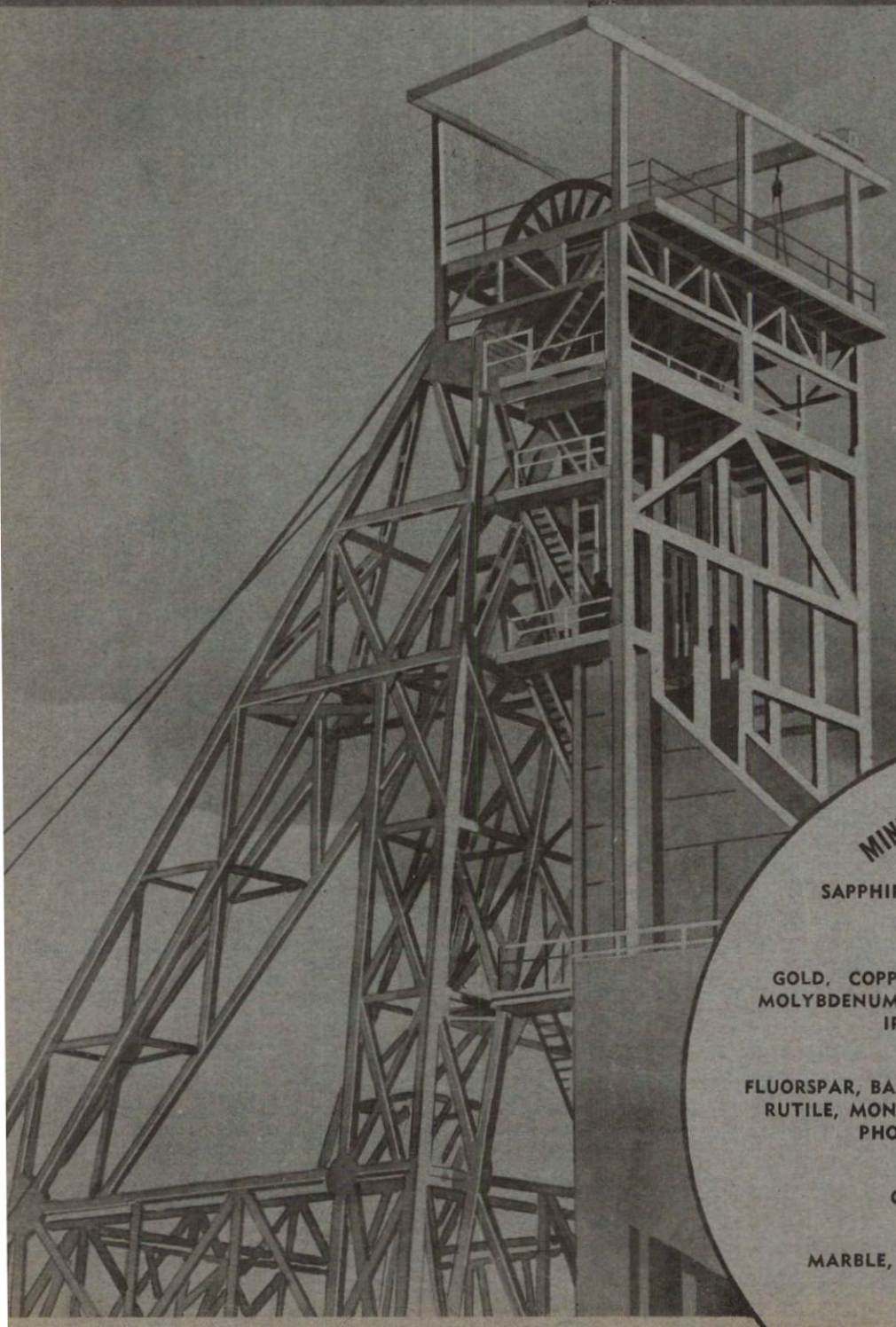
QUEENSLAND GOVERNMENT

MINING JOURNAL



PRICE
SIXPENCE

MINERAL PRODUCTS OF QUEENSLAND

GEMSTONES.
SAPPHIRE, ZIRCON, GARNET, OLIVINE, TOPAZ, TURQUOISE, OPAL, ETC.

METALLIC.
GOLD, COPPER, TIN, SILVER, LEAD, ZINC, TUNGSTEN, MOLYBDENUM, BISMUTH, ANTIMONY, MERCURY, MANGANESE, IRON, CHROME, ILMENITE, COBALT.

NON-METALLIC.
FLUORSPAR, BARYTES, GYPSUM, MAGNESITE, ARSENIC, BAUXITE, RUTILE, MONAZITE, KAOLIN, DIATOMITE, DOLOMITE, MICA, PHOSPHATE ROCK, CORUNDUM, ZIRCON.

CARBON.
COAL, GRAPHITE, OIL SHALE, GAS.

BUILDING STONES.
MARBLE, GRANITE, LIMESTONE, FREESTONE, TU
BASALT.

VOL. XLVI. No. 521. MARCH, 1945

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Correspondence and information on any subject relating to practical mining are invited from those interested and competent to express, in terse, lucid language, facts or theories of general import.

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NOTICE TO PROSPECTORS.

Free Government Examinations and Assays.

PROSPECTORS finding in Queensland minerals which they believe to be of commercial value may hand or send samples of same to the nearest Warden or Mining Registrar, who is instructed to forward them for identification or assay to the Department of Mines, Brisbane; or, in the case of the Northern part of the State, to the Government Assay Office at Cloncurry.

The samples will be examined or assayed free of charge, and the results sent to the finders through the Warden.

Each sample must be properly marked for identification; and a letter, giving the name and address of the finder and the approximate locality where it has been discovered, should be posted separately and at the same time.

Other conditions which it is desirable to observe in selecting and forwarding samples are specified in a leaflet issued by the Department, and obtainable from the local Wardens or Mining Registrars.

V. C. GAIR,
Secretary for Mines.

Department of Mines,
Brisbane, 16th August, 1943.

WARDENS' OFFICES IN QUEENSLAND.

To assist miners and prospectors to decide as to the nearest Warden's Office at which applications may be made for registration of Claims, Leases, or other mining tenements, the following is a list of Wardens' Offices in the State. The list is arranged generally in order of geographical position, commencing in the South-Eastern corner and proceeding Westerly, then returning to the coast and working Northerly and Westerly:—

Brisbane, Ipswich, Toowoomba, Warwick, Stanthorpe, Roma, Charleville, Cunnamulla.

Gympie, Nanango, Maryborough, Biggenden, Eidsvold, Bundaberg, Mount Perry.

Gladstone, Rockhampton, Mount Morgan, Clermont, Blackall, Longreach.

Mackay, Bowen, Townsville, Charters Towers, Ravenswood, Hughenden, Cloncurry.

Ingham, Innisfail, Cairns, Herberton, Chillagoe, Georgetown, Croydon, Burketown.

Mossman, Cooktown, Thursday Island.

QUEENSLAND GOVERNMENT

MINING JOURNAL

ISSUED MONTHLY BY
THE DEPARTMENT OF MINES

UNDER THE AUTHORITY OF
THE HON. THE SECRETARY FOR MINES

VOL. XLVI.] 20TH MARCH, 1945. [No. 521.

EFFECTS OF WARTIME CONTROL IN THE MINING INDUSTRY.

Since the outbreak of war, the mining industry in all its branches has been subject to control, directly and indirectly. In 1942 the demand for many metals and minerals of strategic importance was very urgent, and the Australian prices of a number of metals and minerals were "fixed" in order to obtain maximum production without loss to the producer. Within two years the changed war outlook and the ready response of the industry were responsible for accumulations of stocks to such an extent that the tempo of production was required to be eased, and, in the case of some metals, production ceased.

The gold-mining industry is at present at a very low ebb, and the ranks of the gold miners have almost been depleted. Little importance is attached to gold, and the base metals are all supreme. Without high priorities for numerous types of plant and equipment, without manpower allocation, the gold-mining industry has been stripped and only struggling remnants remain.

There is no market for molybdenite and no great urgency for wolfram supplies. Full exploitation of copper deposits at present being operated would result in over-production. Of the major metals, tin remains the one for which there is an eager market. In short, the mining industry has been geared to the war effort and has successfully met its demands—a very favourable position from the national point of view, but with many unfavourable aspects from the industry's viewpoint.

In the post-war years, even if all wartime controls are abolished, many effects of these controls will remain. In some instances, the results will be advantageous and in others adverse.

American and South African coal export trade has risen tremendously, and recently an American writer stated that there would be a great need for more coalminers in the United States after the war.

The loss of the principal tin-producing countries, Malaya, Siam, and the Dutch East Indies, to the enemy over the past three years has resulted in the substitution of other metals and materials to replace tin, but, despite this feature, it would appear that there will be a strong demand for tin for some years after the war.

In Australia, due to its comparative isolation and when there was the menace of invasion, it was necessary to promote self-support in the matter of metal and mineral supply, and consequently attention was drawn to those items which were imported either wholly or in part. Deposits of the relevant minerals were examined and exploited, thus forming firm foundations for their establishment in post-war years. There would seem to be scope for extension of sulphur and bentonite production. Zircon and rutile will remain in demand for various purposes, but the war-time production rate will undoubtedly be in excess of peace-time needs for home consumption. The proposal to establish a plant for the manufacture of aluminium is an important example of the measures considered necessary to safeguard home requirements.

In the coal-mining industry changes are being wrought, particularly in Britain. New methods and mechanisation are found to be necessary if the industry is to maintain its pre-war importance. Considerable attention has been given to the more efficient use of coal, with the result that the spotlight has revealed wastages in the past amounting to hundreds of thousands of tons annually.

Organisation has directed goods to markets, and rationalisation has determined the quantity of goods produced and marketed. Even if war-time controls were relaxed or abolished to-morrow, many effects of such measures, significant or otherwise, advantageous or adverse, will remain.

On Other Pages—Principal Features:

BLAIR ATHOL COALFIELD.

The Minister for Mines (Hon. V. C. Gair, M.L.A.) has decided that recent developments in methods of exploitation of large and shallow coal seams call for up-to-date information in regard to the extent and thickness of both coal and overburden on the very important Blair Athol coal field.

Photo No. 1 (1939)—BLAIR ATHOL OPENCUT.

It is just eighty-one years since coal was discovered at Blair Athol, near Clermont. Exploitation began in 1892, the product being carted 12 miles by road to the railhead at Clermont until 1909 or 1910, when the railway line was extended. Since then production has been continuous, the principal consumers being Queensland Railways.

The coal did not show on the surface. It was first discovered by station wellsinkers, and the unusual thickness of the seam was not suspected until 1892, when the first drilling was done.

The first official geological survey of the deposits was carried out in 1899 by the late B. Dunstan, who prepared a geological map of the area held under mining lease. At that time most attention had been given the Top Seam, which had a minimum thickness of 4 ft. Drills had penetrated only 12 ft. into the Big Seam, which subsequently was proved by shaft-sinking to attain a maximum thickness of 93 ft.

By 1905 the present Chief Government Geologist (Mr. L. C. Ball, B.E.,) noted that the Federal and Imbil collieries were still restricted to the Top Seam, but the Blair Athol Coal and Timber Co. Ltd. had sunk 42 ft. into the Big Seam, to water level, and drilled through a total of 65 feet of coal, which, in the shaft, approximated—

	Per cent.
Moisture	6
Volatile Matter	28
Fixed Carbon	60
Ash	6

By 1919 the existence of a third seam as much as 7 ft. thick had been discovered.

A geological reconnaissance was carried out in 1936 by Mr. J. H. Reid, District Geologist at Rockhampton, who estimated that, in the Top and Big Seams, the "actual" reserves were 116 million tons (2,150 acres), with a further "probable" reserve of 90 million tons (1,840 acres).

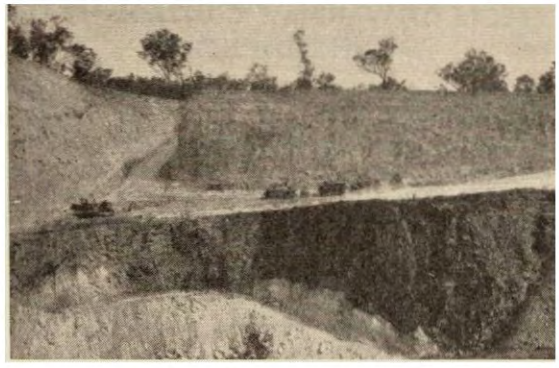


Photo No. 2 (1945)—BLAIR ATHOL OPENCUT.

The Minister has in view possibilities of expansion of output to meet post-war industrial requirements, both local and areal, and possibly supply of more distant markets, and accordingly has arranged for the District Geologist, Rockhampton, to proceed to Blair Athol at an early date to assemble all relevant data that may have accumulated since the last geological survey was made eight years ago. It may subsequently be found necessary to give consideration to systematic core-drilling of the field under the direction of a geologist.

Photo No. 3 (1945)—BLAIR ATHOL OPENCUT.

In this issue appear several photographs taken on the property of Blair Athol Opencut Collieries Limited. The largest (No. 1) is a view of the open-cut in September, 1939, showing face of clean coal 63 ft. (thickening proved to 85 ft.), and overburden 40 ft.

The others (Nos. 2 to 5) have been supplied by Messrs. Thiess Brothers and were taken during the recent work, carried out by that firm, of removing overburden to facilitate and expedite coal production.

No. 2 shows a fleet of machines nearly through the overburden to the coal seam about 70 ft. thick. Behind the machines appear the access road and other overburden for later removal, 78 ft. depth.

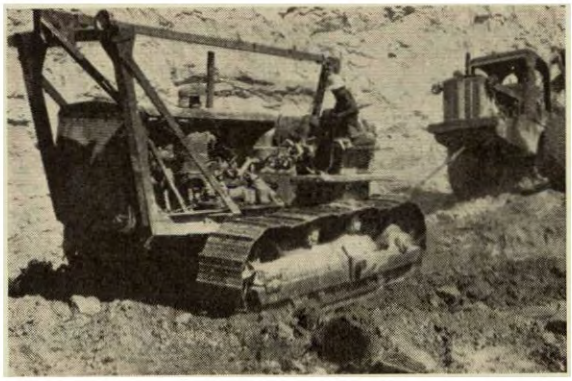


Photo No. 4 (1945)—BLAIR ATHOL OPENCUT.

No. 3 is another view of the access road and wall of overburden 78 ft. in depth (see No. 2).

No. 4 shows a caterpillar D8 tractor hauling a tournapull to fill a 15 cu. yd. scoop with overburden. When filled (a matter of 1 or 2 minutes only) the tournapull is released from tractor and travels with scoop under own power, at about 18 miles per hour, to deposit load at dump, and then returns for attachment to tractor for further loads.

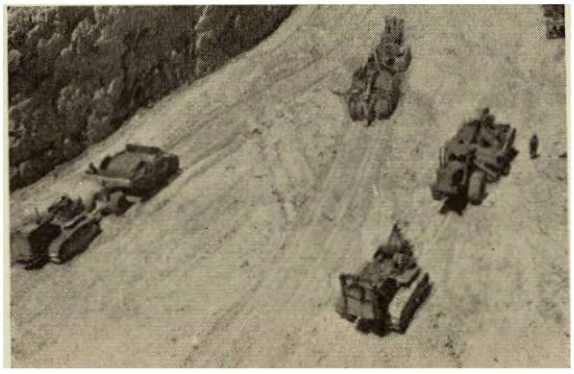


Photo No. 5 (1945)—BLAIR ATHOL OPENCUT.

No. 5 is a general view of units of modern earth-moving equipment in the new coalmining setting. In the foreground are a caterpillar D8 tractor and 12 cu. yd. scoop, and a caterpillar D8 tractor and tournapull with 15 cu. yd. scoop.

ASBESTOS INDUSTRY IN 1943.*

A GENERAL SURVEY.

Because of its strategic importance, no statistics on asbestos can be released at this time. The U.S. Bureau of Mines continues, however, to compile all available statistical data, which will be released at the termination of the present war emergency and will thus preserve the continuity of the statistical records. Ordinarily, the United States produces only 4 to 6 per cent. of its requirements of asbestos fibres, but in 1943, according to statistics compiled by the Bureau of Mines, United States' Department of the Interior, it furnished only 1 per cent. Most of the domestic production consists, normally, of the shorter grades of chrysotile, but the principal producer of these grades suspended operations temporarily in 1943 while opening up a new quarry. Canada supplied the larger part of the United States' needs of chrysotile, but the Canadian output is chiefly of the non-spinning shorter grades. African chrysotile was imported in substantial quantities to supplement the supply of Canadian spinning fibres. Soviet Russia, Australia, and India are other sources of supply. Asbestos is an important mineral in the military programme. The United States is dependent almost entirely for its supply of the critical grades on imports from Canada, Southern Rhodesia, and the Union of South Africa. The domestic contribution of critical grades is negligible. Three types of asbestos—chrysotile, amosite, and blue—are needed for military use. Chrysotile grades fall in two categories—long fibres suitable for textiles, and short fibres used in making asbestos paper, millboard, insulating cements, and a variety of asbestos-cemented products such as shingles, flat and corrugated siding and pipe. The long fibres equivalent to Canadian groups 1, 2, and 3, and Rhodesian grades C and G1, and C and G2, are regarded as critical because they are much in demand and supplies are not as abundant as desired. Aside from a considerable tonnage used in sheet packing, the long fibres are employed in asbestos textiles. Amosite, mined only in Africa, is a critical variety that has important military uses, including woven insulation for ship work, 85 per cent. magnesia and other high-temperature moulded insulations, fireproof marine insulating board, and sprayed asbestos insulation. It it is difficult to increase the production of amosite, and future requirements are not assured for as long a period as is desirable. Blue asbestos, grades MS and S, is imported from the Union of South Africa chiefly for the manufacture of asbestos-cement pipes, which have performed important functions as substitutes for iron pipe, thus freeing iron for more direct military uses. The supply of blue asbestos appears to be adequate, therefore these grades were not as critical at the end of 1943 as they were early in the year. Market trends throughout the year were consistenly from civilian to war needs. Demands were heavy, particularly for the long fibres. Supplies of spinning fibres were little in excess of immediate needs. Short fibres were adequate at all times to meet market requirements. Although demands of private builders lagged, the requirements of asbestos-cement products manufacturers were stimulated to some extent by the call for non-strategic materials to take the place of critical metals.

NEW ASBESTOS DEVELOPMENTS.

Research work is now being conducted in Canada on a process for recovering magnesium chloride from serpentine tailings in the Quebec asbestos area. Magnesium chloride is used as a source of metallic magnesium, now employed extensively in munition manufacture, and which may find wide use under peacetime conditions. Profitable utilization of this waste product in Quebec is highly desirable because the spoil banks now comprise upwards of 200,000,000 tons, and are being increased at a rate of about 20,000 tons a day. Possible by-products are salt cake, chlorine, silica, iron oxide, and chromite. A similar waste-utilization problem exists at all chrysotile-asbestos mining centres. A new sound-deadening and vibration-reducing material, having the trade name "Vibeston," is designed for use in airplanes to protect the hearing of flyers and to extend the life of the plane. No data are now available on its composition, but asbestos is an important component. Glass wool is used to some extent as a substitute for asbestos in making wire coverings and some heat-insulating products, but asbestos is generally regarded as indispensable in making friction equipment. However, claims have recently been made that aluminium wool impregnated with rubber will give satisfactory service in automobile brake bands. Interest has been renewed in a deposit of long-fibre chrysotile of good quality in north-western Alaska on Dahl Creek, a tributary of the Kobuk River. Samples from this deposit were first sent to the Bureau of Mines in 1932. The deposit evidently consists of slip-fibre veins, the largest of which, according to present knowledge, in 3 ins. across. The extent of the deposit has not yet been determined. A use for asbestos that has attained recent prominence is in making protective asbestos felt to prevent corrosion of petroleum pipe lines. The pipe is first coated with tar, followed by asbestos felt wound spirally. The Big Inch pipe line required 36,100 sq. ft. of such felt per mile, and the Little Inch 30,100 sq. ft. per mile. However, the entire length of the pipe lines was not thus covered. A new asbestos-cement product, sold under the trade name

"Stonewall," is said to be particularly adapted to replace metals urgently needed for war uses. The material may be applied to many types of construction. Although asbestos has important war uses, many of them are equally applicable to a peacetime economy. For instance, asbestos gaskets, packings, and heat-insulating products now used in munition plants are employed in just the same ways in factories producing peacetime civilian goods. It is expected, therefore, that post-war asbestos consumption will approximate that of the years immediately preceding the war. It is possible, however, that the use of certain substitutes already mentioned may tend to reduce consumption to some extent.

ASBESTOS IN CANADA.

Canadian asbestos consists entirely of chrysotile, and it all comes from the production centres of Thetford Mines, Black Lake, East Broughton, Vimy Ridge, and Asbestos, in the Province of Quebec. Production has been continuous since 1878, and reserves are still very extensive. The largest mine in the Quebec area is that of the Canadian Johns-Manville Co. Ltd. Other producers are Asbestos Corporation, Ltd., Johnson's Co., Bell Asbestos Mines, Ltd., Asbestos Crude and Fibre Mines, Ltd., Nicolet Asbestos Mines, Ltd., and Quebec Asbestos Corporation, Ltd. Short fibres are the most abundant. A very small proportion of the total output consists of spinning fibre and during recent years a downward trend in this proportion has been noted. This tendency is unfortunate at the present time, when the spinning grades are in greatest demand. The block caving method of mining has been employed in the region for some years, and although it is more economical than deep, open-pit work, especially for winter operation, the drop in the percentage of crudes recovered is attributed to this newer method of mining chiefly because there is limited opportunity for hand cobbing. The Dominion Bureau of Statistics has recently released figures for Canadian production that had formerly been held confidential. Data for 1940 to 1943 are given below:

Year.	Short Tons.	Value.
		$
1940	346,805	15,619,685
1941	477,846	21,468,840
1942	439,459	22,663,283
1943	427,141	21,738,686

ASBESTOS IN OTHER AREAS.

Production of chrysotile in Southern Rhodesia in 1943 was probably the highest on record. The principal production of asbestos in the Union of South Africa consists of amosite, a variety produced commercially nowhere in the world except in the Transvaal. Crocidolite (blue asbestos) is next in importance. Both were produced in unusually large quantities in 1943. In Swaziland, the Havelock mine began production in June, 1939, and produced about 18,000 tons in 1940. No figures are available for later years because of war restrictions, but its output has increased considerably, and it probably operated at capacity in 1943. The output consists of chrysotile. Russian asbestos deposits are large and the quality of the fibre is good. The Soviet Union is unique among all large asbestos-producing countries in that it is also a large consumer of asbestos. No figures for production are available since 1938, when an output of 86,000 tons was reported. A large asbestos products manufacturing industry had been established before the war, and it seems probable that the industry has been enlarged to provide for the automotive needs of its immense army. Asbestos-cement products are doubtless in heavy demand also for rebuilding war-devasted areas. The organization of the Australian Blue Asbestos Co., Ltd., capitalized at £100,000, is reported, and this company will engage in mining and processing high-grade blue asbestos in the Hamersley Ranges of Western Australia. The output will be marketed through the building materials division of the Colonial Sugar Refining Co. Small quantities of asbestos from this source now reach United States' markets. The Bolivian blue asbestos industry has been almost dormant since the loss of its former markets in Japan, but sales to consumers in Argentina were reported in 1943.

* "Mining Journal," London, August 19, 1944.

