraft factories in the North is now turning out industrial refrigerators. The aluminium works at Dolgarrog has expanded slightly.

The catalogue is not complete but it is surely long enough to dispose for ever of the still current notions that Wales is still dependent on a few industries, that the new factories are solely concerned with "fancy goods," that they can employ only young female labour, and that they are operated by "mushroom concerns" that will collapse under the first adverse wind. It is not complacency but undeniable facts which force the conclusion that more has been attained than the early pioneers of the Development Council could have dared to hope for, when they set out on their task of rehabilitation nearly twenty years ago.



The Tir John Electric Power Station.

Few indeed among the Continental refugees who came to Wales armed only with commercial and industrial ability and an abounding courage have failed to build businesses that play a vital part in the export drive and provide much-valued employment. They have been joined by English concerns whose names are household words for stability, enterprise and efficiency:

Austin Motors, Morris Motors, British Overseas Airways, Imperial Chemical Industries, Crompton Parkinson, British Aluminium, Murphy Radio, Brocklehurst-Whiston, N. Corah & Sons, Tube Investments, Monsanto Chemicals, British Celanese, Distillers Company, British Nylon Spinners, Pilkingtons, Alfa Laval, Smiths Clocks, George Kent, Wiggins Teape & Co., Lines Brothers, Frederick Sage, Worcester Porcelain, Northern Aluminium, Enfield Cables, Rubery Owen, Saunders-Roe, Standard Telephones, Renold & Coventry Chain, and Royal Sovereign Pencils, to name a few. Nor are the smaller, less-known names necessarily unstable: the small cycle maker of to-day may be the Nuffield of to-morrow.

Neither is the standard low in terms of employment, whether it be in numbers, sex ratios, or working conditions. The latest available estimate of the Board of Trade is that the sum total of these and other developments will eventually mean about 95,000 jobs for males and 55,000 jobs for females, over and above the factory employment opportunities which existed in 1937. No allowance has been made here for the indirect employment thereby created in transport, warehousing, and professional services; nor employment for those who supply the raw materials; nor for the additional work given by the personal consumption demands of those thousands of Welsh workers now enjoying a decent wage-packet instead of the pre-war "dole" from employment exchange and public assistance committee.

Grave problems still await solution before Wales can enjoy "full employment." Many thousands of its present unemployed are disabled through industrial injury. Large numbers of the less seriously disabled are being absorbed into useful employment again, some in factories built by the Government, in respect of which a rent concession is made in return for the employment of an unusually large proportion of disabled; but many more are at work in firms receiving no Government aid. There remain those so severely disabled that they can never again hope to obtain work under ordinary commercial conditions. The visitor to Industrial Wales encounters nothing more heartening, however, than the sight of many of these at work in the special factories provided by a Government agency, Remploy Ltd., in which miracles of ingenuity in organisation and training enable these workers to produce, under ideal conditions, articles as diverse as

violins, office furniture, locks, step ladders, book-binding, and industrial leatherwork. Again, the vast developments in steel and tinplate at Margam and Trostre will have their darker side in that thousands of workers in these industries will become redundant at the older works in West Wales. Further large-scale new industries requiring a high proportion of male labour will be warmly welcomed in these areas.

Everywhere, the build-up of labour in the new industries already secured has been slowed down by inevitable building delays, material shortages, housing difficulties, the vagaries of taxation policy at home and import restrictions abroad, the need to switch from soft to hard currency markets, and the continued restriction of the home luxury trades. A diminished capital investment programme has delayed the coming of those major improvements in communications for which this Council has fought since its inception. But devaluation has given many of the new industries an opportunity to break into fresh markets, and the part which Wales is playing in the new dollar drive is no minor one.

For the moment, capital investment restriction means that new private factory building will be permitted only in exceptional cases, and that construction of new factories with Government finance is temporarily at an end; but from time to time excellent modern factories on Government Estates and other sites become available through changes in the original tenants' plans, and enquiries are welcomed from sound enterprises with a high export potential and a demand for predominantly *male* workers.

In the 1750's English industrialists swarmed to Wales in order to exploit her iron resources; in the 1850's the lure was coal, in the 1950's there are still human and material resources here that will provide a rich reward to those who have the courage and initiative to tap them. To such as these Wales is still the Land of Industrial Opportunity, and the pioneers' advice of a century ago still stands: " Go West, young man, go West! "

The Caerphilly factory of Welsh Metal Industries Ltd.

Reproduced by courtesy of Welsh Metal Industries Ltd.

Chapters of

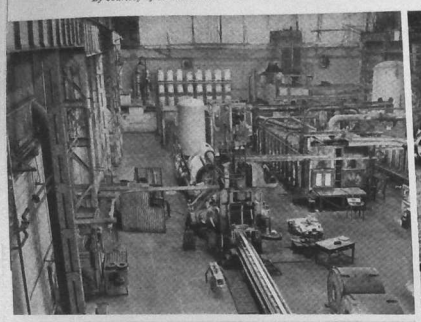
WELSH ACHIEVEMENT

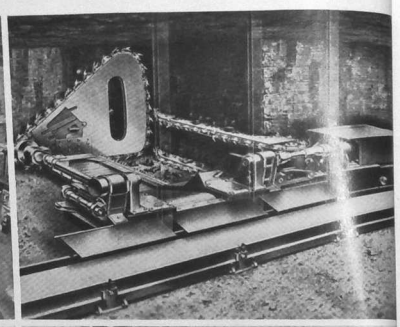
The Story of Wales sparkles with glorious achievement peculiar to each successive age, and the great problems arising from the modern Scheme of Things have been handled with vigour and vision—as the following chapters of "Welsh Achievement" show.

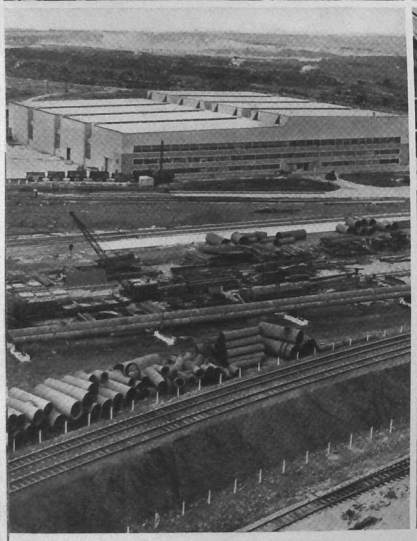
CIVILIZATION IS BUILT ON COAL AND METAL

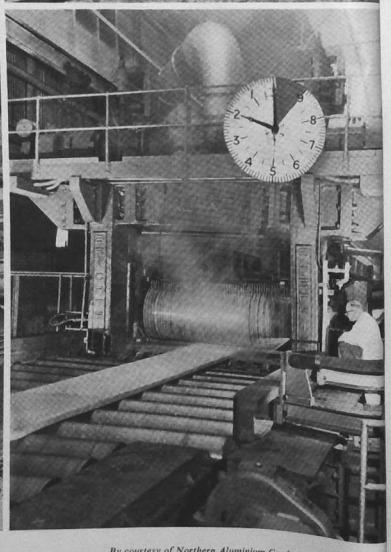
By courtesy of Northern Aluminium Co. Ltd.

Photo: The Associated Press Ltd.









By courtesy of The Steel Company of Wales Ltd

Above: **3,000 ton Press extruding aluminium alloy sections in the Rogerstone Works of Northern Aluminium Co. Ltd.**

Below: **The new Central Repair Shop of The Steel Company of Wales Ltd.**

By courtesy of Northern Aluminium Co. Ltd.

Above: **Britain's "Robot Miner"—a modern mechanical coal cutter.**

Below: **The intermediate mill in the hot rolling line of Northern Aluminium Co's. new £3,000,000 semi-continuous rolling mill at Rogerstone.**

THREE YEARS have now gone by since the coal mines of Britain were nationalised. Discarding the political implications of the word "Nationalisation" it can now be seen that the integration of the South Wales and Monmouthshire coalfield, i.e., the unified control which was largely accepted as being the only remedy for its long-standing ills, appears to be getting results.

To see this clearly it is necessary to look back over a period of almost 40 years—the most material factors in that period being two world wars and their disastrous effects on the coal export trade which was the life-blood of South Wales and Monmouthshire. On the eve of the First World War production of the coalfield stood at its highest point ever, 56,000,000 tons. The wholesale disturbance of trade and the social and industrial dislocation caused by the war appeared to have been overcome by 1923-24. Production was back almost at the 1913 level and the export trade reached a new peak figure. But conditions of world trade had changed fundamentally. The countries which had been deprived of Welsh coal for four years had taken steps to develop their own resources either by working their own coal supplies or by generating hydro-electricity.

A bust in Anthracite by ATRI BROWN

CHAPTERS OF WELSH ACHIEVEMENT

COAL

Moreover, oil and petrol were coming into ever-increasing use. Conversion to oil by the Royal Navy and by a large proportion of the Merchant Service had unfortunate effects on the market for South Wales steam coal, some of which actually carried the name "Admiralty." Also there were new competitors in the coal market, notably Germany and Poland, where exports enjoyed special state subsidies in order to undercut British prices and establish credit in other countries. There was, moreover, an unfortunate hang-over from the coal reparations clauses of the Versailles Treaty.

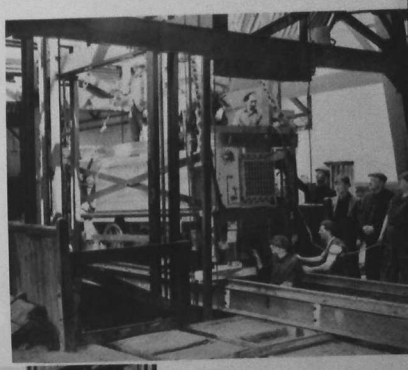
These, broadly, were the circumstances leading up to the six-months' strike in 1926, after which men left the South Wales industry in their thousands because they saw no hope or prospect for the industry. When the international exchange collapsed in the financial crisis of 1929-30 the Depressed Area period set in for South Wales and Monmouthshire. Desolation was general in the coalfield. Collieries closed or worked only spasmodically, It was not until 1937 that there was a brief interlude of better days and some sense of stability restored which appeared even to strengthen in the early "phoney" period of the World War II, when the demand for coal was sufficient to keep collieries working regularly, But when Norway, Denmark, Holland, Belgium and France fell one after the other and Britain stood besieged, holding on desperately to the life-line of the Western Approaches from the U.S.A. and Canada—the coal export trade ceased as it were overnight. Coal which had actually been loaded for export had to be thrown into the sea because ships were more urgently needed for defence. Collieries closed by the dozen and more than 30,000 miners were deployed to the Forces and the factories.

Although a few months later coal for the war factories became a priority demand, it has not been possible, and it will not be possible for many years, to correct

the unbalanced position created in 1940 and persistent ever since. When collieries had to be re-opened as a national necessity the overhead costs, of course, proved colossal because of the reduced manpower and the very much smaller output possible. The younger men had left before the Essential Works Order was put into effect. Productivity was at its lowest capacity. In addition commitments arising in respect of improved wages, the guaranteed week, and other considerations had to be met.

When the war ended the crisis of the South Wales coalfield remained essentially the same. Coal was needed as much for post-war rehabilitation as it has been for victory. Also there was the crying need to restore the export trade as much as possible in order to balance the national economy. But the year after the war ended and the year before nationalisation, more than £6,500,000 was required from the national pool, the Coal Charges Fund, in order to keep South Wales collieries in operation. The South-Western Divisional Coal Board which took over the administration of the deep mines of South Wales and Monmouthshire, the Forest of Dean, and the Bristol and Somerset coalfields on 1st January, 1947 had almost immediately to face new financial commitments caused by the most persistent blizzard for half a century, followed in the summer by the introduction of the five-day week—six days' pay for five days' work, and other improvements in working conditions. In the first year of operation the Board sustained a loss of £10,000,000. Losses in the second year, with production on the upgrade and with a better realisation from prices at home and abroad, were down by 50 per cent. For some months of 1949 the coalfield was working at a profit.

In face of the new low level in manpower, now barely 103,000, the Board has followed two main lines of policy—firstly the mechanisation and modernisation as far as possible of all the collieries where such principles are worth the application, coupled with the closure of inefficient units which would have little expectation



The first Diesel Engine to be taken underground in a South Wales pit, at Llanharan Colliery, 1948. Llanharen was the pioneer of horizon mining in Britain.

The Coke Oven and By-product Plant taking shape at Nantgarw Colliery. Treforest Trading Estate in the background.

of life in the normal way, secondly the re-organisation of the coalfield by vast development projects as at Nantgarw and Mardy, tied up with major individual colliery development projects as at Llanharan, Cefn Coed, Ffaldau and elsewhere. Good results are already accruing from one or two of these latter collieries, but it will be many years before the bigger schemes come to fruition.

Large scale developments are also planned for the Gwendraeth valley in the anthracite area, and for the Cwm colliery between Llantrisant and Pontypridd. The Southern limb of the coalfield, where there are reserves of fine coking coal sufficient to last out more than 200 years, is to be extensively mined. Hitherto it has proved almost impracticable to work this Southern crop because of its very sharply tilted seams, but the practice of horizon mining is being applied to overcome this difficulty.

To sum up, in three years the integrated working of the coalfield has arrested the decline in production which had been going on for so many years without prospect of correction. If there is one thing more than anything else that the National Coal Board has done for the South Wales coalfield it is to open out a prospect for it once more.

The suggestion has been made in some quarters that the coalfields of North Wales and of South Wales, including of course Monmouthshire, should come under a Welsh Board, but for geological and geographical reasons it has been found more practicable to include the North Wales coalfield in the North-Western Division, the administrative centre of which is in Manchester.

The North Wales coalfield lies in the counties of Flintshire and Denbighshire and extends from Point of Ayr colliery, on the Dee estuary, to Ifton colliery on the borders of Shropshire. Geologically, the Area is related to the neighbouring Lancashire coalfield. The fuel finds its market mainly in the North Wales industrial area, although some is shipped to the Isle of Man, Northern Ireland and Eire. There are eight collieries employing 8,500 men and with a total output of over two million tons a year.

The development of this coalfield will depend to a large extent on the result of boring now being carried out. Reconstruction schemes have been planned at Llay Main, Gresford and Point of Ayr collieries. Re-organisation at Point of Ayr will be dependent mainly on two considerations: the extent to which the area is faulted and the fact that some of the coal lies under the sea.

At Gresford, as part of the reconstruction scheme, a new washery has been erected.

The North Wales miners responded well to the joint production appeal made in the Autumn of 1949, a fact that augurs well for the future of the coalfield.

A Mills Horizontal Straightening Press of 100 tons capacity, extensively used in the mines for on the spot bending and rectifying of tramway rails, roof beams and steel props.

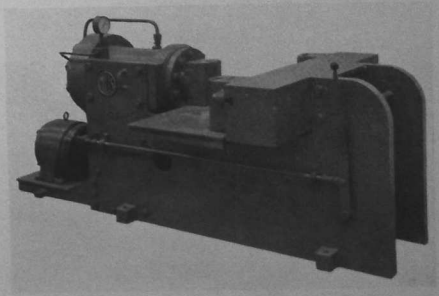


Photo by courtesy of John Mills & Co (Llanidloes) Ltd.

THE CONTINUOUS STRIP MILL AT EBBW VALE. Richard Thomas & Baldwins Ltd. are the largest producers of steel sheets and tinplate—and the only producers of cold-reduced tinplate—in the British Isles.
Furthermore, they have the only electrolytic tinning line in Europe.

CHAPTERS OF WELSH ACHIEVEMENT

IRON, STEEL & TINPLATE

With acknowledgments to Dr. P. M. MacNair, B.Sc., Ph.D.

IRON was probably worked in Wales by the early inhabitants before the dawn of the Christian era; and certainly by the Romans during their occupation. The discovery of coins and the existence of slag dumps show that the Romans were making iron in the Forest of Dean and in the district around Caerleon and Pontypool. Throughout Norman times and the Middle Ages there are several references to iron manufacture in South Wales which was conducted mostly for the production of household utensils and agricultural implements or for war purposes. An account of the practice in 1531, as worked for King Henry VIII, showed that it took nine men working 12 to 14 hours per day to make 2 cwt. of iron.

During the first 1,750 years of the Christian period iron production was associated with easy mining of high grade ore where it outcropped on the earth's surface, the existence nearby of a plentiful supply of wood for smelting, and running streams to supply water power for driving crude machinery such as bellows and tilt hammers. Consequently iron was made in a large number of small units which stretched all the way from the eastern end of Monmouthshire, more particularly along the hinterland, and also in the Vale of Glamorgan, through Carmarthen to Pembrokeshire.

The first fundamental change came when the wholesale destruction of forests to get fuel for the furnaces caused industry to look for another possible source of heat. Pit coal had been known for many centuries and several attempts were made to use it before final success was obtained in 1735. This caused a transference of the iron industry from the areas where wood was available to the great coal centres. The years between 1750 and 1800 A.D. saw the real beginnings of the modern era. There was a rapid development of iron manufacture at the top of the valleys of Glamorgan and Monmouthshire in such famous sites as Dowlais, Cyfarthfa, Hills Plymouth, Penydarren, Tredegar, Ebbw Vale, Blaenavon and many more in districts both further west and further east.

In 1720 tinplate manufacture was started in Great Britain at Pontypool so that, in the earlier words of Yarranton, the country might " establish the manufacture of tinplates, and thus revive the iron and tin trades which are both in a very distressed state owing to the scarcity of timber for charcoal, and keen foreign competition." Fuel problems and foreign competition are again with the country to-day. Although it has had many vicissitudes since, the tinplate trade was destined to develop and become a principal manufacture identified with the South Wales area.

Throughout the nineteenth century the Industrial Revolution had its outstanding period in the history of Great Britain. Wales and Monmouthshire can be justly proud of the prominent part they played in pioneering and developing the iron industry. Pig iron was produced in blast furnaces which proclaimed their existence all night long by shedding a glow of light over the countryside as the long flames surged forth from their tops. It was a picturesque and comforting sight which is no longer to be observed. Nowadays an ordinary household chimney on fire causes more excitement. The brittle pig iron was wrought into malleable metal in puddling furnaces, where the work was of the most arduous type that had to be endured by any man. However, the old puddling process was obviously not suited to supply increasing demands. Between 1860 and 1870 it was superseded by two new processes, the Bessemer Converter and the Siemens Open Hearth. These converted pig iron to a malleable product, now more correctly known as steel.

These developments required large capital outlay for the extensive plant required, and a concentration of the steel producing industry due to the vastly increased outputs per unit. Although the number of works was reduced, there was very little change in their sites. The immediate effect was rather to strengthen the competitive value of the industry in an expanding market by producing a much higher quality at a considerably reduced cost. A similar change is taking place in the tinplate trade to-day and in both cases it has been accompanied by better conditions for the workers due to the elimination of heavy manual work in extremely hot conditions.

With the introduction of railroads from 1830 onwards there was a steady and progressive change which was destined to have an important effect on iron production in Wales. The ironworks between Merthyr and Blaenavon tended to concentrate on the so-called " heavy steel " side of the industry, supplying railway and other engineering requirements. The equally expanding tinplate manufacture became centred more particularly in West Wales around Swansea, although a considerable production was retained in Monmouthshire. In 1850 there were 16 tinplate works at the eastern end of South Wales and 9 in the west. By 1880 they had increased to 27 and 59 respectively.

Before the close of the century, however, signs were evident that increased foreign production was going to be more than a potential threat to expansion. The struggles of the steel industry and the important part it played in two world wars are an interesting story, but it cannot be told here. While the home market has always been more or less assured, foreign markets have decreased through the starting of " protected infant industries," which developed into self supporting, often still protected, and later to potential exporting producers. Although separate figures for Wales are not available, the position of the steel trade of Great Britain well indicates the change. In 1870 Britain had a flourishing industry producing almost 50 per cent of the world's output, accounting for 80 per cent of world exports and with negligible imports. In 1930 the relative position had deteriorated so that production amounted to only 8 per cent of world demand, exports were around 20 per cent of world exports, and considerable tonnages, mainly of Semis, were being imported. Much of this decline was inevitable because, in a rising world demand for steel, each country endeavoured to become as self supporting as possible. The trend was marked between the two world wars, and it is likely to become more extensive in the future.

The outlook for the heavy steel and tinplate sides of the industry in Wales even before 1900 was not bright. The years of rapid expansion were over, and the developments of the present century were determined rather by the necessity for meeting the growing foreign competition by keeping abreast of improvements, even if many outstanding features of these were initiated abroad.

Dealing with the heavy steel side first, there was a marked decline in the competitive ability of the old established works. The small firms consisting of separate plants for production of coke, pig iron, and steel were not so economic as the so-called "Integrated Plant." In the latter the coke ovens, blast furnaces, steelworks and rolling mills are on the same site so that the large quantities of gases evolved in the first two processes can be cheaply and efficiently used for heating throughout all four stages of production.

Among the first plants erected in Great Britain and the first in Wales on this principle was the Margam Works of Baldwins, built during the 1914-18 war, and subsequently used for production of rails, plates, and other heavy steel products. In 1930 there was a fusion of the heavy steel interests of Baldwins & Guest Keen Nettlefolds operating at Dowlais, Cardiff, Margam and Port Talbot. In 1936 they erected the large modern integrated unit at East Moors, Cardiff. Since then the heavy steel industry has been largely concentrated at the Cardiff, Margam, and Port Talbot units, under the aegis of Guest Keen Baldwins with a decline in the area between Merthyr and Blaenavon.

One other plant in this trade in Monmouthshire has to be mentioned, Whiteheads of Newport. They are not steel producers but are said to be the largest Rerollers in Great Britain, consuming about 6,000 tons of steel weekly, producing hoop iron, merchant bars, and strip. Originally started about 1902 to operate the old mills at Tredegar, the Company extended to Newport after the 1914-18 war and has developed steadily ever since.

Turning now to the tinplate industry, the tendency for its concentration in West Wales has been noted. Owing to the similarity in the method of manufacture between tinplates and galvanised sheets, it is not surprising that Wales developed a considerable industry in the latter commodity. Originally patented in 1837, it was in the nature of a novelty when shown at the 1851 Exhibition in the form of corrugated sheets of roofing. Soon after 1900 a number of works were producing galvanised sheets from Newport in the east to Gorseinon in the west. About the same time several interests combined in North Wales, from which evolved the extensive steel and sheet works at Hawarden Bridge, Shotton, near Chester. This is the outstanding steel plant in North Wales. Already it has been partly modernised by the installation of a Wide Strip Mill in 1940; schemes are on hand for further improvements, more particularly in the steel smelting shop.

Although it is necessary to make " black sheets " before coating with tin or spelter to make tinplates and galvanised sheets respectively, it is only since the start of the twentieth century that there has been any considerable development of the black sheet trade, as it is known to-day. These black sheets are the raw material for a variety of uses, but in the majority of cases have to be covered with some protective coating

in order to prevent the well-known propensity of steel to rust. Enamelling has developed rapidly since 1900, although here is an art which like tinning was known from Roman times. Plating with non-corrosive metals such as chromium, nickel, or copper, covering with asbestos, plywood, bitumen, etc., and many other applications are to-day finding new and wider uses for black sheets. The older tinplate trade had thus been further extended by the introduction of the newer galvanised sheet and black sheet trades.

During the years following the First World War and continuing to the present time, there has been an amalgamation of various steel, sheet, and tinplate interests in order to ensure greater strength in the increasingly competitive world markets. The full benefits for the future strength of the industry were made possible in 1945, when the extensive interests of the two separate companies joined together under the title of Richard Thomas and Baldwins.

Starting in 1926 wide strip mills were evolved in America for the production of sheets, chiefly to supply the rapidly expanding automobile industry. They were soon modified to produce plates and tinplates. These wide continuous strip mills were a revolutionary development which were watched with considerable anxiety by the Welsh sheet and tinplate trades. By 1934 its successful application to tinplate was established, and immediately thereafter steps were taken to see that Wales was kept fully abreast. Before 1940 strip mills were erected and in operation both at Ebbw Vale in Monmouthshire and Shotton in North Wales, the first to be erected outside America.

A modern integrated plant such as Ebbw Vale is a sight well worth seeing. In the hot mill great masses of white hot steel, weighing five tons and over, are manipulated and worked with as much ease as a housewife rolls her pastry. Slabs of steel, pushed by invisible machinery from the glowing furnace, slide down inclined skids to crash against bumpers with a resounding clang. Live rollers then pass each one forward towards the mill, where scale is removed by high pressure water spray. With a hiss the scale is scattered in all directions. A casual observer, following on foot, ducks involuntarily; then chases after the slab as it passes through a sequence of four mills, in which it is reduced in thickness. Its speed increases and the observer first lengthens his step, then breaks into a trot in his endeavour to keep up. Next come six finishing mills, impressive in their size as evidence of tremendous power, into each of which in rapid succession the forward end enters with a bump. By the time the last mill has been left the strip is travelling with a speed approaching 25 miles per hour. It is hopeless for the observer to follow what is happening ahead so there is nothing to do except to stand in amazement and watch the uncanny ease with which a huge slab of steel, originally 20 feet long and 6 inches thick, is being reduced to a $\frac{1}{4}$-mile long strip of cardboard thickness. Having failed to follow the first strip he walks along to see what is happening when the next one arrives. It appears to rush towards him with a speed that is awe-inspiring, then quickly disappears underground. A few seconds after the tail has gone down, a neatly wound coil of still red-hot steel is forced out from the coiler, turned over on the flat, and conveyed on rollers to the next operation. It has not once been handled by man, but controlled by him through pressing push buttons and moving small levers.

In addition to the primary development of machinery giving greatly increased outputs in both integrated steel making plants and strip mills, there was coupled with it a not so spectacular but nevertheless equally important advance in technological control. This gave a much superior quality product than could possibly be obtained by older methods. Manufacturing costs were materially reduced. Heavy work for operatives was eliminated. It was evident that plant of this type was a necessity to the future well being of the old established Welsh sheet and tinplate industries. But fears and doubts arose from many quarters. These have been set aside by the success of the Ebbw Vale plant.

During the last two years a great deal has been written about the vast reconstruction project of the Steel Company of Wales which will, when finished, completely modernise the sheet, steel and tinplate industries of South Wales. Most of the reports have dealt with the steel side of the project which is being carried out at Margam, near Port Talbot, but an equally important works is under construction at Trostre, near Llanelly. This works will include a cold reduction mill and a modern tinplate plant.

Of the Margam project, it is sufficient to say here that it consists of enlarging and modernising the existing Margam Steelworks by reconstructing the coke ovens, blast furnaces and coal and ore handling plant in order to raise the pig iron production of the works to 19,000 tons per week.

Next to these works is being built the new Abbey Works, the main feature of which will be an 80-inch continuous strip mill, the largest in the country, which, it is estimated, will produce 20,000 tons of steel strip and plates per week. Seven thousand tons per week of steel strip in coil form will be sent by rail from the

Abbey Works to the new works being constructed at Trostre, there to be manufactured into tinplate by the most up-to-date methods. The necessity for this new tinplate plant arises from the fact that at the present time the whole of the tinplate output of South Wales (with the exception of the Ebbw Vale plant) is produced by the old-fashioned hand-mill method. The modern method of cold rolling from hot rolled coil is superior, not only in speed of production and operational economy, but also in uniformity and ductility of the project, and a change-over to new methods is therefore essential in order to recover the overseas markets which were unavoidably lost during the war years, and to supply these markets with the type and quality of tinplate which is now demanded.

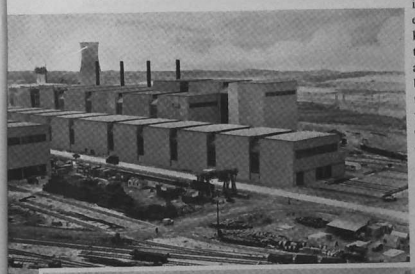
The site of the new works at Trostre is on 420 acres of low-lying ground adjoining the main London-Fishguard railway line. The proposed plant will cover 236 acres. Work commenced in August 1947 and, since that date, initial clearance has been completed, an ash carpet necessitating approximately 1,190,000 tons of fill has been laid, 25,533 concrete piles driven in and more than 150,240 cubic yards of concrete placed for this purpose. About 9,000 tons of steelwork will have to be erected and work is well under way, and now that the steel framework has been completed the great works is about to take its final shape. It is expected to be ready for operation by March 1951, and when that time comes there is no doubt that the efforts of all who are engaged in this project will have constituted one of the largest single contributions towards Britain's industrial recovery by re-establishing Welsh tinplate in the markets of the world.

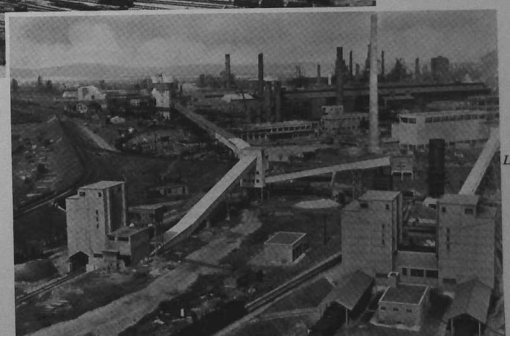
It is of interest to note that as the United States have been pioneers in the continuous rolling of steel strip and in order to take advantage of the wealth of experience they have accumulated in this field, a large part of the machinery is of American design and is being manufactured in America by the United Engineering and Foundry Company of Pittsburgh. In this category are the 5-Stand Cold Reduction Mill and the Temper Mills. Shipments of most of this machinery have already been received at the time of writing, including some of the heaviest pieces, but, although the plant generally is of American design many of the items are being manufactured in this country.

During the past year (1949) there has been little change in the position of the Sheet and Tinplate Trade in South Wales. Demand has continued to be in excess of output so that all units operating have been kept fully employed. This position arises from continued control on steel allocation, and inability to man a greater number of mills due to a lack of interest shown by the older millmen in returning to the jobs which they left for war work, and younger men not entering the trade.

The Only Plant in Europe

The electrolytic tinning plant at Ebbw Vale has proved a valuable asset in the production of the most modern type of tinplate. This is, at the present time, the only plant of its kind in Europe, but another two units of similar size are being erected at Trostre. There would seem to be a very big future for electrolytic





THE STEEL COMPANY OF WALES LTD.

Top: **The mould preparation bay and melting shop buildings.**

Left: **A general view of the reconstruction of Margam Works.**

tinplate, which was developed during the war years to meet the special conditions arising from the temporary loss of the tin-producing countries in the Far East.

In addition to the new strip mill projects schemes have been started (and are well under way at the time of writing) to ensure that they are supplied with such essential raw materials as silica bricks and ingot moulds, also engineering facilities for maintenance. Richard Thomas and Baldwins Ltd. are constructing a new silica brick works at Landore which has been designed on the most modern lines. For raw material they will use the famous Dinas Rock from the Neath Valley. Also at Landore they are erecting a new Ingot Mould Foundry to manufacture the very large size of mould weighing up to 20 tons which is required for strip mills. In addition a new Foundry and Engineering Shop is being erected at Machynys, Llanelly, and when completed this plant will be able to undertake maintenance work on a much larger scale than has ever before been attempted in South Wales.

With demand continuing high and output lagging behind, the prospects for 1950 are good, although it would be a big help to the present difficulties of the country if more men would come forward to operate the idle mills which can easily be started up. When the new strip mill at Margam comes into operation it will help Great Britain to produce greater quantities of the much higher quality sheets and tinplates which are so much in demand, not only in this country but throughout the world.

Moving from visions of the future to the materialised visions of past years the fine works of John Summers and Sons Ltd. at Shotton presents an admirable picture of progress and development. The vision of a great industrialist conceived fifty years ago has become a reality in the vast Hawarden Bridge Steelworks covering 250 acres on the low-lying Deeside. Seven hundred and fifty acres are still available for development, and there are already nearly 6,000 men employed at the works where upwards of 8,000 tons of steel sheets leave every week for world-wide destinations by rail, road and water. The move from Stalybridge to Shotton towards the end of the last century was one of those major decisions in the history of a firm which make the difference between static efficiency and brilliant progress. At Stalybridge, the firm's thirteen mills and galvanising pots already covered all the available land and on the opposite side of the river, alongside the railway, Mr. Henry Hall Summers saw an opportunity to plan afresh. The fifty years since that decision was made have been years of great progress and at the present time more machinery, including a new battery of 88 ovens is being installed, capable of carbonising 11,600 tons of coal per week, together with by-product plant, etc. Provision is also made for the installation of a second 27 feet Blast Furnace which would raise the iron production capacity to 14,000 tons per week. The coking plant is arranged for extending in future to 132 ovens having a carbonising capacity of approximately 17,000 tons of coal per week. Future plans also include a new Power Station now in course of erection to house two blast furnace blowers, each capable of providing 75,000 cubic feet of air per minute, and two turbo alternators each of 12,500 kw., together with the necessary boiler plant. The area of ground occupied by the coke ovens, blast furnaces and power station is approximately 200 acres.

Neath has one of the thirty factories owned by the Metal Box Company and it is one of the most important industries in the area. The Company was built up by the amalgamation of several small privately-owned firms and has grown rapidly during its twenty-seven years of existence. At the present time extensive developments are taking place to enable an even higher production figure to be reached. Astronomical figures convey the speed at which cans of various types are produced—1,000 millions a year, in addition to general miscellaneous types of cans and containers amounting to a further 600 million tin boxes a year. Out of a total floor space of 300,000 square feet at the Neath factory the production area is only about 75,000 square feet, but, even so, the factory produces 45 to 50 million components a week (i.e. the cans themselves and the tops and bottoms) and this does not include the tinplate which is lacquered at the works and sent to other factories for completion. All the thirty factories in the group represent the biggest single users of steel in the country. At Neath 500 boxes of tinplates (112 to a box) are used in one day. In the department dealing with the stamping out of "ends" for cans approximately 400 per minute are produced.

The Llanelly Steel Co. (1907) Ltd. is another industry which employs a very large number of workers in the Llanelly and District area. Output comprises mainly black, galvanised, flat and corrugated steel sheets, sheet and tinplate bars and billets, Siemens Martin acid and basic steel ingots. Their sheets are well known under the trade name "Target Brand Sheets."

Allied industries in the Swansea area embrace manufactures of fibreboard containers for the packing of tinplates and black-plates, and manufacturers of black and galvanised steel sheets, both plain and corrugated. Curved and corrugated sheets, galvanised

ridging and flashing and galvanised Canadian and Italian tiles and pickled black steel sheets are also produced.

Cardiff houses two large steelworks in Guest Keen Baldwins Iron and Steel Coy. Ltd., and Guest Keen and Nettlefolds (South Wales) Ltd. The East Moors Works of Guest Keen Baldwins was originally built in 1889-93 by the Dowlais Iron Co. Ltd., and consisted of blast furnaces, open hearth steel melting shop and plate mill. A complete rebuilding scheme was carried out during the year 1933-36 which made it one of the most modern works in the country. Since then no effort has been spared to further improve the technical efficiency of the works both in increased output and the high quality of its product.

For the production of coke for the blast furnaces 1,000 tons of coal is washed and blended weekly in a modern washery and fed to a battery of 82 ovens. Among the by-products of this plant are motor spirit, ammonium sulphate, tar and gas, the last of which supplies Cardiff's industrial and domestic users.

Foreign ores for the blast furnaces are handled at the Company's wharf on the southern fringe of the works, and, together with railborne home ores and other materials, are electrically hoisted to bunker level, fed to the respective bunkers, from which they are extracted and weighed on electric scale cars and transported to the blast furnaces. There are four blast furnaces, three working and one in reserve. The average weekly output of the furnaces is 9,000 to 10,000 tons, two-thirds of which is basic iron. This is absorbed by the melting shop and transported in 120-ton hot metal railcars. The remaining tonnage is Hematite iron which goes for sale to foundries, etc.

The melting shop consists of five tilting furnaces tapping 240 tons of steel per charge, two 100-ton fixed furnaces, and one mixer furnace of 600 tons capacity. These are oil fired furnaces and the excellence of their performance may be judged from the fact that the " D " furnace of 100 tons per charge has produced 2,000 tons in a week.

Scrap is stored in two separate bays, one for heavy and one for light scrap. The light scrap is hydraulically compressed before loading into the charging boxes. The range of steel made is very wide, and continuous research by a skilled metallurgical staff maintains a progressive application of the most modern technique.

After teeming into moulds in the Teeming Bays, the steel passes to the Stripping Bay on railcars and is stripped from the moulds, and the ingots are transported to the Soaking Pits for reheating, preparatory to rolling.

In the Rolling Mills the ingots are primarily passed through the Cogging Mill which has a weekly throughput of 13,000 tons, and pass on as blooms, either to a

Morgan Continuous Mill for reduction to 2-in. billets, slabs and sheet bar, or are cut into lengths for further fabrication at the three-stand three-high section Mill.

The whole plant is compact, well conceived and balanced. The major portion of the steel products of the works in the form of slabs and billets are transferred to the adjacent works of Guest Keen and Nettlefolds (South Wales) Ltd., to be re-rolled into strip bars and wire, and the sheet bar is used to a very large extent for the manufacture of sheets for the motor car industry. The productions of the Section Mill are mainly taken up by the collieries in the form of steel arches, of which this firm is the largest manufacturer in the country. Other types of material which this Mill produces are steel pit props and roof bars in very large quantities, also light rails and steel sleepers for export as well as home consumption in addition to sections for constructional work.

Steel Strapping

One of the romances of the steel industry in Wales is the phenomenal growth of the steel strapping industry, pioneered by Signode Ltd. some twenty-five years ago. To-day the tensional steel strapping method of packing has hundreds of applications, from parcels for post to 10-ton loads.

Steel strapping is used as a means of reinforcing wooden cases, fibreboard cases, cartons, bales and bundles, and as a deterrent against pilferage; palletised and unitised skid loads are dependent upon the proper use of Tensional Steel Strapping. It is also extensively used in bundling steel, tinplate sheets, bars, angles, pipes, tubes, etc., to facilitate ease of handling, identification and transport. It is used to secure insulating materials and in many production jobs where it becomes an integral part of the finished article.

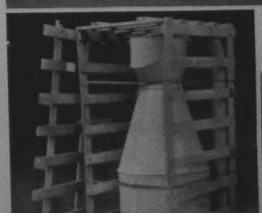
The strapping is produced to exacting specifications to ensure that it is perfectly satisfactory for any job for which any particular section is recommended and consists of either Cold or Hot Rolled steel strip with suitably treated edges, and is normally supplied in continuous coils, but can be supplied and used in cut lengths. The tensile strength of all strapping material should not be less than 85,000 lb. per square inch, and should have such other physical properties as are required to enable the strapping to be applied, tensioned and sealed. It can be supplied in various finishes in Cold Rolled Strapping in all sizes from $\frac{5}{16}$ in. × .012 to $\frac{3}{4}$ in. × .035, and in Hot Rolled Strapping from $\frac{5}{8}$ in. × .030 to 2 in. × .050. The Special Blued finish produced in the new works in Swansea gives an excellent highly rust resisting finish, greatly in demand by the Service Departments and for all export purposes.

The Signodes or Seals secure the ends of the strapping after it has been applied and retains maximum tension. The joint thus made should have a breaking strength of not less than 75 per cent of the minimum tensile strength. Millions of Seals are produced every month, and are supplied Specially Lithographed in any colours, and bearing a trade mark or design as required for rapid identification.

The new factory at Swansea will also be offering an extensive range of other items for the packing room such as specially designed staples, strap cutters, nail pullers, inter-locking stencils, metal labels, and paint sticks for marking both hot and cold surfaces. The range of stencil equipment includes stencil cutting machines, oilboard, fountain brushes, fountain markers and special stencil inks in a full range of colours.

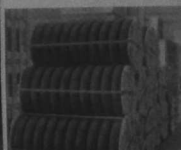
As a service to industry the Signode Packaging Research Department is prepared to give advice on any particular packaging problem. Technical representatives are available at Branch Offices throughout the country, overseas industry being served by associated companies.

Baths nested for export.



A suspended load in crate packing.
Reproduced by courtesy of Signode Ltd.

Tyres bundled for export.



A New Development

A patented development that has done much to solve certain inherent problems of the ironfounder has been fostered by a Gorseinon foundry. The Quasi-Bessemerising Process, as it is called, evolved from the difficulty of making close-end moulds with sound bases. The process was not only completely successful in this direction, but also was found to have other advantages, such as the elimination of shrinking cavities in heavy castings and the risk of corner scale formation. It also enabled automatic feeding of hot iron into moulds during the period of fluid contraction, and had a noticeable delaying effect on the formation of heat-craze marks on the internal surface of moulds. This latter advantage followed as a direct consequence of the extraction of graphite from hypereutectic Haematite iron.

The process later revealed controls of the graphite throw due partly to the presence of silicon, and it is interesting to note that below a silicon content of 1·5 per cent no throw has ever been obtained from iron which was otherwise typical of Haematite iron. Another of the controlling factors was found to phosphorus and it has been established that the percentage of phosphorus above which no throw can be obtained is ·12 per cent. This percentage can safely be allowed in the manufacture of ingot moulds. Dilution of the iron with steel or old mould scrap will also reduce the graphite throw but these operate in a different and familiar fashion different from the controls mentioned above.

Knowledge of these controls can be put to practical use. For instance, in periods of shortage of Haematite iron, information can be obtained from observation of the throw of graphite as to whether the iron will carry more scrap. The throw can be reduced by dilution, to the minimum which will show that the iron has been reduced to the hypo-eutectic state consistent with a satisfactory mould life.

ENGINEERING
LIGHT ALLOYS and NON-FERROUS METALS

IN the popular mind aluminium is easily the most familiar of the whole wide range of non-ferrous metals, indeed the wholesale application of aluminium to the service of the twentieth century has resulted in a revolution in many branches of modern engineering leading to an aluminium invasion of workshops and homes everywhere.

Because is possesses peculiar virtues its uses are infinite in variety—a simple statement which furnishes the foundation upon which is based the incredibly swift development of the vast manufacturing plant of the Northern Aluminium Company Ltd., at Rogerstone, where thousands of Monmouthshire men and women are employed in the production of aluminium in sheets, strips, plates, sections, tubing, wire, forgings, castings, etc., etc.

Naturally, light alloys of all descriptions have come to be associated in the public mind primarily with the construction of aircraft, but the Saunders Engineering & Shipyard Ltd. apply them freely to the building of ships. This company is a subsidiary of Saunders-Roe Limited, Cowes, Isle of Wight, which grew from the original firm of S. E. Saunders, established as ship builders in 1830. Saunders Shipyard Limited was established in 1938 as a result of the parent Company's work on aircraft making it desirable to separate their ship building activities. Before the last war, the shipyard was responsible for the production of 70- and 55-footers and 35- to 45-foot standard cruisers, and had great experience in the production of motor launches ranging from 20 to 30 feet. The Company also gained the highest reputation for high speed motor boats of which *Blue Bird* and *Miss England*, those one-time holders of the world's water speed records, are examples. Many craft were also built for the Royal Lifeboat Institution.

During the early part of the last war, the Company's yard was totally destroyed by enemy action, and until 1945 its activities were restricted to the large scale production of plywood pontoons for military bridging operations. This work was carried on in temporary inland premises near London.

A suitable site for boat building having then become available, the Company moved to Beumaris to re-establish itself in the marine field, the decision being taken to specialise in light alloy construction rather than in timber. The repair of flying boats was undertaken and a considerable amount of development work was also undertaken for the various departments of the Government including pontoons and motor tugs for use by the Royal Engineers in military bridging, a prototype airborne lifeboat—which incidentally was the first of its type to be produced in light alloy in this country, and a number of light alloy torpedo tubes for the Admiralty. The outstanding project in light alloy so far completed is a 75-foot M.T.B. which has recently been accepted into the Royal Navy.

At the present time the Company's production falls into the following main categories apart from the 'bus body side:

1. Light alloy marine craft up to 125 feet in length.
2. Light alloy bridging equipment for the Ministry of Supply.

Light alloy pram dinghies have also been produced for the commercial market and one of the latest features is the construction of two prototype Birmabright ships' lifeboats, work on which is well advanced. It is believed that lifeboat construction may become an important branch of the Company's activities.

In 1939 Metal Alloys (South Wales) Ltd. commenced production of pure metals and metal alloys at their factory on the Treforest Trading Estate. This Company is the only one in South Wales producing pure chromium metal, manganese metal, ferro titanium, refined ferro-manganese, aluminium titanium, etc. by the aliminothermic process.

During 1948 the factory was enlarged to 40,000 square feet and the production of manganese copper, silicon copper, chromium aluminium, titanium aluminium, manganese aluminium, etc. was commenced. In addition to supplying all the large steel works and non-ferrous factories in this country with their various alloys, their products are exported to the U.S.A., Italy, Sweden, Belgium, Switzerland, etc.

During the past year a new research laboratory has been fully equipped in order that the high standard of their alloys is maintained and also that new and more

efficient methods of production are introduced into the factory.

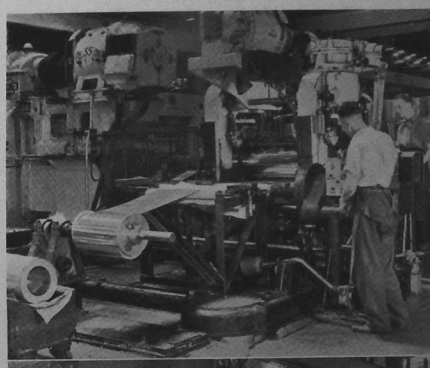
Smelting and Copper Manufacture

On copper as the foundation of all Swansea's metallurgical greatness Mr. W. H. Jones' *History* says:

" It is a historical circumstance that the copper industry, early in the eighteenth century, leading as it did to the immediate development of coal workings in the neighbourhood, formed the foundation of the commercial importance to which our town has attained. Colonel Grant Francis, in his history of copper-smelting in the Swansea district, has credited Dr. Lane with the introduction of copper works in the town of Swansea, but in this detail he appears to have been misled. True it is that Dr. Lane had introduced his works nearby at Landore in 1717, and that on the 26th September, 1720, the Corporation of Swansea approved ' the working of a Copper Worke upon the Bank commonly called Mr. Sey's, alias, " Thomas Evans " Coale bank ' expressing the unanimous opinion that the carrying on the said worke will prove very much to the advantage and not in the least prejudicial or hurtful to our said Burrough or the inhabitants thereof."

Mr. Jones, however, believes that James Griffith was the originator of copper-smelting in Swansea, financed by Gabriel Powell and Sylvanus Bevan (a Quaker) and arrives at these conclusions from the perusal of a manuscript volume compiled in 1774 by Robert Morris, eldest son of the first Robert Morris of Swansea.

It would appear from letters published by Mr. Grant Francis that as early as 1584 it was realised, partially at



In an Aluminium Strip Mill.

Sawing a large aluminium ingot cast by continous casting process.

any rate, that it was an advantage to refine ore where there was a fine supply of coal, hence ore from Cornwall was eventually shipped to Swansea. In those days copper refining was a secret art. Apparently the pioneers of the industry had to contend with many difficulties, and the bursting of "the South Sea Bubble" caused failures. Woman played her part in establishing the first copper works at Swansea, which in 1727 dealt with thirty-two tons of ore per week. Mrs. Morris, wife of Robert Morris, the proprietor of the Forest works, took charge when Mr. Morris was ill, while at the same time her little boy was stricken with smallpox, which proved fatal.

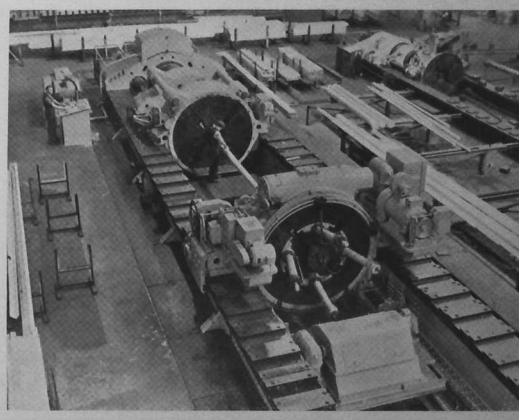
Copper works multiplied from the beginning of the eighteenth century, and from that period may be traced the beginnings of very extensive undertakings. Copper was the earliest metal to be employed by man, the mineral being in certain regions obtainable in a condition which enables it to be put to immediate use without metallurgical treatment. The scientific process of refining copper ore was initiated in the Swansea district. Next in order to the works mentioned came the White Rock Copper Works, the Middle Bank, Upper Bank, Rose and Birmingham Copper Works; then the famous Hafod, Morfa, and Port Tennant. At the Upper Bank Copper Works yellow metal was invented and manufactured.

It became necessary in course of time to go further afield for ore, and a fleet of sailing ships was established which brought cargoes of ore from as far away as South America. These voyages were often hazardous, and the story is told of one skipper, a religious man, whose vessel was held up by a gale on the outward voyage, heading his vessel for home after telling his subordinate he had seen a vision and the voice of the Lord told him to return. Legal proceedings resulted in his certificate being suspended.

When copper-smelting passed, by economic pressure, to the areas where the mineral is produced, the Swansea works turned entirely to the copper manufacture that had previously been a section of their activities. Of late years there has been unified production under the aegis of I.C.I. Metals, a section of the great chemical combine, and notwithstanding the greater outputs obtainable under modern conditions, the industry retains about one thousand employees. Tubes, sheets, locomotive fireboxes and copper bottoms manufactured in Swansea have proved their superiority. The demand for naval purposes and for vessels of the liner type is considerable.

Zinc and Sulphuric Acid

Zinc has been produced in this country for more than 200 years. While there is definite evidence that the metal was produced about the year 1743 at Warmley, near Bristol, it is believed that a quantity was made during the period 1717-1726 at Landore, Swansea. The history of zinc goes back much further than this, however, and brass, an alloy of copper and zinc, was produced as early as A.D. 71, when it was used in coinage.



The 625 ton machine in Northern Aluminium Co.'s Rogerstone Works for stretching and de-twisting large extruded sections.

The manufacture of zinc in South Wales has been carried out on a large scale for at least a century. Originally three types of process were used in the Swansea area, named respectively English, Silesian and Belgian, but of these only a modified form of the last mentioned, called the Rhenish process, has survived. The Swansea Vale Works was erected in 1876 and is now the only one of its kind operating in South Wales.

Three important basic materials are produced—zinc, sulphuric acid, and sweet roasted zinc concentrates, these are obtained from the two chief raw materials zinc concentrates and brimstone, which are imported through Swansea docks. The zinc concentrates, or blende, consist mainly of zinc and sulphur.

The production of zinc takes place in two stages. In the first place the chemically combined sulphur is removed from the zinc concentrates by passing the latter over a moving down-draughted grate, or sinter machine, during which the sulphur is removed in the form of sulphur dioxide gas, leaving a cake-like mass known as sinter, containing very little residual sulphur and consisting largely of zinc oxide.

The sinter is treated in the horizontal distillation plant, (where the Rhenish process previously referred to is used). It is there mixed with duff coal, and charged by hand into refractory retorts fixed in furnaces. The process is intermittent, and during a 24-hour cycle the mixture of sinter and duff is heated to a high temperature to effect production of the zinc, spent residues being discharged at the end of each run. As may be evident from the name of the plant, the retorts rest horizontally in the furnaces, and the zinc is distilled from the retorts as a vapour; this condenses to a liquid in refractory pipes, or condensers, from which it is tapped—on three occasions during the cycle—into ladles and cast into slabs. The metal comprising the last of the three taps requires refining to reduce impurities, and this is performed in reverberatory furnaces.

Sweet roasted zinc concentrates are produced in barrier roaster furnaces, the raw material in this case being zinc concentrates, which are allowed to burn in the furnaces forming sulphur dioxide gas. The product is a fine, powdery material consisting essentially of zinc oxide and containing only small amounts of sulphur.

Brimstone, or raw sulphur, is consumed in Glen Valls burners to form sulphur dioxide gas.

The gases from the sinter machines, barrier roasters and sulphur burners pass to the sulphuric acid plant where, after purification and drying, the sulphur dioxide contained in the gases is converted by the contact process into sulphur trioxide gas, and thence to sulphuric acid.

Much of the zinc and sulphuric acid produced is used in the South Wales area, zinc in the galvanising industry, and sulphuric acid for pickling in tinplate works. In addition, zinc is used in the manufacture of brass, while sweet roasted zinc concentrates are employed in electro-galvanising.

The welfare of the employees receives most careful attention, many facilities being provided for their use, including a bath-house and change-rooms and a laundry service for washing operators' working clothes. There is also an up-to-date medical centre staffed by nurses under the direction of the works medical officer; in addition, at frequent intervals, the centre is visited by a dental surgeon, an optician and a chiropodist, so that these services are available during normal working hours.

The methods of production are under continuous study, and a considerable amount of work is in hand to improve certain parts of the process. Approximate tonnages per week of the three products made are 450 of zinc, 1,600 of sulphuric acid and 130 of sweet roasted zinc concentrates.

All-welded Mild Steel constructed Pickle Tank fabricated by the Fairfield Shipbuilding & Engineering Co. Ltd., Chepstow, Monmouthshire, for Messrs. John Miles & Partners (London) Ltd., Consultants, to their design.

ENGINEERING
Electrical and Mechanical

HEAVY engineering in the Principality is represented by many old established foundries and concerns that have developed their own special lines in service to other basic industries including iron and steel itself, mining, docks and shipping, quarrying, etc. The ramifications of this branch of industry would need a book to itself, but a quick cross-section of the industry will be obtained by thumbing through the advertisement pages in the previous article and at the conclusion of this one. Products range from complete coal handling plant, wagons, metal type, hot water systems, automatic stokers, drop stampings of all kinds, hollow-ware, ropes and pulleys and lifting blocks.

Despite an impression to the contrary, this type of industry is not confined to South Wales alone. In the small county town of Llanidloes in the centre of Wales, for instance, one of the foremost engineering firms in the Principality was founded a hundred years ago, and to-day functions in two branches—mining products and " OILAULIC " products. Over a number of years a sound haulage engine of compact design has been evolved, and although intended originally for mine-work, it has been found suitable for work in ropeways and quarries, and will be found doing this job in many parts of the world. The " OILAULIC " range includes high-speed pressure pumps, presses and riveters ranging from 2-120 tons capacity and used for such operations as straightening, arboring, broaching, etc.

From further north, at Wrexham, come the well-known " Shone " products, sewage equipment, air compressors and textile processing machinery. The Company concerned has been engaged in the design

and manufacture of sewage equipment for nearly three-quarters of a century, the principal products being "Shone" Pneumatic Automatic Sewage Ejectors and "Clearway" Centrifugal Sewage Pumps.

Both Ejector and Pumping Plants have been installed in many of the largest cities of the world, and the plant at the Houses of Parliament can be quoted as an example of one of the many installed in this country.

Compressors for use along with "Shone" Ejectors or for any purpose requiring a supply of compressed air, are produced and are available in various sizes from single cylinder to large multi-cylinder Compressors for motor or engine drive.

Textile machinery includes Washing Plant for treating raw wool, cotton, cotton linters, waste rags, etc., employing the Company's Patent Hydraulic Pressure Squeezer. It is claimed that this plant is more efficient in operation and stronger in construction than any other of its kind, and it has been supplied to many of the largest users both at home and abroad. The Company also manufacture a complete range of Wool Carbonising Machinery comprising Acidising, Carbonising, Burr Crushing, Neutralising and Final Drying Machines and they can if required, supply the Continental or Vervier Type of Wool Washing Machine.

On the Bridgend Trading Estate will be found a Hertfordshire firm of presswork specialists whose 200 workers turn out a wide range of products including insecticide sprayers, cooker fitments, radio and motor components—and something unusual in toasters—a toaster of perforated steel which will operate on a gas burner, gas ring, or paraffin stove!

At Chepstow, also, there is an old established engineering works, which since the war has made a speciality of all-welded steel mineral wagons—production being at the rate of twenty a week. Before the war the works was concerned principally with bridge-building, but war contracts changed the outlook, and the conclusion of those contracts brought new problems. Eventually it was decided to pioneer on the welded all-steel mineral wagons, which has proved so very successful that representatives of other firms have visited Chepstow to study the method of manufacture!

Such examples, however, are comparatively isolated, and the bulk of engineering activity is found in the heavily industrialised south from Newport to Llanelly. Newport has a variety of concerns serving marine and

mining interests. One well-known group of companies specialises in marine and engineering jobbing castings in iron and non-ferrous alloys from a matter of ounces up to fifteen tons, and in electric welding in all metals. This marine influence continues inland even to Pontypridd (now the home of light industry), where a well-known concern produces chains and moorings.

In spite of the fact that Cardiff is no longer a shipbuilding centre, many of its engineering concerns serve the shipping industry. There is one particularly well-known firm of ships furnishers specialising in pulley blocks and tackle, three firms making wire ropes and steel wire for shipping, mining and engineering, a firm of welders specialising in boiler and ship repairs and yet another specialising in launching equipment such as patent gravity davits, synchronised launching equipment, etc.

There is also a particularly strong railway interest, switches, crossings, rails, sleepers, etc., being made by one concern.

The building and repair of wagons for use on the railways, and trams for mineral-carrying, are industries which have been associated with Cardiff for close upon 100 years and which have experienced many vicissitudes. Many of the firms engaged in the trade went out of business between the two world wars, and the industries themselves weakened with the decline of the coal industry.

Wagon building and repairing developed with the growth of the coal trade and the development of the railways, and at one time there was a great number of firms engaged in the work now concentrated under the control of comparatively few firms which now enjoy enormously increased activity.

Thirty-five years ago wagons over 10-ton capacity were something of a rarity, but the demand for larger carrying capacity has grown with the diversity of uses. Coal wagons originally of wood, strengthened with iron and steel, had long life, and some of them still in use have been on the rails for 50 years.

Nowadays 16-ton and 21-ton wagons of steel are not things at which to marvel.

The wagon works at Maindy, are the largest of their kind in Wales. Extensions now progressing will make them comparable with the largest in the United Kingdom. Manufactures include 20-ton goods wagons for the Indian State Railways, tank cars for the Petroleum Board, and 20/22-ton tube wagons for British Railways.

The Maindy works can construct up to 2,000 steel wagons a year for home and export. Wagons have been made with aluminium tops, having a net carrying capacity of 21 tons and a very low tare weight.

In view of the shortage of steel, repair work has assumed an importance even greater than formerly, and another Cardiff concern is working at full pressure to return to the railways the rolling stock it so badly needs.

Many varieties of machinery are made in Swansea, and electrical engineering is also well represented, with the winding of armatures and the making of machine-made armature and stator coils as a speciality. The manufacture of chains and lifting tackle serves once

again as a reminder that South Wales still has much maritime activity (indeed Swansea has had a fleet of steam trawlers since 1904) and has many shore establishments.

In the interests of safety, Government regulations now require every item of lifting tackle to be tested and regularly examined by experts.

Based on the need for local service to fulfil these regulations and under the approval of the several Government Departments concerned, an industry has been established in Swansea for the manufacture and maintenance of lifting appliances.

Annealing of wrought iron crane chains and slings is now carried out in specially constructed furnaces fired by town gas with pyrometer control of temperatures; hydraulic testing equipment with the test bed 50 ft. long is capable of applying the test loads specified by the British Standards Institution; another specially designed appliance is used for testing pulley blocks under working conditions.

Repair of existing gear and manufacture of new chains, slings and attachments is carried out by highly skilled workmen, and, in addition to the common standard types of gear, a wide variety of special appliances has been constructed to suit the particular requirements of the mines, rolling mills, docks and fishing industries.

This Works has also a developing general business in the production of forged iron and steel work for such purposes as building, lorry ironwork, gates and railings, as well as specialities for the mining industry like shafts for pit-ponies and brackets for the attachment of cables and lighting fittings to steel arches underground.

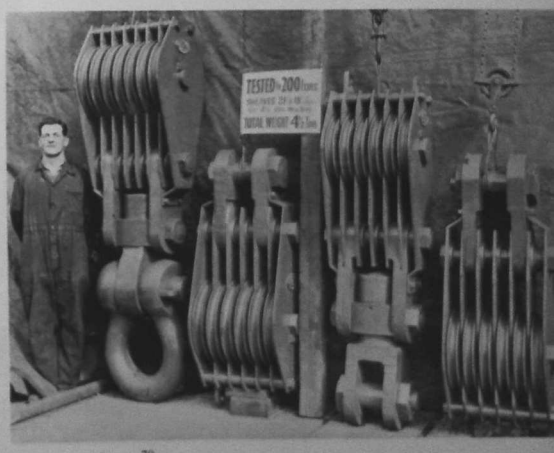
The engineering outlook began to change when the National Industrial Development Council of Wales applied itself to the task of attracting light industries to the Principality. For years the industrial background of Wales had been the same grim picture seen through a haze of coal dust—colliery winding gear, valleys flanked by coal tips with the inevitable wagon balanced on some jutting point, the flare of forge and steelworks after dark and always the clink and hustle with which long chains of goods wagons took their precious contents for export to the docks. But now

we have in the overall picture, long, sleek factories with an attractive surround and all working with the smooth silence that epitomises speed and efficiency. Even the grey flanks of the valleys are acquiring the fresh green of afforestation enterprises in places. And from this new departure in industry is coming a wealth of product including an amazing variety of light engineering products both on the mechanical and electrical side. The day has gone in Wales when we associated engineering with the smoke and grime of forge and anvil to the exclusion of everything else. We see it to-day in the industrial valleys of Wales in many varied forms from aeronautical and agricultural engineering to automobile and refrigeration engineering, and it is a background to these industries that we are attempting to sketch with what must of necessity be extreme brevity in this article.

One of the things which the Development Council realised at the outset was the importance of attracting those factories which make the fullest use of the basic industries like steel and iron available on the spot and to scan a list of the many products coming out of South Wales to-day is to realise how fully and completely they have attained their objective.

Here are some new types of produce which have enriched the industrial versatility of the valleys during the past fifteen years and one might well start with the miners' safety lamps produced by a Cardiff concern, which is incidentally, at the time of writing about to launch a revolutionary type of plastic-cased cap lamp on the market. This firm also turns out controller contacts for mines, tungsten precious metal contacts, soldering irons, transformers, fluorescent fittings with appropriate gear, emergency lighting units, torches, electric fires and trickle chargers for car batteries. Watch and clock manufacture has also arrived with the establishment of factories at Ystradgynlais, Hirwaun and Anglesey. At Port Talbot something entirely new to Welsh light engineering has been introduced, and the firm concerned have been commissioned to construct roofs and other portions of two of the main Festival of Britain buildings on the South Bank site in London. These are the Telecinema and exhibition buildings for the display of television apparatus and techniques.

One concern on the Hirwaun Trading Estate has a worthy record of achievement since its establishment in 1945 as precision and general engineers. A story



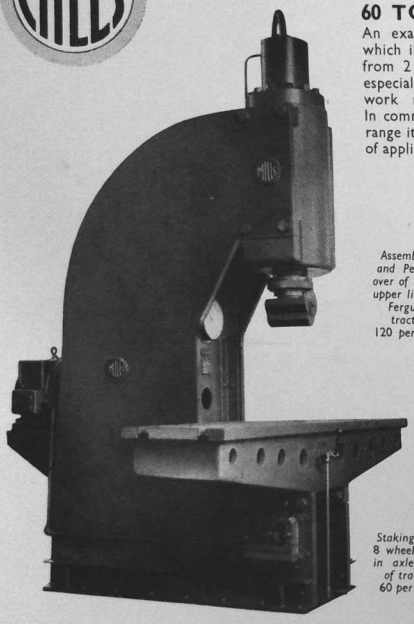
These four blocks, capable of lifting 200 tons, were specially made in Cardiff for the Clan Line, for lifting locomotives.

Reproduced by Courtesy of Loveridge Ltd., Cardiff

'OILAULIC' PRODUCTS

60 TON PRESS

An example from the 'OILAULIC' range which includes pumps, presses and rivetters from 2 to 500 tons capacity, this press is especially suited to high speed assembly work not requiring sustained pressures. In common with all presses from the MILLS range it is readily adaptable to a wide variety of applications.



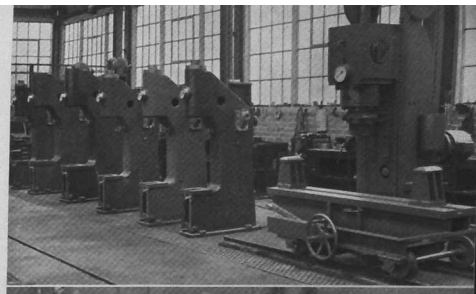
Assembling and Peening over of ball in upper links of Ferguson tractor. 120 per hour.

Staking over 8 wheel studs in axle shaft of tractor. 60 per hour.

JOHN MILLS

AND COMPANY (LLANIDLOES) LTD.

RAILWAY FOUNDRY, LLANIDLOES, MONT. *Agents for 'Oilaulic' Products.* Alfred Herbert Ltd., Coventry.



A line of presses in process of assembly at the works of John Mills & Co. (Llanidloes) Ltd.

A section of the Abertillery Foundry of Messrs. Warwill Ltd., showing moulding machines and moulds ready for closing.

High Pressure Cylinder Block Casting weighing nearly 10 tons, specially manufactured for a Marine Engine by Tubal Cain Foundry & Engineering Works Limited, Cardiff.

Signode Tools repair and Testing Section.

worth the telling is that of the production of a prototype fast running automatic printing machine, the first to be made in South Wales. The machine was built in November 1949 in half the scheduled time, and proved so successful that the firm has contracts for two years ahead. It is a flat-bed machine with a speed of 5,000 copies an hour. It gives dot on dot register because its cylinder is tied and geared to its bed on a rigid framework. The basic principles also permit superior inking with a compact, geared form of rolling yielding exceptional covering power with freedom from shadows. In conjunction with the Government the same firm carried out special tests with tractor spares, and now have a range of tractor spares for practically every type of crawler tractor on the market.

On the Treforest estate at Pontypridd a great contribution to fuel economy is being made by the manufacturers of a well-known stoker for industrial use such as firing foundry ovens.

The range of complete articles made by the engineering industry is too extensive to permit individual mention, and many concerns are known the world over for their particular products. An Aberavon firm makes bakery equipment, in which connection it is interesting to note that one Welsh concern with headquarters at Cardiff manufactures cake on a large scale—some 50 tons being despatched every week throughout the United Kingdom. The Swiss roll plant in the same bakery turns out 150,000 per week!

But to return to the engineering side—the Aberavon firm makes a remarkable little mobile bread moulder which can mould 2,000 loaves an hour with a texture and crumb quality greater than can be obtained by hand moulding—yet the dimensions of the smaller model are only 36 in. by 18 in. and the larger model 48 in. by 24 in.

The electrical side of the industry contains many names that are household words and the factories are well distributed and have therefore done much to help the basic Welsh employment problem.

When this book last went into print there was only one major radio concern in Wales, but now another well-known concern has taken advantage of trading estate facilities at Hirwaun. A remarkable point about this factory is the layout, which has a lorry runway extending through the main doors right through the factory, making it easy to deliver material in large quantities to stores and main assembly lines.

LIGHT INDUSTRY

THE term " Light Industry " covers the manufacture of such a vast multitude of indispensable things that just a list of them arranged in alphabetical order would reduce this chapter of Welsh Achievement to the level of a mere catalogue of names ranging from abrasives and beehives to yarn and zipp-fasteners, with only the letter X for a blank. The entire seventy-six pages of a very informative brochure issued by the National Industrial Development Council of Wales and Monmouthshire under the appropriate title of " Made in Wales " is devoted to listing these precious products of the Welsh factories in useful order for the ready reference and guidance of anyone who may be interested in all or in any single item.

A point of interest, particularly in connection with Light Industry, is that nowadays you find it cropping up everywhere, often quite unexpectedly, alike in the North as well as in the South and Centre of the Country. For instance, Llandudno, generally acknowledged as one of the foremost seaside resorts in the British Isles, also has industry, notably the works of a well-known refrigerator concern, where refrigerator condensing units are made as well as various kinds of storage cabinets for ice cream and frosted foods.

Many types of domestic equipment such as electric washboilers, washing machines, cookers, immersion heaters and so on, in addition to low tension switchgear and power transformers, are made at Blackwood. Electrical hairdressing equipment is made in Cardiff, which city also has branches of two big combines making telephones, electric bulbs, etc. Incidentally, it is of interest to mention that a Welsh firm of electrical engineering contractors are erecting the large new generating station at Burry Port.

There are many firms as well producing in large quantities articles which find a ready market both at home and abroad. All we aim at doing in this brief article is to give some idea of their variety and diversity, the uses they serve and the versatility they impart to the modern industrial background of Wales.

Speaking of diversity — to a Cardiff firm goes the credit for developing and building the 92 lb. collapsible raft used recently in the cold weather survival trials in Northern Waters. From H.M.S. *Truelove* nine volunteers between the ages of 20 and 30 went out as " human guinea pigs " to provide data on the ability of men to survive in very cold conditions at sea.

Their five-day diet consisted of 1,500 calories, made up of two tubes of condensed milk, a small bag of coffee and two-thirds of one pint of water daily, and their " home " was this new-type oval-shaped life-raft.

During the war the same firm made thousands of dinghies for the Royal Air Force and the knowledge gained during those years has been used to develop this latest product. It is made of rubberised cotton fabric and can accommodate twenty persons, with an emergency load of 27. It weighs 92 lb., but with all the accessories—food, water, the inflating equipment, immersion suits, etc.—the weight is just under 300 lb.

The raft can be inflated in 100 seconds. The space filled is 90 cubic feet. There are seven compartments, which means that if one or more is punctured the raft will remain afloat. There are also inflated seats and the weather cover is pneumatically stressed.

A corner of the Foundry of Yendell & Co. Ltd., Risca, Mon., the only typefoundry in Wales and the largest in Europe.

Light Industry in Wales has played and is playing a tremendous part in the national effort to close the dollar gap, indeed it was very largely the already existing transport and dock facilities, plus the general bias towards overseas trade, which, together, secured Government approval for post-war factory-building on such a generous scale, and it is gratifying to note the steady and ever-growing increase in the value of exports from the great seaports of Wales.

The already famous Trading Estates at Treforest near Pontypridd, at Bridgend, at Fforestfach near Swansea, at Hirwaun near Aberdare, and at Marchwiel near Wrexham, have provided ready-to-hand modern well-designed premises capable of immediate application to the special requirements of almost any conceivable enterprise which has for its object the mass manufacture by the most up-to-date methods of something which the world has urgent need!

An important development approved by the National Industrial Development Council is the establishment of a liaison committee of industrialists from Wales and Northern Ireland, the purpose of which body is the promotion of trade between those two portions of Great Britain. This development followed a visit by Welsh industrialists to Northern Ireland which led to an investigation by leading members of a Northern Ireland trade association into the work and products of the new Welsh factories, and it is now obvious that there exists a large market in Northern Ireland for the thousand-and-one products of light industry in Wales.

There is no " two-sides " to the success of the policy pushing forward the establishment of new industries in Wales and Monmouthshire as a solution to the problem of unemployment which arose by reason of the former local dependence on coal, steel and tinplate, a fact which was recently stressed by the President of the Board of Trade when he claimed that over 600 new industrial projects had been established, or were being established, in Wales. This policy has raised the number of employed people in Wales to over 750,000 and has reduced unemployment to the lowest figure for over a quarter of a century. Another important pointer emphasising how very beneficial to all concerned has been this rapid introduction and expansion of light industry is obvious in the recent application of certain firms who have participated in this venture for permission to extend—in one case, to double—the size of their original factory space. It is also of interest to note that at least two large Welsh enterprises have found it worth while to co-operate with firms in America over the interchange of patent rights, etc., to the saving of raw materials and the increase of dollar exports.

The following eloquent reference to the Industries of Wales appeared in the *Manchester Guardian*, 15th June, 1950:

A busy scene in one of the great sheds of Fairholme Products Ltd., Cardiff.

"This area, which formerly had its industrial eggs almost all in the one basket of coal, iron and steel, is to-day a hive of new industrial enterprise and is taking its full share in the export drive. Since the war the industrial picture has been transformed, scores of new light industries are making a vital contribution to national prosperity, and inroads are being made in dollar markets.

"Since 1937, 85,000 new jobs, 54,500 for males, have been created, 227 new factories have been completed, 69 are now under construction, and 76 are approved but not yet started. Coal is making slow but steady progress; iron and steel are setting up new high records, and when the new mills of the Steel Company of Wales start production next year Wales will have the most modern high-output plant in the world.

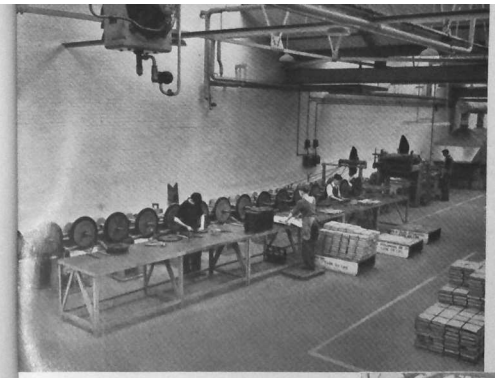
"Among the scores of new industries now providing steady, well-paid work are watches and clocks, motor accessories, clothing, chemicals, electrical switch gear, cutlery, furniture, plastics, nylon, an oil refinery, cycle accessories, washing machines, woollen fabrics, electrical appliances, radio, television and agricultural equipment. Treforest, Hirwaun, Bridgend and Swan Trading estates are 'little Midlands' with a remarkable range of industries. Plenty of alternative employment in 'Music-While-You-Work' factories, it is thought, is one of the reasons why it is not so easy to maintain employment in the mines."

To the list of what is nowadays "Made in Wales," mentioned by the *Manchester Guardian* in the foregoing paragraph may be added the following products of Welsh industry:—

Abrasives, air conditioning equipment, aircraft decoration and seating, artificial flowers, asbestos goods, automatic stokers, bakery equipment, belting, billiard tables, biscuits, boots, boxes (metal, wood, fibre and cardboard), brakes, brattice cloth, bricks, brushes, bus bodies and caravans, buttons, cables, can openers, canteen and hotel fittings, casks and barrels, celanese, chocolate and confectionery, cigarettes, cigarette papers, combs, cork, corsets, cosmetics, cycles and accessories, dairy products (industrial), domestic woodware, drain rodding, embroidery, fancy goods of almost every description, felt, fertilisers, fibrous plaster, fire-fighting equipment, foil, food products, galvanised goods, gates and railings, gears, gelatine, glass and glasswork, gloves, glue, greeting cards, hairdressing equipment, hand tools, hinges, holloware, hose, hosiery, jewellery, joinery, laboratory equipment, ladders, leather goods, lighters, locks, mats and rugs, mattresses and bedding, meters, mica goods, mirrors, nails, bolts and screws, office furnishings, oils and greases, oil seals and gaskets, oilskins, oil drums, overalls, paints and varnishes, paper, parachutes, pencils and pens, perambulators, pharmaceutical products, photographic apparatus, pistons and piston rings, plastic goods, polishes and soap, portable buildings, potato peelers, pottery, prefabricated structures, printing inks, pumps, radio and accessories refrigerators, roofing tiles, ropes and cordage, rubber goods, sacks and bags, safety equipment, saws, scientific instruments, sequins and spangles, signs (road), silk and rayon printing, insulating materials, spectacle frames, sponges, springs, stationery, strings (sport and musical), surgical instruments, tape (adhesive), tar and pitch, tarpaulins, telephones, tents, thermostats, tool handles, torches, toys and games, transformers, type, typewriter ribbons and carbons, vacuum flasks, valves, veterinary preparations, wallboard, watch straps, waterheaters, water treatment preparations, wax, wheelbarrows, window frames (metal), wire (aluminium and steel), wirework, woodwork, wrought ironwork, yarn and zipp-fasteners.

Indeed, it is difficult to think of anything that falls under the heading of Light Industry which is not being manufactured in Wales to-day.

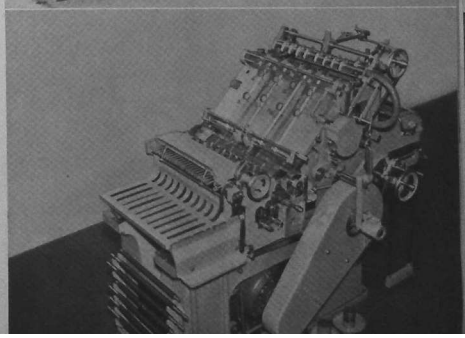
The Canning of Vegetables—a corner of the Cardiff plant of J. Skrek & Co. Ltd.



Pay-off End of Export Strap Blueing Line at the works of Signode Ltd., Swansea.

A general view of the making-up section of Messrs. Larma Ltd.

The Willbow manufactured Revolutionary Automatic Machine destined to become the standard small letterpress unit.



AGRICULTURE

by

E. Verley Merchant

EVERY country, every industry, must have an avenue of expression. This is plainly seen in the history of nations.

Ancient Rome accomplished her greatest achievements around the avenue of militarism. The " world to Rome " phrase was the clarion call. Years ago the Grecian Empire was developed along the avenue of learning. Plato, Aristotle, Socrates were national heroes in this country of knowledge and civilisation. The Jewish race thrived at this time along the avenue of expression of religious thought.

Industries also have an avenue of expression. Coal in its importance to the wealth of the nation expresses itself along the avenue of power, light and heat.

Agriculture also is an industry with a very definite avenue of expression. One more vital to the nation than any other, for it expresses itself not by what is done *by* man, but what is done *for* man. It deals with the basis of life without which none of us could survive and nothing could be accomplished.

Bearing this in mind, it would be of interest to recall the position of agriculture in this country when the war broke out.

It is true to say that at the commencement of hostilities there were two and a quarter million less acres under the plough than in 1914. Two hundred and fifty thousand farm workers had left the farms for industrial centres. And this, we must remember, with four million more mouths to feed than in 1914.

Agriculture at this period—the period between the two wars—went through a time of acute depression. It is a wonder that many survived to tell the tale. Thousands gave up the uneven contest and drifted to other avenues of employment.

Others gave up in despair the old system of rotational farming and resorted to the only economic avenue open to them, that of milk production. The result was that many good arable farmers in our extensive vales dabbled in milk for the first time. This they had to do or go under.

Consequently, the rush into milk nearly brought chaos into the industry. Milk was plentiful and there was widespread undercutting. It was at this time that the Milk Marketing Board came into existence. Not a moment too soon. It brought stability of marketing and guaranteed prices to the producers. This marked the *turning point* in milk marketing, which survived the war period and is still going strong.

But there were many other branches of the industry still neglected and in truth were, unfortunately, lost sight of, until once again we were fighting for our lives in another major war. When the history of farm work during the war will be written up it will show how loyally the men of the soil tuned themselves to the almost super-human effort ahead of them.

It would not be amiss, now, to endeavour to show its importance to our other major industries.

Before the war the estimated value of home farm produce was in the region of two hundred and fifty million pounds. To-day it is more than double this amount.

Where does the farmer spend his money? Many hundreds of thousands of people in this country are still ignoring this aspect of the situation. Had it been realised to the full, agriculture would have had more support from the man-in-the-street and from the man of commerce and industry.

The money is spent with our industrial concerns. The farmer is a very good customer, as he must have implements, coal, steel, fertilisers, machinery, etc. Thus a thriving agriculture means a thriving nation.

Farming is not an industry confined to small centres, as it is carried on in every part of England and Wales. In spite of all the developments that are taking place, eighty per cent of our land is still rural *Agriculture is the pulse of our security, the very pivot of our industrial stability.*

It is no coincidence that the period of depression in agriculture was accompanied by an industrial depression. Why? Simply because that when agriculture is down and out, it brings down with it other industries as well.

This inter-dependence of industry is not always recognised. We must pay due regard to every industry in the country. To neglect one is to injure the other.

Let us therefore deal with this matter for a moment, not from a farmer's point of view but from the national

aspect. The world is made up of some two thousand million souls. Of this number nine hundred million are employed in some industry or other. Of this number more than five hundred million are employed in agriculture. *There is more capital invested in agriculture than in any other industry.*

In the U.K. the national income is in the region of four thousand million pounds. Of this thirteen hundred and five million is spent on food—one third of our national income.

In this respect it would be interesting to point out the contribution of agriculture to the cost of living as it was immediately prior to the war. Let us consider the year 1914 as our basic year for comparisons.

At the time of the outbreak of war rents had increased by about 60 per cent, clothing by 110 per cent, coal 95 per cent, fuel and light 80 per cent, and food ? *In comparison with the other commodities food had only advanced by* 40 *per cent.* It is well to note this, for if food had gone up in the same proportion, the cost to the nation's pocket would have been enormous. In fact, the price of food, keeping much lower than the other necessities mentioned, meant a saving to the British public of some four hundred million pounds annually.

This is such an important aspect of our economy that the Government has in the past paid the farmer to do certain jobs. These monies are mistakenly called subsidies to the farmer. In reality they are no such thing, being in fact, *subsidies to the consumer.*

In the period commencing with the outbreak of war in 1939, the art of ploughing had to a great extent been neglected. Then the call came. A great deal of ploughing was essential to safeguard this country from want. Long hours, shortage of manpower, lack of suitable implements were only some of the problems to be faced.

It was a pathetic position for an island like ours to be in. But the situation was faced with a courage and a determination worthy of our past traditions.

" Every man to the plough " was the order of the day. And how well every man responded! Land that had been green for many years was quickly turned over, seeds were sown and thus began the great fight to keep the food front secure during the days of war.

Young farmers took to the plough with a will. Thousands of girls from offices, factories, etc., heard the call of the land and joined the " Women's Land Army." And what a fine job of work they have done. Yes, they fully deserve recognition.

The Ministry of Agriculture, realising the seriousness of the home front position, proceeded to appoint various War Agricultural Executive Committees with an Executive Officer attached to each one.

A typical Welsh Farm.

Eagle Photos

A national survey was made and a certain percentage of increased arable was the aim. The programme was an ambitious one. It almost frightened the farmers. But not for long. Working with a will, the farmers in the various counties even exceeded the quota laid down for them by the Ministry.

Priority Number One was milk. And this had to be done whilst increasing greatly the arable acreage under cultivation. The result was that our milk output advanced so rapidly that all previous records for the country were smashed.

Our output of wheat, barley, oats, increased considerably. Once again in the country's hour of need the farmers had come to the rescue. Our poultry and pig population dwindled but it was a case of concentrating on the main things. Better use could be made of the food consumed by pigs and poultry. *And this was done.*

At the present time the food position demands still greater effort for the next few years.

Farmers during the war were assured of a market for all their produce. They received guaranteed prices for the commodities. This has been an incentive to greater effort. There has been harmony on the home farming front.

It is the morrow of agriculture about which we are now anxious. What is to become of this great industry in the years ahead? Are we to drift to the old position of instability and insecurity?

Are we to barter our goods and be at the mercy of subsidised foreign competition? There are many problems in front of us.

Agriculture and its future is the main topic amongst farmers in these days. Undoubtedly, many reforms are necessary. The very first essential is an organised form of marketing. Never again can the nation afford to allow agriculture to be relegated to the backwaters of our economic system.

The Milk Marketing Board has proved the value of this form of marketing, not only to the farmer but also to the consumer. Milk is being produced to-day with greater efficiency than ever before.

Given proper safeguards in connection with our other commodities the same measure of improvement will be forthcoming. This is only reasonable to assume, for then, the farmer will have an incentive to work knowing that his labours will not be in vain.

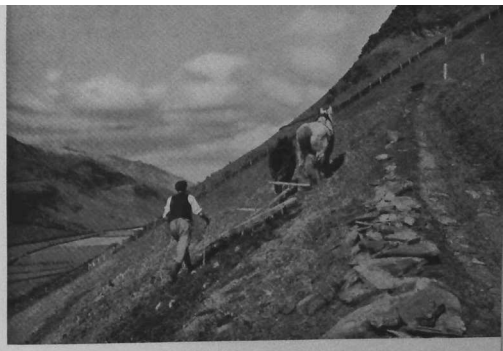
Many reforms are necessary. Electric light to all farms at moderate charges is an essential if we are to advance in the post-war period. It is really remarkable how many have been able to carry on for so long without this facility. This is now recognised by the powers-that-be and no doubt, an attempt to supply current to most farms will be made.

Then the question of proper roadways to outlandish farms should be one of the first reforms to be aimed at. It is with much difficulty that many have been able to carry on. In many cases lorries or motor cars cannot get to the farms. This has resulted in the curtailing of the farming operations. Access to remote hillside farms is one of the first essentials.

What about our water supply to farms? It is in a chaotic position. Hundreds of farms in Wales are without proper water supply. This has harassed milk production in the hills. Many who would like to qualify for the graded standard of milk are unable do so because of the lack of water facilities.

There is plenty of water in Wales to provide for the requirements of the British Isles. And yet hundreds of farmers in the Principality are deprived of fresh running water This should not be so. We cannot afford it.

Farm buildings also need immediate attention. They are now, many of them, in bad condition.



Eagle Photos

Qualifying for the Government's hill-farming subsidy is by no means child's play, as this picture of harrowing after ploughing shows. The photograph was taken at Tan-y-Coed farm, Isaf, Merionethshire.

Wales could be a first-class rearing country. Our stock is renowned. But many farmers are without the necessary buildings to rear their own stock.

When feeding stuffs will again become plentiful—and there is a big question mark here—we can afford to give more milk to young calves, breeding and rearing will become an essential feature of our farming operations. Buildings for this purpose we must have. Our post-war farming will not be complete without a place in our policy for adequate rearing.

The efficiency of the farmer of the future will depend largely upon the economic security and facilities provided for him. The decay of our farming prior to the war was due to lack of the farmer's confidence in his own industry.

Remove this fear of uncertainty and then the country will realise how much farming can be improved in this country.

The potentialities of the homeland in an agricultural sense is enormous. We have no idea of the untapped resources of the country. We are privileged to live in a country rich in capabilities. In this connection I would just mention the possibilities of production from marginal land.

The home farmer is second to none in the management of his farm. He is prepared to move with the times. He is ready to sink money in his industry. He is ready and willing to carry on and improve on what his father accomplished. The spirit indeed is willing.

It is refreshing to know that Chambers of Commerce and Trade up and down the country are now alive to the importance of agriculture to this country. Town and country are coming together. This is the sign of the times. With mutual understanding and co-operation, let us hope that the industry to which we owe so much will not be forgotten now in the days of peace.