ELECTRIC SINGLE BUCKET EXCAVATORS.*

By P. H. R. DURAND, B.Sc. (Eng.), A.M.I.E.E.†

The electrically equipped single-bucket excavator is extensively employed in the quarrying industry for the excavation of rocks of various descriptions such as limestone and chalk for cement manufacture, ironstone and other minerals; also for excavating granite, sand and gravel, clays and shales. Large installations are used in the open-cast mining of coal. In addition these machines are sometimes used around industrial works, where an electricity supply is usually available, for the handling of materials such as blast-furnace slag.

In some quarries the excavator provides raw material which is processed in an adjoining factory, and there may be limited accommodation for storage of raw material prior to processing: the excavator is here the starting-point of a mass-production unit, its rate of output being measured by the hour instead of by the week or month, and in applications of this type the excavator has to be regarded as an automatic machine.

The two main types of single-bucket excavators, the shovel and the dragline, bear a general resemblance as regards the travelling underframe and revolving superstructure, but differ in front-end equipment and super structure machinery.

POWER SHOVEL.

The power shovel normally digs above the level on which the machine stands, although it may excavate comparatively shallow seams below this level. Certain materials such as boulder clay and stratified rock can be excavated directly without the use of explosives, while compact rocks and minerals may be dug after loosening by blasting. In rock quarry work the shovel may have to deal with stone of widely varying dimensions and weights produced by primary blasting; in addition to material with which the crushing plant can deal, the shovel may be required to lift and set aside heavier blocks for secondary blasting.

The reach of the shovel in the vertical and horizontal directions is dependent on boom length and angle and racking-arm length; each size of shovel is normally specified by its bucket capacity in association with these fundamental structural dimensions. The operating range of any one size of machine may be extended within limits by varying the length of boom and racking arms, but the bucket capacity must be correspondingly reduced in order to maintain machine stability. These variations in the machine front-end equipment, while offering a convenient method of applying one particular size of machine to a variety of different projects, have an important effect on the selection of motive power units and incidentally determine the proportion of actual transportation of material in the digging-loading cycle.

DRAGLINE.

The dragline normally digs below the level on which the machine stands. Originally employed for excavating comparatively soft materials in connection with the construction and maintenance of canals, the dragline has undergone radical improvements in construction rendering it capable of carrying out work formerly confined to shovels; for example, it is being successfully used for certain types of rock excavation where the material is adequately broken up by blasting.

Dragline reach or operating radius is a function of boom length and angle; additional reach can be obtained with a skilled operator by throwing the bucket on a slack drag-rope to a point beyond the boom-head radius. Vertical depth of digging depends on boom length, cable capacity of hoist and drag drums, and angle of repose of material; above ground level, vertical reach (maximum discharge height) is dependent on boom size and angle. Any one size of machine can be provided with different lengths of boom, the bucket capacity being varied to ensure stability. The proportion of dragline power expended in transportation of material is more marked than in shovel working because of the inherently longer horizontal reach.

* "Overseas Engineer," Feb., 1943.

† Extracts from a recent address to the Installations section of Institution of Electrical Engineers.

In considering electrical power application it is convenient to group the single-bucket excavator into two main divisions: those having a single power unit operating the various motions through friction clutches (giving to such machines the general title of "friction" machines) and those provided with independent drive to each motion (viz., hoisting or digging, sluing and racking).

The first group covers machines having an approximate range of shovel bucket capacities from ¾ to 2 cub. yds. Machines of from 2 to 5 cub. yds. capacity, generally termed quarry or mining type, are designed primarily for heavy-duty quarrying; the higher-capacity shovels in the second group are high-lift machines developed for stripping overburden in open-cast mines. The first group has few outstanding problems for the electrical engineer, but the larger machines call for the exercise of considerable skill and judgment in the selection and correct application of electrical power units, control gear and auxiliary apparatus.

The electrically equipped excavator in its present form is a highly co-ordinated machine and the steady progress made during the last twenty years is due to continual collaboration between the excavator builder, the electrical equipment manufacturer and, possibly most important of all, the ultimate user.

Intimate knowledge of field operation is one of the first essentials of excavator design.

Among the factors which affect the selection of the electrical equipment are the severe vibration caused by the pitching and rolling of the bucket, the shock loading, the necessity of suitability to all climatic conditions, easy maintenance and simple operation. Equipment has been designed capable of standing up to a range of climates varying from arctic to tropical, to condensation of moisture due to fluctuations of temperature and humidity, and the possibility of long idle periods in exposed conditions.

FUTURE DEVELOPMENTS.

Development in excavator electrical installations in recent years has been mainly in the direction of detail improvement (both mechanical and electrical) in individual machines and control equipment, wiring and equipment layout; field experience has been the leading factor in indicating improvements.

There is still considerable scope, however, for intensive detail improvement. Thus research on transient load conditions may afford data for the more effective correlation of generator and motor design with the control scheme and the application of special systems of excitation. Progress may be sought in the direction of controlling margins in motor performance due to winding-resistance variation arising from temperature changes in the exciter-generator-motor system.

While the Ward-Leonard system has up to the present been generally adopted as the most suitable method of applying electrical power to excavators, it does not necessarily follow that even the further perfecting of this system will represent finality. Fundamental departures from present practice may be evolved from previously established systems.

The development of special a.c. motors of suitable characteristics, combined with appropriate control schemes, would eliminate the necessity for housing converting units with their constant power losses and large floor-space requirements and make possible direct a.c. drive of individual motions from the incoming supply.

Diesel-electric generating sets on excavators confer the advantages of electric drive where no supply is available. Their application has been somewhat retarded for various reasons, among which may be noted:—

(*a*) Direct-coupled sets involve excessive price and dimensions on account of the comparatively low engine and generator speeds.

(*b*) Space available on an excavator for an engine and the separate generators required for full Ward-Leonard control is limited.

Recent developments in high-speed diesel-engine design, together with the perfecting of single-generator, multi-motor electric drive systems, may stimulate a revived interest in this subject. The mobile high-speed diesel-electric sets developed within recent years for emergency service also present interesting possibilities for supplying power to excavators by trailing cable via the machine collector gear.

Obvious advantages over self-contained diesel-electric excavators are the removal of the dimensional restrictions imposed on deck-mounted sets, a normally stationary engine with improved accessibility for maintenance, and the freeing of the excavator from the necessity of housing power station equipment not primarily essential for its main purpose.

J. STEWART NISBET.

Mr. James Stewart Nisbet, who died at Emerald on 7th December, 1944, was an old and well respected resident of the Anakie gem fields, and those who have engaged in gem mining from time to time during the greater part of the present century will regret to hear of his passing.

He first came to the field in November, 1899, and worked at the Mt. Clifford gold mine. He volunteered for and served through the Boer war, and, on returning to the field, engaged in sapphire digging at the *Reward* claim, and resided at Sapphiretown. He then acted as buying agent for various firms of gem dealers for many years.

During his residence at Sapphiretown he helped to promote and acted as chairman of the local field hospital, progress association, miners' association, &c. Latterly he held the position of postmaster at Sapphiretown, was local correspondent of the Rockhampton "Morning Bulletin," and for a period was secretary to the trustees of the Anakie Miners' Common.

The Department of Mines joins with the residents of the field in extending sincere sympathy to his widow and family, of whom there were three. One, the youngest son, Lieutenant Gordon Nisbet, was reported missing, presumed killed, in Malaya.

COAL PRODUCTS.*

The possibilities of a greatly extended use of coal as raw material in the post-war chemical industry of this country are attracting considerable attention. Our present difficulty is that of assessing the economic value of processing under normal conditions, particularly since we do not now know what kind of conditions will be regarded as "normal" after the war. Fractional distillation, hydrogenation, synthetic treatment, modification of the coal by solvents, outlets in rubber, acetylene derivatives, olefines, plastics, and so forth are all possible to-day and the technology is fairly-well established. So long as the world's petroleum resources flow obediently into man's service with but little human application of labour after they have been tapped, however, any serious competition from a raw material such as coal, which calls for a productive effort so much greater, must lie at the mercy of the international distribution schemes which are expected to form part of the return to peace. On the parochial scale autarky is justifiable as a means of keeping people employed—up to a point; so would be a return to hand labour for roadmaking instead of using modern power-plant—up to a point. Where is that point going to be established? If international co-operation is to be pursued sincerely after the war vast changes must be made in the methods of external trade. Coming back to coal and its processing it seems wise to hope for the best while preparing to make shift. Our goods most likely to attract the world's attention will be those which call for a maximum of skill and a minimum of imported raw material in their manufacture. If this is a fair working assumption the processing of coal seems very attractive. It is abundant in this country and involves no foreign exchange in placing it into industry. As a raw material it cannot compete with coal normally produced where it is wanted on the Continent, so that a very real difficulty exists in maintaining an export market. The answer, then, is to go for processed exports and turn away from raw coal export and this fits in with the peace-time labour position in this somewhat crowded island.

* "Mining Magazine," London, Oct., 1944.

SAFETY

The following article, reprinted from the "Canadian Mining Journal" of December, 1942, is the twentieth of a series to appear in this journal. These articles are intended not only as a matter of interest and education, but primarily to effect a greater measure of safety consciousness in the personnel engaged in the mining industry of the State:—

WOODEN SAFETY.

By W. B. PATON.

THE poet has said that ". . . only God can make a tree," but the trend of many mine accidents would almost indicate that only man can abuse the tree after it has been made, and bring about his own downfall.

Many of our Canadian metal mines are regarded as "timberless," inasmuch as little or no timber is used for ground support. But even in the scantiest timbered mine wood plays a sufficiently important part in the accident experience to warrant considerably more than a periodic, cursory examination by the safety engineer or shift boss, and much more than a passing thought by every workman.

Wood or timber, due to the less important part it plays in the many mining operations, has never been deemed worthy of a place in accident classification or cause lists. This is unfortunate, for particular "wooden" experiences seldom get further than the particular mines in which they occur. Thus the frequent outcome of the insignificant sliver is recorded under "infection," the bouncing billet of wood appears under "struck by flying object," the toll of the broken ladder rung under "fell from height," and so on.

The classification of accidents according to causes is admittedly difficult, for almost every accident has at least a dual connection, but persistent lesser causes such as wood, sprains and strains, jamming, &c., should be featured in the spotlight from time to time.

SELECTION AND GENERAL USE.

Except for special purposes like shaft guides, &c., most mine timber is cut locally and the species and characteristics are therefore limited. In spite of this limitation the best of any local timber lends itself more readily to the many mobile support and construction problems underground than does steel or concrete, provided reasonable care is exercised. It has relatively great strength and stiffness in proportion to its weight; and, if properly air dried, almost any local species will compare favourably with steel in bending strength on a weight for weight basis.

Both steel and reinforced concrete are undoubtedly strong, but their initial supporting properties are far in excess of the supporting properties immediately after their first signs of failure. On the other hand the average timber under excessive pressure usually fails gradually and gives the miner ample warning.

The commonest local timbers used in our mines are spruce and jackpine. Their relative bending strengths, compared with oak as 100, are 60 and 63 respectively, and their relative strengths of compression parallel to the grain, and on the same basis, are 72 and 73 respectively. Thus it is seen that our local timber is far from the strongest. In practice the relative figures even may fall lower than those quoted, for several factors may reduce the strength of any timber. Only the best timbers should be selected for jobs involving the safety of workmen, and the best timbers of any species are the straight and knotless ones which show no rot or deterioration as the cut ends.

At the smaller mines the timber is cut and hauled to the mine on contract by local men. Obviously mine officials cannot examine every log; in fact they examine very few. The contractor's only worry is to get the specified quantity cut and delivered, and consequently safety in relation to the quality of the logs practically rests with the miners who use them. But the miners are generally on contract themselves, and in the hurry for footage their urge to examine timber is a minimum. They are ever prepared to take risks.

But experience has taught us that more and greater risks are taken in the use of timber than in its selection. Let us examine some of these risks.

It is not generally known among miners that: the strength of a round timber is independent of its length within the limit of 4 feet 6 inches; the strength of a round timber per square inch of cross-sectional area is independent of its total area; a quartered timber or prop is 23 per cent. weaker than a round timber of equal cross-sectional area; sun cracks (ordinary), if straight and parallel to the length of the timber, do not appreciably affect the strength of timber; sun cracks, if diagonal (say to the extent of quarter of the circumference in a length of 2 feet) reduce, by almost a half, the strength of quartered timbers.

Most mines have their own sawing units which from local timber turn out sized lumber for every kind of rough job and building. These include planks for staging, legs and rungs for ladders, dressed members for underground timbering, &c. When the miner selects his planks, or the raise miner his ladders and stulls, or the timberman his bars and props, he assumes that they are at least of normal strength and perfectly satisfactory for the job on hand, and for his own safety. But does the sawyer or the carpenter know how they will stand up?

The ladder is the raise miner's life-line. It is made in the carpenter's shop, generally of 2-in. by 4 in. legs and 2 in. by 4 in. or 1 in. by 4 in. square rungs notched into the legs at a prescribed distance apart. The sawyer's duty is to cut the logs into sized lumber with as much economy as possible. The carpenter's job is to put the sized lumber together in the form of a ladder. The average rough carpenter has no regard for the position of knots relative to rung notches, or the angle of the grain relative to the length of the legs. And thus is born one of the most subtle dangers in raise work and other mining operations.

Many raise accidents have been caused through the failure of sprags or stulls. In some cases the supporting stull was broken from a direct blow or from too much weight, but the real cause in such cases was generally a flaw in the timber. In other cases the stull has been dislodged or has fallen out of position through sheer carelessness on the miner's part. Particularly where the wall rock is hard and hitches difficult to cut, too much reliance is put on wooden wedges as a means of support. Many miners overlook the facts that wedges are only intended for holding stulls and sprags in position, that the intense vibration of drilling machines has a remarkable loosening effect on the tightest wedges, and that wood shrinkage through quick drying may also have a loosening effect.

Planks used for scaffolding and staging deserve more than a passing word, for they have permitted many miners to pass on . . . . . to their deaths.

So far specific sizes for stage planking have not been written into our mining regulations, except that one province has a ruling that 2-inch planking shall not be used single-ply for any stage or scaffolds.

In normal practice long, straight grain is desirable, but to certain indolent types of miners it provides a real hazard. Rather than take the time and trouble to replace a cracked or broken plank, these chance artists merely turn the plank over and carry on; and even the keen eyes of the observant safety engineer or shift boss may fail to catch the self-made hazard.

Every miner is familiar wtih the adage: "The strength of a chain is but equal to the weakest link," but apparently many of them think that the adage was written for chains alone. At least it is not uncommon to find a 9-12-ft. space spanned completely by a 2-in. plank, but strengthened (?) by two shorter planks overlapping in the centre of the span. This is indeed false security.

Many stupid and unsafe practices are permitted by officials with regard to temporary and semi-permanent ladderways in open stopes, and even in manways. In underhand stoping the ladderway to the working bench is either laid on the footwall or down the rugged face of the next bench. In either case the wall is seldom uniform, but the length of the ladderway is standard. Rather than cut ladders to suit the undulating contour of the wall, complete ladders are used with the result that the lower half of a ladder may stick out in space. The danger of such free ends is apparent, particularly when the quality of the local timber and the inspection of the carpenter who made the ladder cannot be guaranteed.

Again, in the same stopes and in semi-permanent manways, a ladder may be anchored at top and bottom, but in such a manner as to create a different torsional strain when every second or third rung is stepped on. Or the bottom ladder may rest on one leg only to give the same twisting effect when traversed. These are small, important points for the stope boss and safety engineer to check on his daily rounds.

Scaling from ladders or staging is a job for an experienced man, but even the most experienced are caught occasionally. If there is doubt as to whether a slab of loose will fall clear of any wooden structure, it is safe to resort to the simple expedient of dropping a small piece of rock from the nearest edge of the loose area, or about 6 in. nearer for added safety. This precaution may appear to be elementary and uncalled for, but many exeprienced scalers have found out to their cost that sloping ground may be very deceiving. Single, protruding planks are also deceiving with regard to being in the clear of falling rocks, and it is decidedly bad practice to scale from a platform composed of planks which are at "sixes and sevens."

TIMBERING.

There is a wide variation in the methods of timbering for ground support even in our Canadian mines. In addition to special departures to cope with special ground behaviour, identical conditions may be dealt with differently, depending to a great extent on the district or school in which the management got its early training. But there are certain golden rules which are common to every system, if safety and economy are to be recognised.

Under normal conditions "crush" or weight asserts itself gradually and uniformly, and consequently the props should take the first "bite," thereby lessening the shock for the cap or bar and more or less preparing the whole set to take an equal share. But if the cap or bar is not tighly pinned immediately over each prop, the weight will be thrown over the span of the bar (via the lagging) causing it to break close to the prop. This is an important point which the mediocre timberman often overlooks. Of course, even if the bar is lightly pinned over the prop, the same breaking possibility will arise if the lagging is hammered in tightly; for in this case the lagging would take the first "bite" from the crush, and that "bite" may be just sufficient to break the bar.

Occasionally in metal mines we may run across the same condition with side weight. "Behind the timbers" makes a handy stowing place for clean-up, waste-rock, and other material. The waste material is faced with old timbers which are laid on top of each other along the inside line of the vertical props. Sometimes, where no side crush exists, the weight of the stowed material is sufficient to break the props, but more often the props are broken by the first wall movement, through the medium of the waste material.

This condition could be overcome safely and economically if we took a pattern from coal-mining practice, where roofs and sides support means so much. In most coal mines old and scrap timber is used in conjunction with waste to build supporting pillars along "roadsides" and throughout both longwall and "pillar and stall" workings. Conditions in metal mines differ very widely from those in coalmines in wood-rock pillar possibilities, particularly in height-width ratio of roadways and nature of rock for facing between the timbers of the pillars, but there are many situations where the wood-rock pillar could be used to advantage.

Sloughing walls on main haulageways, for example, are often more than a mere nuisance; they are often a danger to passing traffic. But if wooden pillars are adopted for protection, they should be built independent of the side props. This can only be done by double facing, carrying each pillar unit to the roof and pinning all around. Of course, the waste rock should be filled and reasonably packed as the side pillar advances.

The question of rock bursts has got a great deal of attention in recent years, but so far without success. Wooden pillars would certainly not solve the problem, but their wider use at vantage points would very probably strengthen the security in many "crush" areas. The writer has seen 7-ft. wooden pillars crushed to a space of 2 ft., but never instantaneously as is generally the case with shattered rock. And if the time difference between the resilient wooden pillar and the brittle solid rock pillar is sufficient to save one life, the experiment would be warranted.

The Canadian metal-mining industry declared war on combustible scrap underground after the Hollinger fire. That war has been waged relentlessly ever since, but the natural antipathy towards combustible material should in no way eliminate the use of scrap timber for pillar purposes, for the fire possibility of woodstone pillars is almost negligible.

PRESERVATION.

Depending on conditions the useful life of mine timber varies from two to six years, but this period may be extended very considerably if the timber is treated. While timber treatment for preservation is on the increase in our metal mines, yet it is not so extensive as one would imagine. The reason is not hard to find, for preservatives are expensive and timber treatment must be warranted before their use is adopted.

Peeling and seasoning are recognised for extending the life of mine timber, yet few of our mines even resort to these cheap methods. Local timber is generally plentiful and the only passageways where major timbering would be required to provide support for a long period are shafts, escapeways and main airways, main crosscuts and main haulageways. But if the mine is medium to large, even if weight or "crush" is not yet a serious problem, the treatment of timber for such passageways should get careful consideration. Some mine officials seem to think that rotten, but whole, timber sets in place have the magical supporting properties which many miners attribute to a chalk mark on a slab of loose. As a matter of fact, so long as the timber is whole little or no thought may be given to its condition. In such cases the absence of "crush" is the saving factor, but the sloppy official should not forget that when the "crush" decides to act it will not hold back until the timber sets are renewed.

Space here does not permit of going into details of timber deteriorating agents in the mine, but the commoner ones include fungi, insects and larvæ (introduced with the timber), mine gases, humidity and wide temperature limits.

Preservatives and their methods of application have a very wide range and the selection of either depends to a large extent on the amount of timber to be treated and the cost relative to the importance of the anticipated protection. Here are some preservatives that have been used to good advantage.

Creosote.—Different kinds, such as coal-tar, water-gas tar, and wood-tar. To many persons the smell of any of the creosotes is objectionable.

Zinc chloride.—Cheap, odourless, and soluble in water; easy to handle and apply.

Copper sulphate.—Not used extensively, probably because of its action on iron and steel.

Sodium fluoride and dinitrophenol (1 per cent. solution generally used).—This is probably the best of the non-proprietary preservatives. It adheres effectively to wood fibre, and it destroys fungi with complete neutrality to metals. Penetrates where moisture penetrates.

One of the most recent of the proprietary preservatives is Cuprinol, an introduction from England.

Due to capillary attraction, or osmosis, the mere surface application of any preservative would assure some degree of penetration. However, where wood preservation is extensive and important, the deepest penetration is desirable and pressure methods are resorted to. The simplest of these consists of filling a boiler or other suitable receptable with the preservative, introducing the timbers and finally forcing more preservative into the boiler or receptacle.

From a safety angle alone, there is no question about the benefits of wood preservation. The fire hazard is greatly reduced, for, in addition to surface remaining firm and clear, most preservatives are fire-resistant.

MARKET PRICES FOR ORES, Etc.

ORE BUYING FIRMS OPERATING IN QUEENSLAND.

O. T. Lempriere and Co. Pty. Ltd, Melbourne and Sydney.
Smelters: Bowden street, Alexandria, New South Wales.
Mail: G.P.O., Box 226E, Melbourne; Box 117CC, Sydney.
Telegrams: "Lemprie," Melbourne, and Sydney. Branch office at Herberton.

Frank Hambridge Pty. Ltd., 22-24 Bridge street, Sydney.
Mail: G.P.O., Box 1557E, Sydney.
Telegrams: "Hambrid," Sydney. Representatives in Brisbane (H. C. Oakes, 356 Queen street, Brisbane), Cairns, &c.

Norman Hill and Co. Pty. Ltd., Cathcart House, 11C, Castlereagh street, Sydney.
Telegrams: "Hillore," Sydney.

T. H. Kelly, Sydney Smelting Company, tin ore buyer, 39 Hunter street, Sydney. Branch office in Herberton.

Francis H. Snow and Co. Pty. Ltd., Adelaide, South Australia.

Frank Hambridge Pty. Ltd. (see address above).—Buyers of ores, minerals, and metals, representatives of producers in marketing minerals for the Australian domestic market and overseas consumers, and commission agents for the mining industry in general, are interested in the following:—

Wolfram-Scheelite Ore and Concentrates.—See Market Notes.

Manganese Ore.—Quality 70 per cent. MnO_2 and over, x.

Fluorspar Ore.—Quality 85 per cent. CaF_2 and over, x.

Chrome Ore.—Quality 40 per cent. Cr_2O_3 and over, x.

Felspar Ore.—Quality 12 per cent. potassium and over, x.

Graphite Ore.—Quality 70 per cent. carbon and over, x.

Molybdenite Ore.—Quality 85 per cent. MoS_2 and over, x.

x Value advised on request.

MARKET NOTES FOR THE GUIDANCE OF ORE PRODUCERS.

Tin.—A unit price of 66s. delivered Sydney has been fixed by Commonwealth authority for clean concentrates assaying 70 per cent. or over, a 70 per cent. concentrate thus realising £231 per ton delivered Sydney. Penalties apply to grades below 70 per cent. and to concentrates carrying impurities according to a standard scale. O. T. Lempriere and Co. Pty. Ltd. and T. H. Kelly, both of Sydney, are the buyers and smelters.