Bringing down the flock for winter dipping at Blaen Taf Fechan, Brecon Beacons. *Farmers Weekly*

THE DOLHENDRE SCHEME, GLANLLYN ESTATE, MERIONETHSHIRE

By GLANMOR WILLIAMS

FOR some months an informal group set up by the Welsh Secretary of the Ministry of Agriculture and Fisheries, with Sir C. Bryner Jones, C.B., C.B.E., as its Chairman, has been considering how the Festival of Britain, 1951, could best make a contribution of permanent value to the agricultural and rural life of Wales. It was felt that any project should be linked up with a characteristic feature of Welsh life, and should

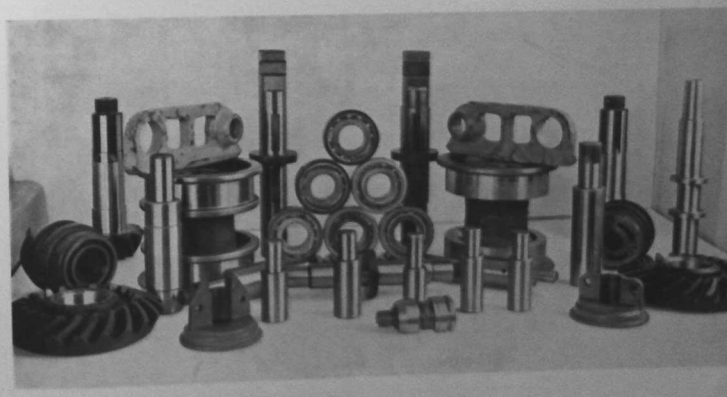
be practical in the dual sense that the standard set was not unreasonably high and that the results could be seen by visitors with little inconvenience.

After examining various proposals the group concluded that the most promising project was the rehabilitation of a group of hill farms in a district where afforestation is also of some importance in the Welsh way of life to-day. It was also agreed that the execution of the major part of a plan by mid-Summer 1951 was only possible if one owner was concerned. Consequently the choice fell on a group of holdings on the Glanllyn Estate in Merioneth, which is managed on behalf of the Minister of Agriculture by the Welsh Agricultural Land Sub-Commission. This is the Estate that was taken over by the State in lieu of death duties.

The hamlet of Dolhendre is situated near Llanuwchllyn village and is readily accessible from the main Bala-Dolgelley road. It nestles at the foot of Garn Dochan, from the top of which visitors can, if they wish, have a wonderful view of the surrounding country.

Broadly the project involves the rehabilitation of three hill sheep farms, the renovation of a cottage, the provision of new houses for forestry workers, works essential for the beginning of an afforestation scheme, widening of the public road leading from the main road along Bala Lake and special festival expenditure on amenities. The basic idea is that the Festival of Britain will have shown owners and occupiers of land in areas of Wales not highly endowed with natural wealth how they can make their homes, homesteads and surroundings more attractive and simultaneously minimise the drudgery of farm work. So far as the farms are concerned the Sub-Commission and the tenants propose to carry out really comprehensive schemes under the Hill Farming Act and hope to secure the grant of 50 per cent of the cost which is open under the Act to all owners and occupiers of hill farms. The technical advice given by the Agricultural Land Service and the National Agricultural Advisory Service in connection with this Scheme is also freely available to all. The Forestry Commission will also execute work which they would do in their usual capacity. The Festival of Britain Fund will provide assistance for amenity items, such as stone and slate for the houses and buildings, planting of shrubs, decoration of houses (which a tenant would normally undertake only in instalments), descriptive literature, etc. The National Library of Wales propose showing exhibits relating to the district at Glanllyn Mansion, on the banks of Bala Lake. Here, also, Urdd Gobaith Cymru (Welsh League of Youth) will welcome visitors to view its work in physical and general education and social activities, as well as providing refreshments for parties and individuals.

Agricultural spares made in Wales by Willbow Manufacturing Co. Ltd.



QUARRYING
CEMENT, CLAY, BRICKS, etc.

STONE production in Wales comes under four headings: limestone, igneous rocks or granite, sandstone, including South Wales Blue Pennant stone, and slate, the great bulk of which is quarried in North Wales.

Pure carboniferous limestone is used by steelworks, for making lime used in agriculture and in many industrial processes such as tarring, paper-making, etc. Road work, Manufacture of concrete and of tarred bituminous macadam, and also protection against explosions underground — these are but a few of the uses emerging from the great quarrying industry. Nearly all of the South Wales towns and many of Cardiff's finest buildings have been built from Blue Pennant stone, which has an extensive use in building, civil engineering works and making paving and curbs. But the extended use of bricks and concrete has almost killed the Blue Pennant stone industry, and with it the skilled stonemason has ceased to be so easily obtainable, so that in order to carry out the important stonework in connection with the Claerwen Dam Italian masons had to be imported under a Ministry permit.

Igneous rocks, or granite are also used for building work and are particularly in demand for the construction of first-class roads. Although there is some igneous rock found in South Wales the most important quarries of this type are in North Wales.

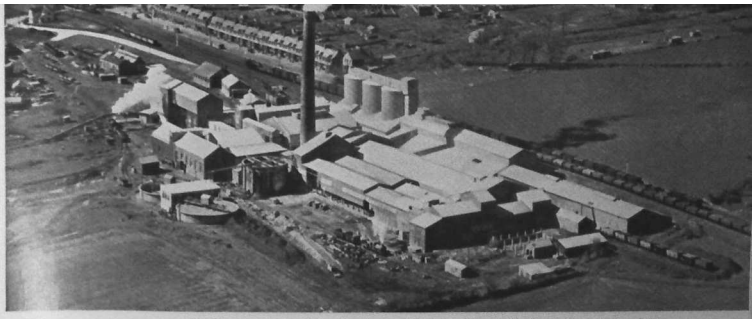
On the site of the lime-producing areas the more important quarries include N. B. Allen and South Wales Refractories Ltd., Stormy Down and Lime Firms, Ltd., at Llandebie. Stone for steelworks, apart from those operated by the steel companies themselves, include Vaynor Quarries Ltd., Penderyn Limestone Quarries (Hirwaun) Ltd., and Ruthin Quarries (Bridgend) Ltd. For Road Stone production, apart from the quarries mentioned, are Libox Quarries Ltd., Tintern, Machen Quarries Ltd., Machen, Risca Quarries Ltd., Risca, Hendy Quarries, Ewenny Quarries (1937) Ltd., C. & F. Gaen, Port Talbot and many others. Most important of the Pennant Stone Quarries are Craig-yr-Hesg Quarries (Pontypridd) Ltd., C.R.C. Quarries, Morriston and Robert Evans & Son, Abercarn. Of the Granite Quarries, Treffgarne Granite Quarries Ltd., Treffgarne (Pem.), Penmaenmawr Quarries, North Wales, and British Quarrying Coy., Builth Wells, are among the best known. Those named are just a few of the 150-odd quarries in Wales all playing an important part in the industrial economy of the Principality. In fact the high position of importance occupied by limestone in British industry is not generally understood. Without limestone, industry in its many shapes and forms throughout the country would come to a standstill—" and that is no exaggeration " says Mr. W. J. Phillips, Secretary to the South Wales and Monmouthshire Quarry Owners' Federation and President of the Federated Quarry Owners of Great Britain.

With an impressive background of experiment and ingenuity the Portland cement industry has been built up, and since the middle of the eighteenth century developments have led to a modern product, the result of a hundred years of constant experiment. In Wales there are at present four modern works producing the highest quality Portland cement. These are at Penarth, Rhoose and Aberthaw, in Glamorgan, and the latest, which has only this year begun producing cement, is at Padeswood in Flintshire. The oldest established of these works is at Penarth where the manufacture of Portland Cement has been carried on continuously since the year 1888, although the famous Aberthaw Blue Lias Lime was being produced there for a great number of years before that time. The works saw the pioneering days of the rotary kiln, two of which were installed in the early days, each being 25 ft. long by 11 ft. in diameter.

The works at Rhoose and Aberthaw were erected in 1912 and 1914 and are of the most modern type and layout. Together with the recently established works already mentioned the cement-producing capacity of Wales has risen to approximately 600,000 tons per year compared with about 50,000 tons at the beginning of the present century.

Two things are necessary for the setting of a cement works: easy access to raw materials, i.e., chalk or limestone and clay, and good transport facilities. All these attributes are present in the works mentioned.

From Portland Cement we go to another part of Wales to find the heavy clay industry in the North, which has been in existence for over 100 years and was developed around the rich seams of primary carboniferous



The Rhoose Works of the Aberthaw and Bristol Channel Portland Cement Co., Ltd.

deposits of the shales of the coal measures. In Denbighshire perhaps the best known source is the Ruabon Marls, a rich vein of great depth lying in the upper coal measures. Many clays go to make up the whole sequence, each different in composition and affording great opportunity for the varied products of first-class ceramics that are still after many years being produced.

Material for high-grade silica refractories is provided by the quartzatic sandstone of the Cefn-y-Fedw series. There are between 25 and 30 works operating in the clay industry of North Wales, mostly small units privately owned. The bulk of the manufacturing capacity by weight is the building brick. A good tonnage of refractories is turned out in the Buckley area and silica bricks for the steel industry at several locations. There is also manufactured special refractories and acid-resisting ware. In the Ruabon area the main use for clay is in the manufacture of paving tiles or quarries for domestic and industrial use.

Flintshire, apart from its contribution to the building industry in the form of building bricks, has gained fame in the manufacture of steel works refractories and acid-resisting materials for the chemical industries.

Ruabon has earned a reputation in the past for the provision of terra cotta mouldings in many complicated designs, used to decorate hundreds of buildings in the large cities of Great Britain. Now the principle manufacture is of floor pavior, called quarry tiles. The quality of these paviors cannot be excelled anywhere in the world, as the finished material, baked in very high temperature kilns, gives an article which resists abrasion, moisture and acid penetration. Forty per cent of the total consumption of quarry tiles in Great Britain is made in the Ruabon area. Many fine buildings in the U.S.A. and Canada have been floored with Ruabon quarry tiles and factories in many places overseas favour Ruabon quarry tiles.

Another side of this vast inter-relation of industries is the brickmaking works. The Tondu Brickworks Company Ltd., at Aberkenfig, near Bridgend, have a capacity for making ten million bricks a year, both facing and common bricks. Before the war facings were supplied to large contracts in all parts of Wales, London and the South of England, but since the war South Wales alone has absorbed a large amount of the output. At one time or another most of the leading architects of the country have specified the products of this company for various buildings. Facing bricks for, as an example, the Roath Power Station, Cardiff, Llynfi Power Station and the power station under construction at Carmarthen Bay, Burry Port, have been supplied by the Tondu Brickworks.

The associate company, the Tondu Flooring Tile Company Ltd., make a very fine red flooring tile. The plant has been built since the end of the war and is the first in South Wales to make these tiles, which are now being sent to all parts of the country.

Some of the very earliest ceramics were discovered at Caerleon and to-day one of the largest works of the Star Brick and Tile Co. Ltd., are situated at Ponthir, very near to the place where early pottery has been found on the site of the famous Roman encampment.

The Company, when in full production, produces approximately 25 per cent of the bricks made in South Wales, and also a substantial quantity of salt glazed pipes and fittings. In addition a variety of clay products is also manufactured, such as hollow clay building and

partition blocks, land drains, electric cable covers and similar types of articles.

To-day all the goods produced by this factory are made from first-class carboniferous shale, and most bricks produced are high quality facing bricks in various types, examples of which can be seen in most of the principal buildings in the area.

The whole of Wales has an approximate output of 250,000,000 bricks a year of which South Wales produces about two-thirds. In the whole of Wales there are about sixty brickworks and in South Wales approximately thirty.

In the North Wales areas the large makers are the Ruabon works already dealt with, and in South Wales the number of common brick manufacturers predominate substantially over the facing brick makers. The former are largely made from coal shale tips and other types of manufacture are split between the carboniferous shales and the red lias sandstones.

The carboniferous limestone on the edge of the South Wales coalfield in places contains considerable amounts of dolomite. The term "dolomite," in its narrowest sense, refers to calcium carbonate and magnesium carbonate in equal molecular proportions which would give a theoretical composition of 54.35 per cent of the former and 46.65 per cent of the latter. Actually the term is used more broadly to describe limestone containing over about 10 per cent magnesium carbonate, though rocks containing up to 40 per cent are sometimes known as magnesium limestone or dolomitic limestone. In Wales the only formations containing dolomite are the magnesium limestone of Permian age and the carboniferous limestone, though the latter is only rarely dolomitized. The outcrop of the carboniferous limestone on the flanks of the Vale of Clwyd in North Wales extends southward into Shropshire, interrupted by faulting, and there is an important quarry in the neighbourhood of Porthywaen. In South Wales dolomite is worked at Taffs Well, Cefn-On near Caerphilly, and at Risca in Monmouthshire. The most important use of dolomite is in the manufacture of refractories for use in the linings of basic steel furnaces. For this purpose it is used either in the form of "basic" (dead burnt) dolomite—known in the industry as "Doloma"—or it is made up into bricks or cements. Nearly all the output of Welsh producers is consumed by the large steel works in South Wales.

Asbestos-Cement

The asbestos-cement industry has been represented in Wales since 1935 when Turners Asbestos Cement Co. Ltd., opened their factory at Rhoose, Glamorgan.

A comprehensive range of corrugated asbestos cement roofing sheets and their many and varied accessories has been in steady and increasing production since its inception. Practically all the asbestos cement roofing on the huge Treforest Trading Estate had its origin at Rhoose and the factory is adequately equipped to handle the total requirements of Wales and Monmouthshire.

A sales office at Principality Buildings, Queen Street, Cardiff is staffed by technical experts who are always pleased to place their services at the disposal of architects, consulting engineers and others who are alive to the economics of building with asbestos-cement.

SLATE

NORTH-WEST Wales has the largest slate-producing areas in the world, the Dinorwic Quarries in Caernarvonshire alone covering an area of about 900 acres. The Romans used Welsh slates for roofing in the third century A.D., but until the nineteenth century workings were extremely crude. Cilgwyn Quarry near the picturesque, hill-girt village of Newville, west of Snowdon, is reputedly the oldest quarry in Caernarvonshire, and it was from here that Methuselem Jones trekked to Blaenau Ffestiniog in Merionethshire and started the Diphwys Quarry in 1755. Oakeley Slate Quarry has been worked systematically since 1800, and the Oakeley Slate Quarries Co. Ltd. took in the Votty and Bowydd companies at Blaenau Ffestiniog in 1933 and three years later the Diphwys Co. was also incorporated with these. There are other less important quarries at Moelfferna, near Corwen, in the Llangollen-Llansantffraid area of Denbighshire, at Aberllefeni and Corris, easily accessible from Aberdovey, at Abergynolwyn, near Towyn, and in the Prescelly Mountains area of Pembrokeshire and Carmarthenshire.

The boom years of the industry came at the end of the nineteenth century, coinciding with the boom in building. From then the output and demand dropped, largely because of the growth of the use of tiles for roofing. Throughout the inter-war period, there was no correlation between the annual consumption of slate and the number of new houses built.

Figures published in March 1947, in the Rees report for the Ministry of Works, show that whereas in 1898 the output was 485,000 tons and 16,000 men were employed, in 1938 the output was only 278,230 tons and manpower had dropped to 8,227. Half of these men, however, left the industry for the Services and war-work, and with the enormous increase in demand for roofing-slates following bombing, the shortage of man-power in the industry became very marked. As a result of representations made to the Ministry of Labour and National Service in 1944, the Welsh Sectional Industrial Council for Slate Quarries was revived, and steps have been taken to make the industry more cohesive. In June 1946 the total number employed in the industry in Wales was 4,050, which, in spite of modern mechanical aids, is much too low a number to cope with the present enormous demand for slates. This shortage of manpower is, however, all that restricts output.

Slate-mining and quarrying calls for skilled workers, and as much of the finer work is still done by hand, the expert craftsman in the industry is able to take a personal pride in his work, such as is never possible in purely mechanised industries. Slate-mining has the great advantage over coal-mining in that there is no danger from noxious and other gases.

Slate itself is a comparatively soft, metamorphic rock of great age, as is shown by the complete absence of fossil remains in the veins. The Welsh slate is of Ordovician or Lower Silurian age, and was subjected to tremendous natural pressure and intense heat during its formative processes. Deposits vary in thickness, often from 150 to 300 feet, and are inter-stratified with

beds of chert and other rocks of a harder nature. The veins or beds of slate, in ascending order, are known as the New or Deep Vein, the Old Vein, the Back or Middle Vein, and uppermost, the North Vein. Colours at Dinorwic quarries include, among others, blue, grey, red, and sea-green slates. At Blaneau Ffestiniog the dominant colour is a soft blue-grey, though slate from the North Vein is slightly darker. Few people, however, realise that by the "Colloidal" process, slates are obtainable in the most delicate pastel tints, in exotic peacock blues and greens; in fact, in any single colour or combination of colours and shades that may be desired. The colour so produced is absolutely permanent and definitely beneficial to the slate.

The use of slate is not confined to roofing. Among the many other uses are billiard tables, brewery tanks, cisterns, aquariums (that at London Zoo is of Welsh slate), dairy and laboratory tables, steps, sills, flooring, shelves, flat roofs and pavements, electric switchboard panels, monumental work, and for "honing" razors, for which it has no equal. Synthetic pumice, used for partition walls, is made from slate treated by heat.

Sizes of roofing slates used to have their own particular names, ranging from units, doubles, and headers, through the entire female line of the aristocracy, from ladies—narrow, small, broad, or wide, according to taste—to viscountesses, countesses, and so on up to queens and empresses; but in our own prosaic days such titles have fallen into desuetude.

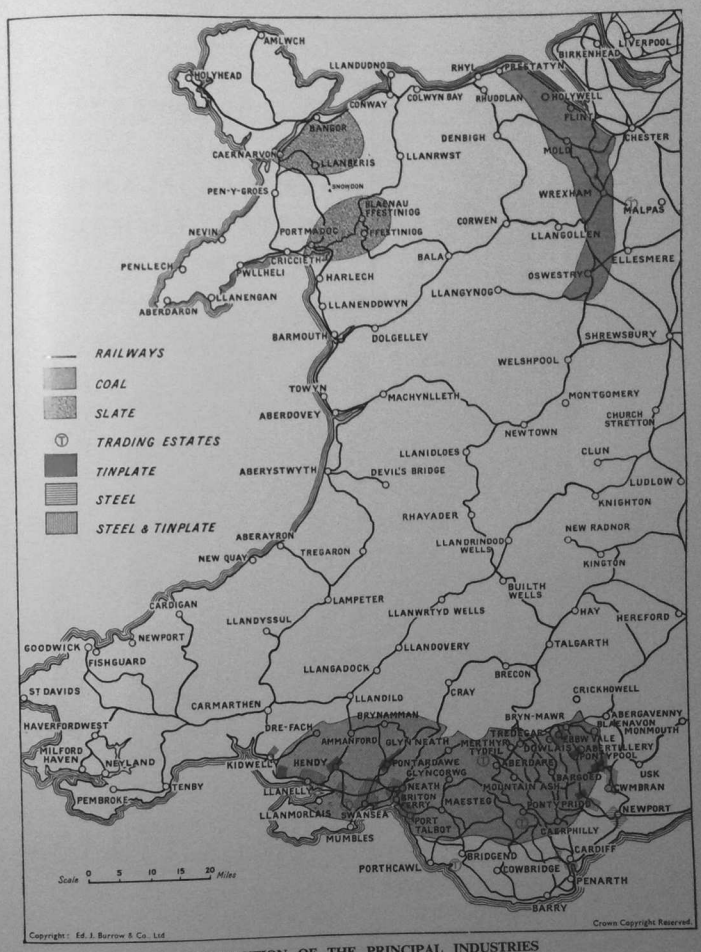
Slate has many advantages. Roofs covered with slate, properly nailed, last a century or more. The light weight of slate makes it economic in use, much roofing timber being saved, and there is little or no maintenance cost. Slate is watertight, fireproof, and has a very low thermal conductivity. It will not corrode with acids and does not harbour moss or other vegetation.

The most important characteristic of slate, however, is its cleavage, which, unlike other rocks, is entirely independent of its original bedding. It seems almost incredible that a strip of slate 1¼ inches thick can be split into 26 strips, and these fine strips can be bent in an arc in the manner of a steel strip edge. In practice, slates are seldom made less than one-sixth of an inch thick. Welsh slate has a tensile strength of 8,470 lb. per sq. in., and a resistance to compression of 31,431 lb. per sq. in.

Open quarrying is possible, as in the Llanberis-Bethesda area of Caernarvonshire, where overlying rocks have been removed by denudation or glacial agency, but when the slate is covered by igneous or other rocks, mining is necessary. At Blaenau Ffestiniog both systems are used, but there are over 40 miles of underground workings. From the highest floor of these workings to the bottom of the lowest floor there is a depth of some 1,550 feet, and the workings extend about 1¼ miles into the mountain side.

It is essential to secure the blocks of slate intact. These rough blocks are split with a chisel into layers of required thickness, and then trimmed and dressed by power-driven revolving knives. Circular saws are also used for cutting.

Special railway trucks carry the slates down to the ports. Port Dinorwic on the Menai Straits, and Portmadoc, Merionethshire, are the two main slate ports, but railway distribution to the North Wales coast and down the Dee Valley to East Wales and England is now important. The narrow (2 ft.) gauge railway, the first of its kind in the world, from Blaenau Ffestiniog to Portmadoc, was specially constructed for the mines and opened in 1836. Passenger traffic has been allowed since 1865, and before the war about 30,000 passengers were carried each summer, for tourists found the mines so interesting and the scenery of the Vale of Ffestiniog so enchanting.



DISTRIBUTION OF THE PRINCIPAL INDUSTRIES OF WALES AND MONMOUTHSHIRE

OIL

WALES has been favoured as the venue of one of the largest oil refineries in the world—the Llandarcy Refineries at Skewen, Glamorgan. It is situated mid-way between Swansea and Neath and some idea as to the size of the industry may be gleaned from the fact that it requires eleven miles of fencing to enclose the 900 acres of property in which the company operates. It was in 1901 that Mr. William Knox D'Arcy, the pioneer of the company, obtained an oil concession from the Shah of Persia on which he was able to build the foundations of what is to-day a very substantial industrial undertaking. It functions as a unit of the Anglo-Iranian Oil Co. Ltd., to which the National Oil Refineries belong.

Constructional work on the Refinery started in

The Great Llandarcy Refinery.

1917 and in 1921 the work was sufficiently advanced to allow the reception and processing of cargoes of crude oil from Persia, the official opening ceremony being performed on June 29th, 1922, by the Rt. Hon. Stanley Baldwin, later Earl Baldwin and Prime Minister. Arrangements were made with the South Wales Harbour Trust for the lease of Queen's Dock, Swansea as an oil dock. The property include a Transit Storage site near the Queen's Dock to which the crude oil is delivered in the first place. From this Transit Site the crude oil is transferred to the main storage site known as the Work Farm along a pipe track some 3¼ miles long.

The manufacture of petroleum products from crude oil started in July 1921 with fairly simple types of stills and treatment plants. Hardly any of these first plants now remain, having been replaced by modern and more complex plants capable of producing various products such as gas, motor spirit, white spirit, kerosine (paraffin oil), diesel oils, lubricating oils, fuel oils, waxes, bitumens and numerous special products. The new 45,000-barrel Crude Oil Topping Unit was completed in September 1949, thus increasing the crude oil distillation capacity of the Refinery to at least 2.5 million tons annually as compared with its previous capacity of 360,000 tons.

The new Cooling Tower, which is capable of dealing with one million gallons of water hourly has also been commissioned together with pump-houses, pipelines and other services. About 5,000 tons of steel have been used already and construction work on site has given employment to 1,800 people over a period of many months. There are, at present, 2,500 refinery employees, 40 per cent of whom reside in the Llandarcy and Skewen area, 20 per cent in the Neath area and the remainder further afield.

Further stages of development will include new catalytic cracking plant, used for obtaining a larger yield of improved quality motor spirit than can be produced by straight distillation, additional lubricating oil plant, extra kerosine treatment facilities and a bitumen processing unit. Further power, steam and water plant and other services will be installed also. As part of the expansion scheme Swansea's Queen's Dock facilities are being improved and the old jetties reconstructed.

There are two modern canteens, a bath-house and heated lockers, so that workmen can change into dry clothes before returning home at the end of the working period. Welfare amenities are being increased and new canteens with additional shower bathing and changing accommodation will shortly be installed. A recently constructed sports ground is the centre of many club activities and a training centre for process and engineering students enables them to study the technique of refining operations. Lecture rooms, a library and a cinema are part of the facilities and various pieces of equipment are on show for visitors and those attending the training courses.

There are, too, a number of undertakings mainly of a distributive nature, operating from Cardiff, Swansea, Newport, Barry and Llanelly. One importer and distributor of fuel oil, diesel oil, gas oil, white spirit, lubricating oil, tractor vaporising oil, transformer oil, and greases, has provided special facilities for ocean-going tankers to berth at the quayside adjoining its Channel Oil Works and Depot at the Queen Alexandria Dock, Cardiff. Shell Mex and B.P. Ltd. also distribute from their Cardiff depot "Shell and B.P. Brand" industrial and motor lubricating oils, grease and motor spirit, kerosene fuel and diesel oils as well as bitumen, candles and wax.

CHEMICALS

TOWARDS the end of the last century Dr. Ludwig Mond and his colleague Dr. Carl Langer made the important discovery that under certain conditions nickel will unite with carbon monoxide to form another gas—nickel carbonyl; and that by altering the conditions this can be broken down easily to nickel and carbon monoxide. They found, further, that under the same conditions other metals with the exception of iron, which reacted slightly, did not react in the same way. Quickly realising the importance of this discovery as the basis of a process for the refining of nickel, Dr. Mond purchased mining properties in the Sudbury district of Ontario, Canada, and in 1900 began the formation of the Mond Nickel Company Ltd., to refine the Canadian material. Very soon the first matte was being treated at his new refinery in Clydach in the Swansea Valley—one of two great undertakings—the other being at Port Colborne, Ontario.

The works at Clydach, opened in 1901, operates what is known as the Mond Carbonyl Process utilising gas produced from Welsh coal, and this process, in use to-day, is the same in principle as that which operated when the plant was first opened. Many small but important modifications and refinements have, however, been introduced, particularly in the past ten years, so that the operation to-day is much more efficient, and notwithstanding the greatly increased cost of labour, coal and necessary raw materials, the cost of refining is little different from that of pre-war days. A notable addition to the Clydach Works in 1939 was a modern, completely automatic water-gas and producer gas plant working on anthracite or a mixture of anthracite and coke. This supplies at low cost the gases required for reduction and volatilization.

One of the great problems which the industry had to face up to in the days immediately following the First War was to find new uses for nickel and its alloys. During the First World War consumption of nickel rose from 30,000 tons in 1912 to a rate of nearly 50,000 tons per annum, but with the armistice and the termination of armament production its principle use disappeared and yearly consumption dropped to below 10,000 ton level. Faced with the task of finding new markets the story of the efforts put forward is an outstanding example of the value of research coupled with imagination and initiative in the development of a successful industry. Until that time few people had any experience of the use of nickel by itself or as an alloying agent, except in one or two restricted fields. But so successful was the search for new markets and the discovery of new uses for the metal that by 1927 more nickel was being used in the peaceful pursuits of industry than in the peak period of war-time production. In that year, with a tonnage of 68,000, it had well passed the war-time peak.

The Second World War naturally saw an end to many of the new uses to which nickel had been put for six years and for a time the industry faced up to another difficult period. Despite a drastic cut-back in production, stocks for a short while mounted steadily, but the tremendous productive capacity developed in the U.S.A., between 1941 and 1945, moved swiftly from war-time to peace-time manufacture and began to meet the pent-up demand for civilian goods. By 1946 the tonnage was already in excess of any pre-war consumption and the demand has continued to increase. The all-over position now is that despite the small requirements of some countries which, before the war, were considerable consumers, the world demand for nickel is already at a peace-time record. In 1948 the world (outside the U.S.S.R.) used over 130,000 tons of nickel, while Russia must have consumed many thousand tons of domestically produced metal. To-day nickel and its alloys is put to a thousand uses, from the creation of attractive necklets in palladium to essential parts of the modern jet engine, and the works at Clydach founded on the research of Dr. Mond and his colleague Dr. Langer, is to-day one of the great industrial units of Wales.

" Successful industrial enterprises are never static, nor are their operations ever finalised " states the progress report of Monsanto Chemicals Ltd. Evidence of the Company's faith in this viewpoint is amply borne out in their development in South Wales, where a completely new factory is being built in Newport, Mon., on a site of more than 140 acres. In Newport it is planned to commence with products which Great Britain has hitherto been obliged to import. These products, for direct export and for use in exporting industries, will add to the industries already served by Monsanto—those concerned with lubricating oils, textiles, electrical equipment, industrial and timber preservatives, and plywood manufacture, all new products.

Future Plans

During the year 1948 interests in the Company has centred mainly on construction and development. Eleven per cent of the actual programme was completed at the end of 1947, and at the end of 1948 the project was almost half-way to completion and the first large production unit almost ready for operation.

First ground was broken at Newport in 1947, and in spite of incidental difficulties, the completion of the Newport plan will yield approximately 100 per cent greater production capacity than was originally envisaged.

Development is also taking place at Ruabon, North Wales, where many new buildings have been built. New plant has been brought into operation and existing plant modified to increase its manufacturing capacity and improve working conditions. New roads have been laid down, electricity, water and other services extended and additional mechanical handling equipment introduced to deal with the rising volume of production. Plans for the future embrace necessary increases in warehouse accommodation and the enlargement of existing welfare facilities.

As 1948 progressed the first results of the Ruabon expansion plan began to show, and by the end of the year material increases had been effected in the production of phenol, aspirin, phthalic anhydride, rubber accelerators and vanillin. Interim production of synthetic detergents and chemicals for oil had been successfully launched and work continued in establishing markets in anticipation of full-scale production at Newport. Another new plant brought into operation was that manufacturing (for the plywood industry) phenolic adhesives of a type not hitherto produced in Great Britain. Production increases in 1948 were considerable, showing a total advance in tonnage of nearly 40 per cent on the previous year. Direct exports were 37 per cent up on 1937 and absorbed one third of the production.

The Ruabon and Newport works both lie in development areas which have suffered in the past from world economic crises and trade recession, but the Company are making a substantial contribution towards retaining the present stability of employment. The Company has calculated that on the expansion programme on which it has embarked every new employee will represent a capital investment of £3,750.

Plans for the future will be born in the new research block at Ruabon and new uses for products developed in anticipation of the needs of mankind. In 1948 the British chemical industry exported goods to a total value of over £86 million. In addition to these direct exports a saving of many millions of dollars was effected by the manufacture in this country of goods previously imported.

Swansea possesses the first plant producing high-grade carbon black to be erected in this country. It now produces this material in commercial quantities at the factory of United Carbon Black Ltd. This project, when completed, will produce 10,000 tons a year of high grade carbon black chiefly for the rubber industry. Since carbon black is imported from dollar sources this factory, when going at full capacity, will be a great asset to the economy of the country. The process is a very flexible one and capable of producing the finished material from indigenous or imported hydro-carbonaceous feed stock.

No reference to the chemical products of South Wales would be complete without mention of the remarkable pioneer work of Powell Duffryn Ltd. This Company's organisation was responsible for such by-products as Synthaprufe, Synthatar, Presotim, Presomet, and at least a dozen other well-known products, all of which were obtained from the by-products of Welsh coals. Powell Duffryn Carbon Products Ltd., working in association with Powell Duffryn Research Laboratories Ltd., have produced a new type of carbon which they have called " Delanium." It is, they claim, the most versatile form of carbon yet placed on the market and they believe that it is destined to become one of the most important constructional materials of the chemical and other industries.

Unifloc Reagents Ltd., Chemical Manufacturers of Swansea, have been established for about fifteen years on specialised developments in the chemical engineering industry, but the chemical manufacturing section of the Company's activities is closely linked with their plant manufacture. Chemicals are manufactured for flocculation purposes such as the purification of industrial wastes, the clarification of effluents and the processing of industrial waters for re-use in processes wherein such effluents are derived. The company also manufactures catalysts and special reagents for use in water softening, especially for improving the rate of settlement and the clarity of the treated water in the lime soda process. It also manufactures chemicals for the treatment of sewage sludge. After this treatment the sludge is easily filtered by mechanical means and large sludge drying areas, which are usually found in conjunction with sewage farms, can be dispensed with. On the plant manufacturing side the company is engaged in the design and manufacture of froth flotation equipment, rotary vacuum filters, thickeners and clarifiers, diaphragm pumps and general plant for wet material

FURNITURE AND BEDDING

ALTHOUGH Wales has produced craftsmen in wood since the earliest times, and many of them turn out furniture of a type and period which is still prized to-day, it is only during comparatively recent years that the industry in Wales has become established as a sound commercial enterprise. Industrial South Wales, growing up side by side with the great industries which supported it—coal, iron, steel, shipping—soon found that the English manufacturers could provide them with cheaper furniture of more utilitarian design. The Welsh craftsman working laboriously through skilfully on his set types of native design soon began to feel the competition of the big commercial manufacturers from the West Country, Midlands and London as they opened up attractive sales centres in the principal towns of the industrial valleys.

Perhaps the greatest move towards organised commercial production in Wales opened up between the two Wars when a progressive effort by the upholsterers brought them right into the limelight with some practical lines which made strong appeal to the purse of the lower-income workers. There was a steady increase in the number employed by the industry and a product which brought them into prominence was an inexpensive three-piece suite which found a ready market at first among the industrial populations, and later over the border.

The depression years which brought home to economists in South Wales the folly of confining all their eggs in the one industrial basket of the heavy industries, brought an entire change in the industrial face of Wales. The Government policy of establishing trading estates with serviced factories and special concessions to factory owners prepared to settle there, soon brought a spate of light industries of all kinds, but up until the outbreak of War there were no British furniture manufacturers among them. When the War ended in 1945 the Board of Trade renewed its effort to persuade some of the bigger English firms to accept factory space in South Wales and with this object in view made a rapid change-over to peacetime industry of two large Royal Ordnance factories. By this means they eventually persuaded twenty furniture manufacturers to take over factories, and at the time of writing eighteen of these are in actual production. The Board of Trade have up to this time granted a total of seventy-seven licences to manufacturers of Utility furniture.

With the concessions extended to manufacturers prepared to settle in South Wales was a promise of plentiful labour supplies, and while that was readily fulfilled it was, for all its willingness and adaptability, entirely unskilled labour. Those British firms who accepted the first approaches found it necessary in the early stages to bring with them key men whose duty it was to train a nucleus of labour within the industry which has grown rapidly since then. But the path of the pioneers was not an easy one.

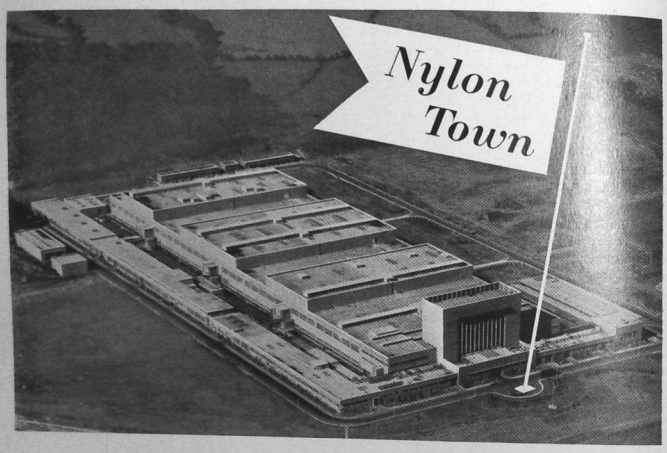
The firms now in course of production vary considerably, but are principally of medium size with an average over-all production of from one hundred to a hundred and fifty suites a week. Practically all of them are located in the industrial area of South Wales where the bulk of Wales' two-and-three-quarter-million population is centred. In fact, more than half the population of Wales is contained in the one industrial county of Glamorgan and it is in the long industrial valleys of

The " Bath Suite " made by P. Bendell Ltd., Bridgend Trading Estate

this county and on its four large trading estates at Treforest, Bridgend, Swansea and Hirwaun, that the greatest number of the factories are situated. For the most part the type of furniture turned out might be described as good lower income group type on sound utilitarian lines. It is not easy to gauge the numbers actually engaged in the industry, for all the statistics given by the Ministry of Labour invariably include in one total the furniture industry with shop and office fitting, but the present number is estimated to be well over the three thousand mark.

The bedding side of the industry in South Wales has a fine record of useful activity working side-by-side with the other branches of the industry. As in other industries much of its progress since the war has been clamped down by controls, and until these are eased to some extent the view of the trade is that there are few prospects of immediate development. "We are just marking time without really keeping pace with requirements" one manufacturer expressed it. Cotton ticking provides the answer to much of the trouble. Its shortage is holding back the industry and manufacturers find it impossible to plan ahead unless they know what materials they are likely to get. It is pretty clear that when money becomes a little "easier" again the general public are going to want more of the spring interior type of mattress but, up until recently they have been in very short supply. And now that they are becoming available in more reasonable quantities again the question of price has set up another problem.

The established manufacturers in the area all advocate an extensive training scheme to bring young people into the industry. South Wales with at least three modern Technical Colleges has exceptional opportunities for putting such a scheme into operation provided the nucleus of a good class can be secured in areas like Cardiff, Swansea and Bridgend. The industry is not helped in any way by the housing situation which has made it exceedingly difficult to persuade craftsmen from outside the area to come down and administer a tonic to the growing pool of skilled labour which has been developed since the War years. Having regard to the many difficulties which the industry in South Wales has faced up to and overcome it is reasonable to assume that the future can have no troubles in store which cannot be overcome with the same strong will and determination.



All Britain's nylon yarn, for sale abroad, for sale at home, comes from this new factory near Pontypool, one of the largest and most modern in the world. So naturally and completely has it established itself in the heart of the Monmouthshire countryside that it is hard to believe that there are a million square feet of floor space — harder still to realise that five years ago it wasn't there at all. There can be nothing make-believe, however, about Britain's important position as a world nylon producer. That stands for better times, better working conditions . . . and much better stockings.

B Nylon S

British Nylon Spinners make the yarns which make the satins, voiles, chiffons, seersuckers and ninons, the nylon stockings and nylon tricots which wash and last as nothing ever has before — as well as one hundred and one other things from filter cloths to ship's hawsers.

BRITISH NYLON SPINNERS LIMITED · PONTYPOOL · MONMOUTHSHIRE

TEXTILES

AN impressive new factory in the Eastern Valley, near Pontypool, Monmouthshire, is now the source of all the nylon yarns produced in Britain. British Nylon Spinners Ltd. are steadily increasing their production of this versatile new fibre, which is now in demand for some two hundred different textile purposes.

The factory itself, which has been described as one of the most impressive achievements of modern industrial architecture, and is said to be the largest single-unit factory in Europe, has a million square feet of floor-space and stands on a site of 112 acres. A sports ground has been laid out opposite the main plant on earth shifted from the factory site when levelling began in April 1945.

Beyond the offices, is the experimental plant, used for research work into all aspects of the production and processing of nylon yarns. This building was originally opened as a pilot plant for training foremen and charge-hands in January 1947, while the main plant was still under construction. It was in the summer of 1948 that regular production work began in the main factory.

Nylon yarn production provides a completely new type of industry in Monmouthshire. At present, some 2,500 men and 500 women are employed at the plant. They have been recruited locally and specially trained for their jobs by training courses combining theoretical and practical work. Production work is on a continuous three-shift system, so the well-equipped canteens are called upon to provide a twenty-four hour service.

From the Pontypool valley, nylon yarns are sent all over the country to the hosiery manufacturers, weavers, knitters and rope-makers who are now producing a remarkable variety of finished nylon goods. As well as the famous nylon stockings, a wide range of nylon fabrics has now been developed, for dress and underwear and for many industrial uses. Nylon ropes are already known all over the world.

Nylon is making a substantial contribution to the export drive. Stockings made from Pontypool yarn are being sent to over seventy different countries, and hosiery manufacturers in Australia and New Zealand are also receiving yarn direct from Pontypool to supply their own mills. The overseas market for British nylon fabrics is expanding steadily; in particular, there is a growing demand from the U.S.A. and Canada.

Through nylon, Monmouthshire is becoming a new centre of Britain's textile industry. This is still a comparatively new fibre, so the full extent of its usefulness has yet to be explored, but the B.N.S. factory at Pontypool is already a vital unit in the textile trade of this country.

Nylon in Underwear and Corsetry

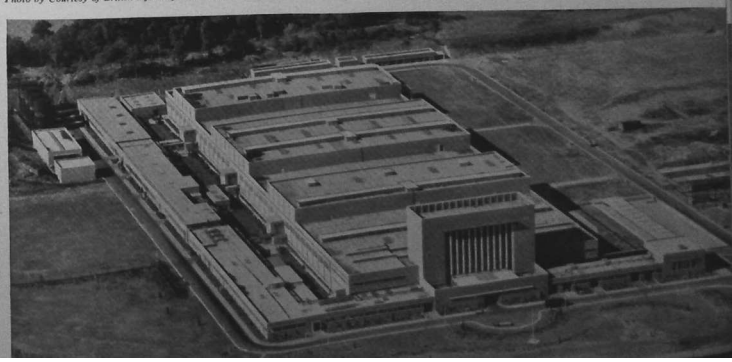
Nylon, is indeed a confident young fabric that lends itself with equal beauty to soft flowing drapery and good styling. A number of outstanding features account for its splendid response from underwear firms, a field composed of innumerous comparatively small firms, each doing a specialised type of business.

1. The Nylon fabrics, woven or knitted, are light, easy to wash and they dry quickly.

2. In knitted and woven fabrics, chiffons, marguisettes and mousselines, full use can be made of the strength and daintiness of Nylon.

Photo by Courtesy of British Nylon Spinners Ltd.

The B.N.S. Factory near Pontypool.



3. Nylon fabrics allow for simpler styles but with what effect they can be worn! Nightgowns, for example, with bodice ruched either side and down the middle front with narrow bands of elastic ganging—easy to launder, cut for casual comfort but with an eye for smartness.

4. Extensive use is being made in underwear to capitalise these features. Nightgowns and cami-knickers are chosen by women who can afford non-utility lingerie. The great demand for Nylon Tricot pantees and vests suggests that their durability and the time saving laundering procedure seem to be foremost in the mind of the purchasing public.

Corset and brassiere makers find nylon satins and nylon marguisette have replaced the traditional poplin and art silk satin, and rightly so. Some nylon textures give that soft, opaque, silk-like appearance and yet have intrinsic strength. The modern silhouette, stressing youthful form, really needs a fabric that can give "uplift" and yet that can mould itself to the figure. Most of the better brassieres therefore incorporate Nylon materials and there are indications that even corslets and suspender belts will soon make use of this new texture.

Rayon

COURTAULDS have four factories in Flintshire. Three (Aber Works, Castle Works and Deeside Mill) are in the borough of Flint; the fourth (Greenfield Works) is in Holywell.

The Company purchased Aber Works in 1916, and built Castle Works in 1922, to meet the increasing demand for viscose rayon yarn, which was first produced on a commercial scale in 1906 by Courtaulds at Coventry. At the same time, this new and progressive industry helped to revive employment on the Dee estuary. Both factories have since been engaged in the production of rayon yarn by the viscose process.

The principal raw material for viscose rayon is cellulose obtained from spruce wood. The process consists briefly of bringing this cellulose into a viscous solution (called "viscose") and forcing it through the minute holes of a jet into a coagulating bath where it solidifies into fine filaments. These filaments are then drawn together out of the bath, twisted, and collected as a continuous thread or yarn. Treatment in various washing liquids completes the process, and the viscose yarn (composed of pure cellulose) is now ready for normal textile use such as processing, weaving or knitting. It is in this form, i.e., as yarn, that most of Courtaulds' production is supplied, to customers at home and overseas. Some, however, is woven or knitted into fabric, and dyed and finished, in the Company's own textile mills.

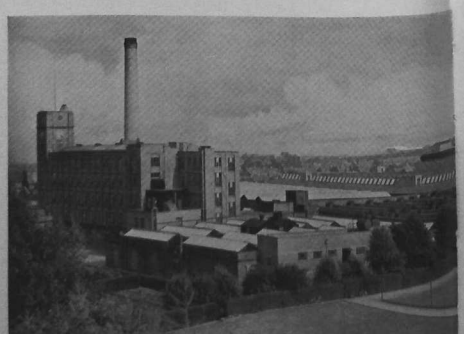
Deeside Mill, acquired in 1927, is one of Courtaulds' "Processing" mills and specialises in putting extra twist into rayon yarns (before delivery to customers) to make them suitable for weaving into crêpe fabrics.

Greenfield Works was built during 1938–9 for the large-scale production of viscose rayon staple; it is the largest factory of its kind in the world. Rayon staple (in contrast to continuous filament rayon yarn) is the particular type of rayon from which the familiar "spun rayon" fabrics are made; it is simply rayon produced in short lengths or staples which can be twisted and spun together into "spun yarns" in the same way as natural fibres. The commercial manufacture and development of rayon staple was also pioneered by Courtaulds, and it was in a part of the Aber factory that some of the earliest work was done.

At Greenfield, rayon staple is manufactured by the viscose process, and the method is broadly the same as for rayon yarn production up to the spinning jet stage. Then, instead of twisting and collecting the filaments together as a yarn, they are cut by a special method into staples, the length varying according to the particular spinning industry for which they are required. After final treatment, the staple is baled up and despatched to Courtaulds' customers at home and abroad for spinning into yarn and eventual weaving or knitting into fabrics. Again, Courtaulds spin, process, weave, knit and dye some of this staple in their own textile mills.

Courtaulds' four Flintshire factories employ over 7,000 people, and they contribute very substantially to the national output of rayon.

Photo by Courtesy of Courtaulds Ltd. **The Aber Works of Courtaulds Ltd.**



THROWING

By MARGARET M. GRIFFITHS, B.A.

BROCKLEHURST YARNS LIMITED, a subsidiary of Brocklehurst-Whiston Amalgamated Ltd., are silk, nylon and rayon throwsters, and in this respect are unique in being the first to bring this industry to South Wales.

The term "throwing" as applied to silk and the new fibres, is one which is not met with in any other branch of the textile industry, and it must be considered as a process similar to the doubling or laying together of two or more strands of a single thread in order to produce a ply-yarn, and then twisting in order to produce finished yarns and threads for further use such as machine-knitting for stockings and underwear, for sewing threads and embroidery, and for an infinite variety of applications in the weaving of fine quality cloths.

In the case of silk the material used by Brocklehurst Yarns Limited comes mainly from China and Japan, and is in the form of hanks which have been wound from cocoons in the country of origin. In order that it may be easily handled by the throwster, it must be made soft and pliable. The first process, therefore, is a prolonged soaking process where special oils are used to soften the gummy coating on each thread of silk. The silk is then dried very carefully in warm moving air, and passes on to the first mechanical process, known as *winding*, where girls are employed to wind the skeins or hanks of silk on to bobbins.

In the new factory at Llanishen it is an attractive sight to see row after row of machines, each painted a delicate green colour, performing this operation, the pleasing effect being caused by fugitive pastel shades denoting the various qualities and types of silk. In front of the winder the hank of yarn is spread on a circular frame known as a "Swift." The free end of the silk thread passes through guides, and the silk is drawn from the revolving "Swift" on to bobbins until they are full. Delicacy of touch is called for in this operation, and the girls are usually working on a fixed wage plus bonus on output. The speed in output depends largely upon skill, patience and care of the winder.

The next stage is *ring-doubling*, where the threads of two or more bobbins are loosely doubled together—depending on the final use to which they will be put—and then run on to other bobbins. Then comes *up-twisting*. This machinery runs at a very high speed from bobbin to bobbin and puts the final twist in the yarn which is then wound on cones, parallel cheeses, cops or pirns, depending on the customer's requirements.

The new factory has been specially designed to deal with the modern man-made fibres, such as nylon and rayon. Most of the nylon processed at Brocklehurst Yarns Limited is British made from materials which are wholly indigenous, and nylon is, therefore, a vital factor in the present dollar question. Fully to grasp the complete plan would require a whole text-book to be written on the arts of the various processes. It suffices to say that Brocklehurst's aim is functional efficiency.

The task of pioneering, however, is somewhat lessened by the amenities offered by the large building covering 135,000 square feet. The factory is windowless and incorporates the latest ideas from similar factories in Canada and the United States. It is bright and clean as a new pin, with paintwork of cream, eau-de-nil, and carnation red. The climate is always warm and equable due to air-conditioning, and fluorescent lighting is used throughout. The factory operates twenty-four hours per day. A spacious well-equipped canteen, excellent administrative offices, and a suite of medical and rest rooms are provided for the welfare of employees.

Here, therefore, for the first time men and women in South Wales will become acquainted with a variety of operations which have been familiar in Cheshire and the Midlands for generations. Operatives will be known as winders, ring-doublers, uptwisters, pirn winders, cone and cheese winders, after requisite training period which varies in accordance with the particular process in which the operative is being trained.

When the greatest task of all—that of training an entirely new type of worker for this locality—is completed, Brocklehurst Yarns Limited will have an output in processed yarn running into millions of pounds (lb.) per year. There are facilities for the employment of one thousand workers, a third of whom will be men, and a substantial proportion of their output will be exported—either directly or indirectly.

Making Up

Towards the end of 1948, N. Corah & Sons Ltd., of Leicester found it necessary to add still further to their production capacity.

The main works and warehouses at Leicester covering over 12 acres of floor space, had already been supplemented by the opening of branch factories at Brigg (Lincolnshire) and Oakham (Rutland).

In early 1949 came the turn of South Wales to welcome an addition to its industries.

At Aberbargoed was established a most modern factory of a floor space approaching 40,000 square feet, which consists of a spacious single storey north light building for manufacturing, storage, packing, canteen and loading docks. Administration and general office

accommodation is provided by a two storey building facing the main roadway.

A nucleus staff was engaged from the district to be trained at the main Leicester Works as competent instructresses in the production of ladies' blouses which was later extended to slumberwear.

The formation of a training centre enabled recruitment of Monmouthshire girls to commence and from this was built up the fully qualified staff of some 200 employees operating to-day, which it is estimated—as work progresses—will be eventually doubled in number.

The ideal working conditions and social amenities provided by N. Corah & Sons Ltd. for the benefit of their employees is having its just reward in the ever increasing production figures at their Aberbargoed Factory. Not only has a new Welsh industry been born but it has already been firmly established by the foresight of the company concerned and the spirit and dexterity of Monmouthshire girls.

Ladies underwear in rayon, cotton and wool is also made by Larmer Ltd., at Fforestfach.

Newport has a well-known firm of overall manufacturers in Caleb & Joshua Griffiths & Co. Ltd., whose present factory was first opened in 1903. The concern has of course grown greatly during the years, and to-day make all types of industrial overalls.

WELSH WOOLLENS

By ALDERMAN THOMAS WATERHOUSE, C.B.E., J.P.

President, Welsh Textile Manufacturers' Association

THE history of the Welsh woollen industry, which dates back to the eleventh and twelfth centuries, provides a remarkable illustration of the tenacity for survival of an indigenous craft. Although more than one occasion threatened with extinction, it has managed to weather many storms, not the least of which was the severe slump which afflicted the woollen industry in company with most other British industries during the inter-war years. In the process, it has suffered casualties, for example, between 1922 and 1939, the number of woollen factories in Wales declined from 151 to 77 but, as one would expect, the survivors were in the main the most efficiently run and progressive firms and their reward was a period of full production and increasing prosperity which began with the outbreak of war in 1939.

These last ten years have seen more progress in the Welsh woollen industry than in any comparable period

of its long history. Prosperity, as well as necessity, can sometimes stimulate the production of new ideas by providing the opportunity for experimentation, and the larger mills at least have shown praiseworthy initiative in developing new fabrics and seeking out new markets. It is, for example, a long way from real Welsh Flannel to the woollen upholstery fabrics which one Welsh mill has supplied for the furnishing of the Cunard White Star liners *Queen Mary* and *Caronia*. These luxurious fabrics with their striking designs are of rayon in their infancy and with further adaptation may yet be used to upholster theatre seats, railway carriages and even motor cars.

Superior Speciality Fabrics

Another measure of the progress made in this period is the gulf which separates Welsh homespuns from the smart dress tweeds and women's coating cloths which more than one Welsh firm is now supplying to the high-fashion houses of London. Wales has no ambition to compete with Yorkshire in the production of cheap-grade woollens, but now that her products have gained a foothold in the market for high-class cloths, there is no reason why she should not develop a reputation for superior speciality fabrics. In this connection a development of considerable significance has been the establishment by Wales and Monmouthshire Industrial Estates Ltd. of factories belonging to leading London garment manufacturers. Here is an opportunity for the closest liaison between Welsh cloth manufacturers and their immediate customers.

Nevertheless, I must avoid the temptation to paint too rosy a picture of the Welsh woollen industry to-day. In spite of the prosperous conditions which have prevailed for the greater part of the last ten years, the number of firms in the industry has continued to decline. There are to-day only 65 factories in the whole of Wales, of which 41 are very small, some being run by the owner and members of his family, and others employing a few workers only. The Welsh Textile Manufacturers Association is very much concerned to see that no more of these small factories close down. They are an asset to the Welsh countryside and a source of great interest to tourists who enjoy buying local materials when they are on holiday in Wales.

It is, however, the other 24 firms which must be regarded as the mainstay of the Welsh woollen industry and it is with them that hope for development in the future must lie. I do not rule out altogether the possibility of new entrants into the industry and, in this connection, everyone interested in the industrial development of Wales will have welcomed the courageous enterprise of the Merionethshire farmers in establishing a new woollen factory (Y Gymdeithas Wlan) at Dinas Mawddwy last year, but I must emphasise that a great deal of capital is required to start a new factory and there are formidable problems to face, such as the long delay in delivery of machinery and the shortage of skilled workers. What then are the prospects for these 24 firms? Up to now, most of them have continued to concentrate their production on Welsh flannel, which is of excellent quality and the most durable of any produced in Great Britain. The demand for flannel, however, has been declining for many years and I suggest that the time has arrived when they should consider turning from the manufacture of materials suitable for underwear to the much greater variety of cloths suitable for outer-wear. There is a large market in London and the main provincial centres for men's and women's coating and suiting cloths, to which only a few Welsh manufacturers have so far directed their attention. Such a changeover would involve a certain amount of re-equipment, since narrow-width flannel looms cannot be used to weave these heavier, double-width cloths, but this step is, I believe, essential for survival.

An Appeal to Manufacturers

Another important implication of this proposal is a change in the marketing methods of Welsh woollen manufacturers. Hitherto, they have found the market for their flannel on their own doorstep, selling very largely to retailers and direct to the general public. If they are now to produce coating and suiting cloths in sufficient quantities to interest wholesale merchants and garment manufacturers, a considerable measure of co-operation between them will be required. It may mean the setting up of a central warehouse where the products of the various factories can be collected, examined and despatched in order to ensure that a standard of quality is maintained. At the same time, it will probably be necessary to consider the registration of a distinctive trademark for Welsh woollens, and there is no reason why, in time, this co-operative venture should not be extended to overseas markets as well.

This scheme pre-supposes a willingness on the part of Welsh woollen manufacturers to accept new ideas. Old methods and old outlooks will not survive the testing conditions of a fiercely competitive world. On the other hand, by means of co-operation between firms and by careful attention to the quality, design and colours of its cloths, it should be possible for the Welsh woollen industry to double the number of workers employed within the next ten years and so help to arrest the steady de-population of rural Wales.

LINES OF COMMUNICATION

The Romans were the first to appreciate that conquest depended on lines of communication—on good roads. Not merely the conquest of countries but the conquest of the primitive and of poverty. The better the road the more easy has always been the flow of commerce along it, for, beside it Industry takes root and flourishes.

SEAPORTS AND DOCKS

by

A. E. H. Brown

Chief Docks Manager, South Wales Ports

THE docks at the five main ports in South Wales located at Newport, Cardiff, Barry, Port Talbot and Swansea are administered by the Docks and Inland Waterways Executive of the British Transport Commission.

Although shipping has been dealt with along the coastline of South Wales for many centuries, the docks owe their existence in the main to the mineral wealth of the area, which resulted in the development of the coal trade during the nineteenth and early twentieth centuries. The rapid growth of the iron and steel trades and the establishment of the copper industry (which, with other non-ferrous metals that quickly followed, made Swansea in particular a centre of international importance in the metallurgical world), brought greatly increased trade to the Docks and emphasised the need for additional accommodation at the ports, which at this period, were hard put to it to keep abreast of requirements.

An immense volume of trade was rapidly built up, not only in coal and iron, but also in the many other traffics from industries which followed in their wake and new and larger docks were built and many important developments carried out. This growth of trade and consequent expansion of shipping facilities continued steadily until the commencement of the First World War, and in the year 1913 no less than 48½ million tons of traffic was dealt with through the Ports. Of this total, approximately 40 million tons was coal, the balance being made up of timber, pitwood and mining timber, iron and other ores, grain and flour, fruit and vegetables, foodstuffs, iron and steel manufactures, tinplates, cement and miscellaneous goods.

After World War I, many of the 1913 markets for Welsh coals were either permanently or temporarily lost and much of the pre-war trade in other commodities had to be regained, but, nevertheless, steady progress was maintained and by 1939 the facilities and services afforded at the South Wales Ports were well known the world over, and although the coal trade had shrunk to something like half the 1913 tonnage, most of the ocean liner services scheduled the ports for regular outward sailings and thereby provided opportunities for a large export trade drawn not only from local works, but from a wide area, which included the Midlands and the West Country.

During the six years of World War II the ports were called upon to deal with a large volume of war and other traffics, and in fact, handled approximately one-third of the 250,000,000 tons of dry cargo dealt with during this period at all the ports of Great Britain, and in addition some 10,000,000 tons of "wet" imports and exports, i.e., oil and petroleum spirit, which passed through the various oil installations during the same time.

As the result of the passing of the Transport Act, 1947, the South Wales Docks (in common with other railway-owned ports in Great Britain) passed from private to public ownership and the responsibility for their administration and operation was transferred to the Docks and Inland Waterways Executive of the British Transport Commission.

The following is a brief description of the main docks in this South Wales Group.

1. *Newport.* Situated on the estuary of the River Usk, is the largest town in the County of Monmouthshire. The docks consist of the Alexandra South and North Docks. The North Dock was the first to be constructed and was opened in 1875. It has a deep water area of about 30 acres. The west side is equipped with moveable coaling appliances, capable of dealing with 20-ton wagons and on the eastern side are the general cargo quays, equipped with cranes for the handling of miscellaneous cargoes.

The Alexandra South Dock has a deep water area of 95 acres. It was constructed in three portions, the first of which was opened in 1893. An extension was later constructed and opened to traffic in 1907 and it was further extended and a new entrance lock opened in July 1914. At that time, this lock entrance was the largest in Great Britain and one of the largest in the world, being 1,000 ft. long by 100 ft. wide. The north and west sides of the South Dock are equipped for coaling and the south and east for general cargo.

2. *Cardiff.* 12 miles from Newport, is the chief City of Glamorganshire. The history of the port goes back

Newport Docks, showing the Entrance Dock.

Photos by Courtesy of Docks and Inland Waterways Executive (South Wales Docks)

to the time of the Roman occupation, and the present Docks cover an area of 165 acres of deep water, comprising the Queen Alexandra Dock, the Roath Dock, Roath Basin, East Dock and Basin, and West Dock and Basin.

The two main docks are the Queen Alexandra Dock and the Roath Dock, the latter having been opened for traffic in 1887 and the former in 1907. These two docks are connected by a short waterway and have a deep water area of 85 acres. Both are equipped with modern appliances for coal shipment and general cargo. The East Dock and Basin, with a water area of over 46 acres, and the West Dock and Basin, which is the oldest of the docks at Cardiff, having been opened in the year 1839, are each equipped to deal with any type of cargo, and with the others previously mentioned, combine to form a group of Docks which rank amongst the finest in the world.

3. *Penarth*. Adjacent to Cardiff is Penarth Dock and Harbour. Penarth Dock was constructed in 1863 and forms part of the Customs Port of Cardiff. The trade at this port, however, had dwindled to such low figures that in July 1936 the dock was closed.

It was temporarily re-opened for Government use during the war and did valuable work in the loading of military cargoes.

The dock is still available for ships lying-up and also for ships undergoing repairs.

Penarth Harbour, which is also under the control of the Cardiff Dock Manager, has a water frontage on the north side of 13,000 ft. and 3,000 ft. on the south side. It has four coaling appliances regularly used by vessels engaged in the coastwise coal trade.

4. *Barry*. Some 10 miles south-west of Cardiff is Barry, also in the County of Glamorganshire, which

Aerial view of Cardiff Docks showing Queen Alexandra Dock (Cardiff's most modern dock) in foreground, and Bute West Dock, Cardiff's oldest dock, in top left corner.

Most of the general cargo berths are designed to enable simultaneous working to railway and road vehicles, barges and transit shed, or vice-versa.

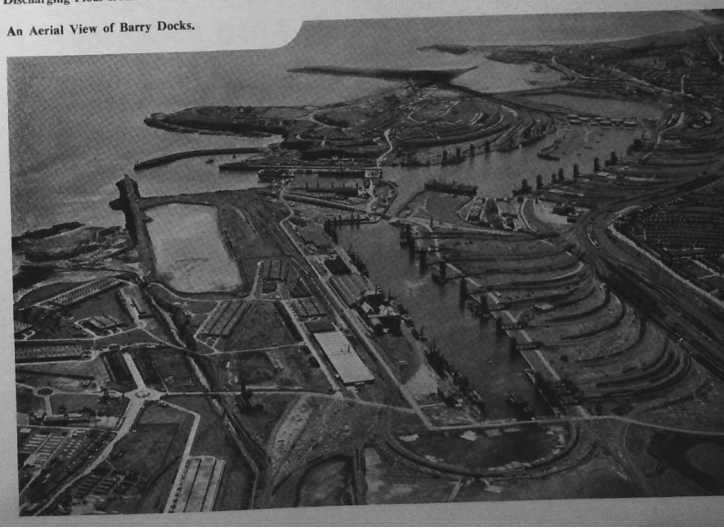
SERVING A WIDE AREA, INCLUDING THE MIDLANDS AND WESTERN COUNTIES OF ENGLAND, THESE **SOUTH WALES PORTS** ARE EQUIPPED TO HANDLE ALL CLASSES OF IMPORTS AND EXPORTS.

CARDIFF
SWANSEA
NEWPORT
BARRY
PORT TALBOT
&c.

A. E. H. BROWN, Chief Docks Manager, South Wales Ports
DOCKS AND INLAND WATERWAYS EXECUTIVE, CARDIFF

Discharging Flour from Canada at Cardiff Docks.

An Aerial View of Barry Docks.



has three Docks numbered 1, 2 and 3. No. 1 Dock and the Basin (known now as Dock No. 3) was opened in 1889, while No. 2 Dock was opened in 1898. The total area of these docks is 114 acres. They have excellent facilities for the shipment of coal and are also equipped with modern appliances for the handling of general cargo.

A new water lock enables locking operations to be carried out over a wide range of tide, and vessels are thereby able to enter and leave with a minimum loss of time.

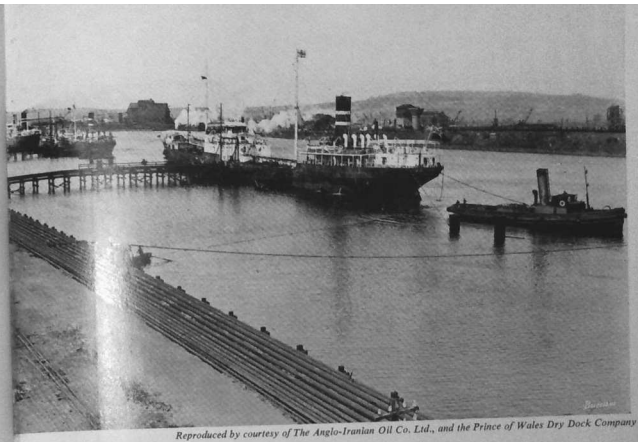
Port Talbot. Further down the Bristol Channel lies Port Talbot, where the Old Dock was opened in 1840. Before its construction, the estuary of the River Afan formed a tidal harbour, through which a fair amount of trade was carried on for many centuries. The new dock was opened in 1898. These docks are about 30 acres in extent and are also equipped to handle both coal and general cargo.

The Steel Company of Wales Ltd. have their extensive Margam Blast Furnaces and the Port Talbot Steel Works practically on the dockside, and important developments and extensions of this Company in the area will undoubtedly have an appreciable effect upon imports of raw materials through the docks.

6. *Swansea.* The westernmost of the main South Wales ports is Swansea. The first dock at this port was opened in 1852 and was known as the North Dock. It has now been abandoned, although the basin, which is 2¼ acres in extent, is still in commercial use.

Swansea to-day has four docks. The South Dock (the earliest) was opened for traffic in 1859. This dock is 13 acres in extent with a basin of 5½ acres. The Prince of Wales Dock was opened in 1881, and has a deep water area of 28 acres. In 1909 the King's Dock was opened. This dock is the largest of the Swansea Docks, used for general purposes, and is 70 acres in extent. The equipment of these docks includes appliances for handling both coal and miscellaneous general goods.

To the south of the King's Dock is the Queen's Dock, opened in 1920, where oil is imported for, and re-exported from, the Anglo-Iranian Oil Company's subsidiary undertaking—the National Oil Refineries Ltd. —who have an extensive establishment at Llandarcy. The water space is 150 acres in extent, of which 32



Anglo-Iranian Oil Company Tankers discharging at Queen's Dock, Swansea.

Reproduced by courtesy of The Anglo-Iranian Oil Co. Ltd., and the Prince of Wales Dry Dock Company

acres are deep water. Oil discharging and loading berths have been provided by the National Oil Refineries Ltd. on the southern side, equipped with pipeline and storage tanks, etc., all of which are connected with refineries situated in the district.

The equipment at all the docks in the South Wales group is of the most modern kind. Appliances for the shipment of coal consists of modern moveable coal hoists (capable of dealing with 20-ton capacity wagons) and electric belt conveyors.

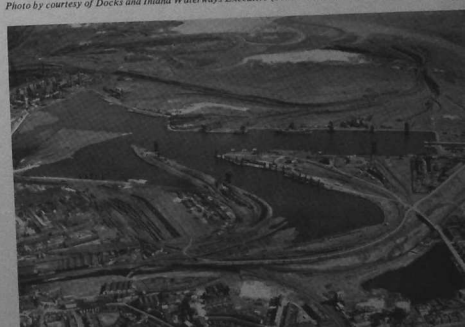
Special mechanical appliances for "digging-out" coals that do not "run" freely from the tipped wagon, and mechanical anti-breakage appliances for shipping brittle coals are special features of the equipment provided for the coal export trade.

Complementary to the coal export trade is the business in coal bunkers which, largely on account of the excellent steam-raising qualities of Welsh coals, has always been an important feature of trade at these ports. Many vessels normally visit South Wales for the sole purpose of bunkering, and special facilities and reduced dock dues are in operation to encourage this business.

The predominant position attained by the South Wales ports in relation to coal exports has tended to overshadow the many other activities of the ports, and it may not be generally realised that approximately half of this immense Dock system is equipped for dealing with all classes of general cargo.

The facilities for dealing with general cargo include

Photo by courtesy of Docks and Inland Waterways Executive (South Wales Docks)



Port Talbot Docks showing Margam Works of Steel Company of Wales Ltd.

the many appliances necessary for the handling of such commodities as iron and steel, timber, oil, grain and flour, ores and general cargo of all descriptions which are handled at the general cargo quays.

Modern quayside electric cranes of up to 6 tons capacity are provided at most general cargo berths. For lifts above 6 tons, each dock is equipped with heavy lift cranes of varying capacities up to 70 tons. In addition, floating cranes with lifts of from 50 to 100 tons are available, which enable vessels to load or discharge all their cargo without moving from berth.

Spacious transit sheds for storage and sorting purposes are equipped with modern appliances for the rapid handling of goods, and fleets of mobile cranes and mechanical trucks enable reception and subsequent delivery of goods to be carried out with ease and expedition. Cold stores are provided for the reception of refrigerated cargoes. The one at King's Wharf, Queen Alexandra Dock, Cardiff, is capable of accommodating 10,000 tons of frozen meat.

Alongside of these docks there are extensive railway sidings for storage and marshalling of rolling stock, and efficient railway systems operate over all parts of the docks, which, in turn, are linked up with the British Railways main line system. This allows of the rapid transit of goods from quayside to all parts of Great Britain or vice versa.

In addition, road vehicles may come alongside and accept delivery of goods direct from ship, thus enabling vessels to discharge to railway wagons, road vehicles and transit sheds simultaneously.

Modern gear is supplied for handling the various traffics dealt with on the general cargo quays, such as trucks, hand trolleys, gravity roller conveyors, discharging grabs and tubs, and miscellaneous equipment generally.

An important trade which has grown to considerable proportions of late years is the oil and motor spirit trade. Swansea is the principal oil port in South Wales and one of the largest in the country, and as previously mentioned, the Anglo-Iranian Oil Co. have important installations there from which they supply the N.O.R. Refinery at Llandarcy.

Oil bunkering facilities are also provided at Cardiff and Barry. At the latter port a large fuel oil business, with extensive tank storage facilities, is operated by Messrs. Cory Bros. & Co. Ltd., and other storage installations of important oil undertakings are situated at Penarth Harbour.

One of the essential industries which must be established at any port of standing is that of ship-repairing, and in this respect excellent facilities and efficient service are available at the South Wales Ports. In addition to the Dock Authority's own dry docks at Cardiff, Newport and Barry, there are numerous other dry docks under private ownership, and repairs of all descriptions are carried out by first-class engineering and ship repairing firms operating at the ports.

One of a Consignment of Railway Coaches for the Iraqi State Railways being shipped by floating crane. Note the Lifting Block.

Photo by courtesy of Docks and Inland Waterways Executive (South Wales Docks)

ROAD TRANSPORT

ROAD DEVELOPMENTS

By C. T. BRUNNER, M.A., M.INST.T., F.INST.PET.

THE peculiar geographical isolation of South Wales provides an imperative reason for the construction of good road and rail communications with the outside world.

The existing roads run mainly from north to south. They served their purpose when the whole economic life of the region was based on export industries such as coal, steel and tinplate. That era has passed. New industrial development makes it essential for South Wales to have first-class road communications with Birmingham.

A great many important Midland firms have branches in South Wales. These firms have helped to build up the South Wales industry of manufacturing semi-finished metal products which then go to the Midlands for final processing and assembly. This fact alone provides a very good reason for improving road connections between two great industrial regions now rapidly becoming dependent upon one another.

The Ministry of Transport plan for improving South Wales internal communications and connections with the Midlands includes the construction of a motorway of 76 miles from Birmingham to Almondsbury, just north of Bristol. From Almondsbury another motorway will link with the Severn Bridge and join the existing road south-west of Newport. Seventeen miles north of Gloucester, a branch will leave the Birmingham-Bristol motorway and end just west of Ross.

Apart from this motorway, the "Heads of the Valleys" road, the "South Wales Ports" road and the Cardiff-Merthyr road are to be thoroughly modernised.

The total costs of these plans are £10,800,000 for the 120 miles of new motorways, plus £9 million for the Severn Bridge, and £15½ million for modernisation. These give a total of some £35 million. The annual cost of providing this system will be £2,196,000, consisting of £1,412,000 (at 4 per cent), £123,000 additional maintenance charge, and £661,000 premium for a sinking fund to recover the cost of the initial capital outlay in 25 years (50 years in the case of the Severn Bridge).

On the basis of the present traffic it is calculated a South Wales development plan would save operators £3,274,000 a year in the running costs of their vehicles. This means a surplus of £1,078,000 a year over the annual cost of providing these improvements, or 3 per cent on the investment after making full provision for interest at 4 per cent on the capital required.

It is estimated that the foregoing programme of road modernisation could be completed in seven years. Under present conditions there is danger that lasting prosperity will not be maintained in South Wales, for the construction of new factories must be matched by improved transport facilities, roads, railways and ports. The outlay of £35,000,000 may sound large, but it is by no means unreasonable in relation to the vast sums being found for other kinds of capital works. It is worth while noting that the Government and industry plan to spend £220,000,000 in South Wales on the development of only four items —steel, coal, oil refining and electricity. In the interests of national efficiency South Wales must be enabled to continue to play her proper part in the national economy.

GOODS TRANSPORT BY ROAD

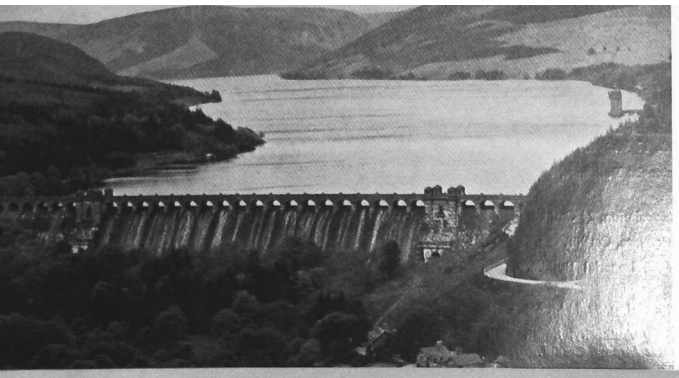
By JOHN FREEGUARD
Divisional Manager, Road Haulage Executive, Western Division

Goods road transport in Wales and Monmouthshire had, in common with all other parts of the country, undergone a complete upheaval in 1949.

The Western Division of the Road Haulage Executive embraces the counties of Brecknock, Cardigan, Carmarthen, Glamorgan, Gloucester, Hereford, Monmouth, Pembroke and Radnor and, by virtue of the Transport Act of 1947, some 170 separate transport undertakings were transferred from private to public ownership.

To-day, British Road Services, which is the trading name adopted by the Road Executive, operate in the Western Division 1,600 vehicles manned, serviced and organised by some 2,500 persons.

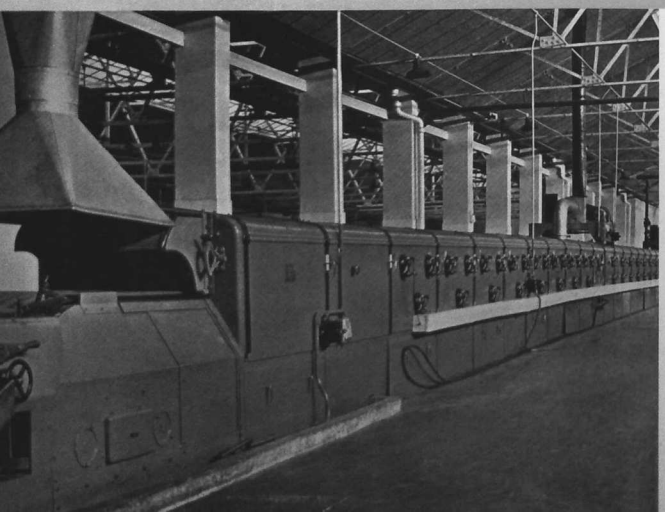
The transport undertakings acquired have been merged and consolidated into nine self contained trading entities called Groups with their main establishment in the largest city or town within their respective territories and depots at outlying necessary towns. As an example, Newport Group has its headquarters in Newport with depots at Rogerstone, Risca, Ebbw Vale, Pontypool, Monmouth and Chepstow.



Lake Vyrnwy

By courtesy of the Liverpool Corporation

POWER

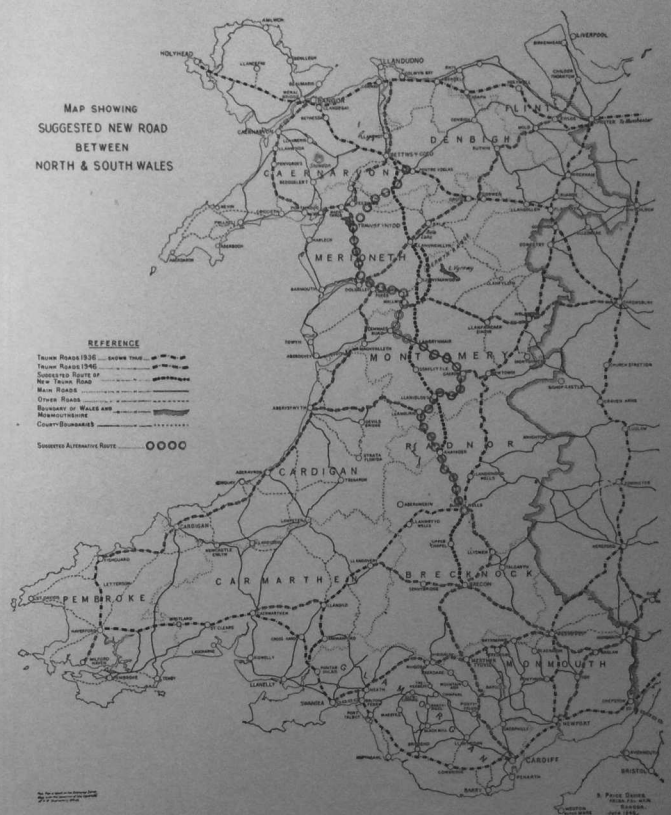


One of three Gas-fired Travelling Biscuit Ovens at Weston's Biscuit Bakery, Llantainam, Monmouth

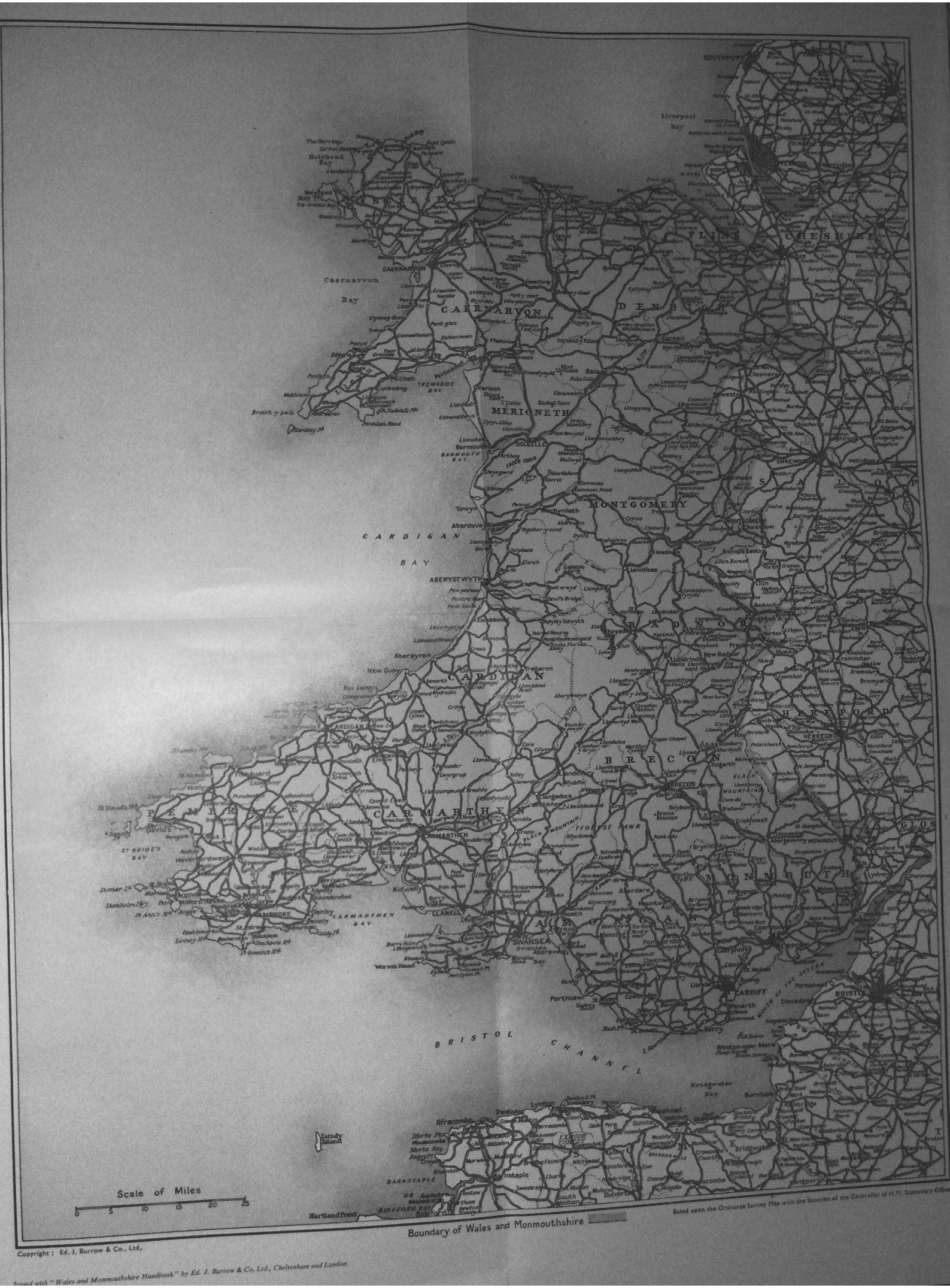
Down the ages man has proved the truth that "Increase of Power begets increase of Wealth." Never before in its long history has so much Power for Production flowed so generously over Wales.

Folding Map of Wales

PLEASE UNFOLD HERE



With this Great Highway completed wherever Industry is located in Wales direct and speedy transport to the great Welsh Docks will be assured.



Issued with "Wales and Monmouthshire Handbook" by Ed. J. Burrow & Co. Ltd., Cheltenham and London.

PASSENGER TRANSPORT

By J. ELLIOTT BOWN
Managing Director, Red & White Services Ltd.

I HAVE been asked by the publishers to write a short article about passenger transport in Wales and Monmouthshire and I think I will preface my remarks by quoting an exclamation I have often heard made by bus passengers—namely—"What on earth would we do without the bus services these days."

I have heard this said by passengers many times, usually as they alight from vehicles after a journey safely completed. I am always glad to hear these words knowing that they are a grateful acknowledgment of the convenience and efficacy of travel by road.

All too often this wide network of road services which cover the length and breadth of the country is taken very much for granted.

Compared, however, with other industrial undertakings and public utilities, road passenger services are a comparatively recent innovation having come into being within the last 30 years or so.

A large proportion of the population, therefore, well remember a time when there were practically no provincial bus services.

Prior to the 1914-18 war there were few bus services outside London and the main provincial cities.

With the perfection of the internal combustion engine and the improvements to the road which followed the Great War the development of road transport services was rapid. The consequences in South Wales and Monmouthshire were far reaching for the country is mountainous and until the development of the motor vehicle inaccessible in the extreme. Deep valleys were cut off one from the other by intervening high mountainous ranges. Feats of engineering took the railways into the valleys and high up into mountainous areas, but owing to the nature of the terrain the railway halts and stations were often situated inconveniently and at some distance from populated centres.

Following World War I and in the early 1920's, a number of small bus companies came into being in various areas and townships spread throughout the country and districts which had hitherto been separated from one another soon came into closer and frequent contact through bus transportation and with consequent advantage to trade and social life generally.

The development of bus services has been gradual, both on the technical and on the traffic side of bus operation. First, the solid tyres and paraffin lamps, and then the development of the pneumatic tyre, the live axle and the dynamo—electric lighting, electrical self-starting of vehicles, better seating and faster travel, and lastly the diesel superseding the petrol engine.

Gradually, too, buses were able to travel greater distances with diminishing risk of breakdown. Traffic organisation was developed and improved and thanks to the broad and often courageous views of the many pioneers in the industry, a mutual, although at first very local, co-ordination and pooling of services with inter-availability of tickets became the keynote for progress.

But for all this to happen much thought and energy has been expended and much hard experience gained. Mechanical breakdowns, lack of capital, and before the Road Traffic Act of 1930 even the political bias and personal whims of members of local licensing authorities were some of the more serious obstacles to success.

Thrift, accurate costing, punctilious, efficient and courteous service by staff were obvious foundations for a successful business and it is upon these that the modern road passenger transport industry has been built. Also the effects of legislation and taxation are factors for reckoning when considering the growth of such an industry. Moderate and prudent laws have helped and immoderate and imprudent laws and taxation have hindered.

When, therefore, in 1950, we are surrounded by a network of road passenger stage and express carriage services, all well integrated and closely knit, all this, with speed, safety and comfort which could not have been visualised 50 years ago, we must reflect that we live in a remarkable age.

To-day, perhaps particularly so in Wales and Monmouthshire, one aspect of passenger road transport is of great importance to the economic well-being of the people. It is the extent to which it provides facilities for rest, pleasure and holidays, by means of the privately hired coach, long distance express carriage services, organised tours and excursions and inclusive holiday tours.

Appreciation of the beautiful country scenery, access to the seaside, trips to famous places of old are all made possible by road, and perhaps of value above all else—"a bus to town" for the busy housewife, and "a bus to work" for all of us.

The tourist industry, so important for our prosperity and national wealth, is very much bound up with the road passenger transport industry, which must continue to take the initiative and improve, and extend transport facilities for the tourist.

In conclusion co-ordination and integration of services of the road passenger transport industry has now for the most part been achieved and to carry this any further may well bring the industry against the stumbling block of over centralisation and the loss of the personal touch and service on which it has been based. But there remains much to be done to maintain this spirit of service in the face of present difficulties, to maintain fares at their present relatively low level and to develop the tourist trade.

EXPRESS COACH SERVICES IN WALES

Associated Motorways

Aberystwyth—Cheltenham (via Llandrindod Wells, Kington, Leominster, Hereford).

Cardiff—Blackpool (via Monmouth, Shrewsbury, Chester, Preston).

Swansea—Cheltenham (via Bridgend, Cardiff, Newport, Chepstow).

Swansea—Cheltenham (via Merthyr, Tredegar, Abergavenny, Monmouth).

Treherbert—Cheltenham (via Tonypandy, Aberdare, Monmouth).

Treherbert—Cheltenham (via Pontypridd, Blackwood, Raglan, Ross).

Crosville Motor Services Ltd.

Aberystwyth—Caernarvon (via Machynlleth, Dolgelley and Portmadoc).

Birmingham—Aberystwyth

Service 127—Liverpool - Birkenhead - Llandudno - Bangor - Caernarvon.

Service 128—Liverpool - Birkenhead - Chester - Wrexham - Bangor - Caernarvon.