Wolfram and Scheelite.—A fixed price of 110s. per unit has been fixed by Commonwealth authority for clean wolfram and scheelite ore or concentrates. The fixed price applies on trucks at nearest railway so that all producers wherever located receive the same price on rail, which for WO_3 65 per cent. is £357 10s. per ton. Delivery to be given in double new ore bags. Producers are charged assay fees at rate £1 1s. per metal determined. There are deductions for grades below 65 per cent. WO_3 and penalties for impurities according to standard scale. O. T. Lempriere and Co. Pty. Ltd., Norman Hill and Co. Pty. Ltd., and Frank Hambridge Pty. Ltd., all of Sydney, and Francis H. Snow, Adelaide, act as buying agents for the Federal Government.

Antimony.—The current price schedule for clean ore or concentrates is as under—

In ores assaying—	Per unit. s. d.
60 per cent. and over	18 0
55·0 per cent. to 59·9 per cent.	17 0
50·0 per cent. to 54·9 per cent.	16 0
45·0 per cent. to 49·9 per cent.	15 0
42·5 per cent. to 44·9 per cent.	14 0
40·0 per cent. to 42·4 per cent.	13 0
37·5 per cent. to 39·9 per cent.	12 0
35·0 per cent. to 37·4 per cent.	10 0

which is the lowest grade to which the scale applies. There is a penalty of 5s. per ton for each 0.1 per cent. of arsenic present in excess of 0.1 per cent. O. T. Lempriere and Co. Pty. Ltd., Sydney, with a branch office in Herberton, are the buyers and smelters.

Bismuth.—Bismuth ores and concentrates are paid for at 9s. 4d. per lb. of contained bismuth when the assay value is 70 per cent. or over. The price falls by 1d. per lb. for each unit or part thereof by which the assay value of the ore falls below 70 per cent. down to 20 per cent., which is the lowest grade to which the scale applies, and an ore assaying Bi. 55 per cent. and free from excessive deleterious impurities would thus be paid for at 8s. 1d. per lb., which for this grade would be—1,232 lb. at 8s. 1d. per lb. = £497 18s. 8d. per ton of ore. Bismuth ores are smelted and refined by Bismuth Products Pty. Ltd. in Sydney, and O. T. Lempriere and Co. Pty. Ltd. act as their buying agents.

Molybdenite.—The market at 95s. per unit, delivered Sydney, which producers had enjoyed for the previous three years, was withdrawn in March, 1944, and there is no immediate outlet for this ore. The latest advised London price is £2 3s. 9d. per unit.

Manganese.—There is a demand in the South for chemical manganese (used with graphite for dry battery manufacture, &c.), and during last year Eveready (Australia) Pty. Ltd. paid £8 5s. per ton f.o.r. nearest railway station for ore with 75 per cent. MnO_2, increasing by 7s. for each additional 1 per cent. to £11 15s. per ton f.o.r. for ore with 85 per cent. MnO_2. This company has a branch at 307 Queen street, Brisbane.

The following is a schedule of prices to operate until further notice, which will be paid by the Broken Hill Proprietary Co. Ltd. for manganese ores delivered at the company's works, Port Waratah, Newcastle, New South Wales:—

Prices are based on ores containing not more than 8 per cent. silica, 4 per cent. iron, and .10 per cent. phosphorus.

PER TON OF 2,240 LB.

	£ s. d.	
Ore containing 45 per cent. Mn.	4 9 0	
Ore containing 46 per cent. Mn.	4 11 0	
Ore containing 47 per cent. Mn.	4 13 0	
Ore containing 48 per cent. Mn.	4 15 0	
Ore containing 49 per cent. Mn.	4 17 0	Fractions of
Ore containing 50 per cent. Mn.	4 19 0	Units, *pro rata.*
Ore containing 51 per cent. Mn.	5 1 0	
Ore containing 52 per cent. Mn.	5 3 0	
Ore containing 53 per cent. Mn.	5 5 0	
Ore containing 54 per cent. Mn.	5 7 0	
Ore containing 55 per cent. Mn.	5 9 0	

The above prices are subject to the following deductions:—

For each 1 per cent. silica above 8 per cent.—4d. per ton (fractions *pro rata*)
For each 1 per cent. iron above 4 per cent.—3/6 per ton (fractions *pro rata*)
For each ·01 per cent. phos. above ·10 per cent.—1/- per ton (fractions *pro rata*)

Settlements will be based on analysis of samples dried at 213 deg. Fahr. The percentage of moisture in excess of 1 per cent. in samples as taken will be deducted from the weight. Payment to be made on railway weights after deduction for excess moisture; or, in the case of shipments, the outturn weight of parcels shall be determined by the Broken Hill Proprietary Company's weighbridges. Sampling shall be done at the company's works, but if seller desires representation every facility will be afforded, and assays may be made, exchanged, and agreed as usual.

The company reserves the right to refuse to accept delivery of any consignments assaying below 45 per cent. Mn. If delivery of any consignment assaying below 45 per cent. Mn. is accepted by the company, a penalty of 3s. per ton will be imposed for each 1 per cent. Mn. below 45 per cent. and *pro rata* for fractions.

To ensure prompt attention, all communications should be addressed to The Manager, the Broken Hill Proprietary Company Limited, Post Office Box 196, Newcastle, New South Wales.

Beryl.—The price offering is approximately £2 18s. 6d. per long ton unit f.o.b. Fremantle, Brisbane or Melbourne, for a minimum grade of 9.5 per cent. BeO.

Quartz Crystals.—The principal purchasers are: Amalgamated Wireless (Australasia) Ltd., 47 York street, Sydney; and Radio Corporation Pty. Ltd., Grant street, South Melbourne. Prices up to £3 per lb. of usable crystal. See article on page 27 of Journal of 20th September, 1943.

Iceland Spar (Calcite).—The United States demand has now ceased.

Mica.—High-grade mica is in urgent demand for defence purposes in Australia. On 15th April, 1944, the Prices Commissioner fixed maximum prices for white mica for delivery at point of production as follow:—

To cut plates	60	to	100	sq. in.—	34s. 6d.	to 135s. 0d. per lb.
To cut plates	48	to	60	sq. in.—	31s. 6d.	to 108s. 0d. per lb.
To cut plates	36	to	48	sq. in.—	27s. 0d.	to 72s. 0d. per lb.
To cut plates	24	to	36	sq. in.—	22s. 6d.	to 58s. 6d. per lb.
To cut plates	15	to	24	sq. in.—	16s. 3d.	to 49s. 6d. per lb.
To cut plates	10	to	15	sq. in.—	8s. 3d.	to 36s. 0d. per lb.
To cut plates	6	to	10	sq. in.—	4s. 6d.	to 26s. 0d. per lb.
To cut plates	3	to	6	sq. in.—	2s. 9d.	to 13s. 6d. per lb.
To cut plates	1½	to	3	sq. in.—	1s. 9d.	to 9s. 0d. per lb.

Samples may be submitted for preliminary examination and report to the District Geologists or to the Chief Government Geologist in Brisbane.

Barytes.—There is a ready market for barytes in Australia. Possible buyers include:—Taubmans Q'ld. Pty. Ltd., 95 Edward street, Brisbane; Minerals Pty. Ltd., 318 Botany road, Alexandria, N.S.W.; and McLeod and Co., 7-9 Ralph street, Alexandria, N.S.W. Taubmans Q'ld. Pty. Ltd. use three grades of barytes: No. 1 pure white, with a minimum specific gravity of 4.2; and Nos. 2 and 3 off-white grades—the specific gravity of third grade should not be lower than 4.0. Probable values of crude barytes in Sydney would be £6 to £3 per ton according to quality. First grade (almost unprocurable in Australia) would command a higher price. The Sydney price for ground barytes would range from, say, £9 to £5 10s. per ton according to quality, and up to £12 per ton for first grade if procurable.

Copper.—Subject to arrangements being made with the Manager, *Mount Isa Mines Limited,* Mount Isa, beforehand, and subject also to the company's general conditions and regulations, that company will purchase copper ores or other copper-bearing material which it can handle through its smelter in conjunction with its own domestic production.

Effective as of the 15th January, 1945, and until further notice, all copper ores received by Mount Isa Mines Ltd. will be purchased in accordance with the following schedule:—

Payments.—Pay for copper contents less 1.3 units at the price for copper in effect on the date the ore is received at the company's works, as fixed by the Commonwealth Prices Commissioner.

No payment will be made for gold and/or silver contents except by special arrangement.

Charges.—Receiving, sampling and smelting—45 shillings per dry ton; converting, refining, and realisation, 5s. 6d. per unit of copper paid for.

Copper.—Subject to acceptance by the General Manager, *Mount Morgan Limited,* of the parcel after assay of a preliminary sample and subject also to the company's general conditions and regulations, the company will purchase copper-gold ores, in lots of not less than 5 tons, which it can handle through its smelter in conjunction with its own domestic production.

Until further notice the following tariff will obtain:—

Draftage.—Deduction of 1 per cent. from the net dry weight.

Payment for Copper.—The gross contents less 1.3 units per ton of material final weight will be paid for when realised at the price for copper fixed by the Commonwealth Prices Commissioner.

Payment for Gold.—The gross fine gold contents (less 1 dwt. fine gold per ton and 3 per cent. of the balance) will be paid for at the price which will be paid by the Commonwealth Bank of Australia when the gold content is produced and available for delivery to the bank, such date of production being not less than 130 days after the date of agreement or finalisation of assays.

Payment for Silver.—The gross fine silver contents (less 1 oz. fine silver per ton and 10 per cent. of the balance) will be paid for at the Australian equivalent of the average price of fine silver in London for the second month following the agreement or finalisation of assays, such price to be as published by the Australian Mines and Metals Association.

Treatment Charges:—Receiving, Sampling, and Smelting.—£2 5s. per ton of final dry weight of material. Converting, Refining, and Realisation.—4s. 6d. per unit of copper paid for. Refining and Realisation, Gold and Silver.—5s. per oz. of gold paid for; 1s. per oz. of silver paid for.

Payments.—Twenty-one days after agreement or finalisation of assays advance payments will be made as follow:—*Copper:* 70 per cent. of value less charges and realisation costs. *Gold:* £8 per oz. (Australian currency). The final payment for gold, silver, and copper contents will be made as soon as possible after details relating to the price the Commonwealth Bank will pay for the gold are in possession of the company and the copper price has been determined.

Information with full terms and conditions is contained in the tariff, a copy of which may be obtained on request from the General Manager, Mount Morgan Limited, Box 51, Mount Morgan, Queensland, to whom all correspondence should be addressed. The company is giving preference to ores high in copper and low in silica, as against siliceous gold ores.

LONDON AND NEW YORK METAL PRICES.

The London Metal Exchange having been closed in favour of maximum prices fixed by the Ministry of Supply, United Kingdom, the following prices are at present current there, alongside which are shown the quotations current in New York:—

—	London.	New York.
	£ s. d.	
Copper (electrolytic) ..	62 0 0 per ton	12 cents. per lb.
Lead	25 0 0 per ton	6·35 cents. per lb.
Spelter	25 15 0 per ton	8·25 cents. per lb.
Tin	300 0 0 per ton	52 cents. per lb.
Antimony	105 0 0 per ton	..
Silver, fine	0 2 1½ per oz.	44·75 cents. per oz.
Gold, fine	8 8 0 per oz.	35 dollars per oz.
Quicksilver	33 13 4 per flask	118 dollars per flask

CURRENT FIXED MAXIMUM AUSTRALIAN PRICES.

	£	s.	d.	
Copper (electrolytic)—Selling	105	0	0	per ton, ex Works, Kembla
Copper (electrolytic)—Buying	100	0	0	per ton.
Copper (electrolytic)—Gougers' Bonus withdrawn from 1st January, 1945.				
Tin	376	0	0	per ton, ex Works, Sydney
Lead	22	0	0	per ton, F.O.B., Port Pirie
Zinc	22	0	0	per ton, F.O.B., Risdon
Silver	0	2	7½	per oz., Fine
Gold (including 16s. 0d. per oz. Tax)	10	12	0	per oz. Fine
Wolfram ..	See paragraphs under Market Notes.			
Scheelite				
Mica				

GEOLOGICAL SURVEY REPORTS

OIL SHALES IN QUEENSLAND.

By L. C. BALL, B.E., Chief Geologist.

Oil shale technically is a bituminous sediment, but by popular usage it has come to include torbanite, which strictly should be classed as coal.

Torbanite, similar to the higher grades mined and treated in New South Wales, has been found in Queensland in quantities likely to attract the industrialist only in the Central district. Thus far, owing to the unrelieved terrain, but one lens of any economic significance has been located, yet there is room in the rather remote permian belt for fresh finds.

Queensland is well furnished with low-grade oil shale of tertiary age. Such are known to occur at intervals along the coastal fall south from the latitude of Mackay. Those of The Narrows are spectacular in their bulk, they are accessible by land and sea, and large quantities approach industrial requirements as regards crude oil yield, but their exploitation will necessitate the design and adoption of special methods of winning and treatment.—L.C.B.

Oil shales of the two main types, high-grade torbanite and low-grade oil shale, have been located in Queensland. The more important deposits of the former are of palaeozoic age and a few feet thick at most; while they occur in rather remote situations, being far inland and some distance from the railways. The latter are of cainozoic age, forming beds that may exceed 250 ft. in thickness or of mesozoic age and of little size; and they are mostly in the coastal belt convenient to the main railway systems. Very little prospecting had been done in any of the areas prior to the outbreak of war, when systematic core-drilling was initiated by the State Department of Mines.

THE TORBANITES.

Alpha, via Rockhampton, Central Queensland.—A small outcrop of inflammable shale near Native Companion Creek (30 miles from the Central Railway and nearly 300 miles inland) has been known for a long while to local station workers; but it was not till 1939 that a beginning was made to open up and test the bed. By shallow shafts and percussion boreholes the prospectors partially proved an area of 40 acres in which the torbanite yielding 95½ gallons crude oil per ton has an average thickness of 3 ft. and bulks approximately 165,000 tons. The torbanite is sandwiched between upper and lower canneloid coals respectively 3 ft. and 1 ft. in thickness and yielding 24 and 28 gallons crude oil per ton where first met. (The later and better laboratory results for this field were obtained with standard Bureau of Mines retort.)

After the outbreak of war, spurred by the falling importation of petroleum products, the mineral lessees endeavoured to interest consumers in the practicability of producing either petrol or vaporiser fuel but without success; and following the forfeiture of all but one of the leases the Government decided on a drilling campaign designed to ascertain the extent of the torbanite deposit.

Operations with core drill commenced at the end of October, 1942, and ceased in the middle of May, 1944, and the boring of the fifteen holes aggregated 2,017 ft. The boreholes are distributed over an area roughly 2 miles square; but the area included by triangulating adjacent bores is only about 2 square miles. Of the fifteen bores seven failed to cut torbanite, but only three failed to reveal coal; and interpolating it is calculated that the torbanite lens is pear-shaped with a maximum length of 2 miles and a maximum width of 1 mile, its area being approximately 800 acres. In the north-eastern part, the torbanite bed is 3 ft. thick, but it thins towards the periphery, and the average of the whole presumably is between 2 ft. and 3 ft. A recovery of nearly 2 million tons of torbanite should be possible, plus 3½ million tons of canneloid coal.

The proximate analysis of the torbanite in the shaft is: Moisture, 3.9 per cent.; volatile matter, 54.6 per cent.; fixed carbon, 25.5 per cent.; and ash, 15.9 per cent.; and the crude oil yield varied between 56 in the thinner northernmost lobe and 132 gallons in the central, the average of the core assays being 93 gallons. A composite sample of the shale oils obtained in the laboratory had a specific gravity of 0.908, and on its distillation range the gasoline and naphtha is 13 per cent. while kerosene is 17 per cent.

The torbanite is overlain and underlain by cannel coals with a combined thickness of 4 ft. to 5 ft. They vary somewhat but on the average yield 35 gallons crude oil per ton with the thicker upper coal tending towards 30 and the thinner lower towards 40 gallons. The proximate analysis (mean of 19 samples from 10 bores) is: Moisture, 7.9 per cent.; volatile matter, 35.3 per cent.; fixed carbon, 44.6 per cent.; and ash, 12.2 per cent.

Carnarvons (Central Queensland).—Torbanite is reported to have been found elsewhere in the palaeozoics of Central Queensland but confirmation is lacking. The high-grade torbanite in the Carnarvon Ranges north of Injune as now exposed appears to be only a few inches in thickness. Very little effective prospecting has been carried out in the area.

Withcott, near Toowoomba.—Bands of shale approaching torbanite in physical character have been found in the Walloon coal measures below the Toowoomba Range, but the thickness is only a matter of inches and no serious prospecting has been done on them.

THE OIL SHALES.

The Narrows, near Gladstone, Central Queensland.—The occurrence of a belt of oil shales along the strait between Curtis Island and the mainland just south of the Tropic of Capricorn has been known for half a century; but, though prospecting areas have been taken up from time to time, the amount of exploratory work done thereon was negligible.

In view of the national petrol shortage after the outbreak of war the Queensland Government decided to test the area; and during 1941-1943 the State Department of Mines core-drilled fifteen holes to the limit of the plant's capacity at about 300 ft. A total of 4,652 ft. of boring was done in a belt 10 miles long with a maximum width of 1½ miles.

The actual area included by triangulating the holes is 7,533 acres. The mean depth of overburden is 62 ft.; the average thickness of oil shale is 88½ ft. The proximate analysis of the drill cores shows: Moisture, 6.9 per cent.; volatile matter, 18.0 per cent.; fixed carbon, 2.5 per cent.; and ash, 72.6 per cent.

The grand total tonnage of 5-gallon oil shale proved is 1,052½ million tons, of which more than one-half (620½ million tons) has a potential crude oil yield of 15 gallons per ton, with progressive improvement from 11 gallons in the southernmost to 18½ gallons in the northernmost triangle. The richest showing was 34 gallons from 127½ to 135½ ft. in Borehole No. 1.

Plevna, via Mackay, North Queensland.—Oil shales of similar grade to those of *The Narrows* occur in the ranges behind Mackay where, however, the exposure is limited. In recent years seven holes have been drilled privately with percussion plant to a maximum depth of 118 ft. and supposedly in oil shale. Four shafts also have been sunk but not sampled. One of the outcrops yields 23 gallons shale. Proximate analysis: Moisture, 6.7 per cent.; volatile matter, 27.2 per cent.; fixed carbon, 6.0 per cent.; and ash, 60.1 per cent.

Lowmead, near Bundaberg.—Tertiary oil shales on the North Coast Railway between Bundaberg and Gladstone have been core-drilled at only one place to a depth of 475 ft. Overburden extends to 30 ft. Oil shale bands aggregating 58 ft. pierced above 221 ft. had a mean capacity of 14 gallons crude oil per ton.

Brisbane.—Tertiary oil shales in the vicinity of Strathpine have yielded as much as 50 gallons crude oil per ton, but

the shale beds revealed in the few shallow shafts sunk are thin or low-grade, the best found measuring 3 ft. in thickness and giving an average yield of 35 gallons per ton. Proximate analysis: Moisture, 4.4 per cent.; volatile matter, 22.5 per ton; fixed carbon, 4.4 per cent.; and ash, 68.7 per cent.

Oakey, Darling Downs.—Low-grade oil shales have been found in association with mesozoic coal seams on the Darling Downs, but the beds are not many feet in thickness and the crude oil yield seldom exceeds 20 gallons per ton, though exceptionally it approaches 40 gallons. Incidentally these coals generally yield between 40 and 50 gallons oil per ton on destructive distillation.

Nagoorin, near Gladstone, Central Queensland.—Tertiary oil shales of similar quality to Lowmead occur at Ubobo Creek, near the Boyne Valley Railway, but they have not been prospected.

Duaringa, near Rockhampton.—Tertiary oil shales occur near the Dawson River on the Central Queensland Railway, but three drillholes cored by the Mines Department in 1940 met only thin beds of oil shale within 200 ft. of the surface.

Carnarvons (Central Queensland).—A 2-ft. bed of 30-gallon oil shale has been located in the ranges north of Injune.

Camooweal, North-West Queensland.—The recent finding of 15 gallon oil shale in the Cambrians of North-Western Queensland in a percussion water bore on the Mt. Isa-Camooweal road opens up possibilities as yet quite unexplored.

Brisbane, 25th August, 1944.

APPENDIX.

REPORTS ON OIL SHALE DEPOSITS IN QUEENSLAND.

General—
Locality Map by L. C. BALL, n "Queensland Government Mining Journal," December, 1937, p. 428.

Alpha—
J. H. REID, Q.G.M.J., October, 1940, p. 262.
J. H. REID, Q.G.M.J., April, 1941, p. 73.
L. C. BALL, Q.G.M.J., December, 1941, p, 258.
L. C. BALL, Unpublished Memo., 25th January, 1944.
L. C. BALL, Unpublished Memo., 26th January, 1944.
L. C. BALL, Unpublished Memo., 25th May, 1944.
(Also several reports by L. C. BALL on drilling progress).

arnarvons—(Torbanite)—
Reference in Geological Survey Queensland Publication 277 (1926), pp 160–161, H. I. JENSEN.
Oil Shale by A. K. DENMEAD in Q.G.M.J., October, 1943, p. 70.

Withcott—
L. C. BALL, Q.G.M.J., April, 1913, p. 188.

The Narrows—
L. C. BALL, Q.G.M.J., February, 1914, p. 713.
L. C. BALL, G.S.Q. Pub. 249 (1915).
L. C. BALL, Q.G.M.J., May, 1921, p. 186.
A. K. DENMEAD, Unpublished Memo., 9th October, 1941.
(Also several unpublished reports by L. C. BALL on drilling progress).

Plevna—
L. C. BALL, Q.G.M.J., August, 1927, p. 306
S. R. L. SHEPHERD, Q.G.M.J., March, 1939, p. 92.
J. H. REID, Q.G.M.J., January, 1942, p. 2.
J. H. REID, Unpublished report, 2nd April, 1943.

Lowmead—
L. C. BALL, Q.G.M.J., January, 1916, p. 13.

Brisbane—
Strathpine, by L. C. BALL, Q.G.M.J., August, 1932, p, 221.
Strathpine, by L. C. BALL, Unpublished reports 12th and 21st January, 1943.

Oakey—
Sugarloaf, by L. C. BALL, Q.G.M.J., April, 1916, p. 165.
Sabine and Sugarloaf, J. H. REID, Q.G.M.J., April, 1929, p. 155.
Kingsthorpe, by L. C. BALL, Q.G.M.J., May, 1926, p. 166.
Oakey District (Acland), by L. C. BALL, Unpublished report, 28th May, 1942.

Nagoorin—
Ubobo Creek, L. C. BALL, Q.G.M.J., May, 1916, p. 213.

Duaringa—
Note in G.S.Q., Pub. 155 (1901), p. 20.
Note in G.S.Q. Pub. 159 (1901), p. 16.
Unpublished report J. E. RIDGWAY, 8th June, 1942.

Camooweal—
Unpublished report, S. R. L. SHEPHERD, 9th June, 1944.

CAMBRIAN OIL SHALE, CAMOOWEAL.

By S. R. L. SHEPHERD, Geologist.

The discovery of oil shale in the Cambrians of North-West Queensland is of intense scientific interest, for none has been recorded in such ancient strata elsewhere in Australia, though the carbonaceous shales in the Lawn Hill series of the Burketown mineral field may yield oil on destructive distillation. Economic repercussions may result, should higher grades be unearthed on further search. Credit is due to the driller in charge (Mr. Francis), who first recorded the fact that some of the drillings from the bore are inflammable.

A sample of drillings from 205-206 ft., as supplied to me from the Irrigation and Water Supply Department, was identified by Mr. T. H. Connah in the Geological Survey laboratory as calcareous shale, with estimated crude oil yield of 15 gall. per ton. Brown calcareous shale drillings from 268-274 ft., 600-680 ft., and 755-785 ft. gave only traces or very little oil in the retort.