Service 138—Liverpool - Chester - Bettws-y-Coed - Blaenau Ffestiniog - Portmadoc - Criccieth - Pwllheli.

Service 139—Amlwch - Bangor - Birkenhead - Liverpool.

Service 136—Wallasey - Rhyl - Colwyn Bay - Llandudno.

Mid-Wales Motorways

Newtown—Cardiff (via Llanidloes, Llangurig, Rhayader, Newbrige-on-Wye, Builth Wells, Erwood, Llyswen, Brecon, Merthyr Tydfil, Pontypridd.

Western Welsh Omnibus Co. Ltd.

This company operate eight express services through Wales, touching the following towns: Aberayron, Aberdare, Abergavenny, Brecon, Builth Wells, Cardigan, Carmarthen, Crumlin, Ferndale, Hirwaun, Lampeter, Llandilo, Llandrindod Wells, Llanelly, Llangurig, Maerdy, Mountain Ash, Neath, New Quay, Newport, Pontypridd, Pontypool, Porth, Rhayader, Rhigos, Swansea, Tonypandy, Treorchy.

RAILWAYS

BRITISH RAILWAYS are not only a great public service, but a vast industrial and commercial concern absorbing tremendous quantities of materials produced by the multifarious industries of England, Wales and Scotland. As one of the largest single customers of industry in Britain, annual purchases range from 15,000,000 tons of coal and coke, 600,000 tons of steel, 436,000 tons of timber and 4,500 tons of paint and varnish, to 3,750,000 yards of material for uniforms, 2,000,000 yards of cotton cloth for overalls, and 3,750,000 yards of canvas for wagon sheets. It will be appreciated, therefore, that the close business relationship which exists between the heavy industries of Wales and Monmouthshire and the railway, is one which has resulted from mutual interests.

One of the most important factors in the development of Wales and Monmouthshire as a centre of industry, as a contributor to the nation's larder, and as a holiday resort, has been the provision of efficient transport services, catering comprehensively for the needs of a community, whether these have been for passenger travel or for the movement of raw materials, merchandise, or parcels. The services provided, both passenger and freight, have linked the remote areas of the Principality not only with England and Scotland, but, by rail enterprise, with the whole of the world through the vast network of docks in South Wales. The link also extends to Eire and Northern Ireland through harbours at Fishguard and Holyhead, from which points railway-owned steamers operate passenger and cargo services.

In the large industrial towns of Wales and Monmouthshire such as Cardiff, Newport and Swansea, where consumer needs of a vast working population are closely associated with diverse industrial and commercial activities, arrangements for handling freight must of necessity be both comprehensive and flexible, and in order to meet these conditions well-equipped rail depots have been sited at convenient centres to enable loading and discharging of all classes of traffic to be undertaken without difficulty. To and from these depots express vacuum-fitted trains operate daily, providing 24-hour services with London, the Midlands and West of England, via Bristol, and the North. Extensive cartage services are also available at all the main depots for collection and delivery of parcels and

merchandise; a service which has considerable importance, owing to the transference of light industries and the growth of trading estates in an area where, in the past, activities have been mainly confined to heavy industries. The majority of the large works in or adjacent to the towns are connected by private sidings with the lines of the Railway Executive, thus enabling incoming raw materials and outgoing manufactured products to be conveyed without intermediate handling, and as development of new industries or extension of old takes place, sympathetic consideration is given to the installation of additional facilities.

Under the national organisation which came into existence on January 1st 1948, certain re-allocation of responsibility has been effected, whereby the whole of the network of lines serving the coalfields in South Wales, together with the line running through Central Wales from Llandovery to Craven Arms, now comes under the jurisdiction of the Western Region. The main line running from Chester to Holyhead, serving the whole of the coast of North Wales, together with the branch lines which penetrate the world-famous Snowdonia area, is still operated by the London Midland Region. The change is a natural corollary of nationalisation, and should result in economy of effort and more efficient services to rail users.

By the very fact that freight services operate mainly at night, they are little known to the general public, and few people realise the immense volume of traffic which is speedily and safely conveyed throughout the country. In an average year over 275,000,000 tons of freight and merchandise, including coal class traffic, are carried by British Railways, which figure exemplifies the tremendous task which the service is called upon to perform.

Co-ordinated with the express freight services, many additional facilities such as road/rail containers, warehousing, railhead and zonal distribution, have been placed at the disposal of the traders.

Whilst the industries of Wales and Monmouthshire must be given prominence, owing to their importance in the general economic life of Britain, there is a large area of land behind the factory chimneys and pithead gear which can be ranked amongst the most beautiful and varied in these Islands. Every year the railway carries tens of thousands of holiday makers to the many seaside resorts and quiet villages of a coast-line which extends from Chepstow, westwards to St. Bride's Bay, and then north along the Cardiganshire coast and West Wales coast to Caernarvon and the river Dee.

Much of this country is also highly productive in dairy and farm produce and many thousands of tons of these commodities are rail-conveyed annually to the markets of England and Wales. In agriculture, high productivity either in land or livestock is dependent upon "feeding," and the flow of animal feeding stuffs, fertilisers and manures by rail to Wales and Monmouthshire indicates the growing emphasis which is being placed on this priority industry.

For a century, Wales and Monmouthshire and the Railway have worked in close collaboration in peace and war, and both having important roles to play in the future economic life of Britain, will move forward with the confidence of tried friends.

CIVIL AVIATION

By S. KENNETH DAVIES
Chairman—Welsh Advisory Council for Civil Aviation

A BIG step forward in aviation was taken in 1947, with the appointment of a Welsh Advisory Council for Civil Aviation comprising eight representative members. At that time, the Principality was without a regular scheduled air service and it was largely as a result of representations made by the Council that in May 1948 permission was given to Cambrian Air Services Limited and Western Airways Limited to fly a scheduled service between Cardiff and Weston "in association with British European Airways Corporation"—the first of such arrangements and the forerunner of many similar useful internal services since. A regular service in this way is now being flown between Cardiff and the Channel Isles by Cambrian Air Services Limited and 2,500 passengers were carried between these places in 1949.

One of the main ambitions of the Council was the setting-up of a North/South Wales air service, and, after many months of hard work and perseverance, British European Airways Corporation were persuaded to fly a service between Liverpool, Hawarden (Wrexham), Valley (Anglesey) and Cardiff, for an experimental period of six months. This service was officially inaugurated on the 11th April 1949. The passengers in the first plane included Lady Megan Lloyd George, M.P., and other well-known North Wales representatives. Lord Douglas of Kirtleside (Chairman—British European Airways Corporation), the Lord Mayor and Lady Mayoress of Cardiff together with the members of the Council, greeted its arrival at Cardiff Airport. The B.B.C. recording units were present and recordings were broadcast the same evening. The inauguration of this service will be remembered as one of the outstanding events in Wales during 1949. Unfortunately,

the service was temporarily suspended during the winter months, but British European Airways Corporation advised the Council that they had future plans to offer Wales. These have since been disclosed in the interesting form of " the first scheduled passenger helicopter service in the world." It is proposed to use Westland-Sikorsky three-passenger helicopters with two journeys each day in each direction between Cardiff and Liverpool with an " on demand " stop at Wrexham. This service was due to start on June the 1st and will be watched with considerable and widespread interest. Whilst acknowledged to be an experimental service and not one that can be economic at this stage it is confidently anticipated it will be well patronised. . . .

Since the inception of the Council, representations have been made continually to the Ministry of Civil Aviation and the Air Ministry concerning the use of Fairwood Common, Swansea. Although the Council worked extremely hard to get the Ministry to keep an interest in Fairwood, it was eventually decided that the Ministry would not take any part in running the aerodrome, following which the Air Ministry announced their intention to de-requisition it. The way is now clear for Swansea Corporation to take over the ground themselves and it is hoped that the aerodrome will be re-opened in 1950.

Similar negotiations are proceeding with the Pembrokeshire County Council and other local bodies to re-open Withybush Aerodrome, Haverfordwest, as a civil aerodrome. The R.A.F. aerodromes at Llandow, Hawarden and Valley are available for civil use " on demand," and there is a small privately owned airfield at Pwllheli which is much used in the summer months.

WELSH NATIONAL ORGANIZATIONS

National Industrial Development Council of Wales & Mon. Ltd., 17 Windsor Place, Cardiff.

Admiralty, Imperial Buildings, Mount Stuart Square, Cardiff.

Automobile Association, 24 Cathedral Road, Cardiff.

B.B.C., 38 Park Place, Cardiff.

Board of Trade, Imperial Buildings, Mount Stuart Square, Cardiff.

British Council (Wales), 52/53 St. Mary Street, Cardiff.

British Electricity Authority, South Wales Division, Rhoose, Cardiff.

Central Office of Information (Wales), 19 Cathedral Road, Cardiff.

Council for Wales & Mon., Secretary, c/o Welsh Board of Health, Cathays Park, Cardiff.

Council of Social Service for Wales & Mon., 2 Cathedral Road, Cardiff.

Docks & Inland Waterways Executive, Pier Head Buildings, Docks, Cardiff.

Industrial Association of Wales & Mon., Aberdare House, Docks, Cardiff.

Merseyside & North Wales Electricity Board, Electricity House, Love Lane, Pall Mall, Liverpool, 3.

Ministry of Food, Tyglas Road, Llanishen, Cardiff.

Ministry of Fuel & Power, 27 Newport Road, Cardiff.

Ministry of Labour & National Services (Wales), Dominions House, Queen Street, Cardiff.

Ministry of National Insurance, Central Office (Wales), Cathays Park, Cardiff.

Ministry of Pensions, Tyglas Road, Llanishen, Cardiff.

Ministry of Supply, Imperial Buildings, Mount Stuart Square, Cardiff.

Ministry of Town & Country Planning, 66 Park Place, Cardiff.

Ministry of Transport, Graham Buildings, Newport Road, Cardiff.

Ministry of Works (Wales), 43 Park Place, Cardiff.

National Chamber of Trade, Area Council for Wales & Mon., 81 High Street, Newport, Mon.

National Coal Board, South Wales Division, Cambrian Buildings, Mount Stuart Square, Cardiff.

National Library of Wales, Aberystwyth.

National Savings Committee, Regional Office (Wales), 6 Park Place, Cardiff.

National School of Music & Dramatic Arts, The Castle, Cardiff.

Regional Petroleum Officer, 21 Charles Street, Cardiff.

Remploy, Limited, Divisional Office (Wales), N.P. Bank Chambers, Docks, Cardiff.

Road Haulage Executive, 4/5 Mount Stuart Square, Cardiff.

Royal Automobile Club, Ocean Chambers, Queen Street, Cardiff.

Royal Welsh Agricultural Society, Queens Road, Aberystwyth.

South Wales Electricity Board, St. Mellons, Cardiff.

South Wales Institute of Engineers, Engineers Institute, Park Place, Cardiff.

University of Wales, University Registry, Cathays Park, Cardiff.

Urdd Gobaith Cymru (Welsh League of Youth), Swyddfa'r Urdd, Aberystwyth.

Wales Gas Board, 1/2 Windsor Place, Cardiff.

Wales & Monmouthshire Industrial Estates, Limited, Treforest, Pontypridd.

Welsh Advisory Council for Civil Aviation, Cardiff.

Welsh Board for Industry, Imperial Buildings, Mount Stuart Square, Cardiff.

Welsh Board of Health, Cathays Park, Cardiff.

Welsh Folk Museum, St. Fagan's Castle, nr. Cardiff.

Welsh National Museum, Cathays Park, Cardiff.

Welsh Textile Manufacturers Association, 30 Greenfield Street, Holywell.

Welsh Tourist & Holidays Board, Temple Chambers, Llandrindod Wells.

Y.M.C.A., National Council (Wales), 53 Park Place, Cardiff.

LINES OF COMMUNICATION

Throughout the Division there are now 42 depots each and all of which are in a position to deal with any transport requirement of trade and industry.

Delivery and distribution of all types and sizes from parcels upwards is effected over the whole Division for traffics arriving from all parts of Great Britain in addition to demands arising locally. Considerable quantities of export and import goods are handled via the South Wales Ports, and a heavy volume of agricultural produce and requirements are carried in the rural areas.

The increasing lighter industries in South Wales are catered for particularly but the basic steel and tinplate industries provide a vast daily tonnage.

The main trunk routes are South Wales to London, the Midlands, Liverpool and Manchester, but large and small consignments are carried daily to all parts of the country. A network of parcels services covers the Division and completely links up with similar services operated by the other seven Divisions into which Great Britain is divided.

Depending upon circumstances after either 1st February 1950, or 1st March 1950, all operators of "A" and "B" licensed vehicles who have not been acquired by the Road Haulage Executive will be limited to a radius of 25 miles except those who have applied for and been granted permits. This affects a very large number of the smaller transport contractors who in the past have been predominantly short distance carriers.

In the South Wales Traffic Area there are approximately 2,000 such operators running some 5,000 vehicles.

Certain specified types of traffic calling for specialised vehicles and handling are, however, excluded from the provision of the Transport Act. These include heavy indivisible loads which require the very large multi-wheeled vehicles and trailers for carrying boilers, loco's, excavators, condensers and other heavy and bulky plant. Similarly excluded are normal household furniture removals, meat and livestock, liquids in tanker vehicles and felled timber requiring special vehicles or trailers.

By virtue of acquiring many transport undertakings which, although predominantly long distance (the test laid down in the Act for acquisition), also operated departments engaged on these excluded activities British Road Services are very large operators of vehicles engaged in these specialised activities.

Whilst, therefore, British Road Services are far and away the largest fleet owners in the country there is still a very considerably greater number of vehicles operated by private owners and traders. According to the Ministry of Transport Statistics at the 31st December 1948 there were 1,977 vehicles on "A" licence and 3,145 on "B" licence with 20,689 on traders "C" licence in the South Wales Traffic Area.

Generally this proportion applies to all areas.

It would appear therefore that trade and industry in South and West Wales has most excellent transport facilities. One large complete transport organisation —British Road Services offering local, parcels, contract hire, long distance scheduled and trunk routes and all specialised services with approximately 2,000 smaller hauliers offering local and specialised services.

A Vehicle and Trailer for General Purposes, where body space rather than dead weight is required.
Photo by courtesy of British Road Services

ELECTRICITY
in South Wales

ON 1st April, 1948, the Electricity Supply Industry passed into National ownership under the provisions of the Electricity Act 1947, and the supply of electricity in South Wales and Monmouthshire is now the responsibility of the South Wales Electricity Board and the South Wales Division of the British Electricity Authority. These bodies have been set up to co-ordinate the activities of the former Statutory Undertakings previously operating in the area, which extends to the northern boundaries of the Counties of Cardigan and Radnor.

The purposes of this co-ordination is "to develop and maintain an efficient, co-ordinated and economical system of electricity supply."

The British Electricity Authority is charged with the responsibility of constructing new Generating Stations and the operating of existing Stations and their interconnecting 132 kV lines, which form part of the National Transmission System, and as far as South Wales is concerned, this is done through the South Wales Division from its Headquarters at Cardiff. The Area Board is responsible for secondary transmission from the bulk supply points and distribution of these supplies to the consumer. The Area Board has therefore close contact with the consumer both as regards the supply of electricity and assisting to ensure the most economical utilisation of electricity in the consumer's home, office or works. Representation of consumers' interest is also assured by the Consultative Council, an independent body set up under the Electricity Act, 1947, to advise the Board of the needs of consumers in the area.

The major Power Stations operated by the South Wales Division are located in the industrial belt and the largest Stations are Newport (89,250 kW.), Cardiff (87,600 kW.), Upper Boat (155,000 kW.), Llynfi (60,000 kW.), Tir John (147,750 kW.) and Llanelly (28,000 kW.).

Llynfi is the most modern Station in South Wales, having been built during the last war. Extensions to this Station are now in progress which will raise its capacity to 120,000 kW.

Two new Stations are being built at Uskmouth and Carmarthen Bay. The Uskmouth Power Station has been designed for an ultimate capacity of 720,000 kW., the "A" Station now under construction having an initial capacity of 360,000 kW. Six 60,000 kW. Turbo Alternator sets and twelve 360,000 lbs./hour boilers will initially be installed. The caisson to be used for the construction of the River Pumping Station foundations, measuring 164 ft. × 110 ft. will be one of the largest to have been sunk in Europe.

Carmarthen Bay Power Station is designed for an ultimate capacity of 345,000 kW. Two 52,500 kW. Turbo Alternators and five 240,000 lbs./hour boilers will be installed initially.

In order to maintain a progressive and efficient service and close personal contact with the consumer throughout the South Wales area of 4,568 square miles,

Photo by courtesy of South Wales Division, British Electricity Board

The new Llynfi Power Station.

with a population of nearly two million, the South Wales Area Board operates through four Sub-Areas, which are divided into a total of twenty-nine districts. Each district is under the control of a District Commercial Manager and District Engineer who are jointly responsible for the operation of the district and for dealing with the day-to-day problems of their consumers.

The distribution system includes 6,280 miles of mains and 2,884 Sub-Stations. In addition, the South Wales Division has nearly 139 miles of 132 kV. Main Transmission Line. The coverage is indicated on the accompanying map (page 177), which shows the position of the Power Stations and Sub-Stations, and also indicates the boundaries of the various Sub-areas and districts. Plans to extend to other parts of the area are under consideration, but the time that the construction is carried out depends, of course, on Government policy regarding capital expenditure. This curtailment, however, does not apply to new Generating Stations under construction.

In accordance with the requirements of the Electricity Act, 1947, the rates of charge for electricity are having detailed consideration, and as regards industrial supplies some degree of uniformity for new rates has been reached. In view, however, of the greater numbers affected, similar progress in domestic tariffs will take longer to achieve.

Advisory services are available to consumers through sixty-eight Service Centres located throughout the area. These Service Centres are linked through the Area Board's Headquarters at St. Mellons with national organisations carrying out research on utilisation of electricity, and by this means ensure that the most up-to-date advice can be given to the consumer. Expert examination of new apparatus is carried out by the Board in order that the most suitable appliances shall be available for the consumers' choice in the Service Centres. Industrial consumers both existing and prospective, have the benefit of a specialist Advisory Service, and a similar service is also available to Local Authorities in connection with street lighting. Besides these services, the Board operates wiring and contracting departments throughout the area.

Industrial supplies are regarded both by the Board and the Division as a very special responsibility, and it should be borne in mind that eighty per cent of the supplies given within the area are in this category. The effect of this industrial concentration is that the demand in the summer for electricity is about ninety per cent of the average winter maximum demand—an exceptionally high proportion which is reflected in the difficulty of undertaking repairs and overhaul and the maintenance of equipment which is usually undertaken in the summer.

In the past South Wales was a chronically an electricity exporting area, but due to the increased industrial requirements and to the time lag in the erection of new plant, the position at present is that it is necessary to import from Power Stations in other areas at peak periods, and particularly in the summer in order to allow plant to be taken out of service for routine overhaul. It is hoped, however, that with the addition of Uskmouth and Carmarthen Bay Stations, which have previously been mentioned, there will be sufficient generating capacity to supply all consumers in South Wales at all periods.

The importance of the well-being of the industrial load in view of its influence on the future of the whole national economy indicates the need for this special attention, and it is therefore satisfactory to note that the average price per unit for industrial supplies in South Wales is the lowest in the country. Apart, therefore, from the encouragement given to new industry in South Wales, both by the Board of Trade and the Development Council, industrialists can be assured that as regards electricity supply, their costs compare favourably with those prevailing in other districts.

ELECTRICITY
in North Wales

IF the depopulation of the countryside is to be prevented, rural areas must be provided with some of the amenities and labour-saving devices enjoyed by town dwellers. Undoubtedly the provision of electricity is one of the basic essentials in this respect.

Nowhere will this task be more difficult than in the mountainous and uneven territory of North Wales, but nowhere, surely, will the benefits of electricity be welcomed more gladly. Responsibility for providing electricity to this area (as outlined under the Electricity Act of 1947) rests with the Merseyside and North Wales Electricity Board and the Merseyside and North Wales Division of the British Electricity Authority. The generation of electricity is the responsibility of the Division, and the distribution of it the responsibility of the Board.

The larger part of the power at present consumed in North Wales is imported from steam power stations situated in the industrial areas of the English Midlands. The balance (now less than one quarter of the total amount of energy used) is obtained chiefly from three hydro-electric power stations in North Wales sited at Dolgarrog, Cwm Dyli and Maentwrog.

North Wales possesses considerable potential power in the water resources available in the high mountainous areas. These areas lie in the vicinity of Snowdon and the other high ground which stretches southwards from the north coast through Dolgelley to Cader Idris, and to the south in the Plynlimon Range east of Aberystwyth.

At present the British Electricity Authority has under investigation six major hydro-electric development projects between the north coast and the Plynlimon area. In addition, extensions to the water gathering ground of the two existing hydro-electric developments at Dolgarrog and Maentwrog are proposed.

In an average year, the existing power stations in North Wales generate about 90 million kilowatt hours out of a present consumption of electricity of over four times that amount. It is estimated that the new developments as outlined would increase power generation in North Wales to some 625 million kilowatt hours—nearly seven times present generation. On account of the comparative magnitude of the construction work involved, the natural growth of load will probably exceed the power made available before the proposed hydro-electric works have been completed in say, twelve years time.

The Division and the Board are working together very closely, in order to ensure, at the earliest possible date, adequate supplies for the demands of industry, commerce, and particularly agriculture in the North Wales area.

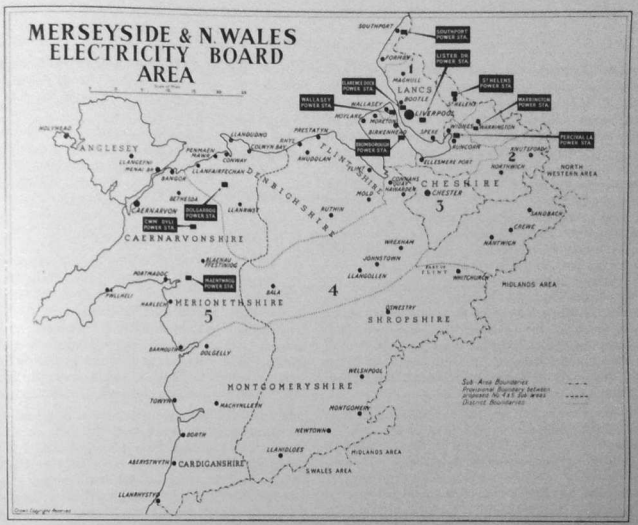
Alongside the schemes for future generation, the Board have embarked on a planned rural development programme, whereby electricity will be brought to all the farms, villages, and scattered rural premises throughout the North Wales area. This is a long-term plan, and will be dependent on the capital, materials and labour which can be made available for this purpose.

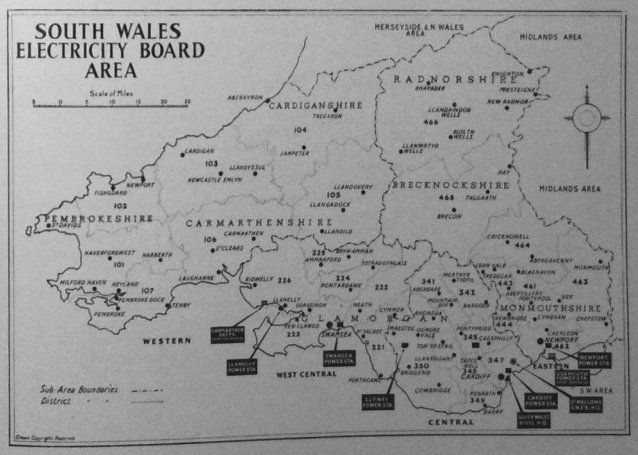
To meet the needs of both existing and potential consumers, the Board's North Wales area is controlled by a sub-area organisation (with headquarters at Wrexham) which, in turn, is divided up into eight districts. These operate 28 service centres (out of a total of 50 for the whole area of the Merseyside and North Wales Electricity Board) thereby ensuring that the day-to-day problems of distribution and consumer service are quickly and efficiently dealt with by the district concerned (the map on page 177 gives details of the location of the service centres, and the district headquarters).

Specialist and advisory services are available at district or sub-area headquarters on all aspects of electricity supply, and the Board are anxious that this service should be well known and fully used throughout the area.

It is realised that the future of industry and the people is linked up with the further development of electricity, and the Board are doing everything possible to ensure that supplies should be made available wherever required. In this connection it should be appreciated that in the present national and financial circumstances, certain priorities have been agreed, and it is inevitable that there must be delay in providing supplies for all premises throughout such an extensive and sparsely populated area.

During the two years that the Board have been operating, a total of 15,523 new consumers have been connected in sub-areas 4 and 5 (which include the whole of North Wales and a portion of Cheshire). This total includes 654 new farm connections, and brings the number of consumers in the region specified to 173,157.





GAS

DURING recent years the introduction of many new factories, and the extension of existing factories in Wales and Monmouthshire has resulted in large demands for gas as a fuel, and in the majority of these new factories Town's Gas plays an important part. In certain cases the availability of a gas supply was the deciding factor in the establishment of a new factory. The use of gas as an industrial fuel during the year 1948 accounted for nearly one quarter of the gas distributed throughout the area of the Wales Gas Board. There is a rapidly growing appreciation by industrialists of the value of gas supplies for their purposes, so much so that in certain areas the increase in industrial gas last year was in the region of 40 per cent, and future developments indicate an equal rate of expansion.

Through the Gas Act 1948, the 108 Undertakings throughout Wales and Monmouthshire are vested in the Wales Gas Board and it is the purpose of the Board to fulfil the requirements of the Act, namely, to develop and maintain an efficient and economical system of gas supply to satisfy all reasonable demands.

In 1948, the two Committees set up by the Minister of Fuel and Power, reported on the integration of gas supplies and greater utilisation of coke oven gas in the Western and Eastern Districts respectively of South Wales and Monmouthshire. These reports put forward schemes for the distribution of gas from coke oven plants and for the development of certain of the larger gas works.

In pursuance in part of these schemes, mains have been laid and others are now in process of being laid from Port Talbot Gasworks to distribute coke oven gas purchased from the Steel Company of Wales to Porthcawl, Bridgend, Maesteg, Glyncorrwg and Neath. These mains will eventually, form part of a larger scheme now under consideration for the West Wales industrial area.

The second of these reports, namely, the Eastern Grid Scheme, covers the distribution of gas from certain large Undertakings and Coke Oven Gas Plants, to some 24 Undertakings from the Rhondda in the West to Usk in the East, and from Barry in the South to Brynmawr in the North. When completed some 136 miles of main will have been laid and the following gives some indication of the progress of the Eastern Scheme.

Mains have been laid from Cardiff to distribute gas produced at the coke ovens of Guest, Keen and Baldwins, East Moors, and also from the Cardiff Gasworks to Barry and Newport.

A complete new gasworks was brought into commission last year at Pontypool, and mains have been or are being laid to distribute gas to Abercarn, Cwmbran, Newport, Brynmawr and Blaenavon Beaufort. The Newport Undertaking already distributes gas produced at the Bedwellty Coke Ovens to Chepstow and Caldicot. The Rhymney & Aber Undertaking already distributes gas produced at the Bargoed Coke Ovens to Caerphilly, Merthyr Vale and Quaker's Yard. Mains have been laid and others are now in process of being laid to distribute gas produced at the Coedely Coke Ovens to Rhondda and Llantrisant.

In the North Wales area the erection of a complete new large gasworks is about to be commenced at Wrexham, and a supply from this new works is to be given to the Rhos, Cefn Mawr and Llangollen Undertakings. Until such time as this new Wrexham plant is in operation, a supplementary supply is being given to these three Undertakings from the existing Wrexham Gasworks. The interlinking of the Mold, Buckley, Hawarden and Connah's Quay Undertakings, with Wrexham, is to be carried out at an early date, which scheme will, eventually, be extended to Holywell and Flint.

Throughout the North Wales area the Wales Gas Board has under consideration the co-ordination of the gas supplies of many of the Undertakings. Interconnecting is envisaged so that the number of producing stations will be reduced. Already, the inter connection of the Colwyn Bay, Llandudno and Conway Undertakings is in progress.

Interlinking of Undertakings will afford supplies of gas in many districts not at present catered for, improve supplies and services to existing consumers, and at the same time lead to economies in production and operation.

The Industrialist of to-day appreciates the advantages of gas to such an extent that gas is relied upon almost entirely for the heat processing of the many components. As a thermal agent, gas gives vast scope for utilisation through a wide range of temperature, rapid initial heating can be obtained when required, it is clean and flexible and, together with the ease of thermostatic

control can enable low " all in " production costs to be obtained.

It is generally agreed that South Wales is the home of the tinplate industry, and in this sphere gas is used extensively for mill-roll heating, annealing of sheet, melting of tin and in many other applications. The metal container industry also uses gas in large quantities as nearly all the lacquered cans and boxes are stoved in gas-fired ovens.

Heat treatment furnaces in which jigs and tools are processed are also gas-fired.

Gas is used extensively for the reheating and annealing processes in the aluminium industry. The aluminium sections used in the building of the air liner the " Brabazon " were all treated in gas-fired furnaces within the Wales and Monmouthshire area.

In the manufacture of nylon, one of the most modern factories in the world is now in production within Wales and Monmouthshire, and relies almost entirely on gas for its heat processes.

On account of the introduction of the many new trades brought into Wales and Monmouthshire (to the undoubted benefit of the Principality), the various industrial uses to which gas has been applied include the heating processes involved in the manufacture of optical lenses; all types of springs; toys; vacuum cleaners; laboratory glass-ware; vacuum flasks; steel furniture; electric motors and control gear; jewellery; clothing; musical instruments; textiles; ceramics; galvanising; motor car accessories; cycle manufacture; chemical works; and the incidental heat demands of manufacturing processes such as are required in constructional steelworks, etc.

With the modern trend for increased cleanliness in the handling of food, considerable progress has been made with the use of gas in the baking of bread, confectionery and biscuits. The reason for the popularity of Town's Gas as a heating medium is that bakers have found that in bakeries the saving in the labour, the absence of maintenance and repairs, and the cleanliness and improved conditions resulting from the adoption of gas as a heating medium represents a substantial annual economy as well as reducing unsettled conditions that may exist due to long hours.

With the demands for labour-saving methods of heating, and to assist in the reducing of pollution of the atmosphere, considerable development has been made in the use of gas for central heating and steam raising for pasteurising and ice-cream manufacture. In this respect gas can claim to make a substantial contribution in supplying a clean and reliable fuel of such controllability to meet all demands.

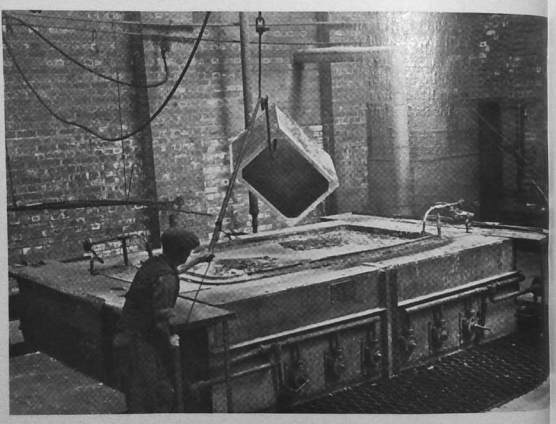
No factory to-day is complete without its canteen, and here again the use of gas is ensuring hygienic and healthy conditions for the factory worker.

WALES AND MONMOUTHSHIRE

The Wales Gas Board, realising that the development of Gas for industrial purposes will make large demands upon the various schemes now under consideration, are giving every consideration to schemes that will make available adequate and economical supplies of gas to industrialists.

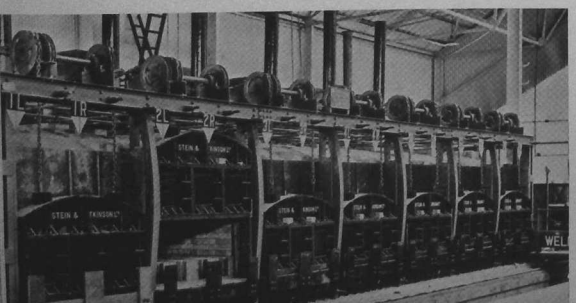
In order to assist the industrialist to utilise gas to its best advantage and to prove the suitability of gas to various processes, the Wales Gas Board has extended the activities of the Industrial Gas Centre, Bute Terrace, Cardiff. The work of this Centre has in the past few years resulted in many valuable contributions to the increased production required by industrialists, and it is here that a free service is provided to demonstrate the suitability of gas as an industrial fuel. The Centre is staffed by experienced and qualified personnel, and when necessary, experimental work is carried out in connection with the particular application or process under consideration.

To cater for the West Wales Industrial area an experienced Industrial Gas Engineer is stationed at Swansea, and similarly, for the requirements for the North Wales area an Engineer is stationed at Wrexham. In this way expert knowledge on gas utilisation is available to any industrialist in any part of Wales and Monmouthshire.



A Gas-fired Galvanising Bath in use at Welsh Metal Industries Ltd., Caerphilly.

Photographs by courtesy Welsh Gas Board



A battery of Gas-fired Heat-treatment Furnaces at Curran Steels, Cardiff.

WATER

by

G. W. Cover,
M.I.C.E., M.I.W.E.

THE area of Wales and Monmouthshire is well blessed as regards rainfall but physical difficulties (e.g. mountains and valleys) and pollution of rivers and streams in the industrial areas make many problems in connection with water supplies.

Rainfall average over a long period is a little over 50 inches per annum for the whole area, varying between 118 inches in the region of Snowdon to approximately 30 inches in the northern coastal areas.

From the time of the Romans, responsible individuals constructed water supplies for their own purposes, using wooden, earthenware and lead pipes, but it was not until the advent of the cast-iron pipe in the early part of the nineteenth century that any real development of water sources commenced. In Wales the various towns and villages derived supplies entirely by bucket or container from local wells, rivers and streams, and no organised water system appears to have become operative until after 1820.

The total area of Wales and Monmouthshire is approximately 8,000 square miles. It does not follow that all the area is served by the Water Authorities, but it is their obligation to do so if required and if proper payment is made to them for the service.

Water from the uplands sources (rivers, streams and springs) is generally very soft in character, varying from 1° to 12° (parts per 100,000) but some of the springs and river supplies are harder and of the order of 20° or more where the source is affected by limestone formation. Where the supply is from wells or boreholes the water is generally harder than from river or stream.

The relatively high rainfall in the mountain districts of Wales, together with the natural suitability for the construction of large dams for impounding water has led to the development of such works for the supplies required by large towns " over the border."

Notable in this group are Liverpool, Birmingham and Birkenhead, which have large reservoirs at Lake Vyrnwy, the Elan Valley and River Alwen, situated in mid and north Wales. These authorities together take nearly 80 million gallons per day from the Principality.

Incidentally the reservoirs constructed for water supply purposes are popular beauty spots visited for pleasure purposes by thousands annually.

Of the total population of 2,553,000 in the area approximately 2,350,000 have the benefit of a piped supply from a statutory water authority. Of the remainder a small proportion only is included in a few privately owned piped supplies. The high cost of extending existing pipe systems or developing new ones for premises in very remotely situated areas makes it likely that it will be a very long time before all will have this benefit.

The number of Water Authorities distributing water in the area is 160. Of these 133 are Municipal Authorities, 7 Joint Water Boards and 20 Water Companies. In addition to these the Taf Fechan Water Supply Board is a bulk supply authority supplying water in bulk for distribution by a number of the above Municipal Authorities and Boards.

Sources of supply are preponderantly rivers, streams or springs, either impounded by dams to form reservoirs or (where the supply is not large) taken straight to filters or direct into supply. About 13 authorities make use of wells or boreholes but the geology of the area is not generally suitable for this type of source. One or two authorities derive their supply from old colliery workings.

Principal developments now proceeding are The Claerwen Reservoir (10,860 million gallons) to be formed by a concrete dam now under construction for Birmingham Corporation and the Usk Reservoir for the Swansea Corporation, which will be formed by the construction of an earth dam on the upper reaches of the River Usk, which has recently been commenced. (Capacity 2,600 million gallons.)

A further reservoir (capacity 900 million gallons) is proposed for the Cardiff Corporation to be commenced in the near future, at the foot of the Brecon Beacons on the upper reaches of the river Taf Fawr.

Grants under the Rural Water Supplies and Sewerage Act are giving financial assistance to many small schemes now under construction or planned in various parts of the country, particularly in the west where the general rural character of the area makes the water supply schemes very uneconomical financially.

PART TWO

Cymru

Land of Mountain and Song

WALES
AND ITS PEOPLE

by

T. I. Jeffreys-Jones, M.A. (Wales)

Senior Tutor, Coleg Harlech

THE Welsh are a proud and ancient people. Racially they are no purer than the English; linguistically they are disunited, less than half of them to-day being Welsh speaking; in religion they have agreed to disagree; and, contrary to commonly held opinions, neither rugby football nor choral singing is a unifying factor, for hundreds of thousands of Welshmen prefer the association code, and the majority of the inhabitants of Wales have never attended an Eisteddfod. Yet they account themselves, and indeed they are, a nation.

The history of Wales has to a great extent been influenced by its geography. As wave after wave of invaders crossed the sea and swept over the lowlands of England, the mountain fastnesses of Wales became the last desperate stronghold of many an incipient civilisation which elsewhere had perished before the ruthless barbarian. The Welsh, Breton, Cornish, Gaelic and Irish languages are all developments of a Celtic language that was first introduced into this island by such invaders within the last five centuries before the birth of Christ. Welsh itself was emerging as a separate tongue by the end of the fifth century A.D., and soon afterwards the firm basis of a Welsh literary tradition was being established by such poets as Taliesin and Aneirin, who probably wrote in the sixth century.

The withdrawal of the Romans in the early fifth century opened the floodgates to the Anglo Saxon invasions. In A.D. 577 the Battle of Deorham enabled the English to advance to the Bristol Channel and this cut off the Welsh of Wales from the tribes further south. Nearly a hundred years later (A.D. 655) the Battle of Winwaed Field separated the Welsh from their fellows along the north west coast. Thenceforward Wales was to be "isolated and self-contained, dependent henceforward upon its own resources for its development" (J. E. Lloyd, *A History of Wales*). All forms of the Celtic language disappeared from England, but Welsh has survived and flourished in Wales.

Christianity, introduced during the Roman era, was submerged in the areas conquered by the heathen Anglo Saxons, but it continued to flourish in Wales, inspiring such saints as Illtud (head of the great monastery and school at Llantwit Major) and Dewi (our patron saint, born c. 520, and who died on March 1, c. 588). The Christian Church in Wales was thus separated from the main continental stream of development and not till the end of the eighth century did it fully acknowledge the supremacy of Rome.

In the meanwhile the boundary of Wales was being defined, a process confirmed in the second half of the eighth century by the construction of Offa's Dyke, running from near Prestatyn in the north to the mouth of the Wye in the south. The land to the west of this boundary was divided into the four great kingdoms of Gwynedd, Powys, Deheubarth and Morgannwg, and inhabited in the main by pastoral tribes of *boneddigion* or "freeborn." Much of our knowledge of the customs and institutions of these people has been derived from the work of Hywel Dda who caused Welsh law to be codified in the first half of the tenth century, an achievement which can be rivalled by few other countries.

Thus, in spite of the disunity from within, and of setbacks caused by the bitter and cruel raids of Norsemen from without, Wales by the end of the tenth century had sent down strong roots out of which grew a society that defied the assaults of a thousand years. A boundary had been defined, a language had been safeguarded and a tradition of difference in religion and way of life had been nurtured that was to stand her in good stead during the trials of the future.

Two centuries after the conquest of England by the Normans, parts of Wales were still unsubdued. Held up by the natural barriers and the tenacity of their Welsh defenders, the early Norman kings were content to allow the border and lowlands of Wales to be ravaged and conquered piecemeal by powerful feudal barons who in course of time carved out for themselves semi-autonomous Marcher Lordships and erected the famous castles of the borderlands and South Wales. Gwynedd, however, which included the mountains of Snowdonia and the fertile Anglesey, defied the Anglo Norman advance. Defended by a succession of able princes, including, in the thirteenth century, Llywelyn the Great and Llywelyn the Last, whose influence and power

extended for a time over a large part of Wales, Gwynedd was the centre of resistance and the spring-board of counter attack until 1282, when she was finally subdued by the military brilliance and superior economic power of Edward I. The Statute of Rhuddlan (1283) determined the administration of the newly conquered territory, and for the next 200 years Wales was divided into two parts, (*a*) the Principality, that is the lands directly controlled by the Crown, roughly, Anglesey, Caernarvonshire, Merionethshire, Carmarthenshire and Cardiganshire and (*b*) the rest of Wales, which was divided into Marcher Lordships, each with its own particular laws, customs and courts.

After the conquest of 1282 Edward took drastic action to avoid further trouble by building the famous circle of castles round Snowdonia—Harlech, Criccieth, Caernarvon, Beaumaris, Conway and Dolwyddelen. Under the walls of these fortresses there sheltered boroughs inhabited by imported English families.

The next two hundred years were probably two of the most tragic centuries in the history of Wales. To the oppression of the Marcher Lords was added the rapacity of Crown officials; to the administrative and judicial chaos inherent in the division of Wales was added the social chaos of a disintegrating tribal system. The series of destructive epidemics called the Black Death plunged Wales into despair and ultimately into revolt under the leadership of Owain Glyn Dwr in the first decade of the fourteenth century. Failure brought punishment and further hardship. Welshmen were forbidden to live in towns or to carry weapons, thousands became outlaws, and robber bands were swollen by the return of indigent Welshmen from the French wars.

Yet those two tragic centuries heard for the first time the verses of some of the most brilliant of all Welsh poets. As is Shakespeare to England, so is Dafydd ab Gwilym to Wales, and in the middle of the fourteenth century his genius lightened the darkness of a seriously troubled society before he died in c. 1380. The fifteenth century also produced a number of poets whose names are familiar to the lips of all cultured Welsh people—Tudur Aled, Dafydd Nanmor, Lewis Glyn Cothi and Guto'r Glyn.

Many of these poets had sung of the leader that was to rise to restore the honour and power of the Welsh people, and the victory of Bosworth (1485) and the seizure of the Crown by Henry Tudor, a Welshman descended from an ancient princely family, seemed to be the fulfilment of their prophecy. But there remains in Wales a division of opinion as to the merits of the Tudor contribution to the pattern of Welsh life. The Tudors by the acts of 1536 and 1542 made the administration of Wales uniform with that of England. The power of the remaining Lords Marcher was forfeited and the whole of Wales was now divided into shires with parliamentary representation. The penalising laws which had accompanied the Glyn Dwr rebellion were repealed and the suppression of lawlessness was followed by an increase in commerce.

English was made the official language. Whilst this was undoubtedly administratively convenient, nevertheless it was unjust to individual Welshmen and a danger to the survival of their ancient tongue. Indeed, were it not for one of the indirect consequences of the Reformation it is quite possible that the acts of 1536 and 1542 would have resulted in the gradual disappearance of Welsh as a medium of speech. The laws of Hywel Dda and the Mabinogi show that Welsh prose could be written with virile style as early as the tenth and eleventh century, and it was another piece of prose, the translation of the Bible, that was ultimately to save the Welsh language. A translation of the New Testament was printed in 1567, and of the whole Bible in 1588, with a more popular revised version in 1630. This was one of the greatest events in the history of the Welsh nation for in the centuries to come the reading of the Bible was to have as much, if not more, influence upon the character and language of the Welsh people than on those of any other nation in the world. Especially was this so after the phenomenal work of Gruffydd Jones, of Llanddowror whose circulating schools taught thousands of Welsh people to read in the later eighteenth century.