Oil shale may occur in other bores in these Cambrians, but drill chips are not available; and no similar rock has been observed to outcrop in the vicinity, though calcareous shales are plotted at Split Rock, 12 miles to the west, and at the 61.3 mile borehole, 16 miles to the south-east.

Cambrians are now shown to extend along the road for 76 miles to the east of Camooweal, with metamorphic sediments of the May Downs series to the south-east and quartzite of doubtful affiliations to the east.

To account for the absence of the Mt. Isa shale series at the head of the Paroo (a tributary of the Leichhardt), the field geologist has invoked faulting with displacement of the order of 8 miles, based on the want of alignment of the Yamamilla and Corella limestone belts. The condition is susceptible to other explanation, viz., lenticularity and warping, folding and pitching. It should be borne in mind that the Argylla-Yamamilla region has not been surveyed or even reconnoitered, unless by field geologists of A.G.G.S.N.A., whose map reveals no important east-west break in this latitude.—L.C.B.

The 40-Mile Plain Bore is situated on the Mount Isa-Camooweal road, 79.6 miles from Mount Isa and 37 miles from Camooweal.

It is one of a series of seven water bores sunk by the Main Roads Commission during the construction of the road. The bore was sunk to a depth of 865 ft. in limestones and calcareous shales of Cambrian age. A small supply of water 75 gallons per hour was obtained at a depth of 840 ft. and the supply was increased to about 300 gallons per hour by shooting the well three times at this depth.

Acting on your advice that a sample from a depth of 205 ft. to 206 ft., submitted for examination in Brisbane, had been determined at the Geological Survey laboratory as a dark brownish-grey calcareous shale, estimated to yield under destructive distillation 15 gallons of crude oil per ton, I visited the bore and spent three days making a general reconnaissance and an attempt to obtain further samples of drillings from this or other bores in the Cambrian limestones.

Complete logs of the bores are not available at Camooweal, but full particulars have been forwarded to the Water Supply Department, Brisbane.

I was able to obtain some data of the bore logs and water supplies from Mr. D. S. Hall, Resident Engineer of the Main Roads Commission, and have received from you copies of the logs of Bores at 19-Mile, 29-Mile, 61-Mile, 92-Mile and the lower section of the bore at 79.6-Mile, which were submitted to the Department of Water Supply and Irrigation, Brisbane.

Although the logs are in general agreement there are some discrepancies in the information obtained from field records and those from Brisbane. As portion of the original field

records have been destroyed accidently by fire, the data submitted to Brisbane at the time of drilling should be accurate, and these have been adopted in preference to the information obtained on the field.

At the time the bores were sunk the urgent need for a water supply was the only consideration, and drilling chips from the bores were not collected systematically.

There are no further samples of drilling chips available from this or any of the other bores as all the small fragments were washed away by heavy rain during the wet season.

The driller's log of the bore at 79.6 miles, as tabulated, is completed from the field records from the surface to 293 ft., and from Brisbane records from 480 ft. to 685 ft. There is no record available from 293 ft. to 480 ft.

DRILLER'S LOG M.R.C. BORE at 79·6 Miles.

Depth.
Ft. Ft.
0– 3—Black soil.
3– 15—Red clay and grit.
15– 25—Yellow rock.
25– 35—Limestone.
35– 40—Clay and limestone.
40– 79—Limestone.
79– 83—Hard limestone.
83– 97—Limestone.
97– 99—Brown limestone, small soakage of water at 98 feet.
99–116—Grey limestone.
116–119—Hard limestone.
119–130—Hard and soft limestone.
130–147—Limestone.
147–172—Soft limestone.
172–178—Hard limestone.
178–205—Limestone.
205–206—*Black limestone.* These strata burn.
206–216—Limestone.
216–226—Hard limestone.
226–227—Hard sand limestone.
227–240—Limestone—hard seams.
240–260—Limestone—soft seams.
260–268—Limestone.
268–274—*Hard brown limestone.* Sample burns when fresh with bituminous smell.
274–293—Grey soft limestone.
293–480—No record.
480–538—Hard limestone.
538–570—*Oil smelling limestone.*
570–680—Hard limestone.
680–697—Decomposed granite.
697–775—Hard limestone.
775–783—*Oil smelling limestone.*
783–810—Decomposed granite.
810–865—Limestone.

Bottom of bore—865 ft.

Water at 840 ft. is only supply below 98 ft.

Originally 75 gallons per hour.

Well shot—

1st shot increased supply to 160 gallons per hour.

2nd shot—no effect.

3rd shot increased supply to 300 gallons per hour.

It appears from the driller's log that oil shale, designated by one driller "black limestone or hard brown limestone which burnt with a bituminous smell," or by another "oil smelling limestone," occurs at several horizons between a depth of 205 ft. and 783 ft. As the beds in the vicinity dip at very low angles this thickness of 578 ft. would be approximately the true stratigraphical thickness of the limestone in which seams of oil shale, varying in thickness from 1 ft. to 8 ft., occur. Strata from 538 ft. to 570 ft. shown in the log as "oil-smelling limestone" was described to me by the driller as being composed of thin beds of oil shale alternating with calcareous shales and limestones.

From the driller's description it is apparent that oil shale was obtained at the following depths:—205 ft. to 206 ft., a sample of these strata was determined as oil shale at Geological Survey laboratory, Brisbane; 268 ft. to 274 ft.; 538 ft. to 570 ft.; and 775 ft. to 783 ft.

I was not able to find any outcropping rocks of similar character, and the drillers state that they have not observed similar rocks in any other bores in this area.

It is quite probable that low-grade oil shale could occur in other bores without the drillers observing its presence, especially under the conditions of emergency when these bores were sunk. There are very few rock outcrops and the limestone soils are marked by a covering of concretionary ironstone pebbles, which have been used extensively in road construction.

Of the seven bores sunk by the Main Roads Commission on the road between Mount Isa and Camooweal, six were successful in obtaining suitable supplies and one at 104.9 miles was abandoned before obtaining a supply, partly because there was no further need for water at that point and partly because of drilling trouble caused by cavities in the limestones.

The bores are—

No. 5 B. at 19.3 miles from Mount Isa
No. 1 B. at 28.7 miles,
No. 2 B. at 48.3 miles,
No. 3 B. at 61.3 miles,
No. 4 B. at 92.1 miles, and
No. 7 B. at 104.9 miles.

The particulars of surface elevations above sea level, depths and water supply are tabulated.

No. of Bore.	Name.	Miles from Mount Isa.	Surface. R.L.	Depth.	Water Level.	Supply Gallons.
				Ft.	Ft.	Per hour.
5B	S. Paroo Creek ..	19·3	1,403	96	62	1,500
1B	Angle Hole	28·7	1,356	303	202	1,600
2B	Johnstone Creek ..	48·3	..	340	220	1,000
3B	61 Mile Camp ..	61·3	1,040	170	142	1,600
6B	40 Mile Plain ..	79·6	1,096	865	400	300
4B	Wooroona Creek or Split Rock ..	92·1	1,104	656	480	1,000
7B	..	104·9	..	120	Aban	doned

WATER ANALYSES (QUEENSLAND GOVERNMENT ANALYST).
(In Grains Per Gallon).

—	5B. 19·3 M.	1B. 28·7 M.	2B. 48·3 M.	3B. 61·3 M.	6B. 79·6 M.	4B. 92·1 M.
Total solids ..	118·0	78·8	20·6	72·0	83·2	48·0
Insolubles	..	..	..	..	..	..
Calcium sulphate ..	1·0	11·6	1·8	10·5	14·0	5·8
Magnesium sulphate	11·5	..	..	..	8·2	..
Calcium carbonate	..	5·5	4·7	9·0	..	4·8
Magnesium carbonate	3·2	15·5	6·8	18·4	6·8	7·4
Sodium carbonate	44·7	6·9	..	9·2	9·0	..
Magnesium chloride	..	..	4·1	..	..	6·3
Sodium chloride ..	57·1	39·9	2·6	15·9	44·9	22·4
Hardness (deg. Clark)	14	31	18	39	25	24
pH value	9·5	..	..	..	7·5	8·5
Organic matter ..	Present	..	Present	Present	Present	Present

Extracts from Government Analyst's report:—

"As organic matter is unusual in bore waters its presence in these samples is probably due to the cardboard inserts in the metal screw tops which may have been impregnated with the previous contents of the bottles. Provided there is no liability of pollution Samples 4B and 2B are considered suitable for human consumption, while 5B, 6B, 1B, and 3B are usable but may have aperient action when first taken by people not accustomed to saline waters."

Mr. D. S. Hall commented as follows:—

"Further to the Analyst's report I would add that I have had camps on bores 1 B (29-Mile) and 3 B (61-Mile) and every other bore for considerable periods and there has been no complaint regarding aperient action from any of these samples. The presence of organic matter is more probably due to the samples having been taken from tanks instead of direct from the pump."

The total solids content of most of these waters is chiefly sodium chloride, and while it may be considered high for colder climates the saline water should be more beneficial to health under the hot climatic conditions of North-Western Queensland than rain water. In the Mount Isa district the addition of salt tablets to drinking water is a long established practice.

The following drillers' logs of bores at 19-Mile, 29-Mile, 61-Mile, and 92-Mile are a copy of the logs submitted to the Department of Water Supply and Irrigation during drilling operations.

The bores at 19-Mile and 29-Mile are within the area occupied by Pre-Cambrian strata, while the bores at 61-Mile and 92-Mile are in the Cambrian beds.

MAIN ROADS COMMISSION BORE, 19-MILE—REG. No. 9304.

Driller's Log.

Ft.	Ft.	
0–	3	—Top soil.
3–	6	—Gravel
6–	12	—Clay and boulders.
12–	34	—Schist.
34–	45	—Schist and hard bars of quartz.
45–	60	—Schist and hard bars.
60–	73	—Schist.
73–	75	—Sand and quartz.
75–	79	—Schist.
79–	82	—Quartz and sand.
82–	85	—Hard quartz.
85–	90	—Quartz and yellow clay seams.
90–	95	—Hard quartz.

Water struck 73-75 ft and 79-82 ft. Rose to 62 ft.

MAIN ROADS COMMISSION BORE, 29-MILE—REG. No. 9286.

Driller's Log.

Ft.	Ft.	
0–	3	—Red soil.
3–	17	—Red clay and gravel.
17–	30	—Yellow clay and gravel.
30–	58	—Cream clay and sand.
58–	125	—Sandy pipe clay.
125–	160	—Pipe clay and fine sand.
160–	180	—Pipe clay and hard rock bars.
180–	195	—Pipe clay and quartz bands.
195–	200	—Light green rock (soakage).
200–	206	—Sand and clay.
206–	210	—Sandstone.
210–	225	—Clay and sand.
225–	247	—Clay sand and quartz.
247–	257	—Fine sandstone.
257–	286	—Sandstone and clay.
286–	301	—White quartz and sand.

Water steadily increased with drilling from 200 ft. to bottom. Rose to 202 ft.

MAIN ROADS COMMISSION BORE, 61-MILE—REG. No. 9289.

Driller's Log.

Ft.	Ft.	
0–	2	—Surface soil.
2–	10	—Red gravelly clay.
10–	20	—Yellow clay sandy.
20–	35	—Red gravelly clay.
35–	50	—Yellow clay gritty
50–	60	—Grey clay.
60–	80	—Chocolate clay and grit.
80–	90	—Red rock with cavities.
90–	107	—Red clay and grit.
107–	111	—Red clay with cavities.
111–	118	—Red clay.
118–	123	—Dark-grey rock.
123–	133	—Yellow clay.
133–	138	—Hard yellow rock.
138–	142	—Hard grey rock.
142–	147	—Yellow clay.
147–	148	—Black quartzite rock.
148–	149	—Hard blue rock.
149–	152	—Soft light yellow rock.
152–	164	—Hard yellow rock.
164–	167	—Hard blue rock.
167–	170	—Hard grey rock.

Water struck from 143 ft. to 149 ft.

MAIN ROADS COMMISSION BORE, 92-MILE—REG. No. 9699.

Driller's Log.

Ft.	Ft.	
0–	70	—Surface soil and clays.
70–	76	—Clays with quartzite seams.
76–	86	—Yellow clay, gravel, and hard seams.
86–	96	—Yellow gravelly clay and chocolate limestone.
96–	102	—Brown clay with seams of limestone.
102–	116	—Yellow clay and gravel.
116–	124	—Limestone boulders and clay.
124–	132	—Yellow clay and gravel with limestone boulders.
132–	134	—Broken chocolate limestone.
134–	150	—Limestone boulders, blue slate, sandstone, and clay.
150–	156	—Clay, gravel, and limestone boulders.
156–	169	—Limestone, clay, and water-worn sandstone.
169–	230	—Limestone.
230–	240	—Sandstone and limestone.
240–	257	—Blue limestone.
257–	268	—Blue limestone with water streaks.
268–	288	—Very porous water strata.
288–	296	—Water strata.
296–	656	—Limestone.

GENERAL GEOLOGY OF MOUNT ISA-CAMOOWEAL AREA.

The geological boundaries shown on the accompanying maps are incomplete but show the relative positions of various formations, more particularly the Templeton Cambrian trilobite beds and the Yelvertoft-Camooweal Cambrian series.

These boundaries vary considerably from those shown on the geological map of the district published by A.G.G.S.N.A. in 1937. In that map the Mount Isa series has been divided into Upper (limestone), Middle (quartzites and shales), and Lower (greenstones) of which the Middle and Lower are represented in this district.

Included in the Lower Mount Isa series are the hornblende schists near Calton Hills and the basalts (Spring Creek volcanics) on the Leichhardt River west of West Leichhardt Telegraph Station, and also a series of sedimentary rocks east of the quartzite and conglomerate range 2 miles east of Mount Isa township. These sedimentaries are not conformable with the north-south striking quartzites and shales at Mount Isa.

It is quite obvious from field observations that there are several distinct series present, but I have not carried out sufficient detailed mapping to establish their relationship.

North from Mount Isa the Mount Isa shales are not continuous to Calton Hills and do not cross the old Camooweal road west of Calton Hills, although it is probable they are represented near Paradise Valley.

They can be seen along the new Camooweal road for a distance of 14 miles, and it is unlikely that their texture would be completely changed to quartzites within a distance of 10 miles between there and the old road further north. I have therefore suggested the possibility of a regional east-west fault about 20 miles north of Mount Isa, although I have not observed any field evidence of its presence.

More field work is necessary to establish its existence but the known positions of the Corella limestones west of the Federal mine and east of Mount Remarkable give some support to the presence of a fault with a horizontal surface displacement of about 8 miles.

West of Mount Isa the A.G.G.S.N.A. map is inaccurate, as granite is shown on Beetle Creek and Little Templeton River, where the bulk of the fossil trilobites have been collected. These Templeton Cambrian beds form a comparatively small outlier and are separated from the Camooweal-Yelvertoft beds by the large batholith of Templeton granite and the May Downs metamorphics which occur in the area shown on the published map as Cambrian. The Camooweal-Yelvertoft Cambrian boundary crosses the Templeton River about 24 miles west of Mount Isa.

The accompanying geological map is left uncompleted and additions will be made as opportunities for more field work are presented.

The boundary of the Cambrian shown tentatively north from Yelvertoft to Thornton River and then westerly and northerly towards Lawn Hill is not accurate, but is shown only to give a general idea of the extent of the Cambrian in this area.

Fossil trilobites occur at 61-Mile camp near Yelvertoft. Specimens were collected also in the vicinity of Yelvertoft homestead by the late B. Dunstan and myself during 1926.

Massive limestones occur at Camooweal and extend at least 6 miles and probably 14 miles east of the township.

At Split Rock (92-Mile) there are extensive outcrops of horizontal calcerous shales. The bore at 104.9 miles was abandoned partly because of drilling trouble in limestone cavities. These cavities are typical of the massive limestones, and it is probable that these limestones extend from Camooweal to a point between Split Rock and the 104.9-mile bore. There are very few outcrops and both the limestones and calcareous shales produce similar soils.

Cloncurry, 9th June, 1944.

[The geological map referred to in Mr. Shepherd's report is incomplete, and, for that reason, is not published.—Ed. Q.G.M.J.]

GALALA WOLFRAM.

By J. E. RIDGWAY, Geologist.

The rather isolated Galala flat wolfram lodes were exploited mainly during the first two decades of the century. Some systematic but not very productive work was done in 1934, and during more recent years some of the old workings have been reopened.

The wolfram veins, which are of quartz 2 to 4 ft. wide, have been traced as much as 2,000 ft. They fill fissures and joints in coarse-grained granite, greisenised near the walls. Some of them are flat lying and others inclined as much as 60 deg.

The mineral associates are scheelite, molybdenite, bismuthinite, arsenopyrite, pyrite, and iron-manganese oxides.

The workings all are shallow but the stoped area cannot be defined. Still it is unlike'y that appreciable reserves remain in the flat veins; and the inclined veins do not give promise of workable ore below 20 or 30 ft. from the surface.—L.C.B.

This field is situated in the parish of Cobb, county of Lynd, district of Cook, some 12 miles by pack horse track north-west of Bullock Creek, a siding on the Almaden-Etheridge Railway Line, 153 miles from Cairns.

In an eight-day inspection of the field at the beginning of October, the main Galala workings, the *Mountain Maid*, about 1½ miles to the south, and the *Ironclad*, 2 miles west-north-west of the main workings, were inspected. The latter two were completely abandoned, and, at the former, only Messrs. R. J. Tansey and F. Reed were working. Other more distant workings in this locality could not be inspected. The main workings are on the eastern slopes and foothills of a prominent ridge, up to 400 ft. in height, and trending approximately north-south. The general level of the country lies between 1,600 ft. and 2,000 ft. above sea level.

History.—The date of discovery of wolfram on this field is not recorded. The earliest available records show that mining was in progress during 1912 on the following claims:—*Constant One, Rising Sun, Hopeful, Black Diamond, Black Jack, Senior, Just in Time, Great Western, Rip and Tear, Gunner, Struggle,* and *Easter Gift.* Subsequent records show that the *Senior* and *Struggle* claims were worked continuously until 1916, *Constant One* until 1918, and *Black Jack* until 1920. A large proportion of this work was on two flatly dipping veins. In 1913 the *Mountain Maid* was first referred to in official records; the *Ironclad* was not opened up until two years later.

A little work was reported to have been carried out on *Constant One* during 1927 and 1930. In 1934 the Galala Mining Company acquired a 60-acre lease, No. 858, embracing a considerable amount of the old Galala workings, and a 12-acre lease taking in the Ironclad lode. Prospecting by this company was confined to the Galala lease, and took the form of three adits on one of the flatly dipping veins which had been worked so extensively in the early days of the field. Fifteen men were employed, and by the end of the year a total of 100 ft. of driving was completed in the three adits. In the following year an old shaft (*Red Terror*) was cleaned out and some 30 tons of ore obtained from 51 ft. of driving, on a 2 ft. 6 in. to 3 ft. vein exposed in these workings. A parcel of 37 tons of ore resulting from this company's activities was forwarded to the Irvinebank battery and gave a return of 7½ cwt. of wolfram. Operations ceased following this result.

In November, 1939, leases were again taken up at Galala and Ironclad, but there is no record of any further mining having been carried out on the field until 1942, when Mr. R. J. Tansey took up the *Black Cat* claim, No. 2521, and reopened some of the old *Constant One* shafts. Just prior to the present inspection Mr. F. Reed became a partner in this claim and a new shaft was sunk which cut the main flat lode at a depth of 33 ft.

A small stamp battery owned by Mr. T. Dennis treated the ore in the early days of the field; at present only hand methods of treatment are being used.

Geology.—The country rock is a medium to coarse-grained granite. Near the *Ironclad* workings a small boss of hornblende diorite intrudes the granite. Dykes, intermediate to basic in composition, were observed in the district. A prominent dyke occurs near the main *Galala* workings, and has been partly mapped (see plan and sections). This dyke is doleritic in composition although in the northern end it has been highly silicified and has the appearance and composition of an acid rock. The wolfram-bearing veins cut through this dyke, although they become much reduced in size in doing so.

The veins occupy fissures and joints in the granite, and although these can be divided into two series—(1) horizontal to sub-horizontal, and (2) those dipping between 35 deg. and 60 deg.—there is no doubt that they are all contemporaneous.

The veins vary in thickness from 2 to 3 in. up to 4 ft.; the quartz being almost continuous in all sections observed. Workings extend along the outcrops of some of these veins for distances of between 1,000 and 2,000 ft. At times two or even more flatly dipping veins occur within a few feet of each other, and most of the flat workings on the field have been on composite or closely associated parallel veins.

Greisening of the granite between these flat veins and for some feet on either side of all veins has occurred. The walls of the veins are well defined as a rule.

The wolfram occurs entirely in the quartz. It is not evenly distributed but occurs as patches or bunches. The size or extent of these patches worked in the past could not be ascertained.

Small amounts of the following minerals were observed associated with the wolfram:—scheelite, molybdenite, bismuthinite, arsenopyrite, pyrite, and oxides of iron and manganese. Most of the scheelite is considered to be primary.

The Main Workings.—A group of connected veins varying in dip from horizontal to 60 deg. has been opened up by means of adits, open-cuts, &c., in addition to some 200 shallow shafts between 20 and 35 ft. in depth. Very few deep shafts were sunk on the field, although one brought to my notice is stated to have been sunk to 90 ft. Most of the underground work has been on two flat veins, which, on account of the surface contour, were easily accessible through shallow shafts over large areas. Where observed these veins varied between a few inches and 4 ft. in thickness.

The new shaft sunk by Messrs. Tansey and Reed cut one of these veins at a depth of 33 ft. It is 24 in. thick here and carries payable wolfram in the form of bunches of knapping ore. The miners estimate that they are producing about ½ cwt. per man per week at present from a small block left by earlier workers.

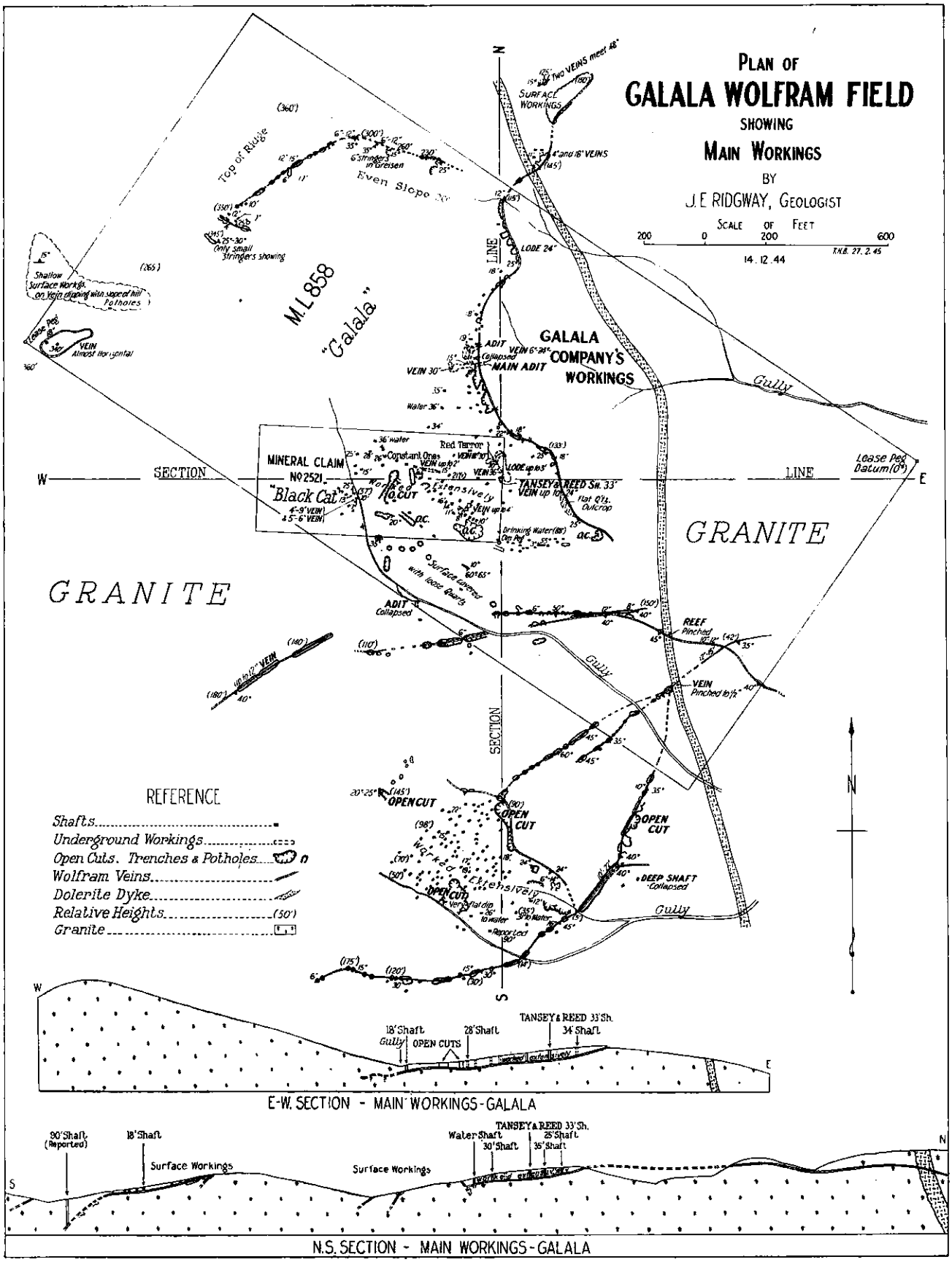
Mr. R. J. Tansey stated that he had produced 1.5 tons of wolfram during the past 2½ years.

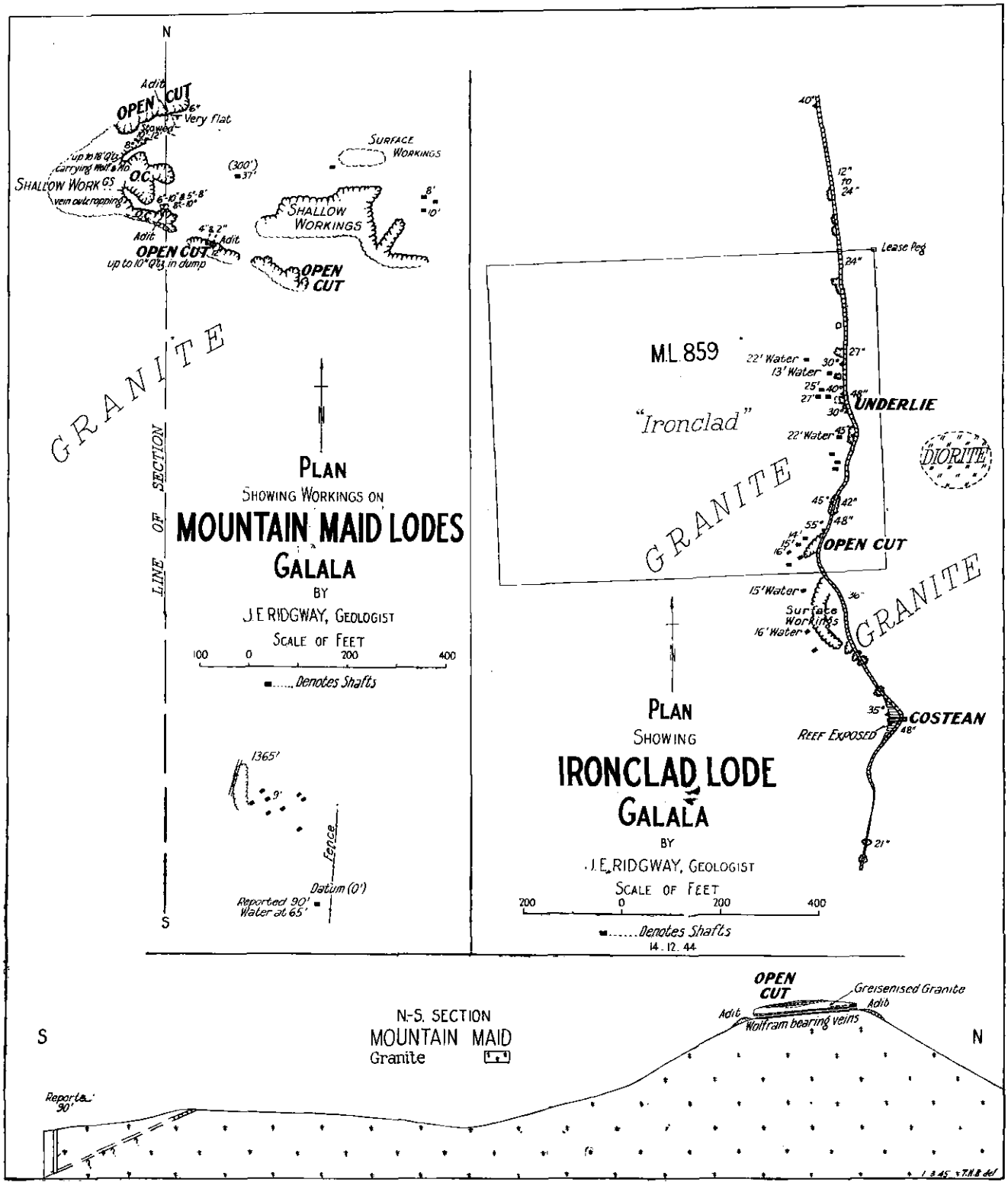
Field's Production.—The recorded production of the field amounts to some 50 tons of wolfram, the greatest output being in 1915 when 17 tons were recorded. The amount of work done on the field, especially on the flat veins, suggests that this does not represent the total production of the field.

Ironclad.—This is completely abandoned and only the surface workings are open to inspection. These reveal a quartz lode containing a considerable proportion of ironstone (hematite chiefly), striking approximately north-south and dipping westerly at 35 deg. to 45 deg. The vein varies between 1 ft. and 4 ft. in thickness. Workings (see plan) are distributed along the reef for a distance of some 1,600 ft., and consist of open-cuts, trenches, and upwards of 20 shallow shafts. Very little wolfram was showing, and records of production are not available. As the workings are all of small extent, only a very limited tonnage of ore can have been mined.

Mountain Maid (now abandoned).—On the top of a ridge about 1½ miles south of the main *Galala* workings, some flatly dipping (8 deg. to 12 deg.) veins have been opened up by means of open-cuts, adits and a few shafts. The wolfram and molybdenite bearing veins occur in greisened granite, and where exposed, vary between 2 in. and 12 in. in thickness (see plan and section). On the flat country 300 ft. below a more steeply dipping vein, which may have been connected with the flatter veins at one time, has been worked from an open-cut and shafts up to 90 ft. in depth.

No production records are available, nor is it possible to indicate future possibilities.


PLAN OF
GALALA WOLFRAM FIELD
SHOWING
MAIN WORKINGS
BY
J. E. RIDGWAY, GEOLOGIST
SCALE OF FEET
200 0 200 600
14.12.44
M.L. 858
"Galala"
GALALA COMPANY'S WORKINGS
MINERAL CLAIM No 2521
"Black Cat"
GRANITE
GRANITE
Gully
Gully
Gully
LINE
SECTION
REFERENCE
Shafts
Underground Workings
Open Cuts. Trenches & Potholes
Wolfram Veins
Dolerite Dyke
Relative Heights
Granite
E-W. SECTION - MAIN WORKINGS - GALALA
N.S. SECTION - MAIN WORKINGS - GALALA



Conclusion.—The lodes on the field have all been worked to shallow depths, which in the case of the flatly dipping veins has meant a considerable amount of mining. No idea of the extent of the underground work is known and blocks of shallow ground might remain which may interest the gouger. The number and closeness of the shafts, however, preclude the possibility of the existence of any large blocks suitable for organised operations.

The more steeply dipping veins have been opened up for the most part to say 20 ft. to 30 ft., and while the records of production are too meagre to enable any idea to be formed regarding the value of ore won from here, the shallow depth of the workings suggest that the veins have been too poor to follow into the undecomposed deeper ground.

I consider that some of the veins on the field, more especially the flat ones, still offer limited possibilities to the gounger or small working party prepared to follow the flat veins further into the hill.

In my opinion that portion of the Galala field which has been dealt with in this report is not likely to be of any importance as a producer of wolfram.

Charters Towers, 15 December, 1944.

QUEENSLAND MINING NEWS

SOUTHERN DIVISION.

Gympie District.

WARDEN'S REPORT FOR FEBRUARY.

Gympie, 8th March, 1945.

GYMPIE FIELD.

Widgee Crossing Cyanide Works.—Messrs. Archbold and Runge treated 1,280 tons of sand for a yield of 48.98 oz. gold worth, with premium, £434 6s. 5d., and 13.35 oz. silver, valued £1 7s. 10d.

Inglewood Cyanide Works.—Messrs. J. and V. Bentley treated 175 tons of sands for a return of 10.85 oz. gold, valued, with premium, £74.

KILKIVAN FIELD.

Essential Metals Syndicate.—In the *Shamrock* shaft, No. 4 north level was driven a further 30 ft., making the total length 261 ft. The reef is from 3 ft. to 5 ft. in width, but values decreased as driving continued, the ore from the last 20 ft. not being payable. At No. 3 north level the leading stope has been shot out, and a second stope was commenced. The treatment plant was idle for five days owing to a breakdown of the crude oil engine, but repairs were effected and the plant worked two shifts daily for the balance of the month. The Southern Cross engine and Myers bulldozer pump, hired from the Mines Department, are being installed at the dam. A total of 156 tons of ore were treated during the month. A parcel of 6 tons of concentrates treated at Mount Morgan gave a return of 12.1945 oz. gold and 1.0801 oz. silver, valued at £129 8s. Eight men were employed full time during the month.

JIMNA FIELD.

Sultana Extended (S. Martin).—No. 1 north drive off the main or western level was extended 5 ft., making a total distance from the level of 20 ft. This drive has been timbered over a length of 13 ft.

R. C. GRENIER, Warden.

Cracow and Eidsvold Fields.

WARDEN'S REPORT FOR FEBRUARY.

Maryborough, 6th March, 1945.

CRACOW.

Golden Plateau No Liability.—Work for the month consisted of the following:—No. 1 level: Ore varying from 20 ft. to 30 ft. in width has been broken from the No. 1 open-cut on Nos. 1 and 2 chutes. No. 3 level: No stoping has been done in No. 3 east stope owing to the filling of the stope being carried out. No. 4 level: Ore averaging 12 ft. in width has been broken from the *Sunrise* shrinkage stope. Mill: Four mills worked for 14 hours daily over the first fortnight, after which two ceased working as the remaining two were sufficient to treat the available ore. The shortage of ore was due to the necessity for filling the No. 3 east stope. Ore treated for the four weeks ended 17th February amounted to 1,880 short tons, from which 306 oz. of fine gold were recovered. Employment was found for 56 men, inclusive of those engaged in wolfram mining at Kildare.

EIDSVOLD.

Golden Plateau No Liability.—The following is a report from the company of work done on its prospecting areas for wolfram situated near Kildare Station in the Eidsvold district:—Green's area: Continued stoping ore 1 ft. wide over the drive on Green's Lode. Grey's area: Stoping ore averaging 1 ft. in width over the drive on this area.

L. H. MANSELL, Warden.

Kingston Tributers, Kingston.

Late South Queensland Mines (Pty.) Ltd.

During January, 1945, the Tributers treated 55 tons, the bullion recovery being 5 oz. 10 dwt. by amalgamation at the battery and 27 oz. 18 dwt. by cyanide; total, 21.58 fine oz. gold.

The corresponding figures for February, 1945, were 65 tons treated, 5 oz. 10 dwt. and 36 oz. 4 dwt. bullion; total 27.18 fine oz. gold.

Inspector's Report for February.

Ipswich, 6th March, 1945.

During the month of February the coal trade was brisk, most of the mines working at full pressure, but unfortunately output in the Ipswich and Rosewood districts was interrupted by the sad occurrence at *New Ebbw Vale* colliery, when four workmen lost their lives as the result of an explosion that took place at that colliery on the first day of February.

As a result of the abovementioned occurrence, most of my time was taken up with matters concerning that particular mine, but other mines inspected during the month, were *Klondyke No.* 3 and *Aberdare Extended No.* 1 collieries, and special inspections were made at the explosives magazine at Ebbw Vale prior to the dismantling of same, and during this particular inspection large quantities of black damp had to be removed before the work of dismantling could be proceeded with.

Excluding the accident at New Ebbw Vale No. 3, eight accidents were reported to this office as having taken place during the month, all being of a minor nature, none calling for any special comment.

The inspection of *Aberdare Extended* colliery was in the nature of a joint inspection with the manager, under manager, mine deputy of the colliery, the miners' inspector and one representative of the workmen employed at the mine, the result of such inspection being submitted in a separate report.

An inquiry as to the cause of the accident at *New Ebbw Vale No.* 3 colliery, was, on the 28th February, opened in the Warden's Court, Ipswich, before the warden, Mr. T. R. Kenneday, and four experienced miners as assessors. After hearing the evidence of four witnesses, the inquiry was adjourned to a date to be fixed.

T. SHARP, Inspector of Mines.

CENTRAL DIVISION.

Gladstone District.

WARDEN'S REPORT FOR JANUARY.

Gladstone, 12th February, 1945.

GLASSFORD CREEK FIELD.

Surprise Copper Mine.—Production by precipitation was continued during the month.

A. V. C. SMITH, Warden.

WARDEN'S REPORT FOR FEBRUARY.

Gladstone, 1st March, 1945.

GLASSFORD CREEK FIELD.

Suprise Copper Mine.—No work was done during the month.

A. V. C. SMITH, Warden.

Mount Morgan.

WARDEN'S REPORT FOR FEBRUARY.

Mount Morgan, 7th March, 1945.

GOLD.

G.M.L. 346 (*S. J. Warry*), *Clanricarde Reef, Mills Gully.*—During the month the drive at the 160 ft. level was cleaned out for a distance of 50 ft. Underhand stoping at this level was commenced and about 1 ton of ore is stacked. The reef averages 4 in. to 5 in. Difficulty in obtaining a suitable engine to drive the air compressor is delaying commencement of operations with the jackhammer.

G.M.L. 347 (*Warry and party*), *Clanricarde Reef, Mills Gully.*—Three test shafts have been sunk on this lease to a depth of 12 ft. to 13 ft., and trenching operations have also been carried out. In places the reef is 4 in. in width. The assay from one test hole was 35.9 dwt. of gold per ton and 18 per cent. copper. This reef cut out at a depth of 8 ft.

COPPER-GOLD.

Mount Morgan Limited, Mount Morgan.—A report received from the company states that during February, 1945, 37,395 tons of sulphide ore were mined and 36,250 tons of ore treated for an estimated production of 2,970 oz. gold and 235 tons of copper. The estimated value of production, taking gold at £9 16s. per oz. and copper at £100 per ton, was £52,606. During the month the company employed 943 men.

COAL.

Mount Morgan Limited, Dawson Valley Colliery.—A return received from the company for January, 1945, states that 714 tons 8 cwt. of unscreened coal were raised during the month and in addition a quantity of 150 tons of boiler coal was used. Thirty-one men were employed at the colliery during the month.

No report of operations for February, 1945, has yet been received.

R. POWER, Warden.

Rockhampton District.

WARDEN'S REPORT FOR JANUARY.

Rockhampton, 19th February, 1945.

The following is a report on mining operations in this district from reports received, for the month of January, 1945:—

COAL.

Styx State Coal Mine.—During January 3,608 tons 8 cwt. of coal were produced, 24 men being employed above ground and 106 below.

Bowman Colliery.—During the month 196 tons 5 cwt. of coal were won, 2 men being employed above ground and 4 men below.

Windsor Coal Mine.—During the month 894 tons 19 cwt. of coal were produced, 4 men being employed above ground and 11 men below.

Excel Colliery.—During the month 540 tons of coal were produced, 4 men being employed above ground and 16 men below.

Cambria Colliery.—During the month 2,043 tons of coal were produced, 6 men being employed above ground and 18 men below.

COPPER AND GOLD.

Mount Chalmers Limited.—Bailing was continued during the month, the water being confined to the sump at No. 3 level.

GOLD.

Banks have returned the following figures of gold won:—Bullion weight, 1.60 oz.; smelted weight, 1.52 oz.; standard weight, 1.52 oz.

LIMESTONE.

E. M. Pilkington & Coy. (*Caves*).—During January 596 tons of stone were quarried for a return of 298 tons of burnt lime, and 20 men were employed.

PRODUCTION STATEMENT.

COAL.

Mine.	Yield.	Value.
	Tons cwt. qr.	£ s. d.
Styx State Coal Mine	3,608 8 0	.. ..
Bowman Colliery	196 5 0	211 4 5
Windsor Colliery	894 19 0	869 2 8
Excel Colliery	540 0 0	511 3 9

GOLD.

Name.	Bullion.	Smelted	Standard	Value.	Premium.	Total.
	Oz.	Oz.	Oz.	£ s. d.	£ s. d.	£ s. d.
Banks ..	1·60	1·52	1·52	5 18 4	7 14 8	13 13 0

LIMESTONE.

Quarry.	Stone Quarried.	Burnt Lime.	Value.
	Tons.	Tons.	£ s. d.
E. M. Pilkington	596	298	698 12 5

A. H. SCOTT, for Warden.

Mackay District.

WARDEN'S REPORT FOR JANUARY.

Mackay, 14th February, 1945.

Mining activity during January was practically at a standstill, and no results were reported.

H. L. KINGSTON, Acting Warden.

WARDEN'S REPORT FOR FEBRUARY.

Mackay, 6th March, 1945.

The following particulars of ore crushed for the month of February, 1945, have been supplied by Mount Morgan Limited:—

Pine Vale Copper Mine (C. Bentley and C. F. Bagley).—Ore treated, 10 tons 7 cwt. 3 qr. Yield, gold, 5 dwt. 1 gr.; silver, 31 oz. 11 dwt. 21 gr.; copper, 1 ton 3 cwt. Value, gold, £2 13s. 5d.; silver, £4 1s. 7d.; copper, £115 1s. 6d. Total, £121 16s. 6d.

No other reports of crushings or of other mining activity have been received during the month.

C. B. BUXTON, Warden.

Inspector's Report for February.

Rockhampton, 1st March, 1945,

Inspections were carried out in the Mount Morgan and Rockhampton districts. Although some rain fell during the month, it did not interfere with the output from *Mount Morgan Ltd's.* open-cut to any extent. Three diesel lorries are now operating in the No. 47 drive, transporting ore from the open-cut to the 574-ft. level ore pocket. Six samples of the lorry exhaust gases were obtained and analysed for their carbon monoxide content which varied between 0.021 per cent. and 0.135 per cent. Two samples of the air circulating in the drive gave 0.002 per cent. and 0.0028 per cent. carbon monoxide. Carbon dioxide content of the lorry exhaust was 1.55 per cent. The handling of waste material through the 574-ft. level to the pocket and then up the Linda supply shaft by Granby skips was continued. No. 16 winze, below the No. 5 bench, is being stripped to obtain supplies of ore and, when connected with the No. 14 shaft, which has already been stripped to some extent, will make the No. 6 bench. A bulldozer has been working on the inclined roadway to the No. 4 bench. This roadway will replace the old inclined tunnel through which all material broken on the No. 4 bench was previously transported. A rise has been put up from the No. 2 waste drive, No. 3 bench, to the surface to facilitate

the removal of overburden from the south-eastern side of the open-cut. Well-drilling is now in progress on the No. 4 bench. Owing to the reverberatory furnace arch collapsing, smelting was suspended until the 13th, when operations were resumed after repairs had been carried out. No. 2 mill is closed down, No. 1 mill handling all of the run-of-mine ore which is hauled up the main haulage shaft.

Inspections were made of the Rockhampton City Council's Athelstone Range, Red Hill, and Koongal quarries and Allen's Gracemere quarry.

HERBERT J. REDMOND, Inspector of Mines.

Northern and Central Collieries.

Inspector's Report for February.

Rockhampton, 8th March, 1945.

During the month visits of inspection were made at the following mines:—*Ellengowan, Burgowan No.* 7 and *No.* 10, *Burrum East No.* 2, *Portland, Jubilee* and *Victory.*

Thirty-two accidents were reported during the month, 8 being for over 14 days' disablement, 23 for 14 days or less, and 1 for a period not yet known. One accident was of a serious nature. James Thomson, employed as a miner at the Blair Athol No. 2 mine, sustained a fractured right lower leg as a result of being struck by a piece of coal which fell off the coal face while he was preparing to bore a hole. The injured man was attended to at the Blair Athol Hospital and later conveyed to the Clermont Hospital for treatment. An inquiry will be held later.

During the month a fire was reported in the old working on the east side of No. 1 dip in the *Bowen Consolidated* mine and stoppings are being erected to seal off the area. The fire will not affect production to any great extent as the fire is on the return side of all the workings.

At the end of the month the three Bluff mines ceased work owing to the tribute agreement at the *Cambria* expiring, with no arrangements made for the future working of the mine. This will mean the loss of about 200 tons of high-grade coal daily.

The *Blair Athol Opencut* showed a substantial improvement in production for the month.

J. T. TAYLOR, Inspector of Mines.

CHARTERS TOWERS DISTRICT.

WARDEN'S REPORT FOR JANUARY.

Charters Towers, 13th February, 1945.

CHARTERS TOWERS.

Black Jack Mine.—Report of work for four weeks ended 27th January, 1945:—No. 6 south level: Driving has been continued in this level, the face having been advanced 38 ft., making a total distance of 158 ft. from the crosscut. There are 10 to 18 in. of white stone and pug in the hanging-wall with 2 ft. of mineralised formation and calcite underneath. No. 4 south level: No work has been done here during the term. No. 3 south level: Stoping has been continued south of the No. 2 underlie near the middle of the stope, where there are 5 to 6 ft. of mixed stone. Near the south end of the stope there is up to 1 ft. of good stone coming in on the footwall underneath the soft formation. Quartz hauled: 74 tons. Mill: No ore was treated during the period. The only work done in the cyanides has been repair work and clearing.

Lucky Hit Mine (F. Wilson).—During the year 1944 Mr. Wilson obtained 9 tons 19 cwt 3 lb of ore averaging 54.2 per cent. antimony, for a value of £435. He sunk several shafts on one ore vein averaging from 1 in. to 12 in. on which the shoots did not persist beyond 25 ft.

KANGAROO HILLS FIELD.

There is nothing important to report from this field, other than that the Shrimp battery will be crushing during February.

CHARTERS TOWERS—RETURNS FOR JANUARY, 1945.

GOLD.

Mine and Owner.	Ore Treated.	Yield.	Value.
	Tons.	Oz. dwt. gr.	£ s. d.
Old Tailings.			
Perseverance Cyanide—H. B. Douglas	300	83 3 0	299 10 1
Perseverance Cyanide—A. Wakeham	80	18 5 7	16 19 6

Smelted Ores.

Mine and Owner.	Ore Treated.	Gold.	Silver.	Copper.
	Tons.	Fine oz.	Oz.	Tons.
Mount Morgan Smelters—90 Mile (Hall and Atkinson) ..	116·5227	21·6769	72·2141	21·9699

ANTIMONY.