Another consequence of the rise of the Tudors was the anglicisation of the Welsh aristocracy. Many of the Welsh nobility sought their fortunes at the royal court in London, others received offices at home and aped the language as well as the customs of their English counterparts. This was to have a profound effect on Wales. With the closure of the monasteries and the defection of the aristocratic patrons of the bards the cultural life of Wales was in a sense impoverished, but only impoverished to be enriched, for the effective Welsh Wales of the future was to be peasant Wales, and its culture a peasant culture.

With the acts of 1536 and 1542 we see the beginning of the development of modern Wales. In time its legislature, executive and judiciary, were merged completely into that of England, its laws were English laws, but the way of life of the Welsh people remained governed by sanctions that were often different from those "over the dyke."

That way of life, however, was to be shaped by two

great revolutions. The first to commence in point of time was religious. Early Puritanism (in spite of the endeavours of William Erbery, of Cardiff, Walter Cradock, of Usk, Morgan Llwyd, of Cynfal and Vavosor Powell of Knucklas) made little impression on the Welsh people, and it is noteworthy that the Roundheads gained little intensive support from Wales outside English speaking South Pembrokeshire. But in the following two centuries the Welsh were swept off their feet by a religious movement which was to convert them from being a nation that took its religion lightly to one that made religious philosophy one of the cardinal points of its existence. The primary cause of this change was the great movement that came to be known as the Methodist Revival, always associated in the mind of the Welsh people with the names of Hywel Harris, Trefecca, Daniel Rowland, Llangeitho, William Williams, Pantycelyn, hymn writer, and later, Thomas Charles the painstaking organiser. Bible reading, closely reasoned and imaginative sermons and Sunday School classes were to be forms of mass education and creatures of a nonconformist conscience, both of which have influenced individual conduct and political thought to our own day.

The second revolution that influenced the way of life and the content of thought of large masses of Welsh people was industrial. Coal, steel, and tin plate brought wealth and squalor, prosperity and unemployment to Glamorgan, West Monmouth, East Carmarthen and parts of Denbigh and Flint. For the first time large sections of the Welsh people became town dwellers. Once again Wales was subject to invasion—this time by thousands of people seeking work. The population of Wales increased, but so did the proportion of those who did not speak Welsh.

The eighteenth century had seen the revival interest in the traditional forms of Welsh[1] poetry, a revival encouraged by the antiquarian activities of the three brothers Morris of Anglesey (Lewis, Richard and William) and the famous eccentric Iolo Morgannwg. But apart from Goronwy Owen who wrote in the old *cynghanedd* (or strict metre) the eighteenth and nineteenth centuries belong to poets who wrote in the free metres, possibly the best known being William Williams, already mentioned, and John Ceiriog Hughes. With the opening of the twentieth century, however, traditional Welsh poetic forms once again entered a golden age. It is doubtful whether the poets of any country before the second world war could improve on the inspiration and craftsmanship of such writers as W. J. Gruffydd, Gwynn Jones, Parry-Williams and Williams Parry. Indeed, one may say that in almost all literary forms Welsh writers were experimenting with and achieving new standards; thus literary criticism (J. Morris Jones) and the short story (Kate Roberts) were given new life and virility.

The story must not end there. By to-day the majority of the inhabitants of Wales cannot speak Welsh and there has emerged what, for lack of a better term, is called the Anglo-Welsh school—artists who though they frequently write about Wales and the Welsh people do so in the English language. If one confines oneself to this century alone, one might claim that there are at least a score of poets and prose writers of Welsh extraction whose names and work are familiar to the English reader: W. H. Davies, Wilfred Owen, Edward Thomas, Richard Hughes, Richard Llewelyn, Dylan Thomas, Rhys Davies, Emlyn Williams, Gwyn Jones, Keidrych Rhys, Geraint Goodwin, Jack Jones, Vernon Watkins, Hugh Menai, Alun Lewis, Cledwyn Hughes, R. S. Thomas, Hilda Vaughan, Dorothy Edwards, Caradog Evans . . . and the list is far from complete.

We have said that the Welsh people until very recently were not town dwellers. Even their villages were small in size and few in number. There was little need or opportunity in the peasant buildings of Wales for the study of architecture, painting and orchestral music. Until very recently, therefore, interest in these forms of art was inconsiderable and Wales has made little contribution to their development. It is true that a few of the best known English sculptors and painters were actually born in Wales or of Welsh parents—John Gibson for example, Richard Wilson and Augustus John—but there has never been a school of "Welsh art" or "Welsh architecture." To-day things are gradually changing for the better. Organisation—and possibly the moderation of the austerity of nonconformity—has allowed more encouragement to be given

The Crowning of the Bard at the Welsh National Eisteddfod.
Photo: Topical Press Agency

to the visual arts and it is to be hoped that men such as Clough Williams-Ellis, Percy Thomas and Alwyn Lloyd, may be the harbingers of a fuller life in this respect for the Welsh people.

In orchestral composition, too, the names of Arwel Hughes and Grace Williams have become well known to all music lovers. But, of course, Wales is best known in the music world for its choral singing and Eisteddfodau, both of which are typical of a peasant tradition and are an essential part of the culture of Welsh Wales.

The Welsh might be considered a strange people. Given to philosophical analysis they are yet fervent in their religious faith; showing a tendency to be radical in politics they are conservative in their allegiance to traditional values; and while jealous defenders of the individual conscience, nevertheless they have a highly developed sense of community. Their tendency to self-criticism is often mistaken for introspection, and their courtesy for hypocrisy. But each Welshman is what history has made him, and what is true of one is not so of another. Nevertheless the survival of the Welsh language in the face of every conceivable difficulty, the fierce faith in democracy that has survived the cruel years of depression, and the abiding sense of the omnipotence of education, are surely indications of the stability of the Welsh people—and of their tenacity and almost fanatical loyalty to what they consider to be the important values. The founding of the University of Wales, the widespread influence of the Educational Workers' Association, and the great experiment in residential education at Coleg Harlech, are merely the contemporary symbols of the traditional Welsh allegiance to the ultimate ideal of honest craftsmanship by brain as well as hand.

IMMORTAL WELSHMEN

by

Glanmor Williams, M.A.

Lecturer in History, University College of Swansea

EARLIEST, and in some ways, greatest of Welsh national figures was *Arthur* (c. ?450-?500), though in reality he can hardly be called a Welshman at all. Yet the saga of his struggle against the invaders of his country has so fired the imagination of Europe down the centuries as to win for him a place in the international pantheon of heroes.

Hardly less famous, though his was the sword of the spirit wielded against the powers of darkness, was Wales' patron saint, *David* (?520-?588). In him the ideals of holiness and learning, the glory of the Celtic Church, found their highest expression.

Spiritual heirs to an older tradition were *Taliesin* and *Aneirin* (flor. c. ?600). Themselves North Britons, they were nonetheless fathers of Welsh poetry, and first of a long line of versemakers whose achievements are a priceless contribution to European literature.

Among the kings whom the early poets praised none could have been greater than *Hywel Dda ap Cadell* (reigned 910-50), who, for his memorable gift of a codified law, was the only Welsh prince to win the title of " the Good."

But the unity which Hywel Dda gave his people they could not maintain in the face of the onset of the Norman conquerors, though they fought long and hard. And none led them better than The Lord Rhys (1132-97), noblest of all the princes of South Wales, as famous for his patronage of verse and song as for his valour in battle. Still, it was the northern kingdom of Gwynedd that was the heart of Welsh resistance. Its two great Llywelyns, *Llywelyn the Great* (1173-1240) and *Llywelyn the Last* (d. 1282), bade fair to make of Wales an independent, united state till the odds proved too great, and Edward I's hammer-blows shattered their proud creation.

Yet if the Normans conquered Wales, she in turn conquered many of them. None more than *Gerald de Barri* (c. 1147-1223), who gloried in being called " the Welshman," who described the Welsh with rare percipience and understanding, and who defied the might of England's king and Canterbury's archbishop in an unavailing, but glorious struggle to free the church in Wales. Through *Geoffrey of Monmouth's* (?1100-54) chronicle of the legends and history of the kings of Britain, the Normans gave to the world the treasures of Arthurian romance.

Nor did the vernacular lack its creative spirits. As if to console Wales for her lost independence, her bards found a new and wider freedom in their verse. *Dafydd ap Gwilym* (flor. 1340-80), beguiled by the loveliness of Nature and of maidens, made the somewhat grim and bony visage of the older verse smile with a warmer humanity and more graceful liveliness. He was the harbinger of the golden age of Welsh literature, the first of that host of *cywyddwyr* of the fifteenth and sixteenth centuries, the men who fashioned the loveliest treasures of the language and who kept the nation's soul alive.

The rising of *Owain Glyn Dwr* (c. 1359-1416) seemed

to betoken for a moment the appearance of the national deliverer so often foretold by the bards. Alas! the success of his revolt was fleeting and it seemed to end in complete disaster. Yet his legend was supremely victorious, for Welshmen since his death have cherished a memory of his dauntless courage and magnetic idealism more potent even than his living reputation was.

The man who really seemed to fill the role of the long-prophesied victor over the English was *Henry Tudor* (1457-1509), first and not least distinguished of the greatest dynasty of British kings. Borne to victory at Bosworth in 1485 on a mighty surge of Welsh support, his triumph did much to reconcile Welshmen to his son's incorporation of Wales into England fifty years later.

As notable as any Welshman during the brilliant Tudor period was *William Salesbury* (c. 1520-99). Scholar, man of letters, and biblical translator, his talents were as varied as his erudition was profound. His pioneer work was of the greatest value to *Bishop William Morgan* (1545-1604) whose translation of the Bible (1588) was no less epoch-making in the history of literature than of religion. *Thomas Middleton* (1550-1631), who bore half the cost of producing the first cheap edition of the Welsh Bible, was one of the many Welshmen who seized the new opportunities to make their fortunes in commerce, and was one of the founders of the East India Company and a Lord Mayor of London.

In the years of bitter conflict in church and state in Stuart times, both sides produced their champions. *John Williams* (1582-1650) Archbishop of York and Lord Chancellor, was the last of the great ecclesiastical statesmen, and a pillar of the royalist cause. *Vicar Rhys Pritchard* (1579-1644), too, was a staunch anglican and royalist, though his homespun verses, which were to be a veritable " candle " to generations of Welshmen had a strong Puritan flavour. Among the Puritans, none was more significant a figure than *Morgan Llwyd* (1619-59), mystic and visionary, and one of Wales' most intense and powerful prose writers.

It is to the men of the " great awakening," however, that the transformation of the spiritual and intellectual life of Wales is due. There were those three giants of Methodism—*Howell Harris* (1714-73), the organiser *par excellence*, *Daniel Rowland* (1713-90) the most eloquent of Welsh pulpit orators, and *William Williams, Pantycelyn* (1716-91), into whose magnificant hymns was distilled the very essence of Welsh religious fervour. Towering above all other Welsh educationalists was *Gruffydd Jones* (1683-1761), whose astonishing talents as an organiser enabled him to teach an incredibly large number of adults and children to read in his circulating schools. In the years that have followed one of the characteristics of the Welsh has been their thirst for learning. It inspired *Thomas Charles* (1755-1814) to take a leading part in founding the British and Foreign Bible Society. It led to the founding of the University of Wales on the " pennies of working men," and the work of *Hugh Owen* (1804-81) and *Owen M. Edwards* (1858-1920) who, more than any other men, have shaped the recent development of Welsh education.

Interwoven with the thread of Nonconformity was an older strand of political radicalism. Handed on from the Puritans via great eighteenth century radicals like *Richard Price* (1723-91), a man who profoundly influenced the American and French Revolutions, it produced the remarkable pattern of later Welsh liberalism. Its first leaders were minister-propagandists like *Henry Richard* (1812-88), for so many years secretary of the Peace Society, or journalists like *Thomas Gee* (1815-98), by means of whose newspapers popular opinion was educated in political liberalism; but later there emerged professional politicians like *David Lloyd George*, prime minister of Britain at a time of great national peril.

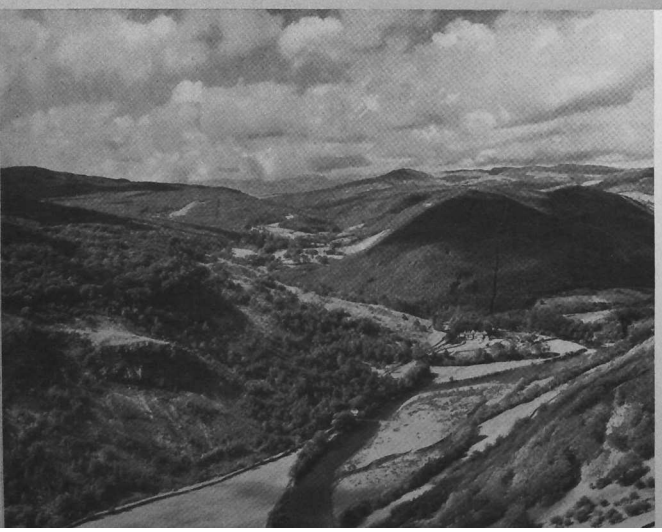
Of the leading industrialists whose activities changed the face of the land and the way of life of the people, most were Englishmen like the Guests or the Crawshays or the Vivians. Of the native industrialists the greatest by far was *David Davies, Llandinam* (1819-90), railway-builder, pioneer of the Rhondda coal industry, and creator of the port of Barry.

Meantime, into the ancient vine of Welsh literature new stems had been grafted. From the hymns of Pantycelyn has sprung a new verse in the free metres, enriched by the intimate lyricism of *Ceiriog* (1833-87) and the mystical exaltation of *Islwyn* (1832-78). The glories of the medieval *cynghanedd* poetry were rediscovered by *Goronwy Owen* (1723-69), the nostalgic exile from Anglesey, and his friend, the versatile *Lewis Morris* (1700-65), scientist, engineer, manuscript-hunter, and poet. They gave it a new lease of life until in our own day *T. Gwynn Jones* (d. 1949) brought to it a mastery of language unsurpassed by any older Welsh poet, and a poetical insight equal to any in twentieth century Europe. Nor has the growth of Welsh prose been less impressive, from the vivid apocalyptic descriptions of the sleeping bard, *Ellis Wynn* (1671-1734), through the immensely lovable and humorous novels of *Daniel Owen* (1836-95), down to the prolific output of present-day prose authors, some of whose work reaches the very highest levels. The work of scholars has fructified the efforts of the writers. *Edward Lhuyd* (1660-1709), one of the greatest philologists of all ages, has had worthy successors in scholars of the calibre of *John Rhys* (1840-1915) and *John Morris-Jones* (1864-1929) and others still living.

St. Margaret's Island from Caldey Island.

Leonard and Marjorie Gayton

THE WONDERLAND OF WALES



The Mawddach Valley from Precipice Walk, Dolgelley.

Leonard and Marjorie Gayton

Progress has dismissed from our minds the "Fear of Wonders" which animated old-time writers on "horrid mountains" and "dreary wastes." Nevertheless, no one can explore the Wonderland of Wales without experiencing that divine sense of awe and reverence which is the natural reaction of man to the presence of Perfection.

ANGLESEY
LLEYN PENINSULA and SNOWDON

SOONER or later, in your journeyings through Wales, you will reach the shore of the Menai Strait. Across the narrow stretch of swirling water lies the Island of Anglesey, invitingly aloof, with a charm and history all its own, and carrying as its county motto the proud title, "Anglesey, the Mother of Wales."

Stand and gaze over to the wooded shores of the island, and you will be emulating the action of many men whose names have long since passed into history—men with far less peaceful intentions in their hearts.

The crossing to-day is a matter of minutes. The old Porthaethwy ferry, where every year thousands of horses, cattle, sheep and pigs were ferried or swam across to the island, is no more. It has, in effect, been replaced by two bridges, both of which are masterpieces of engineering skill. The graceful Suspension Bridge is a reconstruction of the original designed by Telford and built in 1826, and the massive Britannia Tubular Bridge, a mile farther down the Strait, was built by George Stephenson to carry the main railway line from London to Holyhead.

From the town of Menai Bridge, a pleasant little place, with an air of self-importance befitting its position at the gateway to the island, Telford's great road, the A5, cuts across to Holyhead. If you would see Anglesey at its best, however, don't follow the main stream of traffic. This is considerable, for the island has a large agricultural industry, and market towns of the interior, such as Llangefni and Llanerchymedd, keep up a brisk trade with the mainland. Take instead one of the quiet lanes that wind between the tall hedgerows. It is almost certain to lead you to some tiny hamlet of colour-washed cottages that seems to drowse in the afternoon of time, and often bears up manfully under some long, seemingly unpronounceable Welsh name. Stretches of thistle, marsh and scrub fall into pattern with oatfields, windmills and native black cattle, and over all will be felt the restful charm which is so very much a part of this island.

It is not surprising that superstition and legend are deeply-rooted in the minds of the islanders. With such a wealth of historical remains, it would be strange indeed were they not. The house of Plas Penmynydd, to the south east of the island, is particularly interesting for its royal associations. For centuries it was the home of the Tudor family from which came Owain Tudor,

Pleasant and restful though the interior of the island may be, for sheer delight of scenery the eighty some odd miles of coastline takes pride of place. Roads hug the coast fairly closely, but the old coast-guards' walks which still exist in many places are worth following. Sandy bays and intriguing little coves hollowed out from cliffs that are often magnificent, are represented by names such as Trearddur Bay, Bull Bay, Red Wharf Bay, whilst Rhosneigr and Holyhead are examples of growing seaside resorts in the island. Holyhead, incidentally, is not only the largest town in Anglesey, but is the passenger port for Ireland.

Beaumaris remains the principal show place of the island. A thriving market town, it stands on the south-east shore, overlooking beautiful Conway Bay, likened by that great traveller George Borrow, to "the far-famed one of Naples." Its great castle, built in 1293-96 by Edward I, is a ruin, although a very magnificent one; the view from its walls, across the blue waters of the bay to the distant peaks of Snowdonia, remains lovely and unchanged.

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SNOWDONIA. There is a hotel on the top of the highest peak where you can stay overnight and watch the sun rise over one of the most spectacular groups of mountains in Europe. Y Wyddfa is 3,560 feet high, but the fact that you may have no experience in rock climbing does not place its summit out of reach. From Caernarvon, which with its lovely old castle lies under the very shadow of the mountains, a road runs to the tourist centre of Llanberis, at the foot of the wild pass of the same name. Here the main railway ends and the little rack-and-pinion railway begins. From Easter to October, several times a day, it makes its journey up the mountainside, carrying its quota of about 7 people, and covering a gradient which at its sharpest is 1 in 5.

That is the easy way. Those to whom the mist-shrouded peaks present a challenge, can climb Snowdon by at least six different tracks, ranging from easy to difficult. Snowdonia is, in fact, a training ground for many well-known Alpine climbers. Everywhere in this wild mountain country, grouped around the huge massif of Snowdon, are razor-edged precipices and wild passes, spectacular waterfalls, and lakes that glisten like jewels in their wild rock-bound settings.

The whole of this fascinating touring district is bounded roughly by the River Conway and Vale of Ffestiniog, by road from Tremadoc to Caernarvon, and by coast from Caernarvon to Creuddyn Peninsula.

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CARDIGAN BAY
and CADER IDRIS

Southwards from Snowdonia, the Lleyn Peninsula forms the northern arm of sweeping Cardigan Bay. In shape the Peninsula bears a curious resemblance to Cornwall and Land's End; in the characteristics of its people it is very, very Welsh; and from the appearance of its countryside, it might well belong to Ireland! Altogether a fascinating mixture for tourist enjoyment.

Road travel is, of necessity, the order of the day in Lleyn, for the railway terminates at Pwllheli on the south coast. One of the main road arteries follows the route of the old Pilgrim's Way, which ran from Bangor in the north, Beddgelert in the east, over the Rivals Pass and down to Aberdaron. The objective of those who trod this way was the Island of Bardsey, just off the tip of the Peninsula, the reputed burial ground of 20,000 saints and famous sanctuary of the Middle Ages.

It passes through typical Lleyn country. Green fertile lowlands give way to stretches of wood and bog, and towards the south, wilder heathland. There are mountains that lose nothing of their impressiveness by comparative isolation, and queer little white cottages warmed by peat fires. The whole is bounded on three sides by a rocky coastline whose lonely, lovely bays, cliffs and villages are yearly becoming more familiar to holiday-makers. Criccieth and Pwllheli, on the shores of Cardigan Bay, have become very popular, Pwllheli having been chosen as the site of a Butlin's Holiday Camp.

Guarding the north coast, the three peaks of The Rivals look out across Caernarvon Bay. The eastern peak is topped by the remains of a prehistoric fortified town—Tre'r Ceiri—the most important in North Wales, and from the centre peak is unfolded a panoramic view equal to any in Wales.

THE " dancing, slashing green waters " of Cardigan Bay form the westerly boundary of the counties of Merioneth and Cardigan. The warm sun-kissed beaches of sand that ranges from grey to yellow stretch down along the coast, with holiday names threaded like beads on a string—Harlech, Barmouth, Dolgelley, Towyn, Aberdovey, Aberystwyth, Aberayron. Broad quiet estuaries carry the sea far inland, and behind the coast are heath-clad hills and mountains where swift-flowing streams are in many glens transformed into noisy spray-hung waterfalls, and still blue lakes are cupped in secret hollows among the peaks. Legend and superstition take on a new meaning in such surroundings, and the many rather pathetic reminders of our prehistoric ancestors acquire a sombre dignity.

There is surely no lovelier example of mountain scenery than where, north from Harlech, the Vale of Ffestiniog carves its way up into the fastnesses of Snowdonia.

Eastwards, in the green valley of the River Dee, the old town of Corwen stands on Telford's great Holyhead road, the A5. The river here enters the lovely Vale of Edeyrnion, south of which lie magnificent Lake Vyrnwy and the heath-clad moors of the Berwyns that drape themselves along the Montgomeryshire border. A main road runs through the Vale to Bala,

Butlin's Holiday Camp, Pwllheli.

The Menai Straits.

Photo: Aerofilms Ltd.

Lovely Llandudno.

Photo: Aerofilms Ltd.

seated at the foot of the largest natural sheet of water in Wales, in whose clear depths fishermen may catch by net a peculiarly local fish known as the " Gwiniad."

Near to the head of Bala Lake diverges the narrow road to Dinas Mawddwy, made notorious by the formidable Bwlch-y-Groes, the highest as well as one of the steepest motoring passes in the Principality.

Even if it were not known for its impressive castle ruins, overlooking the waters of the Bay, Harlech would find fame for its Royal St. David's Golf Links. The sea hereabouts has retreated from the shore to leave the flat grassy sea marsh of Morfa Harlech, where innumerable paths lead down to the beach between miniature mountains of sand. Both the castle and the land south of it have been presented to the National Trust.

From Harlech southwards, as far as Dyffryn, stretches the low-lying strip of coast and the rocky hills of Ardudwy, closely dotted with prehistoric relics and associated with the grim legend of the wife-stealing Men of Ardudwy.

The gleaming sheet of water that forms the estuary of the River Mawddach has popular Barmouth at its head. From here to Dolgelley the main road hugs fairly closely the northern bank of the estuary, passing through scenery that is among the finest in Wales. The existence of a rich gold vein in the area adds interest: from the Beddycoedwr[illegible] Trawsfynydd mines came gold for the wedding ring of Princess Marina of Greece, now Duchess of Kent, and the famous Clogau mines produced in one year alone £60,000 worth of gold. Near to the Mawddwyd Valley,

Eagle Photos **Blackwater and Cader Idris.**

deep-sunk between wooded heights and threaded by the Mawddach stream, are the "black" falls of Rhaiadr Ddu, and the "spout" of Pistyll Cain. The latter, hidden in a rocky glen and falling 150 feet, is one of the finest in Wales. Skirting the summit of nearby Moel Cwywch is the famous Precipice Walk, one mile long and 800 feet above sea level, commanding magnificent views, whilst nearer to Dolgelley are the ruins of thirteenth-century Cymmer Abbey, the only monastery ever built in the county.

Dolgelley itself is incomparable in its beauty of setting. The county town of Merioneth, it is built over the little river Wnion, in the "Switzerland of Wales." Its "walls" are the mountains that press around it, "three miles high," as a seventeenth-century wit once phrased it, and it is the most convenient centre for exploring the Cader Idris country that extends between the town and the estuary of the Dovey.

This is country dominated by the shapely giant whose magnificent precipices and climbing possibilities have made it one of the most notable peaks in Wales. The Cader Idris range, 9 miles long and reaching its highest point in Pen-y-Gader, 2,927 feet, means translated, the "Chair of Idris." Idris was a giant, both mentally and physically, and his "chair" was a hollowed precipice between the summit and the lake. According to legend, the person who sleeps there for a night will awake either mad or a genius.

The main road over the mountains links Dolgelley with the Dovey estuary, which forms the northern boundary of Cardiganshire. Interest in this county is not confined entirely to the coast, lovely though that is. Places such as the Rheidol Valley and Devil's Bridge are well-known beauty spots; along the eastern boundary curve the shaggy mountains of Breconshire and the Wye Valley; and southwards lies the Valley of the Teifi, or Tivy, a river famous for its salmon fishing.

Perhaps one of the most delightful of the many minor holiday resorts in all Britain is lovely little Borth, a choice discovery lying between the broad estuary of the Dovey on the north and popular Aberystwyth on the south. Borth is a charming spot possessing a most invigorating climate and extensive clean yellow sands.

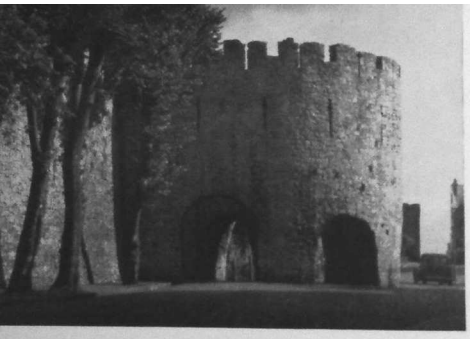
Indeed it is a picture-book resort which offers the safest of bathing together with a very fine Golf Course and ample facilities for Tennis.

ALONG DEE and CLWYD

Pistyll Rhaiadr and Wrexham steeple,
Snowdon's mountain without its people,
Overton yew-trees, St. Winefride's Wells,
Llangollen Bridge and Gresford Bells.

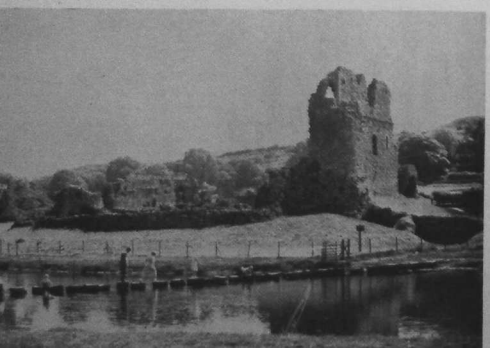
THE old rhyme recounts the Seven Wonders of Wales. Of them, four—Wrexham steeple, Overton yew-trees, St. Winefride's Wells and Llangollen Bridge—are claimed by the counties of Denbighshire and Flintshire, a land of two rivers known to every fisherman worthy of the name! Ruling the coastline that sweeps from Great Orme's Head to the estuary of the River Dee, are seaside towns such as Colwyn Bay, Rhyl and Prestatyn; behind them lie high ranges of mountains and moorland, green valleys and swift-flowing streams.

In Bala Lake, north of Lake Vyrnwy, is born the silver Dee. It begins its journey quietly, passing through the lovely and peaceful Vale of Edyrnion to Corwen, the old market town that was once an important stage-coach halt on Telford's great road, the A5. Eastwards lies Llangollen—and some of the best-known scenery of the Dee. The valley is broad and green. The southern slopes of Llantysilio Mountain run down to the river in a series of delightful valleys, and southwards, the high ridge of the Berwyns denote the border of Montgomeryshire.



The Five Arches at Tenby.

Coracles in use on the River Teify.



Ogmore Castle and the Stepping Stones.

The town of Llangollen itself is known for many things—for its beauty of setting, " overhung by bulky hills " and standing at the head of the famous Vale of Llangollen; for the fourteenth-century bridge that spans the rushing, swirling Dee; and for its associations with famous people. There were the " Ladies of Llangollen," who lived in the " fake " black-and-white timbered building known as Plas Newydd. Self-imposed exiles from their native Ireland, these two eccentrics made a vow to resist marriage and live together in peace and seclusion for the rest of their lives. Visitors to their home included such famous personages as Wellington, Wordsworth and Scott. It was a recognised rule that on his second visit, each guest should bring a panel of carved oak, and as a result, there is an incredible assortment in the house to-day.

The monks of olden days loved seclusion. They built their religious houses amid the shelter of hills and woods, close to the sound of running water, and in Valle Crucis Abbey, they left an architectural treasure second only to Tintern Abbey. Close by the abbey ruins is Eliseg's Pillar, considered to be the earliest inscribed pillar in Britain.

Northwards the pink terraced cliffs known as Eglwyseg Rocks form the southern escarpment of the Ruabon Mountain plateau, and south-east of Llangollen is a hill topped with a ruin. Castell Dinas Bran, it is called—the Fort of Bran. In the castle that once stood here lived the beautiful Myfanwy Fychan, who was wooed, unsuccessfully, by the great bard Hywel-ab-Einion Llygliw. It is a stiff climb to the summit, but the view gained is a worthy reward.

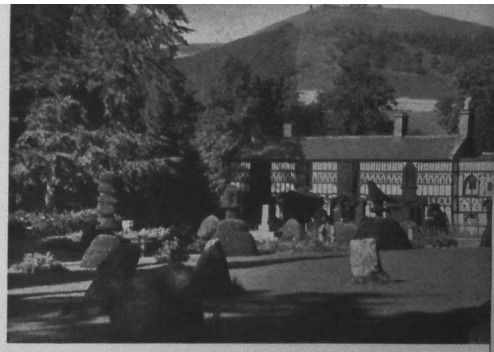


Photo: J. Percy Clarke

Plas Newydd—Formerly The Residence of " The Ladies of Llangollen."

The Dee emerges from the Vale of Llangollen to flow northwards through the lowlands, passing Overton, with its 21 yew trees, and busy Wrexham.

Of the Vale of Clwyd, Defoe wrote:

" Descending now from the hills, we came into a most pleasant, fruitful, populous, and delicious vale, full of villages and towns, the fields shining with corn, just ready for the reapers, the meadows green and flowery, and a fine river with a mild and gentle stream running thro' it . . ."

The hills were the hills of the Clwydian Range, which as the highest between Snowdon and the Derbyshire Peak, has its chief summit in the green mountain of Moel Fammau. The River Clwyd itself, a rather insignificant stream for the most part, has its source on the edge of the Hiraethog moorland that rolls away to the west. The view from the summit of Moel Fammau is one of the loveliest in North Wales, and the whole of the Vale is visible from end to end. Perhaps the most striking feature is the crag that rises from the floor of the Vale. On its windy height stands the castle of Denbigh, a town of romantic history standing halfway up the Vale. The river here is broad and gently-flowing, and past the Denbigh valley widens, to contain such towns as St. Asaph and Rhuddlan, until at Rhyl the river widens into its estuary.

A Coracle on the Dee.

Photo: J. Percy Clarke

Eagle Photos

The descent into Welshpool, with Long Mountain beyond.

MID-WALES
The LAKES and SPAS

MONTGOMERYSHIRE and Radnorshire partner each other to form the geographical division known as Mid-Wales. As a touring area it should have a separate entity, but unfortunately in this respect it has gained quite a reputation as the "Cinderella of the Principality." The casual tourist is so apt to divide his Wales into two—north and south—that he often overlooks the country between. And more is the pity, for these two counties, snugly niched between Shropshire and Hereford on the east, and Cardiganshire and Merionethshire on the west, lose points in beauty of scene to no other touring district in Wales.

On the western boundary of Montgomeryshire rises the hump of Plynlimon, a wild moorland plateau that in Pen Plynlimon Fawr attains a height of 2,469 feet. The northern escarpment drops down to the Valley of the Dovey, which having risen in the wild country round Dinas Mawddwy in Merionethshire, now winds towards its estuary between low curving hills and woods of small windswept oaks. Of Plynlimon itself, Robert Gibbings, in his *Coming Down the Wye*, writes:

"Plynlimon is the kind of mountain I like . . . there are cliffs, but they are not formidable ones, and he must have a poor head who cannot look down on the dark green waters of the Rheidol Lake and watch the buzzards soaring to and from the overhanging rocks . . . in all directions there was a tumult of hills: on all sides there were glimpses of distant lakes."

The Rheidol River is but one of the many rivers separated by the spurs of Plynlimon. The most famous are the Wye and Severn, which begin their journeyings only a few miles apart. The Severn flows east: at Llanidloes, "the first town of the Severn," the waters of the tributary Clywedog slip quietly into the main stream, and both rivers continue as one through an ever broadening and fertile valley, in which stand Newtown and Welshpool, to cross the Shropshire border under the shadow of the triple Breidden.

Of the Severn's numerous smaller tributaries, the Camlad, whose valley is overlooked by the old county

town and castle of Montgomery, the Mule and the Rhiw, are particularly delightful. The chief tributary of the Upper Severn is the Vyrnwy: in the lovely Vale of Meifod through which it flows once stood the old capital of the Powysian Princes at Mathrafal. Between the Vale and the high heather-clad moors of the Berwyn Range on the northern boundary, a profusion of wooded hills form the perfect setting for the long sheet of water that is Lake Vyrnwy. Source of the River Vyrnwy and reservoir for Liverpool, this beautiful lake is one of the showplaces of Wales. East, beyond the little border village of Llanrhaiadr-ym-Mochnant, the waterfall of Pistyll Rhaiadr plunges 240 feet, and west, the central moorlands and their small upland farms fill the area between Dolgelley and Machynlleth.

The Wye flows south from Plynlimon into Radnorshire. The act of crossing the Radnorshire border soon brings a delightful surprise in the form of the magnificent Elan Valley Lakes, or more prosaically, the Birmingham Corporation Reservoirs. Motoring roads run along the margin of the reservoirs, which are reached down the Elan Valley from Rhayader.

The Wye is essentially a fisherman's river, and from Rhayader onwards, the sight of anglers in their coracles —small, circular and very light fishing boats—is a familiar one. Disused lead and copper mines are dotted throughout the district, and everywhere are enormous flocks of sheep. In July and August takes place the great drive of the Welsh mountain sheep for "dipping" purposes. Sheep dog trials are held at various centres during the year and provide an opportunity of witnessing the almost human sagacity of the trained sheep dog in action.

Although, generally speaking, Mid-Wales is a land of fine hills rather than oppressive mountains, Radnor Forest, in the east of the county, passes at Great Rhos the 2,000 foot mark. This lofty expanse of moorland is, in summer, a riot of colour—green and purple predominating—and it overlooks one of the most delightful districts in Radnorshire—a county of "forests without trees, mountains without rocks, hidden waterfalls and secret lakes . . . where the full enjoyment of unspoiled loveliness sets your heart at peace with the world."

And that can be taken literally! At Llangammarch Wells, beautifully situated in the Irfon Valley, are barium chloride springs, unique in England and especially effective in the treatment of heart disease. Llangammarch is one of a quartet of such spas that runs in an almost straight line south west from Llandrindod Wells to Llanwrtyd Wells in Breconshire. The thirty springs of Llandrindod Wells—saline, sulphur and chalybeate—have brought rapid development to the town so that it is to-day the largest in Mid-Wales. Builth Wells, with two saline and sulphur wells, is a centre for some of the loveliest scenery of the upper Wye.

LITTLE ENGLAND BEYOND WALES

TRAVEL where you will in Wales, you will find no county more remote, and in consequence, less unspoiled, than Pembrokeshire. It has been described as a "Welsh county with a split personality," a characteristic that has given rise to its popular nickname. For the county is divided into sharply-contrasting halves, each differing from the other in appearance, tradition and language. The north is Welsh, the south English. Centuries ago, the Norman warlords, seeking conquest of Wales, made their headquarters at Pembroke, and two hundred years later, Henry I sent Flemish weavers to the town: the influence of that Anglo-Flemish colony has remained to this day.

This southern part of Pembrokeshire, this "Little England Beyond Wales," is made up of rolling foothills, coastal plains and park-like landscapes. Its coastline—far less rugged than that of the north—is one of gently-curving bays and headlands, with inviting seaside towns such as Saundersfoot and Tenby, both of which have been developed during more recent years. Tenby, in particular, is a fascinating little place, perched high on top of a limestone cliff above two fine sandy bays, and separated from the mainland by its thirteenth-century town walls.

West of Tenby, the calm blue waters of the fiord-like Milford Haven wind inland for twenty miles to form one of the finest land-locked harbours in the world. Its upper reaches rival in beauty those of the Thames and Dart, and it is deep enough to float the largest vessels. The many delightful creeks or "pills" that branch off from the main channel make sailing a joy, and yachts are anchored in the Haven all the year round. At the head of one of the creeks stands Pembroke, one of the very oldest boroughs in Britain. Its impressive cliff-top castle, frowning above the river Pembroke that flows round it on three sides, was originally built in 1087. The oldest part of the existing castle, the keep, probably dates from 1200.

Pembrokeshire is a county of castles, containing in all the remains of fourteen. One of them, the beautifully kept Manorbier Castle, is believed to have been the birthplace of Giraldus Cambrensis, the famous twelfth century historian and ecclesiastic.

Whichever road you may take in the county, it is almost certain to converge on to Haverfordwest, the steep-streeted little county town that is also a port of the tidal river Cleddau. Westwards lies St. Davids, the pride of Pembrokeshire, set on the northern arm of St. Brides Bay. The road—there is no railway within 23 miles—runs between flat, gorse-covered heaths, Roch Castle springing suddenly from the plain like a sentinel. For a short while a high ridge of grey pebbles hides the gloriously blue sea and fine sands at Newgale from the road, which later drops down into the village of Solva. This enchanting little fishing village of white-washed cottages on a hill-bound and wooded creek, stands on the headland of a bay which has been presented to the nation.

St. Davids is the smallest cathedral city in the British Isles. It is difficult to imagine that behind its quiet village-like main street is the superb cathedral which is architecturally one of the finest in Wales. It is built in a hollow between the city and the sea so that its towers should not be visible to Norse Sea Rovers in the days when their long ships crept along the coast.

Just off the tip of the southern arm of St. Brides Bay, which has been scheduled as a National Coastal Park, are the bird sanctuaries of Skomer, Skolholm and Grassholm Islands. As their names suggest, these islands were once occupied by the Northmen. They have been found to be impracticable for farming purposes, and the "eligugs," or guillemots, the kittiwakes, and the razorbills, among others, have the islands to themselves. Skolholm has an observatory and bird-marking station.

North from St. Davids, the coast becomes more and more rugged, possessing a grandeur typical of North Wales. Lighthouse-tipped Strumble Head juts out to sea to become a landmark of Cardigan Bay: between here and Fishguard Bay is Carreg Gwasted Point, which saw the last invasion of Britain, when a French privateer force landed here in 1797.

Newport, with its castle and harbour, stands at the sea end of the Nevern Valley, the northern boundary of the Prescelly Hills. Their softly-rounded slopes and lofty summits dominate much of Northern Pembrokeshire, a county of moorland and tor. Between the estuaries of the Nevern and the Gwaun the hills overlook the sea, the gorse-grown heaths that clothe them creeping to the very cliff edge. At its highest point, Foel-cwm-cerwyn, the range attains 1,760 feet.

Among these northern hills are many well-defined ramparts and hut circles. It is believed that from the Prescelly range came the stones for the inner ring and horse-shoe of "foreign stones" at Stonehenge. The reason, and the method of transportation, however, remains part of the great riddle of Stonehenge itself.

* * * *

Southwards the foothills fall away towards the Haven, eastwards the River Teifi. Here they are claimed by Carmarthenshire, their hump-backed grassy heights overlooking river valleys whose broad pastures are dotted with neat white-washed cottages. This is the dairy-farming county of Wales. The old county town of Carmarthen, dreaming beneath its castle ruins, looks up the Vale of Towy, whose high milk yield has earned for it the title of "Milky Way." On the River Towy itself is practised the oldest industry, that of coracle fishing, an activity shared also by the northern river of the county, the Teifi.

GOWER PENINSULA and the GLAMORGAN COAST

THE air of peaceful seclusion characteristic of their cross-channel neighbours in Devon and Cornwall is shared by the villages in Gower. Fifteen miles long, 6 miles wide, this rocky peninsula juts out to form the southern arm of Carmarthen Bay. Swansea's crowded beaches are but 18 miles away from the most westerly tip of the peninsula, yet they might well be in another world. Here, in Gower, the sea-washed sands gleam brightly as a newly-minted penny; cool dim caves, carved by the relentless surge of the sea, lead under tall dark cliffs; and byway roads and tracks thread a hinterland where ruined castle and saddle-back church guard the villages that lie among the heaths and commons.

To attempt to describe every one of Gower's 26 bays would be clearly impracticable in the small amount of space available. The coastline can, however, be divided up into roughly three distinct sections.

Perhaps the least frequented part of the peninsula is the north. Here the coast turns at Burry Holm to

run east to join the mainland of Carmarthenshire at Loughor, and lonely lighthouse-tipped Whiteford Point, approached by sand dunes and marshes, looks out across the mouth of the Burry River.

Southwards from Burry Holm, 3½ miles of sand fringes lovely Rhossilly Bay, second in size only to Swansea Bay, and overlooked by the Old Sandstone Mass of Rhossilly Down. From bleak little Rhossilly, clinging to its sides, the Down can be climbed by a footpath, and the view from the Beacon, 633 feet, is well worth the effort involved. Just off the tip of the southern arm of Rhossilly Bay, Worms Head points due west, providing some of the Peninsula's most striking cliff scenery. This little promontory is really composed of two rocky islets joined together by a narrow causeway along Devil's Bridge. If you would learn of the approach of a storm, listen at the Blow Hole, through which the wind whistles a curious warning. As Worms Head is cut off at high tide, however, it is a wise precaution to consult a coastguard before making the journey.

From the Worms Head to Mumbles stretches the most popular section of the Gower coast, with bays such as Mewslade Bay, Three Cliffs Bay, Caswell Bay and Langford Bay holding a firm place in the affections of Gower holidaymakers. That this popularity is of long standing, and not confined to the twentieth century alone, is proved by the discovery of skeletons in the caves that riddle the coast. In Paviland Cave, for instance, was found the "Red Lady of Paviland," a Paleolithic skeleton which now rests in the Swansea Museum, whilst from Bacon Hole and Minchin Hole have come an immense number of animal bones, such as those of the mammal, together with fragments of primitive pottery. The smugglers of the eighteenth and nineteenth centuries made good use of such caves. Brandy Cove is well named, and Culver Hole, accessible from Port Eynon at low time, still retains its old-time smuggler's staircase.

A delightful feature of this southern coast are the small streams that flow down from the interior to empty into the bays: Bishopstone Valley, with its "disappearing" stream, is a particularly lovely example.

A five-mile stretch of sand separates Swansea from the Mumbles, the most attractive and popular holiday resort of the Peninsula. The name really refers to the two islets off the tip of Mumbles Point, a rocky headland forming the eastern extremity of Swansea Bay: it now includes also the village of Oystermouth, whose thirteenth-century castle ruins, standing on a hill a few yards from the railway, were gifted to Swansea Corporation by the Duke of Beaufort.

Photo by courtesy Porthcawl Recreations

Coney Beach, Porthcawl.

The fifty miles of coastline that sweeps round from Swansea to Cardiff must be familiar to every South Wales tripper. The sandy beaches, holiday towns and the farmlands of the Vale of Glamorgan behind give an impression far removed from the usual idea that South Wales is covered with coal dust! It is true that Swansea itself is the largest of a chain of manufacturing centres that includes Neath, Morriston and Port Talbot, yet how relatively small and confined is the area devoted to industry may be judged by looking over the countryside from one of the many fine heights in the area. The industries of Swansea lie tucked away behind the valleys of the River Tawe; mountains, grand in contour and in colouring, close in on the Vale of Neath, renowned for its waterfalls; and Port Talbot shares with Aberavon a 3-mile stretch of sand that would be envied by many a larger holiday resort.

From Gower to Cardiff is preserved a geological sequence of cliffs, sand and cliffs. The latter are seen at their best in Gowerland, then comes a central section of sand from Aberavon to Dunravon, the cliffs re-appearing here to extend as far as Lavernack. Set in the heart of the central region of sand-dunes is Kenfig, once an ancient borough. All that remains of the original Kenfig is the castle tower, the rest having been engulfed by a terrific sandstorm in the sixteenth century.

Nearer to Cardiff lie the gay and well-known holiday towns of Porthcawl, Penarth and Barry.

Porthcawl has safe, firm sands, and away to the north-west a wilderness of sand dunes whose peace and isolation may be enjoyed—in contrast to Coney Beach where will be found every amusement device calculated to thrill and amuse and attract the crowd!

The industrial valleys of the south-east corner of Wales spread north from Pontypridd, and west of Cardiff the Vale of Glamorgan, green and fertile, lies behind the coast. Castles are plentiful in this area. Guarding the gorge of the River Taff is the twelfth century Castell Coch, which might well have been transported from a Hans Anderson fairy story, and north again is the striking medieval ruin of Caerphilly, second in size only to Windsor Castle.

If any doubt should still remain as to whether South Wales is able to play "fair charmer," travel northwards from the Gower Peninsula towards Llandilo, turn right at the College Inn, between Llandybie and Ffair-fach, and climb the steep grassy hill to the most bizarre citadel in Great Britain—Carreg Cennen Castle. From the top of the sheer crag on which this castle stands can be seen hundreds of square miles of South Wales, with not a factory chimney, not a coal mine and not a workshop in sight!

The MOUNTAINS and RIVERS of BRECON and MONMOUTHSHIRE

EAST of the green spearhead of the Vale of Towy, north of the industrial valleys, the mountains of South Wales rise slowly to their summits. Unspectacular in outline for the most part, they yet attain

often heights equal to those of many of Snowdon's giants. In winter their uplands are bleak and dangerous to those unfamiliar with their paths, and the white-washed farmhouses tucked into the folds of the hillsides seek what protection they can from gale and storm. Summer tells a different story, of small wall-divided fields planted with oats and barley, root crops or grass, sweet-smelling heather and ling covering moorlands that stretch for seemingly endless miles; and tumbling waterfalls and noisy little streams that, clattering through deep-cut, tree-roofed glens, lure the fisherman with promise of good sport.

The mountains fall into roughly four groups. The most westerly are the Black Mountain range, whose principal summits are Carmarthen Van and Brecknock Van. Down the slopes of the Van, the infant Usk begins its journey towards the Severn, and the lonely and legend-haunted pools of Llyn y Fan Fach and Llyn y Fan Fawr are not only the reservoir for Llanelly but form the source of the River Tawe of Swansea fame.

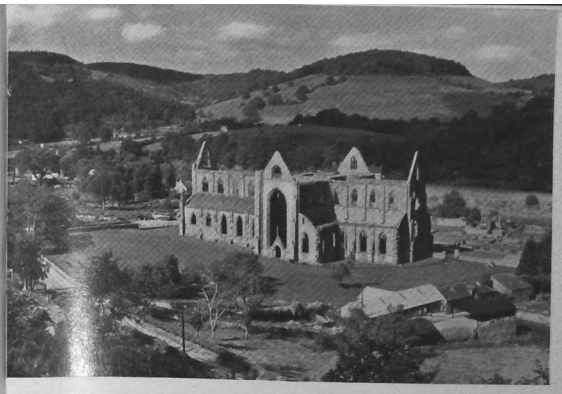
Eastwards, beyond the four mighty summits of the Fforest Fawr range, are the two strange and familiar peaks of the Brecon Beacons, with Pen-y-Fan rising to 2,907 feet. This is the highest point in South Wales, and the view in good weather extends to the Bristol Channel and Somersetshire, Swansea Bay, Plynlimon and Cader Idris.

Almost the whole of the Beacons and the Black Mountains has been scheduled as a National Park. The block of the Black Mountains, on the Herefordshire border, stretches into England, and to the east presents a steep wall 1,000 feet high. The principal summits are Waun Fach, 2,660 feet and Pen-y-Gader Fawr. Running south-east and drained by tributaries of the Usk and Monmow, are wild valleys that provide delightful excursions for the tourist. One such valley is the Vale of Ewyas, in which stand the ruins of Llanthony Priory, a twelfth-century Augustinian monastery founded by Hugh de Lacy. South of the gleaming sheet of water that is Llangorse Lake, well known for its fishing and as the traditional site of a lost Roman town, the village of Bwlch looks down the Usk Valley.

This valley separates the Brecon Beacons and the Black Mountains. From Brecon to Crickhowell the river passes through wild scenery of high moorland and lofty mountains; from Abergavenny onwards it is seen in softer mood, steep bare hills being offset by

The mountain road linking The Rhondda with Swansea, Port Talbot, Porthcawl and the West, 1,700 feet above sea level.

Photo: The Norman Studios, Pentre



Incomparable Tintern Abbey.

Photo: L. & M. Gayton

pasture land and woods. Abergavenny itself is a good centre both for the exploration of the Black Mountains to the north-west and the Usk Valley. Its own guardian hill, the Sugar Loaf, peers over the summits of its three off-shoots, Rholben, Deri and Mynydd Llanwenarth; eastwards is the curiously split summit of Pirrid Fawr, traditionally formed on the night of the Crucifixion; and westwards from Brynmawr, the little river Clydach tumbles hurriedly through a valley which, despite a few industrial depredations, is still renowned for its beauty.

Before entering Newport, the Usk flows beside Caerleon. The present importance of this little town is somewhat dwarfed into insignificance by the glory of its past, when as the Isca Silurum of the Romans and the base of the Second Legion for over 200 years, it was one of the three most important military centres in Britain.

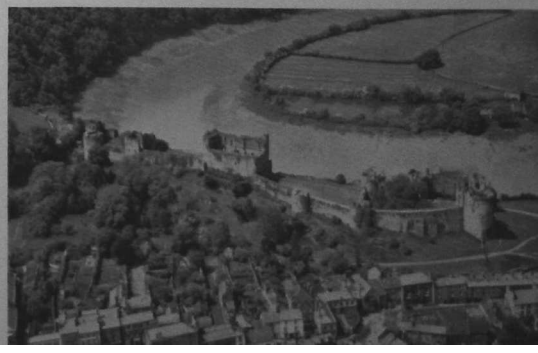
West of the Usk is the smaller half of the county, divided up into industrial valleys such as the Rhymney, Sirhowy and Ebbw, and east, under the shadow of Chepstow's grand old castle, the River Wye slips into the broad-flowing Severn.

The beauty of the Wye Valley has been very much publicised, yet there is no doubt it comprises along its length some of the finest river scenery in Europe. One of the most popular reaches is that from Chepstow to Monmouth, where the Wye, backed by Wintour's Leap curves round the Llancaut Peninsula and flows past Tintern Abbey. This lovely monastic ruin, set among rolling and softly wooded hills, is one of the great architectural treasures of Britain.

The old county town of Monmouth stands on a tongue of land at the confluence of the Wye and Monnow. The Wye here turns east towards Ross, and the Monnow passes under the old gatehouse-bridge to skirt the eastern declivity of the Black Mountains.

Chepstow Castle.

Photo: Aerofilms Ltd.



WITH ROD, GUN & CLUB

by George Brenhand

FROM the moment the fisherman-tourist crosses that invisible border-line between the Saxon lands and the country of the Celts, that unseen line which has been called the Welsh March, he will find himself in a land of fishing rivers and fishing men.

From the time he stops his car or gets off his bicycle on some bridge in Monmouthshire, Brecon or Radnorshire, until the moment when he crosses the bridge at Chester, with Wales behind him, he will find that he can fish almost anywhere. As in England, Scotland and Ireland, he will discover that the best rivers are not to be fished either easily or cheaply, but in Wales and Monmouthshire there is a vast amount of free or reasonably cheap fishing to be enjoyed almost everywhere. Even when the fishing is not very good, where the mountain trout are very small, or the salmon impossibly "dour," he will find that his fishing will take him into places so beautiful and so far removed from the clatter of industry and the worries of modern life, that success or failure will not seem to matter so very much.

The southern border alone and the River Wye and its tributaries, which has been called the "best salmon river in England," although it flows for the most part, like the Severn, through [illegible] can provide [illegible] summer's [illegible] the most [illegible] part. The very best and most famous "casts" of the [illegible] may be in Herefordshire, but the Monmouthshire and Welsh lengths of the river are, in places, very good salmon fishings, indeed. If the fisherman explores the upper reaches of the Wye and its tributaries, he will also find any amount of delightful trout fishing.

Llangammarch Wells, Llanwrtyd or Glasbury in Breconshire are admirable centres for the fishings of the Irfon and several other rivers.

In this area are numberless small rivers and streams which can be explored and fished, right from the lowland country near the Hereford border, up to the shallow little stream, which is still the Wye, under the shadow of the bare slopes of Plynlymon.

A little to the south and west of this country he will find that strange and most weird of all fishing areas, the great "Desert of Tregaron," beyond Strata Florida, with its sinister small lynns and peaty streams; one of the most lonely and peculiar places in Britain.

But before the fisherman leaves the quiet lowland country of Monmouthshire and Brecon, he should, without fail, fish the Usk, one of the loveliest of all rivers, which, apart from being a really first-class salmon river, is probably one of the best brown trout streams of Britain.

Very many rivers, which are essentially salmon or sea trout waters, are definitely bad for trout, but the Usk is a very notable exception to this rule. Around Abergavenny, Usk, or Crickhowell, the trout fishing is really remarkable, and the average size of the trout quite unusually good.

The Wye and the Usk, for some reason, are not, like so very many Welsh rivers, famous for their sea

Trout-fishing in Tal-y-Lyn, near Cader Idris.

Eagle Photos

trout or sewin, but a little further on in Carmarthenshire, the sea trout fisherman will find in the Towy some of the finest fishing for migratory trout in Britain. Only the Dovey in mid-Wales and the Conway of North Wales can equal the Towy in the size of its sea trout.

In this brief sketch it would be impossible to name a tenth part of the rivers and streams which have "runs" of sewin, but from the Towy estuary of Carmarthen right round the coast of Wales, almost every river is, if you are lucky and know where to go, a sea trout river. The Teifi of Cardigan is both a good salmon river and a good sewin river, while the Dovey is, I think, about the best sea trout water in England and Wales.

Then again, Wales is, pre-eminently, the country of lakes, and the lynns of mid-Wales, Snowdonia and Carmarthenoth, although far too numerous to mention, do hold trout, although, for the most part, these trout are very small, and very many of the lynns so remote as to reach them it is necessary to be more of a hill-walker than a fisherman.

Many of these lynns are what the Scots would call very "dour," but great sport can sometimes be had when the "bracken-clock" beetle hatches in June, or if a live minnow is used, before the beginning of July.

And then, as the fisherman moves northwards, he will find that great salmon river the Conway, which is, together with the Lledr, I am sure, one of the finest and most sporting rivers of Britain for its length. The Conway is also a very fine sea trout river.

And last of all, he will come to the Dee, that finest of all Welsh rivers, where the best of the fishing is as expensive as any Scottish fishing, and quite as good. Apart entirely from fishing the scenery of the Conway, the Lledr and the upper Dee valleys, is as wild and as beautiful as any that can be found in Britain.

And finally, it can be said that if the fishings of Wales had been or could be developed and tended as the fisheries of Scotland have been, Wales would very soon be looked upon as one of the finest and certainly one of the most "scenic" fishing countries of Europe.

Even the development of the various hydro-electric schemes which so frequently cause alarm to the fishing community, could, at a very little extra cost, and with a little advice from knowledgeable fishermen, be made to add greatly to the revenues and to the general amenities of Wales.

There are plenty of trout and plenty of salmon and sea trout to be caught in Wales, and all that is lacking is the time in which to catch them.

SHOOTING

By LIEUT. COLONEL J. C. WYNNE-EDWARDS

BOTH Nature and the care of men combine to make or mar the shooting amenities of any particular country. On the one hand, geographical position and climatic conditions exercise a profound influence upon the numbers of native gamebirds. On the other, careful management ensures that the resident species are given the best chance to thrive and to increase. Unfortunately Wales is, generally speaking, blessed with neither of these attributes.

All three of Britain's chief varieties of gamebirds—grouse, pheasants and partridges—require a dry climate if they are really to flourish. Thus, we find the greatest number of partridges and wild pheasants in East Anglia and the southern English counties where the annual rainfall is lowest. Similarly, in each of the moorland areas of Britain we discover, as a general rule, that the easternmost and driest moor carries the largest stock of grouse. This criterion is true when applied to Wales herself, for it is along the border, where the valleys debouch into the lowlands, that pheasants and partridges thrive best under natural conditions, while no other Welsh moor could compare with Ruabon Mountain in its heyday. Alas! to-day grouse shooting in Wales is in the doldrums, and there is hardly a hill on which it is now worth while.

Again, examination of man's contribution reveals an equally unfavourable state of things. This is mainly due to the fact that, even before 1939 over 70 per cent of the farms of Wales were in the hands of owner-occupiers. Since the end of the Second World War the further break-up of estates has increased that proportion, so that, judging from the comparatively wide area well known to me, it can be said without exaggeration that the number of keepers employed has been reduced by four-fifths during the past twelve years. However desirable this agrarian system may be from other points of view, there is no doubt that it militates against game preservation, as nearly everyone, who has attempted to build up a shoot by renting adjacent farms from their owner-occupiers, will testify. It is not that the average Welsh farmer is aware of a poacher or less of a respecter of contracts than anyone else, but that he seems fundamentally incapable of realising the value to himself of well-protected sporting rights, in spite of the lessons of the past.

But if Wales, by reason of her climatic conditions and her system of land tenure, cannot be reckoned as a first-class natural shooting country, she possesses in her topographical features a highly valuable asset. When her dingles and hanging woods were fully stocked with hand-reared pheasants, she provided sport of a quality unsurpassed elsewhere. Experienced visitors have been known to say that they never realised what covert shooting was until they came to Wales. It would be invidious to mention place names when so many reached the highest level of distinction, but it is relevant to recall that, in a series of articles dealing with high pheasants, and published by *The Field* before the War, five out of the eight estates chosen were Welsh.

Nor was this asset confined to the enjoyment of a few, for the whole rural community derived considerable financial benefit from this form of shooting. Many years ago, it was calculated that, from this source,

£20,000 per annum was circulated in the Vale of Clwyd alone, and those were the days when a sovereign was worth twenty shillings. To-day country-folk are fairly prosperous, but many of the older inhabitants will acknowledge how much they owed to intensive pheasant rearing in times of adversity. While it is devoutly to be wished that present prosperity will continue indefinitely, one may also, perhaps, express the hope that this facet of the old way of life will re-appear some day, for it was and still will be a unifying thing.

Yet, because emphasis has been laid on her past glories and present shortcomings, it would be both unfair and far from my intention to decry the shooting amenities of Wales. The size of the bag is not everything, and a country which can provide in a single day some nine or ten varieties of game ranging from the blackcock to the snipe cannot be dismissed as a sporting nonentity.

Let us, then, forget the days that are gone, of a thousand pheasants or three hundred brace of grouse. Instead, let us remember with gratitude that wild-duck still flight at evening in the glorious sunsets of Anglesey, that woodcock still jink like great brown leaves through the woodlands of Lleyn, that snipe still rise with their "scape scape" from the marshes of Pembroke, and even that the humble rabbit is still six inches too short for our errant aim. And, as we sally forth gun in hand, we shall not need to be reminded that, above us, below us and all around us, lies the varied loveliness of the Welsh countryside.

GOLF

YOUR true golfer is a practical man. His clubs form the essential part of his holiday baggage, and, while his enjoyment of lovely surroundings is as keen as the next man's, he is doubly charmed if a good golf course is in the immediate vicinity. Wales can provide him with such a combination, for the courses of her golf clubs lie along the sea shores, on mountain tops, and in green river valleys.

Two names in particular stand out amongst Welsh golfing resorts—Royal St. David's, Harlech, and Royal Porthcawl. We wondered as to the origin of the prefix "Royal," and on turning up the *Golfers' Handbook* read, "The right to the designation 'Royal' is bestowed by the favour of the Sovereign or a member of the Royal House. In most cases the title is granted along with the bestowal of royal patronage on the Club."

Royal St. David's was so honoured in 1934, when the Duke of Windsor, then Prince of Wales, "played himself in." The 9-hole course itself, one mile from the railway station of the little town that lies under the impressive shadow of Harlech Castle, is laid out on the Morfa Harlech. This is an area from which the sea has receded to leave turf and sand that form ideal golfing conditions. Three meetings are held here every year, at Easter, Whitsuntide and Summer (August). At the latter, the Harlech Town Bowl is played for under handicap conditions, and just before the Summer meeting the St. David's Gold Cross is played for—a 36-hole event that is one of the leading scratch matches in the country.

Royal Porthcawl is a championship course of 18 holes, over which the Prince of Wales played in 1932, and its open Championship events are well known throughout the golfing world. The course is the venue for the Amateur Open Championship; Team Championship; and Ladies' County Championship matches, other venues being neighbouring Southerndown, Swansea Bay, Radyr, Pyle and Kenfig. Glamorgan, in fact, has more golf courses than any other county in Wales, having a total of 37, 17 being within very easy reach of Cardiff.

Apart from various county championships, there are many events to attract the golfer on holiday. The North Wales Amateur Championship is played for every year at the venues of Wrexham, Maesdu, Great Orme, Rhos-on-Sea, Prestatyn, Colwyn Bay and Rhyl, the North Wales Club Championship match being held at the same venues. The Welsh Amateur Native Championship and Welsh Professional Championships are played for at venues that include Aberdovey, Penarth, Porthcawl, Rhyl, Tenby and Harlech, whilst the South Wales Professional Alliance, South Wales Amateur Alliance and West Wales Amateur Championship are popular events. Aberdovey is a particularly well-known course. The links lie along a narrow stretch of turf, separating it from the sea by sandhills, and with green links on the far side.

Welsh golf courses are well-tended, and in addition, often possess distinguishing features either as regards situation or associations. Pyle and Kenfig, for example, lies near to the Kenfig Pool with its memories of the old town of Kenfig that lies buried beneath the sand dunes; Newtown, whose course contains a Norman motte-and-bailey castle known locally as the "Gro Tump;" Tenby, the oldest golf course in Wales; Pontypool, whose 11th tee is 1,400 feet above sea level; and Golfa Hill, Welshpool, whose top tee is 1,100 feet above sea level.

The Cities and Towns of Wales

and a Gazetteer of Places of Interest

THE great City of Cardiff, unofficial capital of Wales, throbs steadily as the heart of Welsh industrial and commercial activity. More details of such activities are given in the industrial and other articles of this handbook than is possible here; but so carefully have the amenities of Cardiff been guarded that the city's industrial life in no way mars the beauties of the fine public buildings, handsome shops, attractive suburbs and spacious parks. Streets are clean, wide and tree-lined, radiating from the magnificent Civic Centre of Cathays Park. This park was purchased in 1898 from the Bute Estates and on these broad acres now stands a harmonious group of modern public buildings, including the City Hall, the National Museum of Wales, the Law Courts, the County Hall, the University College of South Wales and Monmouthshire and the University Registry, the Technical College, the Welsh National War Memorial (1914-18), the Welsh Board of Health building, and the Hall of Nations, Temple of Peace and Health. With Cardiff's castle, these civic buildings form show-places of great interest.

CARDIFF

The City Hall, open to visitors on week-days, is dominated externally by a graceful clock tower over the west front and a domed central entrance on the south front. Inside, the Marble Hall with its monolithic columns of Sienna marble commands attention. Here stands a series of statues, given by the late Lord Rhondda, commemorating Welsh national heroes and ranging from St. David to Sir Thomas Picton (who fell at Waterloo).

West of the City Hall stand the Law Courts, surmounted by two graceful cupolas; and east of the Hall is the National Museum of Wales, created "to teach the world about Wales and the Welsh people about their own Fatherland." The geology, botany, and zoology of Wales are extensively illustrated in the ground floor galleries, while other collections cover Wales from prehistoric times and show National Folk customs and life. The Art Galleries have many fine pictures.

The Gorsedd Gardens opposite contain modern "Druidical" stones and interesting statues.

In Alexandra Gardens, Cathays Park, stands the Welsh National War Memorial, unveiled in 1928, and comprising a temple in a sunken court, approached by three porches facing respectively a soldier, a sailor and an airman.

University College faces the centre of Alexandra Gardens and opposite in King Edward VII Avenue which leads north from here, are the University Registry, the large and handsome Technical College, and the stately

City Hall, Cardiff.

Photo: Crawly, Cardiff

portico of Glamorgan County Hall, fronted by coupled Corinthian columns and symbolic groups of statuary.

Cardiff Castle stands almost in the centre of the city and overlooks the river Taff. The site has been occupied by fortifications since Roman times and excavations revealed a perfect example of a third-century Roman wall, 270 feet long and averaging 12 feet high. The oldest parts of the extensive Norman structure are the ruined keep and the outer wall on the south-west side, built by Robert of Caen in the eleventh century. Adjoining the southern gateway is another Norman section, Curthose Tower, where Robert of Normandy is reputed to have died in 1134 after twenty years' imprisonment. Other parts of the castle date largely from the fifteenth century, but include such recent additions as the Clock Tower, dating from 1867.

Apart from these special features of interest, the City of Cardiff offers excellent shopping facilities ranging from the modern, multiple stores of Queen Street, High Street, and St. Mary Street, to the cosmopolitan shops and eating houses of Bute Street leading to the docks, and the trim business premises set up in the pleasant, modern suburbs.

In one of the more developed suburbs, to the north-west, stands yet another highly interesting and historic building—the bomb-damaged Llandaff Cathedral, in its setting of old-world peace. This restored Norman and Early English cathedral is the mother-church of the oldest bishopric in Great Britain (possibly excepting St. David's). Nearby, on the hill, are the ruins of the old cathedral bell-tower, and on Llandaff Green are the picturesque ruins of the thirteenth-century Bishop's Castle and relics of Wood's eighteenth-century "Italian" cathedral.

Of Cardiff's great parks, the chief is Roath Park to the north-east covering 133 acres including a 32-acre lake for boating, bathing, and fishing. Splott Park, nearer the centre, has an open-air swimming pool, and Sir David's Field gives a fine view over the city. Sophia Gardens lie across the river Taff from the Castle and have a recreation ground adjoining. Beyond, along the Cowbridge Road, is the Victoria Park and Zoo. Near Llandaff are the Llandaff Fields maintained as informal playing-fields.

Beyond Rhiwbina Garden Suburb are fine stretches of heath and woodland, ideal for rambles and picnics; and off the road to St. Fagans, west of the city, is the extensive Plymouth Great Wood. In 1946 Lord Plymouth gave his Tudor manor house, St. Fagan's castle, and its delightful grounds to the National Museum of Wales. This is to be developed as an open-air cultural centre on Scandinavian lines, to show the evolution of Welsh society and life, and will be the first of its kind in Britain.

SWANSEA

AMONG the great industrial centres of the British Isles, there is none which can show such contrasts as Swansea, which offers on the one hand all the life and organisation of a great city of commerce and industry and the ceaseless activity of a busy seaport, and on the other hand all the pleasures and beauty that can be desired for relaxation and recreation, together with opportunities for the enjoyment of first-class music, theatres and cinemas. Swansea's importance as a seaport and industrial city is described elsewhere in this book, for here there is but space enough to indicate very briefly some of its attractions to the visitor.

The industrial coast of South Wales is much less spoiled than those of the north of England—Northumberland, Durham and Cumberland—and within a very short time and distance the visitor can change from the populous city of Swansea to a sandy bay on Gower, so secluded that he may find himself absolutely alone with the sea and where he can sit and brood " at some old cavern's mouth " and forget the world.

Swansea is a County Borough with a population of approximately 165,000 and an area of forty square miles. The port has been developed at the mouth of the river Tawe, the first dock having been opened in 1847. The industrial part of the city, eastwards of the High Street, is not unduly obtrusive, for it is more or less hidden in the valleys to the north and east of the town and along the river Tawe, which flows into Swansea Bay. The Welsh name of Swansea is Aber Tawe, which, of course, signifies its situation at the mouth of the river.

The five mile sweep of Swansea Bay is bordered on the west by the fine, clean sands which curve around to Mumbles Head, within five miles of the business centre of the city. At the Mumbles has developed a charming suburb and seaside holiday resort, notable for its pier and lighthouse and for the magnificent views from the limestone ridge of Mumbles Hill.

The town of Swansea is attractive, with imposing civic buildings at Victoria Park, art galleries and central library in Alexandra Road, spacious streets and fine shops. The new Civic Building in Victoria Park, with

its white walls and slender campanile, possesses many features which distinguish it from the general character of municipal buildings. It is divided into four main units—the Council suite, municipal offices, Law Courts and Assembly (or Brangwyn) Hall—grouped around a large courtyard. The glory of the building is the Brangwyn Hall, which houses the Brangwyn collection of British Empire panels given to the town under the terms of the Iveagh Trust. The covered Market, the largest in Wales, which was situated in Oxford Street, was destroyed by enemy action during the recent war. Pending rebuilding, the 2-acre site is now used as an open market and presents a lively scene to the visitor. University College, one of the four constituent colleges of the University of Wales, stands in a 250-acre park on the outskirts of the city, with Singleton Park containing a collection of rare tropical and sub-tropical plants. The most attractive, modern residential estate is on Town Hill, to the north of the town, and from the summit of the hill extensive views are obtainable.

Sport of all kinds is catered for in Swansea, both for the player and the spectator. There are no less than five golf-courses easily accessible from the town: the 18-hole courses at Langland Bay, near Oystermouth, Clyne, near Bishopston, and at Briton Ferry, Morriston and Pennard. Swansea's famous rugby football team plays at St. Helens, and this ground is also used for Glamorgan County Cricket. Bowls, tennis, putting and miniature golf are provided for in the numerous public parks, and there are excellent facilities for boating and angling. Bathing is safe at nearly all of the twenty-six bays of Swansea and the Gower, but care is needed at Three Cliffs and Mewslade Bays.

Near the Mumbles is the village of Oystermouth with the ivied ruins of Oystermouth Castle, dating from the thirteenth century; and from here westward for nearly twenty miles is the famous Gower peninsula, not only physiographically interesting, but full of beauty and variety. Here are magnificent limestone cliffs, particularly between Worm's Head and Port Eynon, their dizzy heights cut into coves and headlands with numerous caves. From the headland overlooking Worm's Head there is an exceptionally fine view, both eastwards along the cliffs towards Swansea and northwards along the 3½-miles of glorious sands of Rhossili Bay. On the north coast of Gower the old cliffs stand boldly behind the marsh and sandy shores of the bays. On the south coast, eastward of Port Eynon Point, are the wide sweeps of Port Eynon Bay and Oxwich Bay, backed by sand dunes and woods, while nearer to Swansea are numerous smaller bays alternating with high, limestone cliffs. Behind is a hinterland of picturesque villages, ruined castles and old "fortified" churches set amidst Gower's charming pastoral country, unspoilt and wildly beautiful.

Here, therefore, at Swansea is a playground for the holiday maker of seventy-five square miles of romantic and picturesque country, adjoining a city with concerts, theatres and cinemas, sport and indoor entertainment, making a combination which cannot be surpassed elsewhere for a happy, healthy holiday.

LLANDUDNO

LLANDUDNO is one of the gayest and most enjoyable seaside holiday resorts in Great Britain, backed by scenery that is generally acknowledged to be amongst the finest in the word. Here is the wide sweep of Llandudno Bay with its firm, safe sands, a paradise for bathers and sand-castle builders, curving right round from Little Orme in the east to the mighty cliffs and rocks of Great Orme Head in the west. Around Great Orme runs the fine four-mile long Marine Drive, giving access to delightful walks and affording magnificent views in all directions. A straight road, however—Gloddaeth Street and Avenue—leads directly across the narrow isthmus from South Parade on the Bay to West Promenade beyond the Great Orme and overlooking Conway Bay.

Llandudno thus enjoys the rare advantage of two completely different sea fronts, both easily accessible from the heart of the town; that on the north, with Llandudno Bay and the Irish Sea, the Pavilion and Pier and golden sands, and the busy shopping centre of Mostyn Street running parallel behind the broad Promenade; that on the west front, with a sandy beach facing across Conway Bay to the shores of Anglesey, with Great Orme Head to the north and sand-dunes to the south. On West Shore, too, is a fine 18-hole golf course (there is another at Maesdu), and beyond is the estuary of the Conway River giving opportunities for delightful river trips, and access to a land rich in legend and ancient churches and the grand scenery of the North Wales mountains.

Apart from all this, Llandudno town can claim for itself a leading position among the seaside resorts of

Great Britain. From the first the town was laid out with the precise object of making Llandudno not only attractive to live in, but a town so beautiful and so rich in amenities that it could not fail to attract visitors the whole year through, visitors, too, who would never tire of its attractions and would repeat their visits year after year. Llandudno's popularity too is much helped by the mildness of its climate. The air is stimulating and bracing even in the hottest summer weather; wind from any direction brings sea-breezes; the sunshine record is high and the winter temperature is comparable to that of resorts on the south coast of England. The Pier and Pavilion, the Grand Theatre, and the various cinemas, cater for a variety of tastes. Throughout the town are well laid out parks and gardens, including Happy Valley near the pier and the Haulfre Gardens in Cwlach Road. There are model yacht lakes at Craig-y-don and Western Shore and splendid sands on both shores for bathing. In addition to golf, every kind of seaside sport is catered for, and excursions can be made to innumerable places of beauty and interest in North Wales.

NEWPORT

THOUGH the historic borough of Monmouth retains the dignity of the county town of Monmouthshire, Newport is the largest town and the only County Borough in the shire. The offices of the Monmouth County Council are situated here in the County Hall and the parish church of St. Woollos is the pro-cathedral for the Monmouth diocese.

Newport has its roots deep in the past, even as Monmouth, but Newport's advantageous position as a Bristol Channel port at the mouth of the River Usk and on the main road and railway line to South Wales, has helped the town to develop rapidly as an industrial centre and port, while Monmouth remains comparatively free from industrialisation, a quiet market town, education centre, and an excellent base for motoring, walking and angling.

Newport owes its original development to the decline of the celebrated Roman station at Caerleon, a few miles upstream, and to distinguish it from that station it was called *Novus Burgus*—New Town.

In the twelfth century Newport was fortified with a castle erected on the river bank by Robert, Earl of Gloucester. After descending through several owners and being rebuilt in 1448, it was seized by Henry VIII, and later destroyed by Cromwell. The ruins at the east end of High Street were at one time used as a brewery, but were presented to the town for preservation by Lord Tredegar some years ago, and have been carefully restored by the Ministry of Works.

Newport's modern history as an important port began with the opening of the first dock in 1842. "Formed on a grand scale," and costing £126,000 this dock was capable of taking the largest ships of the navy and of having two-way traffic through its wide entrance.

Newport's industrial development has been extremely rapid. Industries were already established here a hundred years ago, when the old borough of Newport, which had received its first royal charter from Edward II, had an area of 1,008 acres and a population of less than 11,000 people. Now, as a County Borough, Newport extends to 7,873 acres and has a population estimated at nearly 95,000, many people being housed in the charming hillside suburbs behind the town.

The church of St. Woollos, Stow Hill, has been the pro-cathedral church of Monmouth diocese since 1921. It retains its fine Norman nave, separated from the Chapel of St. Mary by a very remarkable Norman arch, with supposed Roman columns. The tower is Perpendicular in style.

Beyond the church is Belle Vue Park, attractively laid out with flower-beds, and facilities for bowls and tennis. From the higher part of the park are extensive views of the town and rivers Usk and Severn. Beechwood Park and Ridgeway also afford good views.

Public services of electricity, water, bus transport, provision market, baths, libraries, up-to-date schools, etc., are provided by the Corporation, whose offices are at the Town Hall, and a new Civic Centre, at Clytha Park, projected before the war, has now been partly completed.

The most striking feature for miles around is the huge Transporter Bridge over the Usk, one of only three in England. The towers are 241½ feet high above the road and the distance between the towers is 592 feet. It was opened in 1906 to carry vehicular traffic and pedestrians across the river, where neither a ferry nor a swing bridge was practicable.

A new bridge, 60 feet wide, now carries the main traffic from London to South Wales and connects by a by-pass road, running parallel to Dock Street, with the main Newport-Cardiff road.

CHEPSTOW

HEALTHILY situated on rising ground above the tidal waters of the Wye, where the river twists its way towards the Severn Sea a few miles downstream, stands the ancient market town of Chepstow. Across the Wye from the station are traces of Offa's Dyke, the wall and rampart ascribed by Asser in his life of King Alfred to Offa, King of Mercia, who in the eighth century constructed this mighty earthwork from Dee to Severn to hold back the Welsh from Mercia. Now Chepstow stands in Monmouthshire in England, and continuous traffic to and from South Wales crosses its busy bridge and the main railway line follows above the Wye and along the low coast of the Severn from Chepstow station to Severn Tunnel Junction. Near here, too, it is planned to build the long-debated Severn Bridge, which will be of enormous advantage to Chepstow in that it will bring the town within a very much shorter distance of Bristol, Somerset and the West, and open up still further attractions to business and industry in the locality.

Chepstow is now the head of an Urban District of 1,500 acres with a population of approximately 5,000. The U.D.C. offices are in Gate House. Its lively streets climb steeply above the river, their buildings huddled picturesquely together and retaining many interesting architectural features, such as the thirteenth-century groined vaulting in the room of a shop in Market Square. Portions of the old town walls, including one of the gateways, still remain, as well as the grand ruins of the castle.

The Castle, perched on the summit of one of the many precipices towering above the Wye, was erected soon after the Norman Conquest, and with the strong defences of the town walls formed one of the most strongly fortified posts on the Welsh Marches.

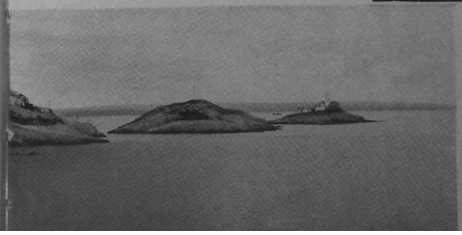
The Castle suffered much damage during the Civil Wars, when the local people held strongly to the Royalist side and on the restoration of Charles II became the lifelong prison of Henry Marten, one of Charles I's judges.

Another building of Norman date is the parish church which is one of the finest in the county. The west front has a richly decorated Norman doorway and the nave is also Norman.

Chepstow is an excellent touring base for the famous Wye Valley and the Forest of Dean. Hunting, golf, fishing and other sports are available, and the racecourse is notable for its fine straight mile.

IN THE GLORIOUS GOWER PENINSULA NEAR SWANSEA

The mighty ramparts of Worms Head.



Mumbles Head.

GAZETTEER

A. = Anglesey. B. = Breconshire. Cd. = Cardiganshire.
Caer. = Caernarvonshire. Cm. = Carmarthenshire.
D. = Denbighshire. F. = Flintshire. G. = Glamorgan.
Mer. = Merioneth. Mon. = Monmouthshire.
Mont. = Montgomeryshire. P. = Pembrokeshire.
R. = Radnorshire.

ABERAYRON (Cd.) (U.D., 1,360). Quiet seaside resort and port, with tiny harbour and shingle beach; popular for excursions and fishing. Note ancient forge. Golf; bathing; angling.

ABERCARN (Mon.) (U.D., 18,620). Industrial district in western valley of Monmouthshire, hemmed in by wooded heights, broken by little glens.

ABERDARE (G.) (U.D., 40,850). Colliery and industrial centre in Cynon Valley, with mountains producing world's finest steam coal. Golf.

ABERDARON (Caer.). Remotest fishing village in Wales, situated at western-most tip of Lleyn Peninsula.

ABERDOVEY (Mer.) (p. 1,570). Quiet resort, with safe, extensive sands, at mouth of Dovey Estuary. Charming countryside around steeped in legend and folklore. Angling; bathing; one of the best golf courses in Britain.

Aberayron. *Eagle Photos*

ABERGAVENNY (Mon.) (M.B., 8,57[illegible]) Attractive gateway to Wales, in huge amphitheatre of mountains at confluence of Usk and Gavenny. [illegible] Roman *Gobannium*. Starting point for ascents of Sugar Loaf, Blorenge and Skirrids. Angling.

ABERGELE (D.) (U.D., 7,395). Old-fashioned market town between sea and hills, with seaside suburb at Pensarn. Ancient church. Golf.

ABERSOCH (Caer.). Remote seaside resort on Lleyn Peninsula. Fine sands. Sheep-dog trials in August. Fishing.

ABERTHAW (G.). Famous for limestone (used in Eddystone Lighthouse). Cement works.

ABERTILLERY (Mon.) (U.D., 28,070). Manufacturing town. Collieries and tin-plate works. Golf.

ABERYSTWYTH (Cd.) (M.B., 10,650). Progressive seaside resort with healthy, equable climate and variety of holiday attractions. Ancient castle ruins and grounds preserved as open space. University College of Wales and Welsh National Library. Convenient touring centre on Cardigan Bay, backed by broad green river-vales and near famous beauty spots. Golf; bathing; boating; angling; sheep-dog trials.

AMLWCH (A.) (U.D., 2,713). Seaport with interesting harbour, hewn out of solid rock.

AMMANFORD (Cm.) (U.D., 6,395). Industrial town in centre of anthracite coalfield. Remains of Norman castle in ground of Tirydail House.

ANGLE (P.) (p. 399). Charming fishing village on rock-girt promontory jutting into Milford Haven, with fine sands edging its two bays. Ancient peel-tower and chapel. Bathing; boating; fishing.

BALA (Mer.) (U.D. 1,510). Quiet market town and popular centre for angling and grouse-shooting. Famous for associations with Welsh Nonconformity

and Thos. Charles, a founder of the British and Foreign Bible Society. Golf.

BALA LAKE (Mer.). Largest natural lake in Wales set amid gently sloping hills. Angling; boating.

BANGOR (Caer.) (M.B., 13,800). Centre of Welsh National life and pleasant residential town and holiday resort. Cathedral and Colleges. Golf; boating; yachting; fishing; walking; climbing and motoring.

BARDSEY ISLAND (Caer.). Pilgrim's "Island of 20,000 saints," separated from Lleyn Peninsula by dangerous Bardsey Sound. Lighthouse.

BARMOUTH (Mer.) (U.D., 2,406). Seaside resort with equable, healthy climate, fine sands and grand scenery. Glorious views over Mawddach estuary to Cader Idris. Renowned as centre of splendid mountain, river and woodland scenery. Golf; tennis; boating; bathing; angling; hiking and climbing.

BARRY (G.) (M.B. 41,780). Important seaport with popular holiday and excursion resort at Barry Island. Fine sandy beach at Whitmore Bay and pebble beach at Porthkerry Bay and Knap. Promenades and extensive seaside attractions, including largest swimming pool in Wales. Golf; tennis; bathing; bowls; boating lake; etc. Excellent public parks.

BEAUMARIS (A.) (M.B. 2,100). County town and holiday resort overlooking Menai Straits with views of distant Snowdonia. Castle ruins and restored church. Passenger ferry to Bangor.

BEDWELLTY (M.) (U.D., 28,910). Industrial and colliery district, interesting for E.E. hill-top church of unusual plan.

BEDDGELERT (Caer.) (p. 1,000 approx.). Beautifully situated touring centre at junction of three Snowdonian valleys and surrounded by towering mountains. Convenient 4-hour ascent of Snowdon.

BERWYNS, THE (D. & Mer.). Broad county-boundary mountain range of heather and grouse-moors, spreading south-west of Llangollen for nearly 20 miles. Principal heights are Moel Sych (2,713 ft.) and Cader Fronwen (2,572 ft.). Grand views and scenery.

BETHESDA (Caer.) (U.D., 4,450). Slate-quarrying town in valley at foot of Nant Ffrancon Pass on London-Holyhead road. Convenient for ascent of Carnedd Daffyd (third highest peak in Wales with fine broken precipies) and Carnedd Llewelyn (second in height to Snowdon). Near Benglog Falls and Llyn Ogwen.

BETWS-Y-COED (Caer.) (U.D., 753). Charming inland resort, beautifully situated in shallow valley amid exquisite glen and river scenery. Ancient church with Norman font and monument to Gruffydd ap Dafydd Goch.

BLAENAVON (M.) (U.D., 9,975). Small industrial town set in mountainous country. See unique cast-iron font in church.

BLAENAU FFESTINIOG (Mer.). Slate-quarrying town with exceptionally healthy climate and with sombre quarried peaks towering over slate-built houses of town. Charming mountain and river scenery around. Angling; climbing and touring centre.

BOSHESTON (P.) (p. 121). Interesting little village with beautiful two-mile-long water-lily ponds stretching from village to bay.

BRECON (B.) (M.B., 6,728). Historic county town and important marketing and touring centre. See Cathedral, Priory, Castle, remains of town walls, Sarah Siddon's birthplace, old churches, picturesque houses and Old Bridge. Beautiful scenery with river-valleys and massive twin Brecon Beacons highest in South Wales. Golf; boating; angling; bathing in Newton Pool.

BRIDGEND (G.) (U.D., 13,700). Busy industrial, market and residential town. Ruined castle and interesting houses. Old bridge spanning River Ogmore. Golf; angling.

BRITANNIA TUBULAR BRIDGE (Caer. & A.). Massive railway bridge across Menai Strait erected by Robert Stephenson and Sir Wm. Fairbairn in 1846-50 at cost of £600,000.

BRITON FERRY (G.). Large industrial town and seaport at mouth of Neath. Interesting churches near at Baglan.

BROAD HAVEN (P.). Charming and quiet seaside resort on St. Bride's Bay, with fine sands and good bathing.

BRYNMAWR (B.) (U.D., 6,569). Quarrying and market town on northern edge of mountainous South Wales coalfield. Interesting for factory experiment initiated by Society of Friends.

BUCKLEY (F.) (U.D., 7,500). Brick-making and clay-products manufacturing centre.

BUILTH WELLS (B.) (U.D., 1,674). Delightfully situated touring and health resort in Wye Valley. Earthworks of historic castle; rebuilt twelfth-century church; interesting bridges. Charming scenery of rivers and mountains. Golf; boating; angling.