Mine and Owner.	Ore Treated.	Assay.	Value.
	T. C. Q. L.	Per cent.	£ s. d.
Lucky Hit—Shields Creek—F. M. Wilson (Parcel 1) ..	4 2 3 0	54·6	80 14 6
(Parcel 2) ..	3 15 2 25	52·6	159 6 5
(Parcel 3) ..	2 0 2 6	55·5	95 13 1

KANGAROO HILLS.

Alluvial Tin.

Locality.	Quantity.	Value.
	Cwt. qr. lb.	£ s. d.
Kallanda	13 2 1	148 10 0
Mount Fox	0 3 23	5 10 0

Wolfram.

Locality.	Quantity.	Value.
	Cwt. qr. lb.	£ s. d.
Ewan	8 3 4	219 0 0

H. B. CARNEY, Warden.

CAIRNS HINTERLAND.

Herberton Field.

WARDEN'S REPORT FOR JANUARY.

Herberton, 14th February, 1945.

ALLUVIAL TIN.

Nettles Creek Sluicing (Broken Hill Proprietary Co. Ltd.).—Sluicing operations were continued during the month working two shifts. The boxes were run out on the 3rd and the 23rd January, 1945, for a return of 6 tons 6 cwt. 2 qr. 14 lb. tin concentrates net, valued at approximately £1,450. The yardage treated for the month was approximately 7,500 cub. yds. Heavy storms on the 17th, 23rd and 24th January yielded 546 points, causing heavy floods in the creek. The total rainfall for the month was 790 points. Total men employed, 32.

Tableland Tin Dredging No Liability (Mt. Garnet).—350,000 cub. yds. of material were treated for a return of 61 tons 8 cwt. 1 qr. 5 lb. of tin oxide of a value of £14,100. The dredge operated satisfactorily throughout the month. Eighty-three men were employed. Work continued by M. R. Hornibrook Pty. Ltd., on the raising of the Return Creek dam, and 37 men were employed.

Corella (Nymbool).—Dredging continued until 18th January; 9 cwt. of tin were recovered. From this date the party were engaged in shifting to a new dredging site, and was also engaged in part excavations for the suction gas engine and producer to be installed.

McNab's Surprise Gully Claim (Nymbool).—Seven men were employed during the month, engaged in building dams, repairing boiler and hauling firewood. Expect to commence sluicing operations again shortly as plenty of water should soon be available.

WOLFRAM.

Just in Time Tributers (Mount Carbine).—G. Jonassen reports workings are flooded and he has ceased work on this tribute until after the wet season. His party is now opening up a scheelite lode about 4 miles easterly from Mount Carbine.

Black Beauty (Cassowary Creek near Herberton).—Mr. Wildman reports that prospecting work on the surface only was performed during the month.

Griffin Extended (Nettles Creek).—Martin Whelan reports that during the month the shaft was sunk for another 10 ft. The lode continues to go down in a north-easterly direction, but the wolfram has cut out for the last 8 ft. During the month approximately 1 ton of ore was treated for a return of 1 cwt. 3 qr. 7 lb.

GENERAL.

Good rains have now fallen over practically the whole of the Herberton Field, and there should be no hold ups over water shortages. However, the heavy rain has played havoc with the roads and many are in very bad condition. Neither the State Treatment Works at Irvinebank, nor the Great Northern Battery at Herberton reported any crushings for the month. The tribute party at the *Brassbottle* mine, one of the principal producers of lode tin for the past few years, has ceased operations, and the owners advise that they hope to have a new party commence work there shortly.

CRUSHINGS, &c., FOR THE MONTH OF JANUARY, 1945.

WOLFRAM.

Name of Mine.	Ore Treated.	Yield.	Value.
	Tons.	Cwt. qr. lb.	£ s. d.
Windbag—			
C. Henchell Tributers ..	4	0 3 15	17 0 0
McPaul and party, Tributers	10	4 2 24	89 0 0
Jonassen and party, Tributers	8	6 2 16	126 0 0
	22	12 0 27	£232 0 0

ALLUVIAL TIN.

Locality.	Treated.	Yield.	Value.
	Cubic Yards.	T. C. Q. L.	£ s. d.
Tableland Tin Dredge—			
Mount Garnet	350,000	61 8 1 5	14,100 0 0
Broken Hill Pty. Ltd.—			
Nettles Creek	7,500	6 6 2 14	1,450 0 0
O. T. Lempriere and T. H. Kelly—Purchased ..	..	1 12 0 15	356 0 0
		69 7 0 6	£15,906 0 0

Total Production for Month .. .. £16,138.

C. CLELLAND, Acting Warden.

WARDEN'S REPORT FOR FEBRUARY.

Herberton, 12th March, 1945.

There was very little mining activity on the Herberton Field during the month owing to the torrential rains making roads and creeks impassable. Neither the State Treatment Works at Irvinebank nor the Great Northern Battery at Herberton reported any crushings for the month. The dam at the State Treatment Works, Irvinebank, which was repaired about two years ago was again washed away early in the month, and repair operations have not yet been commenced.

ALLUVIAL TIN.

Nettles Creek Sluicing (Broken Hill Pty., Ltd.).—Owing to heavy rains, flood conditions interrupted sluicing operations from the 1st to the 5th February and again from the 15th to the 19th February. During the latter half of the month sluicing operations were confined to one shift only owing to wet season conditions making transport of fuels and concentrates very difficult. No. 2 shift is operating the boring plant, &c., which is testing the ground ahead of the working face. The boxes were run out on the 12th February for a yield of 3 tons 11 cwt. 3 qr. 13 lb. net of concentrates, valued at approximately £825. The throughput for the period was approximately 5,000 cubic yards. Twenty-nine men were employed on the workings during the month.

Tableland Tin Dredging No Liability (Mt. Garnet).—380,000 yards of material were treated during the month for a return of 73 tons 17 cwt. 0 qr. 17 lb. of tin oxide of a value of £16,960. The dredge operated satisfactorily throughout the month, and a total of 89 men were employed. Good rains have fallen throughout the district and both the Return Creek and the Eastine Creek dams are overflowing.

Corella (Nymbool).—Mr. W. G. Ikin reports that operations during the month were chiefly confined to dismantling and re-erecting the complete plant on a fresh dredging site approximately 200 ft. downstream. He has commenced operations on the new site partly through clay and mud to a depth of 10 ft. and reports the going very difficult.

McNab's Surprise Gully Claim (Nymbool).—Eight men were employed during the month engaged in dam-building, race-cutting, sinking sumphole for sluicing purposes, and sluicing the overburden. The ground contains boulders, which makes it difficult to work, and the party have also met with big bars of rocks. Heavy rain washed the dams away, but the party have repaired one of them and have a good supply of water on hand for future operations. They report the prospects for future working as good.

WOLFRAM.

Griffin Extended (Nettles Creek).—Martin Whelan reports having sunk a further 6 ft. during the month and recovered no ore. The country being too hard to warrant further prospecting he advises that he intends to abandon the mine and engage in ground sluicing operations.

LODE TIN.

Brassbottle (Hayles Siding).—It has been reported that a new tribute party has commenced operations in this mine, which has been a good producer for the past few years.

Omeo (Irvinebank).—Messrs. Perkes and party have commenced operations in this mine, which was formerly worked by the De Jarlais Syndicate. Bad roads and wet weather conditions have hampered operations.

Freethinker (Irvinebank).—A party of Irvinebank miners have formed a syndicate and have applied for a lease comprising the old *Freethinker* mine at Irvinebank. It is the intention of the syndicate to drive a tunnel approximately 220 ft. to connect with the lode, to facilitate trucking operations of the low-grade ore. As the mine is only 1 mile from the State Works, they consider that this ore could be worked economically in this manner.

CRUSHINGS, &c., MONTH OF FEBRUARY, 1945.

LODE TIN.

Name of Mine.	Ore Treated.	Yield.	Value.
	T. C. Q. L.	T. C. Q. L.	£ s. d.
Fuhlbohm's Mill—			
Ivanhoe	5 0 0 0	0 2 0 0	15 0 0

ALLUVIAL TIN.

Name of Mine.	Treated.	Yield.	Value.
	Cub. Yds.	T. C. Q. L.	£ s. d
Tableland Tin Dredge—			
Mount Garnet	380,000	73 17 0 17	16,960 0 0
Broken Hill Pty., Ltd., Nettles Creek	5,000	3 11 2 13	825 0 0
O. T. Lempriere and T. H. Kelly (Purchased) ..	..	2 17 0 24	632 0 0
	..	80 5 3 26	£18,417 0 0

Total Production for Month, £18,432.

C. CLELLAND, Acting Warden.

Chillagoe Field.

WARDEN'S REPORT FOR FEBRUARY.

Chillagoe, 12th March, 1945.

WOLFRAM.

Larkin Mine (A. E. and B. A. Gilder).—Very little development work has been done, activities being confined principally to pulling water. Sinking was carried on about 4 feet.

Forget-Me-Not Mine (P. W. Blakeney and party).—No. 4 drive off the main tunnel has been driven 15 ft. on payable ore. Approximately 5 cwt. of wolfram were recovered by hand treatment, but water interfered with operations for a fortnight during the recent heavy rains. A. Tudehope and party are prospecting in a stope in the old *Forget-Me-Not* shaft, but have not struck payable ore to date. J. Blakeney and V. Bailey have been handicapped by heavy water in a shaft on the *Sphlann*, but are now working on payable ore.

Osborne United Claim (S. M. Carr and party).—During the month of January work in the *St. Patrick* shaft was restricted to 13 days owing to the shortage of labour available. Sinking was continued on the main lode, and when work ceased owing to the flooding of the mine, the lode showed no payable values, but small pieces of metal occurring persistently give promise of an early enrichment.

During February, owing to heavy rain and continued flooding of the mine, there has been no further work in the *St. Patrick* shaft. From prospecting, a small leader was opened up some 80 ft. north of the *Osborne United* shaft. By following this for approximately 15 ft. on the side of the hill, 7½ bags of wolfram have been produced. The lode has been cut off at present, and prospecting is being carried on with the possibility of picking it up again. Dewatering of the *St. Patrick* will be commenced when the weather permits. Men employed for January were two, and February two.

Forget-Me-Not Mine (Bamford, Harry Bird).—Heavy rains washed away filling from surface installations at the *Two Jacks* shaft, and blocked the tunnel which led to a partial flooding of the mine. The damage caused has been repaired and work resumed in the sink at a depth of 220 ft., where ore containing fair metal values is being broken.

In the *Key of the Hill* shaft driving has been commenced on the ore-body at the 93 ft. level in a northerly direction.

Mavis Bruce Mine (Koorboora, George Egretz).—During January and February the old shaft was timbered from the surface to a depth of 10 ft. The wet was very heavy and filled up the old shaft, the new one, and all levels; work had to be discontinued.

An engine and pump have been ordered but have not yet arrived. A drain about 6 ft. deep has been cut around all the workings, and has proved of great value. The road has been repaired from the mine to the railway. Two men are employed at present.

Golden Casket Extended (M.L. 864, Winters and party—Bamford).—Work has been confined to prospecting in ground above water-level, and keeping the mine bailed out to keep it from being completely flooded.

LODE TIN.

Gilmore Lease (Woepen).—There has been no underground work done since the wet began. Dumps which were sluiced produced about 4 tons. Two men were employed.

A parcel of 10 tons sent to the Emuford battery yielded 1 tons 9 cwt. 21 lb., valued approximately £210.

PRODUCTION FIGURES.

COAL.

Name of Mine.	Tonnage.	Value.
	T. C. Q. L.	£ s. d.
King Cole Coal Mine	488 15 0 0	800 8 8

MILLED TIN.

Name of Mine.	Treated.	Yield.	Value.
	Tons.	T. C. Q. L.	£ s. d.
Emuford Battery— Gilmore Lease, Brodie and party	10	1 9 0 21	209 14 3

METAL PURCHASES.

Name of Mineral.	Yield.	Value.
	T. C. Q. L.	£ s. d.
Wolfram	16 13 0 1	6,291 18 10
Bismuth	0 0 1 11	10 2 4

E. D. SMART, Warden.

Etheridge Field.

WARDEN'S REPORT FOR FEBRUARY.

Georgetown, 12th March, 1945.

PRODUCTION FIGURES.

ALLUVIAL GOLD.

Producer.	Locality.	Bullion.	Gold.	Silver.
		Oz.	Fine oz.	Oz.
Firth Haigh ..	Struggle Creek and Havelock	5·85	3·97	1·27

E. D. SMART, Warden.

Inspector's Report for February.

Herberton, 1st March, 1945.

Due to the continuous heavy rain in the district the usual inspection trips have been considerably curtailed. Reports from small mines in the district indicate that few are working at present and quite a number are flooded. The dam at the Irvinebank State Treatment Works was washed away during the month.

Inspections were carried out in the Cairns, Watsonville, and Chillagoe districts. In the Watsonville district, Messrs. Struber Bros. intend to work the *Easter Sunday* mine. In the Cairns district, the Cairns City Council quarry has begun work, and crushing operations are proceeding. In the Chillagoe district, a special investigation was made regarding the Chillagoe State Smelters.

One accident was reported during the month. Ganger H. A. Day was seriously injured while working in the crushing plant of the Cairns City Council quarry. He is now recovering. No ropes were tested during the month.

J. L. JOLLY, Inspector of Mines.

CLONCURRY FIELD.

WARDEN'S REPORT FOR FEBRUARY.

Cloncurry, 9th March, 1945.

The following operations have been reported by Mount Isa Mines Limited in connection with the company's operations at Mount Isa during the month of February, 1945:—

COPPER.

Black Star.—No. 9 level: X69 stope.—Development consisted of 47 ft. of sublevel driving and crosscutting. X70 stope.—Development consisted of 7 ft. of sublevel crosscutting and 31 ft. of sublevel rising. X72 stope.—Undercut stoping development consisted of 122 ft. of sublevel driving and crosscutting and 78 ft. of sublevel rising. Blasthole drilling was continued in the above stopes and blast holes were fired as ore was required. The ventilation drive and crosscut at the grizzly level were completed, progress being 76 ft.

Black Rock.—11060 sublevel: J49 stope.—Ore-breaking by stripping of the floor pillar below the undercut stope. Development consisted of 18 ft. of sublevel driving. No. 4 level.—J50 rise advanced 31 ft., making a total of 81 ft. above the level.

SILVER-LEAD.

Black Star.—No. 8 level: V71 winze.—Advanced to 60 ft. below the level, progress being 44 ft. The stripping of the fan shaft above 8 level was completed.

GOLD.

No gold ores were produced or treated on this field, and no alluvial gold reported during the month.

PRODUCTION FIGURES—FEBRUARY, 1945.

TREATED AT MOUNT ISA BY MOUNT ISA MINES LIMITED.

Name of Mine.	Ore Treated.	Copper.	Value.
	Tons.	Tons.	£ s. d.
Mount Isa Mines Limited—			
Black Star (Sulphide Ore) ..	20,042		
Black Rock (Oxidised Ore) ..	498		
Ores purchased (Oxidised Ore)	227	1,005·28	100,528 0 0
Flue Dust purchased ..	9		
	20,776	1,005·28	£100,528 0 0

During the month of February, 1945, Mount Isa Mines Limited raised 20,010 tons of copper sulphide ore from the *Black Star* section and 558 tons of oxidised ore from the *Black Rock* section.

During the month of February, 1945, Mount Isa Mines Limited purchased the following copper ores:—

Name of Mine.	Ore Purchased.	Copper Content.
	Tons.	Tons.
Crusader	3·9264	0·9905
Lady Fanny	20·7595	2·9852
Manxman	4·7021	0·5607
Orphan	10·2341	1·1564
Bedford	39·8017	3·4740
Mount Olive	3·0681	0·3436
Mammoth	3·1156	0·3209
The Ace	20·1140	3·0827
Hampden	6·4530	1·2132
Coolan's Hope	4·7987	1·2663
Mussolini	21·3397	4·2695
Little Wonder	37·3518	5·4434
	178·7527	25·1064

Total value, £2,510 12s. 10d.

C. BURCHILL, Warden.

Inspector's Report for February.

Cloncurry, 5th March, 1945.

Field inspections, owing to the occurrence of scattered thunderstorms throughout the division, were confined to the Mount Isa and Quamby districts. Two accidents involving more than 14 days' disablement were reported during the month.

At *Mount Isa Mines Ltd.*, the tonnage of ore raised totalled approximately 20,000 tons, being a slight decrease on the previous month's figures. The completion of essential repairs to shaft storage pockets and a minor breakdown in the transport system caused the slight production drop. The bulk of the ore produced was obtained from X69 and X70 stopes, Black Star section, while a small tonnage of siliceous carbonate ore was obtained from the Black Rock section. Development and stope preparation are proceeding in X72 stope, Black Star section, and in the 110 lode, at No. 4 level, Black Rock section. The stripping of the air shaft between Nos. 7 and 9 levels has been completed and, on the withdrawal of the broken ore, ventilation of the lower levels will be further improved. Operations in the smelting section were continuous, but owing to shortage of ore the milling section was closed down for one day.

J. OWEN JONES, Inspector of Mines.

CAPE YORK PENINSULA.

WARDEN'S REPORT FOR JANUARY.

Cooktown, 12th February, 1945.

GOLD.

Blue Mountains Gold N.L. (near Coen).—No report has been received for the month, but it is expected that operations were suspended owing to the heavy seasonable rains. A Mint return has been received respecting the treatment of 15 tons from the *Golden Sunrise* mine. The yield was 15.24 fine oz., which is valued at £149 15s. 11d., with premium. (See report for December, 1944.)

TIN.

Heavy rains fell throughout the district during the month and continued on into February. The production of tin has not been up to expectation.

Mt. Poverty.—A. S. Campbell is working on Normanby Tin Company's tailings and leases by arrangement with the owners and is recovering good tin. S. Dowzer and G. Gliddon are also employed in these operations.

Mt. Amos.—G. Faber has returned to the field after an absence of two years. He has opened up a new claim. Work done consists of cutting scrub, new intake dam, head and tail race. O. Klohs has shifted from scrub to forest country. He has dug about 15 chains of head race and finished the tail race, and is ready for production.

Returns for the month are:—

GOLD.

J. T. Parker recovered 2 oz. 14 dwt. of alluvial at Ebagoolah, which is valued at £19 11s. 8d, with premium. J. A. Ludlow recovered 3 oz. of alluvial at Coen, which is valued at £19 7s. 3d., with premium.

TIN.

Locality.	Quantity.	Value.
	T. C. Q. L.	£ s. d.
Rossville	0 9 0 22	106 13 1
Mount Poverty	0 2 0 0	23 11 7
China Camp	0 7 2 22	85 3 9
Totals	0 18 3 16	£215 8 5

S. M. POWE, Acting Warden.

CANADIAN IRON ORE.

Canadian ore production in the past, although outstanding in regard to most minerals, has not yielded an important tonnage of iron. This should now be taken care of when the deposit being developed under what was till recently Steep Rock Lake gets into production. Before the ore, which was proved by dip-needle survey followed by diamond drilling and geoelectrical methods, can be attacked a vast amount of water must be pumped from above it, in addition to the diversion of a river and a lake drainage system. At least 30,000,000 tons of high-grade ore are expected from the deposit and plans for taking out 2,000,000 tons annually are well on the way. Steep Rock Lake is the lowest of a chain forming the Seine River system and lies 1,262 ft. above sea-level. Waters above are to be diverted into the western third of the lake, which is to be dammed off from the eastern portion carrying the ore. This has helped by tunnelling under Clearwater Lake and dropping its level 60 ft. in such a way that no sudden flood damage resulted lower down. Beside this diversion waters entering the ore area have been sealed off and run around and the isolated basin is now being pumped out by a battery of 500-h.p. electric pumps, which should expose the uppermost ore-body by next August. One of the minor jobs in connexion with the project is the excavation of the fish from two of the lakes concerned.—("Min. Mag.," London, March, 1944.)

Board of Examiners—Queensland Mining Acts.

Question Papers used at December, 1944, Examinations.

MINE MANAGERS' EXAMINATIONS—FIRST CLASS.

Metalliferous Mining.

Paper I. Monday, 4th December—9.30 a.m. to 12.30 p.m.

METALLIFEROUS MINING PRACTICE (Section I.).

Illustrate your answers wherever possible.

All questions have equal value.

Only SIX (6) questions to be attempted, one of which must be No. 7 which is compulsory.

1. Describe with sketches how you would—
   (*a*) Commence the sinking of a vertical shaft;
   (*b*) Timber a three-compartment shaft with frame sets;
   (*c*) Replace a frame set which had become damaged in the shaft.

2. What are the essential conditions for the successful working of the shrinkage method of stoping? Discuss its advantages and disadvantages.

3. A level in soft ground has completely caved in. Describe with sketches how you would drive through the broken ground and form a 7 ft. x 7 ft. level. Show dimensions of the timber you would use.

4. A vertical shaft 14 ft. x 7 ft. is being sunk in limestone and the depth is 250 ft. A full cut is required in each blasting operation. Show by sketch the position, number and depth of the boreholes you consider are necessary to successfully bring out the cut.

Give details of the equipment, number of men required and procedure to be adopted to ensure a complete cycle of operations in a shift of 8 hours.

5. A copper lode with good standing walls is approximately 50 ft. wide and dips at 80 degrees. In the oxidised zone the ore is friable but the sulphides are good standing ground. Describe with sketches how you would in each case exploit the lode showing any necessary timbering so as to extract the ore safely and economically.

6. Describe—
   (*a*) How you would take samples along a drive on a lode varying in width from 1 ft. to 6 ft. and how you would compute the average value of the lode.
   (*b*) The plant ordinarily required to bore an alluvial deposit 100 ft. deep.

7. Review the accidents which have occurred during operations at the mine or mines at which you have been employed for the past few years, naming the types of accidents as to nature and cause which have been most frequent. Discuss the measures you would take, mentioning any appliances you would use in each instance in order to prevent similar accidents in the future.

Metalliferous Mining.

Paper II. Monday, 4th December—2 p.m. to 5 p.m.

METALLIFEROUS MINING PRACTICE (Section II.).

Illustrate your answers with sketches wherever possible.

All questions have equal value.

Only SIX (6) questions to be attempted.

1. What is meant by the term "exudation" as applied to explosives and what are the conditions causing it? Give the name and composition in each case of at least three explosives in common use.

2. Give a general description of shaft equipment designed to handle 300 tons of ore and supplies per shift.

Comment in detail on plats, landing stations and arrangements on the surface for the safe working and economical handling of the ore.

3. Describe, with sketches, the arrangements of a change house suitable for a wet mine in which 150 men are employed.

4. Two shafts, 400 ft. apart, have been sunk upon a narrow quartz vein with steep dip and containing fairly uniform values. Sketch a longitudinal section showing how you would by means of levels, winzes, &c., open up the mine to provide for the employment of 60 men per shift underground.

Discuss how you would adequately ventilate the mine by natural ventilation, mentioning any subsidiary appliances you consider are necessary and showing their positions on the sketch section and the directions of the air currents indicated by arrows.

5. At a large mine producing 1,000 tons of ore per day from underground workings, the surface layout is considered unsatisfactory. The milling section, however, is well laid out. The mine is connected by a siding to the main State railway network. Sketch a surface layout you would recommend, showing the positions of all units and buildings necessary for the handling of supplies and equipment and the general administration of mining operations.

6. If a fire broke out underground in a large mine, what danger to the men would you apprehend? What steps would you take to ensure their safety and what steps would you take to deal with the fire?

7. Discuss the question of "dust" in metalliferous mines. Comment on the sources from which it may arise during operations and the methods you would use to combat its incidence.

Coal Mining.

Paper I. Monday, 4th December—9.30 a.m. to 12.30 p.m.

COLLIERY MINING PRACTICE (Section I.).

Illustrate your answers with sketches wherever possible.

All questions have equal value.

1. Describe with sketches how you would sink a shaft 12 ft. diameter and 900 ft. deep through ordinary coal measures strata. Give dimensions and other particulars of materials used. How would you deal with a feeder of 60 gallons per minute if met with at a depth of 300 ft. from the surface?

2. A report is requested on the advisability of using mechanical means for cutting, loading and conveying the coal in a mine. Give a description of the factors you would be influenced by in arriving at a decision and state their relative importance.

3. A haulage road 11 ft. wide and 6 ft. high supported by timber is to be widened to 20 ft. by 11 ft., using H girders on brick or ferro-concrete walls. Describe, using sketches, your methods of procedure whilst not interfering with coal production which must proceed on at least one shift.

4. Explain the factors governing roof control in longwall working. Describe the method of stowage you would adopt on a longwall face of 100 yards in a seam 3 ft. 6 in. thick, including a dirt band of 8 in. The roadway would be brushed 9 ft. wide and 7 ft. high.

5. What are the causes and indications of spontaneous combustion in coal? Where are fires most likely to occur from this source? Outline, using sketches, the precautions you would adopt in projecting the workings of a thick seam known to be subject to fires.

6. Review the accidents which have occurred during operations at the mine or mines at which you have been employed

during the past few years, naming the types of accidents as to nature and cause which have been most frequent. Discuss the measures you would take mentioning any appliances you would use in each instance in order to prevent similar accidents in the future.

Coal Mining.

Paper II. Monday, 4th December—2 p.m. to 5 p.m.

COLLIERY MINING PRACTICE (Section II.).

Illustrate your answers with sketches wherever possible.

All questions have equal value.

1. (*a*) Explain what is meant by the saturation point of air. What effect has an increase of temperature on the saturation point and how would this affect the underground workings?

(*b*) Describe the hygrometer and state the purpose for which it is used in coal mines.

2. A ventilating fan working at 80 revolutions per minute produces an air current of 110,000 cubic feet of air per minute with a W.G. of 2 in. What is the H.P. of the ventilation? If it is necessary to increase the quantity of air to 165,000 cubic feet per minute, what fan speed would be required? What would then be the W.G. and H.P.?

3. If, in unwatering by means of a water tank an old shaft connected with extensive workings at a steep inclination, a sudden lowering of the water occurred with a simultaneous outburst of gas, explain the probable cause.

4. Two vertical shafts are sunk to a coal seam 4 ft. thick at a depth of 200 fathoms, inclination 1 in 4. The distance between shafts is 44 yards along the line of strike. The area on the surface to be supported lies between a radius of 40 yards from each shaft. The ground sunk through consists of 10 ft. of surface soil, 30 ft. of clay and the remainder ordinary strata. Give sketches showing—

(*a*) The dimensions of shaft pillars;
(*b*) Accommodation for water standage (300 gallons per minute);
(*c*) Position of main roads (output, 600 tons per day).

5. It is found necessary to wind men and materials at the fan shaft of a large mine. Describe, with sketches, an efficient arrangement to allow of such without altering or adversely affecting the ventilation.

6. After completing a course of training at a rescue station, the brigade is to carry out a practice below ground, using self-contained breathing apparatus. How should the practice be conducted?

Metalliferous and Coal Mining.

Paper III. Tuesday, 5th December—9.30 a.m. to 12.30 p.m.

MINING MACHINERY AND MECHANICS.

Only SIX (6) questions to be attempted.

All questions have equal value.

Illustrate your answers with sketches wherever possible.

Metalliferous Mining Candidates must attempt No. 7.

Coal Mining Candidates must attempt No. 8.

1. What are the various forms of brake usually installed on a winding engine? Give sketches illustrating the principle on which the various forms act. How and when should brakes be tested?

2. Describe the water tube boiler and give a sketch (longitudinal section) of such a boiler equipped with a chain grate automatic stoker and indicating by arrows the passage of the products of combustion from the grate to the chimney stack.

3. In a vertical shaft 12 ft. x 5 ft. and 900 ft. deep the water has risen to within 300 ft. of the surface after abandonment. Prior to closing down, the quantity of water dealt with was 96,000 gallons per 24 hours. It is decided to unwater the shaft and continue the sinking for a further 100 ft. How would you proceed to take the water out and keep it under control while carrying on with the sinking?

4. Sketch the water end of a double acting pump showing the positions of suction and discharge valves and show the course of the water through the valves.

5. Describe and illustrate in each case the following—

(*a*) An appliance for releasing the winding rope from a cage in the event of an overwind;
(*b*) How you would shoe or cap a winding rope;
(*c*) How you would fix electric cables in a deep vertical shaft;
(*d*) An appliance for preventing the falling of a cage in the event of breakage of the winding rope.

6. What is the horsepower required to drive a pump having a 14-in. stroke with a barrel 3 in. in diameter 30 strokes per minute to deliver water from a shaft 150 ft. deep. How many gallons per hour are delivered?

7. Sketch and describe the appliances you would use for drilling a round of 6-ft. holes in the face of an 8 ft. x 8 ft. drive. Describe the cycle of operations and procedure necessary to bore and muck out in a shift of 8 hours.

8. Describe, with sketches, a type of hand-held electric drill for short holes, giving the voltage you would prefer, with reasons. Discuss the cycle of operations which you would adopt in using such drills in a mine or district with twelve working places in a 6-ft. seam where grunching is practised. Outline requirements as to safety from electric shock when using the drills.

Metalliferous and Coal Mining.

Paper IV. Tuesday, 5th December—2 p.m. to 5 p.m.

SURVEYING.

Candidates to provide themselves with a copy of Chambers' Seven Figure Mathematical Tables.

Illustrate your answers with sketches wherever possible.

All questions have equal value.

All calculations must be shown.

Only SIX (6) questions to be attempted.

Metalliferous candidates only must attempt No. 6.

Coal Mining candidates only must attempt No. 7.

1. A and B are the terminal stations on a level course 1,020 ft. in length. C is an inaccessible point on the top of a sandstone cliff. The angle subtended at A between the base line AB and the line of sight from A and C is 40° 30′ and that subtended at B between the base line and the line of sight from B and C is 55° 20′. The angle of elevation from B to C is 32° 40′. Calculate the height of the point C above A and B.

2. Describe a transit theodolite and enumerate its adjustments.

3. Two points A and B are half a mile apart. B is 60 ft. above the level of A and the country between is undulating. It is desired to lay a double tram line between A and B for the purpose of hauling coal or ore from B to A. How would you proceed to take levels between A and B and lay off the tram line with a uniform gradient?

4. The following table represents a page from a level book. Complete the table and calculate the gradient from A to G:—

Station.	B.S.	I.S.	F.S.	Rise.	Fall.	Reduced Level.	Horizontal Distance.
A.	4·69					100	
B.		9·21					62·0 feet
C.	6·28		3·06				81·0 feet
D.	4·53		11·64				36·0 feet
E.		15·17					42·0 feet
F.	6·72		8·48				56·0 feet
G.			3·19				78·0 feet

5. Explain the method of reducing and plotting a survey by rectangular co-ordinates. What are the advantages of this method as compared with that of plotting with a scale and protractor?

6. A block of ore containing 4 per cent. tin oxide has been developed and measures 350 ft. in length, 8.8 ft. wide and 150 ft. in depth measured on the lode. The specific gravity of the ore is 3. If tin oxide is valued at £200 per ton, what is the total value of tin oxide in the block?

7. In a coalmining lease of 56 acres there are two seams of coal, 6 ft. 2 in. and 4 ft. 4 in. thick respectively, dipping at 10° 40'. Assuming 5 per cent. of the coal is allowed for loss in working, calculate the tonnage of available coal. The specific gravity of the coal is 1.28.

Metalliferous and Coal Mining.

Paper V. Wednesday, 6th December—9.30 a.m. to 11 a.m.

MINING LAWS.

Only FOUR (4) questions to be attempted.

Metalliferous Mining candidates must attempt Nos. 4 and 5, which must not be attempted by Coal Mining candidates.

Coal Mining candidates must attempt Nos. 6 and 7, which must not be attempted by Metalliferous Mining candidates.

All questions have equal value.

Where the term "Rules" is used, it refers to the Rules under the Mines Regulation Acts or Coal Mining Acts.

1. Enumerate the legal requirements in regard to "Fencing and Protection" in and around a mine.

2. You are required to instal ladders in a vertical shaft 300 ft. deep. State how you would build the ladders and instal them in the shaft in order to comply with the Rules under the Acts.

3. What are the requirements of the Rules in connection with the testing of ropes and chains?

4. What are the Rules relating to the storage of explosives (Mines Regulation Acts)?

5. What is meant by the term "pressure" in relation to electrical supply? Define the terms—low pressure, medium pressure, high pressure, extra high pressure, "minimum"?

6. What are the requirements of the Coal Mining Acts in regard to the charging and firing of explosives?

7. What are the Rules under the Coal Mining Acts in connection with trailing cables for electrical machines?

Metalliferous and Coal Mining.

Paper VI. Wednesday, 6th December—11 a.m. to 12.30 p.m.

GEOLOGY.

Illustrate your answers with sketches wherever possible.

All questions have equal value.

Only FOUR (4) questions to be attempted, one of which must be No. 5.

1. Define the following terms, with sketches:—
   (*a*) Anticline;
   (*b*) Syncline;
   (*c*) Reversed fault;
   (*d*) Hade;
   (*e*) Dip;
   (*f*) False bedding.

2. Group the following rocks under the heading (igneous, sedimentary, metamorphic) to which each rock belongs:—Limestone, shale, granite, sandstone, diorite, basalt, slate, conglomerate, gneiss, schist. Describe any two of these rocks and name an economic mineral found in close association with each of the abovementioned rocks.

3. What is a dyke and how is it formed? Describe any dyke you have seen, giving the name of the rock of which it was composed. In what manner could a dyke affect a mineral or coal deposit?

4. What is oil shale? Give a description of its usual occurrence, naming the rocks with which it is usually associated.

5. Describe the principal geological features of any mining district in Queensland with which you are acquainted, and show by means of a sketch the relative positions of the coal seams or mineral deposits.

Metalliferous Mining.

Paper VII. Wednesday, 6th December—2 p.m. to 3.30 p.m.

METHODS OF TREATING VARIOUS CLASSES OF ORES.

Illustrate your answers with sketches wherever possible.

All questions have equal value.

Only FOUR (4) questions to be attempted.

1. Sketch and describe a modern flotation unit and enumerate briefly the principles employed in the separation of the mineral from the gangue by its use.

2. Sketch and describe a dust-collecting unit for use in a modern milling plant.

3. Describe the construction of a modern ball mill and its action in reducing ore. What is its particular function in connection with the reduction and concentration of ores?

4. Give a sketch (vertical section) of a blast furnace and a reverberatory furnace. What products are obtained from these furnaces when smelting copper ores and give the approximate analysis of each?

5. Briefly describe jaw and gyratory breakers. What are the main points to be considered when selecting a breaker for mill work?

Coal Mining.

Paper VII. Wednesday, 6th December—2 p.m. to 3.30 p.m.

USES OF VARIOUS CLASSES OF COAL.

Illustrate your answers with sketches wherever possible.

All questions have equal value.

Only FOUR (4) questions to be attempted.

1. Briefly sketch and describe the layout of an efficient screening plant to handle 1,000 tons of coal per day and giving four products.

2. To what extent can you judge as to the utility of a coal from its analysis? Illustrate your answer by commenting on the following coals:—

	Moisture.	Volatile Hydro-carbons.	Fixed Carbon.	Ash.	Calories.	B.T.U.
A.	4·48	39·64	50·6	5·28	7,137	12,847
B.	0·9	19·90	65·10	14·10	7,180	12,924
C.	1·04	6·09	86·92	5·95	7,847	14,125

3. What means would you adopt to reduce an excessive consumption of fuel at a colliery? Describe any appliances you would use and the results you would expect to get.

4. What it meant by the terms "carbonisation" and "hydrogenation" as applied to the treatment of coal? What products are obtained in each instance?

5. Explain what smoke is composed of, what causes dense smoking, and how it can be reduced or avoided.

MINE MANAGERS' EXAMINATIONS—SECOND CLASS.

Metalliferous Mining.

Paper I. Monday, 4th December—9.30 a.m. to 12.30 p.m.

METALLIFEROUS MINING.

Illustrate your answers with sketches wherever possible.
All questions have equal value.

1. Sketch and describe a good type of truck for use underground and mention the conditions for which the truck described is most suitable.

2. Describe either (*a*) the shrinkage or (*b*) the rill stope (cut and fill) systems of stoping ore bodies. State the conditions under which you would select either method. Sketch a typical section.

3. Sketch and describe a modern jackhammer (hand drill). What are the parts most subject to wear? How is it lubricated?

4. What are the provisions of the Mines Regulation Acts in regard to—(*a*) ladders, (*b*) signalling?

5. Sketch and describe the following:—

(*a*) The timbering of a rise in broken ground.
(*b*) Opening-out frame for an underground plat.
(*c*) Square set stope timbering.

6. You are required to drive a 7 feet by 5 feet level in hard granite using drilling machines. Describe how you would carry out this work mentioning how you would place the holes, their depths, the explosives you would use, and the amount and the order of firing. How would you ventilate the work?

7. What are the provisions of the Mines Regulation Acts in regard to the storage of explosives?

Metalliferous Mining.

Paper II. Monday, 4th December—2 p.m. to 5 p.m.

MACHINERY AND APPLIANCES.

Illustrate your answers with sketches wherever possible.
All questions have equal value.
Only SIX (6) questions to be attempted.

1. Sketch and describe a suitable cage for a vertical shaft 600 ft. in depth and showing all necessary safety appliances and other features which would fully comply with the Mines Regulation Acts.

2. Sketch and describe any small portable hoisting appliance with which you are acquainted.

3. What horsepower is required to pump 5,000 gallons of water per hour from a depth of 250 ft? Describe the pump you would use to do this work.

4. Sketch and describe a good type of stopehammer.

5. Sketch and describe a steam boiler suitable for supplying steam to a winding engine installed on a mine handling 60 tons of ore per day.

6. What are the requirements of the Mines Regulation Acts in regard to—

(*a*) Examination of winding gear;
(*b*) Quality and quantity of air in a mine;
(*c*) Ambulance at a mine.

7. Describe two types of machine drill bits and how they are sharpened and tempered. What class of bit would you prefer under the following conditions—

(*a*) Soft rock (limestone);
(*b*) Hard rock (quartzite).

Coal Mining.

Paper I. Monday, 4th December—9.30 a.m. to 12.30 p.m.

COAL MINING.

Illustrate your answers with sketches wherever possible.
All questions have equal value.

1. If on inspection before a shift commences your deputy finds an accumulation of inflammable gas in a working place in the mine, what action would you expect him to take? In the event of clearing the accumulation, what written report would you expect and when? If the accumulation remained, what report and steps would you expect of the deputy and when? What action would you take on the reports as under manager?

2. Describe the function and give particulars of the gauze in an oil-burning safety lamp. Under what conditions and for what purpose solely must safety lamps be used?

3. A main haulage road 11 ft. wide and 6 ft. high has to be driven through a fault which makes the roof, floor and sides weak and broken for a distance of 18 yards. Describe how you would proceed and the method you would adopt to make the road secure. Give full particulars of all materials used.

4. Compare fuse with electric shot firing. Give conditions which would cause you to prefer either method in places on coal, in stone drives and shafts respectively. Describe the common electric circuit when magneto exploders are used.

5. Outline three methods of operating a self-acting incline or gravity plane—

(*a*) Where hand-wheeling is carried on by a balance;
(*b*) Where the operator does not travel with the skip;
(*c*) By an endless haulage rope.

Sketch a method of attaching the skip to the rope in (*c*).

6. Sketch an air regulator. Give the circumstances requiring one, explaining fully its functions. State the minimum requirements in the Coal Mining Acts for quantities of air per man and horse underground.

Coal Mining.

Paper II. Monday, 4th December—2 p.m. to 5 p.m.

MACHINERY AND APPLIANCES.

Illustrate your answers with sketches wherever possible.
All questions have equal value.
Only SIX (6) questions to be attempted.

1. Sketch and describe an appliance for drawing props which allows the timber drawer to operate at a safe distance. Outline the precautions you would adopt to avoid accidents in withdrawing timbers including chocks or cogs after a lift from a pillar of coal had been completed, without using a special appliance.

2. How would you ascertain the quantity of air passing along a roadway measuring 12 x 8 ft. (*a*) without using a wind instrument; (*b*) with an instrument, describing the full procedure? What would be the quantity passing if the instrument recorded 230 ft. per minute and the correction to the instrument between 200 and 300 ft. per minute was + 22 ft. per hundred feet?

3. Describe with sketches a method of testing the effectiveness of the safety catches on a cage in a vertical shaft. What would be the maximum permissible distance regarded as safe for the cage to fall freely before being held?

4. Describe the endless rope system of haulage.

On an endless haulage road skips are clipped to the rope at 30-yard intervals in pairs, they carry 15 cwt. each, and the speed of the rope is 2 miles per hour. What weight of coal would be delivered at the end of the road in 8 hours, allowing 15 per cent. loss for stoppages?

5. A tank measuring 10 ft. square and 10 ft. deep is placed 40 ft. above a pump which delivers water through a 2-inch diameter pipe in the bottom of the tank.

Find—

(*a*) The weight and quantity of water in the tank when full;

(*b*) The pressure per sq. inch at the pump when the tank is full.

6. Describe any type of cell used for electric signals with which you are familiar. What is the voltage of the cell?

7. The barrel of a windlass is 9 in. in diameter and the handle 20 in. long. The bucket and rope below in a vertical shaft weigh 19 lb. The bucket is 21 in. in diameter and 24 in. high. It is filled with water. What force in lbs. must be exerted on the handle to raise the bucket, neglecting friction?

EXAMINATION FOR CERTIFICATE OF COMPETENCY AS MINE ELECTRICIAN (COAL MINING ACTS).

Paper I. Monday, 4th December—9.30 a.m. to 12.30 p.m.

Illustrate your answers with sketches wherever possible.

Where Rules are quoted or asked for they shall be taken to mean the Rules relating to the use of electricity and electrical machinery in coal mines under "The Coal Mining Acts, 1925 to 1940."

The value allotted to each question is shown.

1. Marks, 15.

State the requirements of the rules in regard to the following:—

(*a*) Installing cables in shafts;

(*b*) Installing cables in drives and haulage roads;

(*c*) Installing motor sub-circuits;

(*d*) Layout plans of the electrical installations in a mine.

2. Marks, 15.

(*a*) What is the principle of the flame safety lamp?

(*b*) Describe how you would make a test for the presence of methane in a coalmine by using the above lamp.

(*c*) What indications in using the flame safety lamp would induce you to verify the presence of 4 per cent. of explosive gas in a mine atmosphere?

3. Marks, 15.

When installing equipment in a coalmine where safety lamps are used what special precautions would you take when—

(*a*) Making joints in conductors?

(*b*) Installing electric lamps?

(*c*) Installing signalling apparatus?

(*d*) Installing motors and transformers?

(*e*) Selecting the pressure and cables to be used?

4. Marks, 10.

What action would you take if you found a workman lying in an unconscious condition from an electric shock in a haulage roadway?

5. Marks, 10.

Describe the apparatus and equipment installed on an electric winding engine to prevent overwinding and overspeeding. Use sketches to illustrate your answers.

6. Marks, 10.

You are employed at a colliery in which naked lights are used. It is desired to equip each person working in the mine with a suitable electric lamp.

(*a*) State the type of electric lamp you would recommend and why.

(*b*) Give an account of the construction of the electric lamp recommended.

(*c*) Make an annotated sketch of the apparatus required for the charging of the lamp batteries.

7. Marks, 10.

Draw up specifications for the purchase of an electric pumping plant and equipment for delivering 300 gallons of water per minute from the bottom of a vertical shaft 500 feet deep. Assume that a 2,200 volt A.C. three-phase supply is available near the shaft.

8. Marks, 15.

State—

(*a*) The width of the passage way that must be allowed in front of a switchboard in a machine room.

(*b*) The minimum distance between the back of a switchboard where conductors are exposed and the adjacent wall.

(*c*) The minimum rating of fuses used for the protection of motors.

(*d*) The minimum height that a cable can cross the space at the back of a switchboard.

(*e*) The minimum height that a trolley wire can be mounted above the track.

Paper II. Monday, 4th December—2 p.m. to 5 p.m.

Illustrate your answers with sketches wherever possible.

Where Rules are quoted or asked for they shall be taken to mean the Rules relating to the use of electricity and electrical machinery in coal mines under "The Coal Mining Acts, 1925 to 1940."

The value allotted to each question is shown.

1. Marks, 15.

You are required to instal a new trailing cable to a portable underground machine. Explain how you would—

(*a*) Connect the cable to the machine.

(*b*) Connect the cable to the source of supply.

(*c*) Make periodical inspections and tests to see that the cable was maintained in safe condition.

(*d*) Make records of such tests and inspections.

(*e*) Mark the cable for identification.

Use sketches where necessary.

2. Marks, 10.

What inspections must be made from time to time of an underground trolley wire system in order that you can ascertain if same is safe and in accordance with the requirements of the Coal Mining Act.

3. Marks, 15.

A 3-phase 415 volt 150 h.p. haulage motor is installed 600 yards from the transformer position. If the supply voltage is 445 volt, the efficiency of the motor 90 per cent., and its power factor on full load 0.8, calculate—

(*a*) The line current on full load.

(*b*) The area of the supply cables to give 415 volts at the motor on full load. The resistance of copper at 70 deg. Fahr. is 1.714 microhms per cubic centimetre.

4. Marks, 10.

Describe the essential features of an electric haulage plant for handling a load of 10 tons up a grade of 1 in 5.

5. Marks, 10.

Describe an electrically operated coal-cutting machine for use in a longwall face, particularly mentioning those features which have been incorporated in the design to ensure its safe use. The voltage is 415 A.C.

6. Marks, 15.

(*a*) State the conditions under which a "high pressure" supply may be installed underground.

(*b*) Describe the various methods which may be used to instal electric light conductors in a mine and state the precautions which must be observed when using each method.

7. Marks, 15.

What types of electric motors are most suitable for use in a "gassy" mine—

(*a*) For driving a pump.

(*b*) For underground haulage.

(*c*) For coal-cutting machines.

State your reasons in each case.

8. Marks, 10.

Give a sketch and description of a telephone suitable for use in a coalmine in which explosive gas is found. What faults most often interfere with its efficiency, and how may they be prevented or remedied?

MINE SURVEYORS' EXAMINATION (COAL MINING ACTS).

Paper I. Monday, 4th December—9.30 a.m. to 12.30 p.m.

Illustrate your answers with diagrams wherever possible.

All calculations must be shown.

Chambers' Mathematical Tables, protractors, scales, and drawing instruments may be used.

The value allotted to each question is shown.

Coal Mining Acts.

1. Marks, 10.

The plans of a colliery are considered to have been improperly kept and their accuracy is doubted. You have been selected to make a report on these plans. What particulars would you examine in order to report fully as to the plans complying with the requirements of the Coal Mining Acts, and what would be the extent of your examination of the plans to enable you to report on their accuracy?

Mathematics.

2. Marks, 7½.

Using logarithm tables, find the value of—

(*a*) 467.3 *tan* 34° 12′ 50″ + 52.6 *cos* 12° 11′ 40″;

(*b*) $\dfrac{92{\cdot}601}{\sqrt[3]{16.62}} + 19^{1\cdot2}$

3. Marks, 7½.

The dimensions of a coal hopper are 40 ft. long by 15 ft. wide at the top and 30 ft. long by 8 ft. wide at the bottom, the vertical depth being 12 ft. What is the capacity of the hopper, 40 cubic feet of coal weighing 1 ton?