BURRY PORT (Cm.) (U.D., 5,793). Small seaport near Llanelly. Sands and bathing at Pembrey. Golf.

CADER IDRIS (Mer.). Nine-mile-long mountain ridge to south of Mawddach estuary and commanding magnificent views. Most popular mountain in Wales after Snowdon. Highest peak Pen-y-Gader (2,927 ft.).

Best ascended by Llyn-y-Cau route from Minfford (2½ hrs.); may also be climbed from Dolgelley by Bridle Path (3 hrs.) or Aran route (3½ hrs.), not safe in mist; and from Lake Tal-y-Llyn (2½ hrs.). Arthog (4 hrs.), Abergynolwyn (3½ hrs.). Recommended descent by Foxes' Path to Dolgelley.

CAERLEON (Mon.) (U.D., 4,760). Royal town of Arthurian legends and site of *Isca Silurum*, base of Second Roman Legion for over 200 years. Important Roman remains; museum; earthworks; ancient church and inn.

CAERNARVON (Caer.) (M.B., 9,130). Medieval walled town, essentially Welsh in character, beautifully situated on Menai Strait at mouth of River Seiont. Fine castle built in 1327 by Edward I.

CAERPHILLY (G.) (U.D., 34,430). Rapidly developing old industrial town, overshadowed by enormous and striking medieval ruin of Caerphilly Castle, one of the most perfect fortresses in country built upon concentric plan. Note leaning tower and Great Hall. Golf.

CAERWENT (Mon.) (p. 1,500). Small village interesting for remains of Roman *Venta Silurum*.

CALDEY ISLAND (P.). Lonely sea-girt island in Carmarthen Bay, easily accessible from Tenby by boat (2½ miles). Traditionally "Island of Saints" and schooling place of St. David; now Cistercian monastery. Modern Abbey; pre-Conquest church; Norman watch-tower; thirteenth-century Old Priory and church; lighthouse.

CALDICOT (Mon.) (p. 1,599). Large village near Severn, interesting for excellent example of twelfth century fortress and fine church.

CAPEL CURIG (Caer.) (p. 492). Popular touring centre high amid charming mountain scenery. Convenient for Snowdonia and for ascents of Moel Siabod Trifan, the Carnedds and the Glyders (fantastic rock effects). Magnificent views. Trout fishing.

CARDIFF (G.). See page 213.

CARDIGAN (Cd.) (M.B., 3,677). Pleasant old seaport, market and county town, with shipping trade and fishing industry. Convenient motoring base for West Wales. See Castle, St. Mary's Church, the Priory, and ancient five-arch bridge. Golf; boating; fishing; sheep-dog trials.

CAREW CHERITON (P.) (p. 718). Picturesque village with ninth-century cross and great castle ruin.

CARMARTHEN (Cm.) (M.B., 12,580). Historic old riverside county, market and educational town in centre of rich agricultural district; once capital of South Wales and *Maridunum* of Romans. Traditionally birthplace of Arthurian wizard, Merlin. Only borough in Wales privileged to have a State Sword carried before its chief citizen. Features of interest include County Buildings; fourteenth-century Gatehouse and castle mound; remains of Greyfriars' Monastery; portions of town walls; fourteenth-century restored church; monuments and obelisk; seventeenth-century earthworks. Golf; angling; three county agricultural show.

CARREG CENNEN CASTLE (Cm.). Twelfth-century ruined castle spectacularly perched on top of 300 ft. perpendicular crag.

CENARTH (Cm.) (p. 1,134). Charming village on River Teifi, with excellent fishing (salmon) in deep rock-bound pools and cascades. Celtic cross with near.

CHEPSTOW. See page 219.

CILGERRAN (P.) (p. 874). Charming village situated village on river Teifi with restored thirteenth-century castle (scheduled as National Monument) on cliff and Ogham stone in churchyard.

COITY (G.) (p. 2,501). Interesting for extensive ruin of 13-15th century castle and church.

COLWYN BAY (D.) (M.B., 23,290). Select all-the-year-round seaside resort, largest in North Wales, on fine, sweeping, sand-fringed bay. Mild, dry climate. Promenade, parks and woods. All seaside attractions. Golf; bathing; boating and angling. Centre for excursions to many beauty spots in North Wales.

CONNAH'S QUAY (F.) (U.D., 7,455). Small port and industrial town on Dee estuary.

CONWAY (Caer.) (M.B. 9,725). Old walled town (regarded as most beautiful in Wales), with narrow streets and quaint alleys, set against a background of hills on western bank of Conway estuary. Famous Edwardian castle overlooking river; old College remains; "Smallest house in Great Britain;" etc. Favourite climb behind town to Conway Mountain (808 ft.) with interesting old fort on summit.

CORWEN (Mer.) (p. 2,534). Old market town of one main street in wooded valley, overshadowed by Pen-y-Pigin cairn. Headquarters of Owain Gwynedd and Owain Glyndwr. See partly thirteenth-century church with Norman font, and "kneeling gravestones." Beautiful scenery around. Views of Snowdonia. Angling; tennis and boats.

COWBRIDGE (G.) (M.B., 1,140). Market town and hunting centre in Vale of Glamorgan. Gatehouse dating from Norman period.

CRAIG-Y-LLYN (G). Highest point in Glamorgan, 1,969 ft. Reached by footpaths from Rhyd-groes and Blaen Rhondda. Grand views.

CRICCIETH (Caer.) (U.D., 1,610). Ancient seaside town, with modern holiday attractions. Facing south over Cardigan Bay and backed by gorse-clad country. See ruined castle. Golf; boating; bathing; tennis; etc.

CRICKHOWELL (B.) (R.D., 7,607). Market town in beautiful Usk valley. Thirteenth-century castle mound and ruins; old bridge; interesting church; views from churchyard. Golf; boating; walks and climbing (Black Mountains).

CWMBRAN (Mon.) (U.D., 12,950). Traditional burying place of Bran, father of Caractacus, who is said to be buried at Dinham, a few miles away. Now industrialised.

DAN-YR-OGOF (G.). Tiny place in Tawe valley amid spectacular scenery. Extensive caves with underground lakes, explored 1938-39.

DEE, RIVER (Mer., D. & F.). Chief river of North Wales, rising in Ddualt Hill. "Sacred Dee" of Tennyson and subject of Kingsley's ballad-poem *The Sands of Dee*.

DEGANWY (Caer.). Pleasant resort and slate-shipping port on Conway estuary, with ruined castle on hill. Ferry to Conway Marsh.

DENBIGH (D.) (M.B., 7,877). Ancient market and county town on isolated hill above Vale of Clwyd. See ruined castle; Burgess Gate; de Lacy statue; unfinished sixteenth-century church; Carmelite Friary ruins; etc.

DEVIL'S BRIDGE (Cd.). Famous romantic beauty-spot, framed in impressive setting of deep gorges, rocky waterfalls and rich hillside woods. Devil's Bridge comprises single–arch stone bridge attributed to twelfth-century monks of Strata Florida Abbey, with eighteenth- and twentieth-century bridges in tiers above. Entrance at turnstile on main road (1/-).

DOLGELLEY (Mer.) (U.D. 2,740). Ancient market town of grey houses and crooked streets, huddled around market square below towering peaks of Cader Idris range. County town of Merioneth and excellent centre for touring. Some of finest scenery in country, including routes along Mawddach estuary to Barmouth, mountains and cascading streams. Angling; golf; climbing.

DOLWYDDELAN (Caer.) (p. 840). Village with castle, reputed birthplace of first Prince of Wales. Convenient for ascent of Moel Siabod (2,860 ft.), views.

DOVEY RIVER (Mont. & Mer.). Charming green vale extending from moorland fastnesses under Aran Mawddwy to sea at Aberdovey.

DOWLAIS (G.). Industrial centre adjoining Merthyr Tydfil.

DULAS VALLEY (Mont.). Pretty, hill-flanked valley forming part of border between Merioneth and Montgomeryshire, and opening into Dovey Valley.

DYSERTH (F.) (p. 1,363). Ancient village at foot of limestone cliffs forming eastern wall of Vale of Clwyd. See church; waterfall; and Siamber Wen, ruined medieval building ¼ mile north.

DYSINNI RIVER (Mer.). Beautiful river flowing from Lake Tal-y-Llyn to broad lagoon near Towyn. Note Bird Rock, only inland crag where cormorants nest. Angling. Boating below Tal-y-Bont.

EBBW VALE (Mon.) (U.D. 29,440). Industrial town at head of Ebbw river valley, between mountains rich in coal deposits. Steel works.

ELAN VALLEY LAKES (R.). Chain of extensive reservoirs of outstanding beauty, providing Birmingham with water supply and forming one of the touring "sights" of Wales. Magnificent cascades over dams in flood times. Motorable road skirts reservoirs and road bridge across Caban Reservoir at Careg-ddu leads to Claerwen Valley (dead-end road). Angling by permit from Elan Estate Office, Rhayader.

FAIRBOURNE (Mer.). Growing resort built on low alluvial shore between mountains of Cader Idris range and Cardigan Bay. One of finest sandy beaches in Wales. Bathing; surfing; angling in Mawddach estuary; boating; golf. Grand scenery in vicinity.

FFESTINIOG (Mer.) (U.D., 7,211). Favourite inland resort on commanding site above beautiful Vale of Ffestiniog. Healthy climate. Centre for delightful walks amid glens, woods and hills. Golf; angling. Glorious views from nearby Moelwyn mountains and Cynicht.

FFOREST FAWR (B). Conspicuous mountain range between Black Mts. and Brecon Beacons. Wonderful views from summits over 2,000 ft.

FISHGUARD and GOODWICK (P.) (U.D., 4,775). Picturesque market town perched above cliffs. Port for British Railways route to Ireland. Historical associations with eighteenth-century French "invasion." Golf; angling; boating; bathing on sands at Goodwick.

FLINT (F.) (M.B., 14,160). Industrial county town on Dee estuary. Roman lead-mining centre. Ruined Edwardian castle. Cotton, artificial silk and paper industries.

FRESHWATER EAST and WEST (P.). Fine sandy bay, backed by cliffs and unspoilt downland. Popular for picnics; bathing at E. Freshwater.

GELLIGAER (G.) (U.D. 36,390). Coal-mining village to west of Rhymney valley. Site of Roman camp and other historic remains. Breezy Gelligaer Common near.

GOWER PENINSULA (G.). Popular sand-fringed, cliff-bound holiday peninsula, characterised by old villages, little rocky bays, fine caves rich in prehistoric remains, ruined castles and fine old "fortified" churches. See also Worm's Head and Swansea, page 215.

GRESFORD (D.) (p. 1,507). Church has famous peal of 8 bells, one of "Seven Wonders of Wales."

GWYDYR FOREST. National Forest Park in Snowdonia, extending 10 miles from Llanwrst south to beyond Penmachno. Public access to roads and paths. Magnificent scenery.

HARLECH (Mer.). Ancient village on hill-cliffs above sand-dune coast (Morfa Harlech), famous for precipice-crowning medieval castle, Royal St. David's golf-course (second only to St. Andrew's of Scotland) and song, *The March of the Men of Harlech*. Castle and district rich in history and legend from prehistoric times to end of seventeenth-century Civil Wars. Excellent holiday centre for coast of Tremadoc and Cardigan Bays and hinterland of mountains. Views of Snowdonia. Angling; bathing; musical festival. Coleg Harlech, famous working men's college, centre of Welsh adult education.

HAVERFORDWEST (P.) (M.B., 7,300). Historic and attractive old county capital and river-port on Cleddau, with steep irregular streets and ruined twelfth-century castle, ancient churches and fragments of town walls. Thirteenth-century Priory in riverside meadow near Quay Street. Council Chamber (viewable) with autograph letter of Oliver Cromwell. One of few counties in own right in Britain, with, until recently, own Lord Lieutenant.

HAWARDEN (F.) (p. 34,400). Small town with associations with W. E. Gladstone. Ruined castle-keep embowered in trees nearby. Modern Castle not viewable, but grounds open to pedestrians on weekdays, except Thursdays (entrance at Hawarden Lodge and Leopold's Gate). Interesting church; St. Deniol's Hostel and Library; old "House of Correction;" old rectory (now William Temple College). Golf.

HAY (B.) (U.D., 1,407). Historic old Welsh border and market town, on river Wye and backed by Black Mountains. Stately Jacobean Castle with twelfth-century ruins (viewable by permission); fragments of town walls in Newports; ancient restored church (without the walls) and Chapel of St. John (within the walls). Golf; angling; delightful riverside and mountain walks; touring centre.

HOLYHEAD (A.) (U.D., 10,470). Passenger seaport for Ireland and holiday resort on northern shore of Holy Island. Popular promenade along 7,860 ft. long breakwater. See massive churchyard walls and thirteenth-century church.

HOLY ISLAND (A.). Rocky heather-clad island connected to mainland by mile-long Stanley Embankment. Grand rock scenery.

HOLYWELL (F.) (U.D., 7,870). Hilltop industrial town containing St. Winifride's Well, one of "Seven Wonders of Wales" and shrine of R.C. pilgrimage.

HOYLE'S MOUTH (P.) Series of underground caves and passages (said to be Belarius's cave of Shakespeare's *Cymbeline*) in wooded limestone hill between Manby and Penally. (Torches needed for exploration.)

HUNTSMAN'S LEAP (P.). Fearsome gash in cliffs, said to have been jumped in heat of chase by huntsman, who afterwards died of fright when reflecting on danger of it.

KERRY (Mont.) (p. 1,626). Attractive village girt by bold, bracken-clad mountain-ridge of Kerry Hills. Partly twelfth-century church with chained Welsh Bible and timber belfry. Prehistoric remains. Wide views from hills and grand scenery.

KNIGHTON (R.) (U.D., 1,881). Old border town on line of Offa's Dyke above Upper Teme Valley and girt by gentle hills patched with woods. Old houses and inns. Golf; angling.

LAMPETER (Cd.) (M.B., 1,840). Old riverside market town set amid wooded hills and pasture lands. See St. David's College (apply to view) with Lübeck missal, early MSS. and antiquities in library. Golf; angling; bowling; tennis.

LAMPHEY (P.). Small village near ruin of Lamphey Palace, once residence of Bishops of St. David's and boyhood home of Elizabethan Earl of Essex.

LLANBERIS (Caer.) (p. 2,370). Popular centre for Snowdonia, disposed along shore of Llyn Padarn, and terminus for Snowdon Mountain Railway. Starting point for five-mile "Bridle Path," easiest and least spectacular track to summit of Snowdon. Grand scenery in Llanberis Pass and on through road to Bettws-y-Coed, etc.

LLANDAFF (G.). Pleasant residential suburb of Cardiff. See cathedral, (considerably damaged by air-raids during 1939-45 War) with magnificent west front and window; ruined thirteenth-century Bishop's Castle and eighteenth-century Bishop's Palace.

LLANDILO (Cm.) (U.D., 1,940). Riverside market town above Vale of Towy in district interesting to geologists for "Llandilo Flags." Nineteenth-century bridge with 145 ft. span. Golf; angling.

LLANDOVERY (Cm.) (M.B., 2,036). Lively town in upper valley of river Towy. Twelfth-century castle ruins on wooded rock above river Bran. Llandovery College (Boys' Public School) near.

LLANDRINDOD WELLS (R.) (U.D., 3,438). Favourite modern spa and health resort, in bracing situation on open plateau above River Ithon. Pretty gardens; Lovers' Leap crag above river; fine Common with boating lake; Little Hill near with charming views. Concerts; regattas; sheepdog trials; golf; bathing; etc.

LLANDUDNO (Caer.) (U.D., 16,310). See page 217.

LLANDYSSUL (Cd.) (p. 2,590). Riverside market town on lovely stretch of river Teifi, with several woollen factories around. See restored Norman and Early English church. Angling.

LLANELLY (Cm.) (M.B., 33,630. Busy industrial centre. Note fine modern public library building and interesting museum in Mansion House of Parc Howard.

LLANFAIRFECHAN (Caer.) (U.D., 3,143). Attractive seaside town, sheltered by quarried headland of Penmaenmawr. Excellent centre for mountain walks.

LLANFAIR PWLL GWYNGYLL (A.) (p. 965) Noteworthy for fictitious place-name of 55 letters (Llanfairpwllgwyngyllgogerchwyrndrobwllantysiliogogogoch).

LLANFYLLIN (Mont.) (M.B., 1,449). Typical old Welsh border town near grand region of mountains and lakes.

LLANGAMMARCH WELLS (B.). Quiet inland health and holiday resort, famous for barium chloride springs (unique in Britain) recommended in treatment of heart disease. Golf; angling.

LLANGEFNI (A.) (U.D., 2,082). Busy little market town for Anglesey. See inscribed stone in church. Golf; fish; sheepdog trials.

LLANGOLLEN (D.) (U.D., 3,033). Pleasant riverside resort of old white houses and more modern red-brick buildings, situated in valley of exquisite scenery. Picturesque fourteenth-century bridge, with weir and salmon-leap below, is one of the "Seven Wonders of Wales." See Plas Newydd, black and white mansion, visited by early nineteenth-century celebrities.

LLANGORSE LAKE (B.). Large natural lake, fringed with reeds, traditional site of lost Roman city. Bathing; boating; excellent angling and wild-fowling. Interesting church in Llangorse village.

LLANHILLETH (Mon.) (p. 9,022). Busy coal-mining place on site of Roman *Castell Talorium*. Important remains of ancient castle near church and numerous camps and tumuli in vicinity.

LLANIDLOES (Mont.) (M.B., 2,225). Market town with sheep-rearing, iron-founding and manufacture of flannel and leather. Stands above junction of rivers Severn and Clywedog in grand mountain country.

LLANMAES (G.) (p. 190). Village with church of Norman origin, interesting as burial-place of Ivan and Elizabeth Yorath, aged "180" and "177" years. Ruined castle near.

LLANPUMPSAINT (Cm.) (p. 645). Secluded village traditionally birthplace of quintuplet saints (Celynen, Ceitho, Gwyn, Gwyno and Gwynnoro). See old church. Angling.

LLANRWST (D.) (U.D., 2,670). Ancient market town with spectacular views across Vale of Conway to wooded cliffs of Gwydyr. Once harp-making centre.

LLANSANTFFRAID GLYN CEIRIOG (D.) (p. 1,366). Little hillgirt village with noteworthy village institute commemorating more than 40 famous Welshmen, including Ceriog Hughes and Thos. Jefferson (third President of U.S.A., who drafted Declaration of Independence).

LLANTHONY PRIORY (Mon.). Imposing ruin of twelfth-century Augustinian monastery, finely situated in valley of Black Mountains. Track over pass to Hay.

LLANTRISANT (G.) (R.D., 25,700). Town picturesquely situated above Vale of Glamorgan. Fragments of thirteenth-century castle, Edward II's last refuge in 1326.

LLANTWIT MAJOR (G.) (p. 3,500). Old-fashioned, historic market town, site of "first Christian school of learning in Britain," founded in sixth century by St. Illtyd. See thirteenth-fifteenth-century St. Illtyd's church; dovecote and gatehouse of vanished monastery; Old Swan Inn and fifteenth-century Town Hall.

LLANYSTUMDWY (Mer.). Boyhood home of the late Earl Lloyd George.

MACHYNLLETH (Mont.) (U.D., 1,872). Pleasant old-fashioned market town of clean, tree-lined streets with black-and-white houses, on Dovey river with magnificent scenery of mountains and valleys near. Note ancient bridge; Old Court House, Maengwyn St. and Royal House, Penrallt St. Angling; golf; walks and tours.

MAESTEG (G.) (U.D., 23,100). Active mining centre and three new factories in valley. Golf.

MANORBIER (P.) (p. 555). Attractive stone and whitewash village in glen behind fine sandy beach of Carmarthen Bay. Geraldus Cambrensis was born in castle overlooking bay, and called Manorbier the "Paradise of all Wales."

MATHERN (Mon.) (p. 648). Historic village near Chepstow. Stately church built over body of Teudrig, sixth-century King of Glamorgan and burial place of several bishops. Old Palace of former Bishops of Llandaff near church.

MAWDDACH ESTUARY (Mer.). Beautiful expanse of water at mouth of river Mawddwy, protected by sandy bar and crossed by 800-ft. long rail and footbridge from Barmouth to near Fairbourne. Renowned for magnificent mountain scenery of Cader Idris and Aran ranges. Boating and excellent angling.

MENAI BRIDGE (A.) (U.D., 1,895). Extensive village at Anglesey end of famous bridge over Menai Strait.

MERTHYRMAWR (G.) (p. 224). Attractive thatched village screened from undulating wastes of Warren by belt of maritime pines. See seventh-eighth-century wheel crosses, Celtic inscribed stones and effigies.

MERTHYR TYDFIL (G.) (C.B., 60,880). Historic centre of iron and steel industry. Now re-developing as new light industrial area.

MILFORD HAVEN (P.) (U.D., 10,380). Important fishing port near one of world's finest natural harbours. See St. Katherine's church, containing historical relics, and St. Thomas Becket's restored thirteenth-century " beacon " chapel.

MOLD (F.) (U.D., 6,354). Brisk county and market town, lying in fertile Alyn Valley.

MONMOUTH (Mon.) (M.B., 5,360). Ancient riverside county town and delightful touring centre for beauties of Wye Valley and Forest of Dean (Glos.), and set amid lovely valley, hill and woodland scenery at junction of Wye and Monnow rivers. See ruins of Norman castle, Henry V's birthplace; remarkable fortified bridge and gateway on Monnow; fourteenth-century oriel window in " Geoffrey's Study " near parish church; and Nelson Museum with Lord Nelson relics.

MONTGOMERY (Mont.) (M.B., 912). Borough for more than 700 years; and county town of Montgomeryshire, attractively situated overlooking vales of Severn and Camlad. See relics of thirteenth-century Castle on height above town and largely fourteenth-century church with wealth of interesting features. Convenient touring base for Welsh Marches. Angling.

MOUNTAIN ASH (G.) (U.D., 31,900). Coal-mining town in mountainous South Wales industrial region. Golf at Cefn-pennar and Abercynon.

MUMBLES (G.). Very popular seaside holiday and residential resort beneath rocky headland on Swansea Bay. Name particularly applied to village of Oystermouth, with ruined thirteenth-fourteenth-century Castle. Grave of Bowdler, expurgator of Shakespeare and originator of " Bowdlerism," in All Saints' churchyard. Promenade, sands, pier, oyster-ground and up-to-date attractions. Bob's Cave near lighthouse on Mumbles Head.

MYNYDDISLWYN (Mon.) (U.D., 14,400). Coal-mining and quarrying district, set amidst impressive scenery. Views from hill-top church, and [illegible]ulus near.

NANTGARW (G.). Village in Taff Valley, associated with highly prized nineteenth-century [illegible] manufactured here. Centre of new large mining development.

NANTYGLO and BLAINA (Mon.) (U.D., 11,490). Centre of manufacturing district with collieries and works. Golf.

NARBERTH (P.) (U.D., 1,000). Old [illegible] town on hill against background of bold Prescelly [illegible], famed as source of " foreign stones " at Stonehenge. See twelfth-century castle ruins.

NEATH (G.) (M.B., 32,030). Important industrial town and port, in centre of rich coal-mining district, once strategic Roman military station (*Nidum*) on *Via Julia*. See remains of Norman castle and fragments of walls, near Old Market St.; Gnoll House, open daily, and Gorsedd Circle in Victoria Gardens. Golf; swimming in pool; fairs. Neath Abbey ruins near, Leland's " fairest abbey in all Wales," founded in 1129.

NEVIN (Caer.) (p. 1,781). Royal Borough of Wales in 1355, now fishing village and quiet resort on " The Saints Road." Sandy beach and lovely views of Lleyn coast and The Rivals.

NEWCASTLE EMLYN (Cm.) (U.D. 905). Quiet town and angling resort on River Teifi; birthplace of Welsh novelist Allen Raine (Mrs. Beynon Puddicombe). Ruin of Sir Rhys ap Thomas' fifteenth-century castle (accessible at any time); picturesque old bridge.

NEWGALE SANDS (P.). Fine sweep of firm sands, fronting St. Bride's Bay and backed by lovely gorse-clad uplands, with submerged forest at northern end. Charming view from approaching road. Bathing.

NEWPORT (Mon.). See page 218.

NEW QUAY (Cd.) (U.D. 1150). Delightful little seaport and holiday resort, set on steep hill above Cardigan Bay. Safe bathing; boating; good fishing.

NEW RADNOR (R.) (p. 367). Township, once county capital, lying between bold shaven heights of Radnor Forest and The Smatcher (1,396 ft.). Formerly walled and moated. Note earthworks of fortress above modern church. Centre of fine scenery. See waterfall, " Water-break-its-Neck," nearby.

NEWTOWN (Mont.) (U.D., 5,000). Pleasant Severnside town, cupped between gently swelling hills; well known for important flannel manufactories. Birthplace

of Robert Owen, socialist pioneer. Ruined church near bridge, with Owen's grave in churchyard. Owen Memorial Museum in Broad St. Fine old rood-screen and font incorporated in nineteenth-century church. Golf; angling.

OGMORE (G.). Delightful growing holiday resort at mouth of Ogmore river in valley beneath Ogmore Downs. See ruin of Norman fortress. Golf; bathing; boating and angling.

OLD RADNOR (R.). Village in lovely situation overlooking fertile vale. Magnificent medieval carved screen and rare old organ case in fifteenth-century church. See also font (oldest in the country) and good specimens of medieval encaustic tiles and fifteenth-century glass.

OVERTON (F.) (p. 1,099). Old border township near River Dee, with glorious views of Dee Valley. See celebrated yews (one of the " Seven Wonders of Wales").

PASS OF ABERGLASLYN (Caer.). Exquisitely beautiful narrow defile (Nat. Trust property) with River Glaslyn flowing as rapid torrent between fir-clad precipices and Pont Aberglaslyn below. Note conspicuous rock styled " White Lady of the Pass;" old bridge and Roman road near. Climbing: Cynicht, via Bwlch Gwernog, and Moel Hebog.

PEMBROKE (P.) (M.B., 12,020). Typical old Welsh country town, formerly a walled borough and capital of Pembrokeshire. Essentially an agricultural centre, Pembroke is also admirable for tourists, being surrounded by excellent coastal and country scenery. Industries comprise textiles and light engineering. Note Castle ruins, birthplace of Henry VII, mirrored in waters of Pembroke River.

PENALLY (P.) (p. 545). Attractive village behind sandy Penally Burrows, and neighboured by grand limestone cliffs. See restored thirteenth-century church and Runic crosses.

PENARTH (G.) (U.D., 18,040). Seaside resort and residential suburb of Cardiff built on headland affording glorious views of Somerset and Devon coast.

PENDINE (Cm.) (p. 190). Quiet seaside village and summer resort, famous for magnificent six-mile stretch of firm, smooth sands, formerly used for speed tests.

PENMAENMAWR (Caer.) (U.D., 4,026). Modern seaside health and pleasure resort, delightfully situated, with safe sands, four-mile seafront; golf; bathing; boating and angling. Pretty walks and huge mass of green porphyry descending abruptly into sea nearby. Note remains of Braich-y-Dinas (prehistoric settlement). Views.

PIERCEFIELD PARK (Mon.). Large public park, bordering Wye above Chepstow, to near the Wyndcliffe. Note ancient camp. Excellent viewpoints—Alcove, Grotto, Double View, Giant's Cave, Lover's Leap and Temple.

PISTYLL RHAIADR (D. & Mont.). Finest waterfall in Wales, one of " Seven Wonders of Wales," with an initial drop of 100 ft., in beautiful glen of River Rhaiadr. Reached from Llanrhaiadr-Ym-Mochnant village. See also ancient church with fine chancel roof and sepulchral slab. Angling.

PLYNLIMON (Mont. & Cd.). Vast, windswept mountain group, cradling source-springs of rivers Severn, Wye, Rheidol, Llyfnant and Ystwyth, in remarkable waste of heather, gorse and ling. Principal summit, Pen Plynlimon Fawr (2,469 ft.) most easily climbed from Eisteddfa Gurig, on Llanidloes-Aberystwyth road (2 miles). Grand panorama from summits. *Note:* Keep carefully to tracks.

PONTYPOOL (Mon.) (U.D., 42,650). One of chief centres of coal and iron trade amid hills affording several good viewpoints.

PONTYPRIDD (G.) (U.D., 39,440). Important coal-mining, manufacturing and distributing centre situated in deep valley and dominated by rugged mountains.

PORTHCAWL (G.) (U.D., 9,237). Popular, up-to-date and rapidly growing seaside resort, with invigorating climate. Safe, firm sands and wilderness of sand-dunes spreading to north-west. Esplanade with palm court, pavilion, gardens and all seaside attractions. " Coney Beach " pleasure centre on Sandy Bay. Golf; tennis; bowls; boating; bathing; fishing and prawning; etc.

PORTMADOC (Caer.) (U.D., 4,110). Small modern industrial town and seaport, near slate quarries. Fishing. Fine scenery near in Snowdonia and Vale of Ffestiniog.

PORT TALBOT (G.) (M.B., 43,670). Modern industrial town and port on main Glamorgan coast road. Picturesque mountain country inland; fine, smooth sands and seaside attractions at Aberavon, northern end of town. Golf.

PRESTATYN (F.) (U.D., 8,659). Neat and attractive residential resort with sandy beach. Golf; bathing.

PRESTEIGNE (R.) (U.D., 1,154). Historic little market and county town, with large Perpendicular church showing remains of earlier Saxon and Norman churches, and chancel ranking with the best in the West of England. Gateway from Midlands to beautiful hill country of mid-Wales, upper Teme Valley and Radnorshire Forest. Angling; fairs and shows.

PWLLHELI (Caer.) (M.B., 3,900). Old market town and fishing port, with two modern residential suburbs.

RADNOR FOREST (R.). Lofty, wild treeless plateau, cleft by charming stream-watered valleys and clothed in heather and bracken. Ideal for walking; views from summits (highest—Great Rhos, 2,166 ft.).

RAGLAN (Mon.) (p. 700 approx.). Famous for beautiful ruined castle, one of finest military remains in kingdom.

RHAYADER (R.) (p. 1,100). Old market town, formerly border stronghold, amid fine Wye scenery and near Elan Valley Lakes. Golf; angling.

RHEIDOL VALLEY (Cd.). Lovely glen of Rheidol stream, best seen from Aberystwyth-Devil's Bridge road. Waterfall; views.

RHONDDA (G.) (U.D., 112,630). Well-known for highly industrialised Rhondda Valleys, two deep valleys carved through grim and scarred mountains of Glamorgan coalfields. Wonderful mountain-top viewpoints near.

RHOSNEIGR (A.). Seaside village resort with fine sands. Boating; bathing; angling.

RHOS-ON-SEA (Caer. & D.). Modern resort, with sand and shingle beach, forming part of Borough of Colwyn Bay. See St. Trillo's Chapel over Holy well.

RHUDDLAN (F.) (p. 1,800 est.). Ancient borough pleasantly situated on River Clwyd about 3 miles from Rhyl. Former residence of several Welsh princes. Scene of defeat and slaying of Welsh under Caradoc (A.D. 795). Fine ruined Edwardian castle, built about 1277 on site of earlier castles. See also ancient " Parliament House " in main street; ruined monastery near at Abbey Farm; interesting mainly thirteenth-century church; partly sixteenth-century bridge. Golf; bowls; tennis and angling.

RHYL (F.) (U.D., 18,710). Largest town in county and popular seaside holiday resort with summer population of approx. 60,000. Excellent sands; pier and promenade; bracing air. Golf; fishing; boating; bathing; annual bowls tournament and all seaside attractions.

RHYMNEY (Mon.) (U.D., 9,137). Town at head of industrialised Rhymney Valley.

RISCA (Mon.) U.D., 15,270). Town with considerable steel and tinplate works and collieries.

RUABON (D.) (p. 3,266). Industrial town with collieries, ironworks, chemical and terra cotta works. Interesting parish church with fourteenth-century wall-painting.

RUTHIN (D.) (M.B., 3,625). Attractive old market town on hill in Vale of Clwyd. Old houses in Wells Street and Castle Street.

ST. ASAPH (F.) (p. 2,000). Small cathedral city, attractively situated on ridge between rivers Elwy and Clwyd. Highly interesting small restored cathedral and largely fifteenth-century Parish Church. Bowls; tennis; hunting; angling.

ST. DAVID'S (P.) (p. 1,580). Smallest cathedral city in Great Britain, set in treeless heather and gorse-covered countryside, on sea-girt horn of land. The city has only three main streets and is strangely isolated from railway and town. The cathedral, standing in a deep hollow, is mother-church of the oldest episcopal see in the U.K. (with the possible exception of Llandaff), and was originally founded by St. David in the sixth century. The present large building dates mainly from the twelfth and fourteenth centuries. See also picturesque ruins of St. Mary's College, south of the Cathedral; Bishop's Palace (fourteenth century); and ruined thirteenth-century Tower Gate.

SEVEN WONDERS OF WALES. Well-known sights in North Wales:

" Pistyll Rhaiader and Wrixham steeple,
Snowdon's mountain, without its people;
Overton Yewtrees, St. Winifred Wells,
Llangollen Bridge and Gresford Bells."

(The St. Winifred Wells here referred to are at Holywell, and Woolston, Shropshire.)

SNOWDONIA. Fascinating touring district surrounding Snowdon, with Y Wyddfa (3,560 ft.) highest peak in England and Wales. The district is roughly bounded by the River Conway and Vale of Ffestiniog, by road from Tremadoc to Caernarvon, and by coast from Caernarvon to Creuddyn Peninsula, and embraces one of the grandest and most spectacular ranges of mountain peaks in Europe. Rack-and-pinion railway from Llanberis to Snowdon Summit Hotel and cairn running from Easter to October. Pedestrian tracks to summits, 2 to 4 hours.

SOUTHERDOWN (G.). Small and quiet bathing and golfing resort, edging cliff-backed bay and sheltered by uplands. Magnificent and geologically interesting cliffs.

STRATA FLORIDA ABBEY (Cd.). Venerable ruin of historic twelfth-century Cistercian monastery; burial place of many celebrities. (Admission 6d.)

SWANSEA (G.). See page 215.

TAFFS WELL (G.). " Smallest spa in world," with noted tepid medicinal springs, near Cardiff. Fine scenery.

TAL-Y-LLYN (Mer.) (p. 1,135). Village on fine lake amid mountains of Cader Idris group. See old church (carved and painted ceiling). Angling; climbing.

TENBY (P.) (M.B., 4,495). Very attractive seaside place scattered over limestone headland above two fine bays. See preserved fourteenth-century town walls; ruined keep of the thirteenth-century fortress on Castle Hill; remains of fourteenth-century Carmelite nunnery in churchyard; the " oldest house " near Post Office

and gabled houses in Bridge Street. Bathing on sandy beaches; boating; fishing in Bay and from Victoria Pier; tennis; golf; bowls; etc.

TINTERN (Mon.). Picturesque village in narrow and richly wooded Wye Valley near Chepstow, famed for ruined Cistercian Abbey, third founded in Great Britain. One of the grandest and most impressively situated monastic ruins (Admission 1/-). Remains date from thirteenth century and form remarkably perfect example of transition from Early English to Decorated style. See also church of St. Mary-at-Hill on hillside above road. Fine walks; angling.

TOWYN (Mer.) (U.D., 3,809). Ancient town ¾ mile from the sea, with modern seaside suburb built on shore, fine promenade and all seaside amenities. Nearly six miles of safe, sandy beach. Golf; tennis; bowls; putting; boating. Fishing in the sea, in the Broad Water and in Dysinni river. See ancient church with famous " St. Cadvan's Stone " with unsolved seventh-century inscription. Beautiful hinterland of hills, mountains and valleys.

TRAWSFYNYDD (Mer.) (p. 1,557). Village neighboured by vast lake-like reservoir of N. Wales Elec. Power Co. Ltd., and surrounded by bleak moors and abounding in swift streams. Unusually wild, secluded walks on mountains rich in archaeological remains. Angling.

TREDEGAR (M.) (U.D., 20,090). Large and busy town of coalmines and light industries, at the head of the Sirhowy Valley. Golf.

TREFRIW (Caer.) (p. 723). Pleasant inland resort, near river Conway and below pine-wooded hills. Chalybeate wells.

TREGARON (Cd.) (P. 5,860). Old-fashioned market town and anglers' resort, situated in countryside of swelling hills and whitewashed farms. Birthplace of sixteenth-century Welsh hero and poet (Twm Shon Catti) and of Henry Richard, nineteenth-century " advocate of peace and international arbitration "—note statue in Market Square. Ancient restored church. Annual sheepdog trials. Remarkable expanse of Tregaron Bog near.

TREMADOC (Cm.). Birth place of Lawrence of Arabia.

USK (Mon.) (U.D., 1,717). Quiet market town, with remains of historic castle, dating from thirteenth-century and standing on bold bluff overlooking river Usk. See highly interesting church and gatehouse of original thirteenth-century priory. Convenient centre for walks and tours in beautiful Usk Valley. Fishing.

VALE OF CLWYD (D. & F.). 25-mile long broad and picturesque valley of river Clwyd, known as " The Garden of Wales."

VALE OF CONWAY (C. & D.). 20-mile long narrow valley of river Conway between Bettws-y-Coed and Conway Bay. Rich pastures and woods. Good roads on both sides.

VALE OF LLANGOLLEN (D.). Portion of Dee Valley between Llangollen and Wynnstay Park and distinguished by brilliant green pastures. Angling.

VALLE CRUCIS ABBEY (D.). Fine ruin of early thirteenth-century Cistercian Abbey. Extensive remains, mainly Early English, open daily, admission 6d. Near Berwyn.

WELSHPOOL (Mont.) (M.B., 5,865). Pleasant market town and summer resort of red-brick buildings, in hill-bound valley. See imposing modern Town Hall, High St.; St. Mary's Church, preserving thirteenth century and later work and " Druidical " stone in churchyard; black-and-white cottage of Grace Evans near church; Powysland Museum and Reference Library. Magnificent park and noble residence of Earls of Powis at nearby Powis Castle. (Main drive open to pedestrians.) Boating; golf; angling.

WORM'S HEAD (G.). Magnificently picturesque headland at tip of Gower coast.

WREXHAM (D.) (M.B., 29,710). The industrial capital of North Wales, with collieries, breweries, steel, brick and tile works, flour mills, publishing works and leather-pressing mills. The sixteenth-century tower of the imposing Perpendicular parish church is one of the " Seven Wonders of Wales," and the north porch, restored by students of Yale University, U.S.A., the sixteenth-century lectern, chancel-screen and eighteenth-century gates are also worthy of note. The tombstone of Elihu Yale, benefactor of Yale University, is in the churchyard.

WYE VALLEY (Mon.). Famed and beautiful river valley, watered by winding Wye, and closed in below Ross by great walls of rock, often clothed in masses of vegetation and dense woods. Lovely scenery, especially at Symond's Yat and between Monmouth and Chepstow. See ruined Abbey at Tintern. Fine viewpoints, especially Wyndcliffe, near Chepstow.

YELLOW TOP (G.). Cliff in Gower peninsula pierced by famous Paviland Caves, where Dr. Buckland discovered the famous paleolithic skeleton, " The Red Lady of Paviland " (probably a man), in 1823. Further exploration in 1939 and at other times have revealed many treasures of the Aurignacian period. Caves accessible only at very low tide.

YNYSDDU (Mon.). Colliery village, birthplace of famous Welsh Bard, " Islwyn " (Rev. William Thomas. 1832-78).

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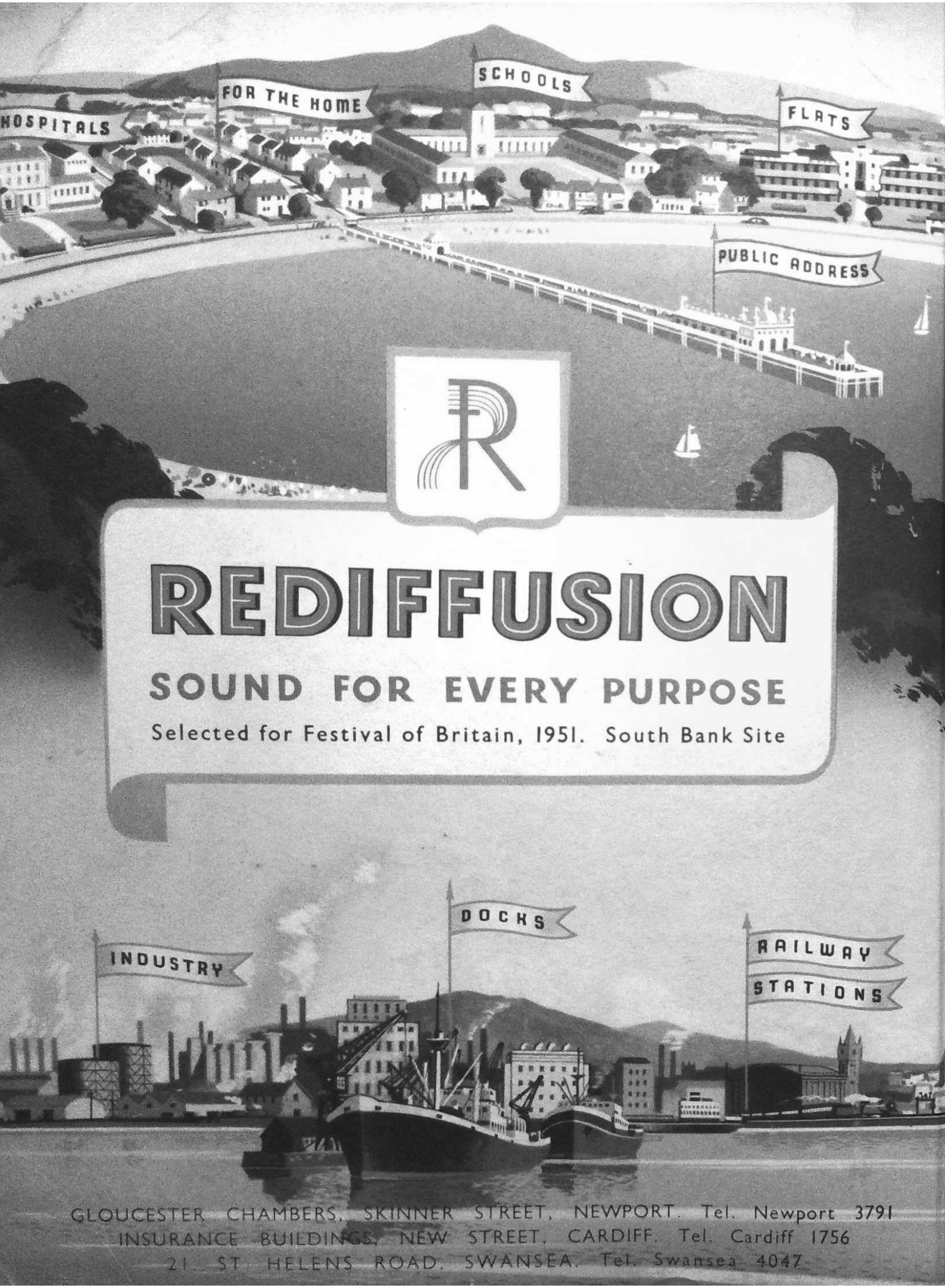
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