4. Marks, 7½.

Calculate the area of a triangle, the sides of which are 38, 56 and 84 ft. in length respectively.

5. Marks, 7½.

A coal seam dips at an angle of 10 degrees on a bearing of S. 20° 30′ E., and a haulage road is required to be set off on the easterly side of a point in the mine workings on this seam to maintain a rising grade of 1 in 80. What is the bearing of the proposed road?

Surveying, Levelling, and Drawing.

6. Marks, 12.

The following are the co-ordinates of the respective stations calculated from a theodolite survey at the Charon colliery:— The main haulage road and levels are 4 yards wide and other drives and headings 3 yards wide. Construct a plan to a scale of 1 chain to 1 inch. Title the plan. Plot in pencil. Neatness is essential and will be taken into consideration when marking the work.

Station.	Links. Latitude.	Links. Departure.	Remarks.
0	00	00	Datum. South-west corner of lease.
1	1055	955	Centre of main haulage shaft (vertical).
2	935	795	Centre of fan shaft (vertical).
3	1092	928	Intersection of main haulage road with drive on northerly boundary of shaft pillar.
4	980	765	Intersection of drive on northerly boundary of shaft pillar with drive to air shaft.
5	1020	983	Intersection of main haulage road with drive on southerly boundary of shaft pillar.
6	900	825	Intersection of drive on southerly boundary of shaft pillar with drive to fan shaft.
7	960	905	Intersection of heading with drive on southerly boundary of air shaft.
8	1120	905	Intersection of main haulage road with No. 1 level (east).
9	1343	1170	Centre of face No. 1 level east.
10	1220	833	Intersection of main haulage road with No. 2 level (east).
11	1420	1090	Centre of face No. 2 level (east).
12	1040	850	Intersection of heading with drive on northerly boundary of shaft pillar.
13	1160	760	Intersection of No. 2 level (west) with heading from station 12.
14	1410	685	Centre of face, main haulage road.
15	1363	612	Centre of face of heading from station 13.
16	1130	722	Centre of face of No. 2 level west.
17	840	1120	Intersection of main haulage road with No. 3 level.
18	1045	1380	Centre of face of No. 3 level east at fault having an easterly dip of 70 degrees.
19	1115	1350	Centre of face of drive along fault from the end of No. 3 level east.
20	780	1040	Intersection of No. 3 level west with heading to station 7.
21	610	780	Face of No. 3 level west.
22	720	1085	Intersection of heading from station 20 with air return drive for No. 3 west level.
23	525	835	Centre of face of air return drive for No. 3 west level.
24	675	1245	Intersection of main haulage road with No. 4 level.
25	815	1442	Centre of No. 4 level (east) on fault as found at station 18.
26	620	1170	Intersection of No. 4 level west with heading from station 22.
27	560	1215	Centre of face of heading from station 26.
28	550	1345	Centre of face of main haulage road.

Paper II. Monday, 4th December—2 p.m. to 5 p.m.

Illustrate your answers with diagrams wherever possible.

All calculations must be shown.

Chambers' Mathematical Tables, protractors, scales, and drawing instruments may be used.

The value allotted to each question is shown.

Surveying, Levelling, and Drawing.

7. Marks, 8.

Describe how you would transfer the azimuth from the surface to the underground workings of a colliery in which only one vertical shaft is available.

8. Marks, 10.

Reduce the following series of levels taken along a roadway in a colliery and plot to a horizontal scale of 1 chain to 1 inch and a vertical scale of 10 feet to 1 inch.

Station.	B.S.	I.S.	F.S.	Reduced Level.	Distance.
				Feet.	Chains.
A.	4·19				·00
B.		6·20			2·15
C.	3·29		5·92		3·60
D.	4·96		5·83		6·25
E.	6·01		7·89		9·65
F.		4·12		100	11·70
G.			3·11		12·10

What is the gradient from A to F?

9. Marks, 12.

The following notes are taken from an underground survey. Calculate the length of the line D-E and the bearing of E-A.

Line.	Bearing.	Distance.
A—B	S 70° 30′ E	1·52 chains
B—C	N 32° 40′ E	3·28 chains
C—D	N 9° 30′ E	2·45 chains
D—E	N 62° 20′ W	..
E—A	..	5·84 chains

10. Marks, 10.

The development heading at a colliery is driven on the true dip of a seam, the dip is 20°. A normal upthrow fault is intersected in the heading, the hade of the fault is 1 horizontal to 1 vertical. The fault is at right-angles to the dip of the seam and its vertical displacement is 60 ft. Calculate the length of a stone drive to be driven on a level course to intersect the seam on the other side of the fault, the dip remaining constant.

11. Marks, 8.

The main development heading in a colliery equipped with endless haulage is to be driven a further 10 chains. Two permanent stations are available in the heading, both being on its centre line, and the nearest is 4 chains from the face. Describe in detail how you would prolong the centre line using a transit theodolite and what practical steps you would take to ensure that the heading was driven on a straight course.

WIRE ROPES.*

When the engineer orders a 6 by 19 wire-rope he is calling for a six-stranded rope with 19 wires in each strand. The principal constructions are 6 by 7, often spoken of as "coarse laid," a rope preferred for severe abrasive or corrosive working conditions with no sharp bending over sheaves, etc.; 6 by 19, made of smaller and hence more flexible wires, yet still sturdy enough to stand up to hard treatment; 8 by 19 and 6 by 37, ropes increasingly flexible, but less resistant to abrasion, and favoured where sharper bending will be imposed by the working system. There are, of course, several other constructions, but the 6 by 19 is most used because it has good abrasion resistance and can take a fair bend, while 6 by 7 would be chosen for mine haulage over big sheaves where the rope might have to withstand abrasion through scrubbing on rock, etc. Where high pressure exists between rope and the equipment over which it bends, or where there is considerable working heat, an independent wire-rope centre is used—not so much for the 7½ per cent. extra strength it gives, as to provide support and thus prevent distortion and flattening of the rope, which would seriously shorten the working life. This centre replaces the ordinary hemp centre. When wires of a regular or of a Lang's lay rope break this is easily seen, as they unlay and can be felt. With pre-formed rope, in which the strands have been pre-shaped to the form they will take in the finished article, there is none of this unlaying when wires break and they should be inspected in a good light, when their surface is clean. Wire rope is lubricated during manufacture, but this lubricant needs periodic renewal, particularly with wire rope centres which do not form a good reservoir for the oil. Moisture penetrating can set up serious internal corrosion which may pass unsuspected, although a marked reduction of rope diameter at any point must be regarded with suspicion. A heavy lubricant, applied hot, will last longer in wet working and provide better protection than a thin one applied cold.

* "Mining Magazine," London, Oct., 1944.

POINTERS FROM NATURE.*

From time to time we are reminded by experts of the extreme inefficiency of mill grinding systems in terms of useful applied energy. When one considers the methods used in nature for concentrating, say, the trace-mineralisation of stanniferous or auriferous rocks to form alluvial gravels, one is repeatedly impressed by their completely different handling of the problem of bringing a mass of hard rock down to the liberating mesh of its heavy-mineral content and then concentrating the heavy fraction. Man has accomplished much, but he still has far more to learn and to apply.

To take one thing only—thermal application as a disintegrating agency and particularly the disruptive effect of water expanding as it freezes. What a rock-breaking system would be possible if we understood exactly why water begins to expand as its temperature falls below 4 deg. C. and as it changes from the liquid to the solid phase. If we had a clear picture of what happens we might conceivably be able to harness this expansion to the direct and quiet breaking down of rock in transit, so that as it flowed through alternating freezing and heating fields, with intermediate re-impregnation of the crevices in the lumps of ore with water, there would be progressive scaling off and disintegration of our ore. If nature can do the job in her own unhurried way, with nothing to aid her but the succession of summer and winter, heat and frost, with a few hundred thousand years to help the work, will it not some day be possible for us to speed her up and cram those cycles of expansion and contraction into a passage of hours through a suitable series of chambers? Perhaps even now somebody, somewhere, is making tests on some electronic application which can be made to apply "physical jerks" to water in ore cracks.

It is not just wishful thinking or idle speculation sometimes to dream like this, provided the dreams keep touch with natural laws. All progress in mining work depends on our ability to surmount economic hurdles and thus make it possible to work the low-grade deposits our fathers had to neglect. Milling economics always must start by looking at the heaviest item of cost—the crushing and grinding systems. What possibilities there would be in a set-up which had no linings to renew, no moving parts beyond those of the conveyor-system, and which used all its input power as heat, thus avoiding the loss on conversion to mechanical effort. Where would such a dream-system start? Would it encroach on the transporting system till at last the attack was carried direct to the rock *in situ*? Or is it carrying even a dreamer's license too far to imagine a mine without explosives and the harsh noises of drilling, the dust and fume, producing a stream of docile ore, broken only along its natural planes of weakness and innocent of tramp iron and "gremlin" chips?

* Min. Mag., Lond., July, 1944.

BRIDGING THE GAP

With a view to permanently recording the reports of Field Officers during the period of suspension of publication of the Mining Journal, the following monthly reports are being published in this issue. It is proposed that reports on other fields be published in later issues:—

COOKTOWN DISTRICT—continued.

WARDEN'S RETURN FOR MARCH, 1943.

The returns for the month are as follow:—

TIN.

Locality.	Ore Treated. T. C. Q. L.	Value. £ s. d.
Mount Amos	0 11 3 1	125 9 10
Mount Poverty	2 14 0 0	729 0 0
	3 5 3 1	£854 9 10

GOLD.

REEF.

Field.	Ore Treated. Tons.	Yield Bullion. Oz. dwt. gr.	Value per oz. £ s. d.
Palmer	Concentrates	7 7 0	4 0 0
Wenlock	200	20 8 2	3 8 6
	200	27 15 2	

WARDEN'S REPORT FOR APRIL, 1943.

There was no gold production for the month. It is believed that Blue Mountains Gold N.L. will be resuming crushing operations during this current month.

TIN.

Tin production is still very low, but to my mind there should be an increase in same. The heavy rainfall mentioned in my report for the month of February did not continue and the "wet" season was, on the whole, very disappointing. From this cause it would appear that there will be a serious shortage of water on the field before the early summer storms. Doolan Bros. and some other of the more active producers have been shifting plant, so there is a prospect of an increase in production when they resume operations. It is anticipated that Normanby Tin N.L. will have a fair clean-up during the month.

Tin returns for the month are as follow:—

TIN.

Locality.	Ore Treated. T. C. Q. L.	Value. £ s. d.
Rossville	1 3 2 15	272 5 9
Mount Amos	0 10 0 0	111 8 6
Shipton's Flat	0 16 0 4	184 6 0
	2 9 2 19	£568 0 3

WARDEN'S REPORT FOR MAY, 1943.

The returns for the month are as follow:—

TIN.

Locality.	Ore Treated. T. C. Q. L.	Value. £ s. d.
Rossville	0 4 2 19	52 18 5
Mount Amos	1 5 0 3	294 14 1
Shipton's Flat	1 18 1 20	443 0 11
Big Tableland	0 3 3 24	45 9 0
Mount Poverty	3 11 0 0	850 0 0
China Camp	0 10 3 10	122 18 3
	7 13 3 20	£1,809 0 8

GOLD.

REEF.

Field.	Ore Treated. Tons.	Yield Bullion. Oz. dwt. gr.	Value per oz. £ s. d.
Coen	20	38 10 0	2 10 0

ALLUVIAL.

Field.	Yield. Oz. dwt. gr.	Value. £ s. d.
Palmer	3 6 10	4 0 0
Hamilton	2 6 17	3 0 0
	5 13 3	

WARDEN'S REPORT FOR JUNE, 1943.

The returns for the month are as follow:—

TIN.

Locality.	Ore Treated. T. C. Q. L.	Value. £ s. d.
Rossville	0 9 3 11	114 13 0
Mount Amos	0 11 2 20	130 2 9
Shipton's Flat	2 0 2 12	447 19 11
Big Tableland	0 3 0 0	32 9 5
Mount Poverty	2 14 0 0	640 0 0
	5 19 0 15	£1,395 5 1

MACKAY DISTRICT.

WARDEN'S REPORT FOR JANUARY, 1942.

A return received from the State Smelters, Chillagoe, for the month disclosed the following particulars in respect of ore treated from the Mackay district:—

C. Bentley, Pinevale.—Ore treated: 6 tons 13 cwt. 3 qrs. Yield: Silver 44 oz. 16 dwt. 3 gr., and copper 18 cwt. Value: Silver at 2s. per oz. £4 9s. 7d., and copper at £62 per ton £55 16s.; total value £60 5s. 7d.

WARDEN'S REPORT FOR MARCH, 1942.

Returns received from the manager, State Smelters, Chillagoe, for the month disclosed the following particulars of ores treated from the Mackay district:—

J. W. Iceton, Eungella.—Ore treated: 3 tons 14 cwt. Yield: Gold, 5 oz. 3 dwt. 4 gr., standard value £21 18s. 3d., premium £32 2s. 10d.; silver, 36 oz. 3 dwt. 16 gr., value £3 12s. 3d.; copper, 3 qr., value £2 6s. 6d.; total value, £59 19s. 10d.

T. C. Bentley, Mirani.—Ore treated: 9 tons 3 cwt. 2 qr. Yield: *Silver, 66 oz.* 19 dwt. 16 gr., and copper 1 ton 12 cwt. 2 qr. Value: Silver £6 14s., copper £100 15s.; total value, £107 9s.

WARDEN'S REPORT FOR APRIL, 1942.

A return received from the Chillagoe State Smelters for the month disclosed the following particulars of ores treated from the Mackay district:—

L. Burgess, Eungella.—Ore treated: 5 tons 9 cwt. 3.56 qr. Yield: Gold 9 oz. 6 dwt. 19 gr., silver, 37 oz. 7 dwt. 6 gr., and copper, 1 cwt. 1 qr. Value: Gold standard £39 13s. 6d., premium £57 18s. 7d., silver £3 16s. 1d., and copper at £62 per ton £3 14s. 11d.; total value, £105 3s. 1d.

C. E. Congdon, Bong Bong, Mia Mia.—Ore treated 6 tons 5 cwt. 1 qr. Yield: Gold 12 dwt. 12 gr., silver 172 oz. 15 dwt. 19 gr., and copper 16 cwt. 1 qr. Value: Gold standard £2 13s. 2d., premium £3 17s. 8d., silver £17 11s. 9d., copper at £62 per ton £50 1s. 5d.; total value, £74 4s.

Mount Morgan Limited advises that during the month of April, 1942, ore as follows was forwarded for treatment:—

Pine Vale Copper Mine.—Ore treated: 6 tons 7 cwt. 1 qr. Yield: Silver 28 oz. 18 dwt. 7 gr., copper 19 cwt. 2 qr. Value: Silver £2 18s. 9d., copper at £62 per ton £60 7s.: total value, £63 5s. 9d.

WARDEN'S REPORTS FOR MAY, 1942, TO JUNE, 1943.

Returns received from the manager, State Smelters, Chillagoe, show the following particulars of ores treated from the Mackay district during the months stated:—

Owner and Mine.	Ore Treated.	Yield.		
		Gold.	Silver.	Copper.
	T. C. Q.	O. D. G.	O. D. G.	T. C. Q.
D. Strand, Tierawoomba, May, 1942	5 14 2	0 3 2	32 1 17	1 9 0
Value	..	£1 15 11	£3 5 3	£89 10 5
A. McFadzen, Mount Flora, May, 1942	1 3 1	..	2 4 4	0 5 3
Value	..	..	£0 4 6	£17 6 0
C. Bentley, Pine Vale Copper Mine, May, 1942 ..	61 19 0	0 5 3	310 8 2	6 15 2
Value	..	£2 13 2	£31 11 2	£420 3 6
C. Bentley, Pine Vale Copper Mine, June, 1942 ..	15 12 3	..	59 7 0	1 8 1
Value	..	..	£6 0 10	£87 10 0
L. Burgess, Eungella, June, 1942 ..	5 18 3	1 9 17	42 15 9	0 1 3
Value	..	£15 10 3	£4 7 1	£5 3 4
J. W. Iceton, Dalrymple Heights, July, 1942 ..	2 14 3	4 17 0	24 7 18	0 0 2
Value	..	£50 13 6	£2 9 8	£1 17 4
D. and L. Strand, Tierawoomba, July, 1942 ..	4 15 0	0 3 19	23 5 2	0 16 0
Value	..	£1 19 7	£2 7 4	£49 8 8
C. E. Congdon, Bong Bong, Mia Mia, July, 1942 ..	7 1 0	0 2 20	148 13 2	1 4 0
Value	..	£1 9 6	£15 2 9	£74 5 2
Pine Vale Copper Mine, C. Bentley and C. F. Bagley, August, 1942 ..	79 18 3·4	..	338 0 15	6 18 2·2
Value	..	..	£34 8 5	£429 9 10
Pine Vale Copper Mine, C. Bentley and C. F. Bagley, September, 1942	37 9 2	..	140 8 22	2 18 1
Value	..	..	£14 6 0	£180 7 0
Pine Vale Copper Mine, C. Bentley and C. F. Bagley, October, 1942 ..	28 14 1	..	131 3 3	2 12 0
Value	..	..	£13 7 1	£160 16 7
C. E. Congdon, Bong Bong, Mia Mia, October, 1942 ..	5 11 3	..	81 2 3	0 7 1
Value	..	..	£8 5 2	£22 3 11
Pine Vale Copper Mine, C. Bentley and C. F. Bagley, November, 1942..	32 1 2	..	105 18 5	2 4 3
Value	..	..	£10 15 8	£138 9 11
C. E. Congdon, Bong Bong, Mia Mia, November, 1942..	5 15 1	0 4 14·5	147 7 4	0 15 1
Value	..	£2 5 1	£15 0 1	£47 16 5
Pine Vale Copper Mine, C. Bentley and C. F. Bagley, December, 1942..	25 16 3	..	70 2 0	1 10 3
Value	..	..	£7 4 0	£95 3 11
C. E. Congdon, Bong Bong, Mia Mia, January, 1943 ..	6 6 3	0 5 2	164 3 6	0 18 2
Value	..	£2 12 11	£16 14 4	£56 19 2
Pine Vale Copper Mine, C. Bentley and C. F. Bagley, April, 1943 ..	6 2 3	..	20 17 9	0 6 0
Value	..	..	£2 2 6	£19 0 7
C. E. Congdon, Bong Bong, Mia Mia, May, 1943 ..	6 8 0	0 7 16	184 4 4	0 15 3
Value	..	£4 0 2	£6 5 2	£48 15 4
Pine Vale Copper Mine, C. Bentley and C. F. Bagley, June, 1943 ..	21 6 3	1 3 8	86 8 17	2 7 3
Value	..	£12 2 11	£8 15 9	£147 18 8
C. E. Congdon, Bong Bong, Mia Mia, June, 1943 ..	6 4 0	0 9 22	189 12 11	0 17 2
Value	..	£5 3 6	£19 5 6	£54 3 5
Bruce Bros., Nebo, June, 1943 ..	1 12 3	2 15 13	5 1 7	0 4 2
Value	..	£29 0 2	£0 10 3	£13 9 5

CAIRNS DISTRICT.

WARDEN'S REPORT FOR QUARTER ENDED 31ST MARCH, 1942.

The following are the production figures reported from the fields under my jurisdiction for the quarter:—

Mine.	Owner.	Tonnage.	Yield.	Value.
		Tons.	Oz.	£ s. d.
MOUNT PETER FIELD.				
Alpine ..	A. O. Keller ..	2·6465	5·0548	52 19 4
Golden Crown	Golden Crown Syndicate ..	16	12·38	110 12 10
Golden Crown	Golden Crown Syndicate	15	30·20	269 4 5
Golden Crown	Golden Crown Syndicate ..	17	28·8	Not given
Mount Peter ..	Jones and party	4	6·04	53 16 10
MULGRAVE FIELD.				
Dud	Eddy and party	10	18	Not given
Krawil ..	Bartle Frere G. M. Synd.	34	41·20	368 4 4
Reward ..	E. C. Luscombe	.	2·81	25 6 2

Values include premium.

WARDEN'S REPORT FOR APRIL, 1942.

The following are the results of the operations in this district as reported during the month of April, 1942:—

MOUNT PETER FIELD.

Mine.	Owner.	Tonnage.	Yield.	Value.
		Tons.	Oz.	£ s. d.
Golden Crown	Golden Crown Syndicate ..	17·5	31·48	280 12 7
Golden Crown	Golden Crown Syndicate .	23	21·6	Not given

The 28.8 oz. shown in previous report as from the *Golden Crown* was valued at £254 10s. 2d.

Mulgrave Field.—The 18 oz. shown in previous report as from the *Dud* was valued at £155 18s.

All values include premium.

WARDEN'S REPORT FOR MAY, 1942.

The only recovery reported for the month was 5.5 tons from the *Mount Peter*, Jones and party, which was valued at £47 8s. 7d.

The 21.6 oz. shown in last report as from *Golden Crown* realised £197 18s. 1d.

Values include premium.

WARDEN'S REPORT FOR JUNE, 1942.

The only reports of recoveries for the month were from the Mount Peter Field and are as under:—

Lucky Wednesday:—4.5951 tons, yield 20.6779 oz., value £216 1s. 6d.: value includes premium. Owners, Farmer and White.

Golden Crown:—46.5 tons, yield 72.69 oz., value not given. Owners, Golden Crown Syndicate.

WARDEN'S REPORT FOR JULY, 1942.

The only recovery reported for the month was 3.01 oz. of gold from 2 tons of stone produced by J. H. Jackson and party from the *Dividend* mine on the Mulgrave Field, valued at £26 16s. 8d.

The 72.69 oz. of gold mentioned in the previous report as having been obtained from the *Golden Crown* mine, Mount Peter Field, was valued at £674 18s. 6d. Values include premium.

WARDEN'S REPORT FOR AUGUST, 1942.

The only recovery reported for the month was Golden Crown Syndicate, from the *Golden Crown* mine, 40 tons for a yield of 75.14 oz.—the value has not yet been received—and from the *Talisman*, O'Cavanagh and Jorgensen, 8.8110 tons for a yield of 20.7058 oz., valued at £218 16s. 6d. This values includes premium.

Both these mines are on the Mount Peter Field.

WARDEN'S REPORT FOR SEPTEMBER, 1942.

The only recovery reported for the month of September, 1942, was from the *Golden Crown*, on the Mount Peter Field, where 39 tons were crushed for a yield of 34.2 oz. of gold. The value has not yet been ascertained.

The 75.14 oz. reported in August from the *Golden Crown* were valued at £698 8s. 3d., including premium.

WARDEN'S REPORT FOR OCTOBER, 1942.

The following is a report of returns received for the month of October, 1942:—

MOUNT PETER FIELD.

Mine.	Owner.	Tonnage.	Yield.	Value.
		Tons.	Oz.	£ s. d.
Lucky Wednesday	Farmer and White ..	6·3704	15·9897	165 6 7
Talisman ..	O'Cavanagh and Jorgensen ..	25·1955	48·3041	505 5 1

The 34.2 oz. reported in last report as having been produced from the *Golden Crown* were valued at £318 17s. 10d.

Values include premium.

WARDEN'S REPORT FOR DECEMBER, 1942.

The only recovery reported for the month of December was 6 tons of ore from the *Golden Crown*, on the Mount Peter Field, which yielded 5.37 oz. of gold valued, with premium, at £47 9s. 11d.

WARDEN'S REPORT FOR JANUARY AND FEBRUARY, 1943.

The only recovery reported for the months of January and February, 1943, was 9.0585 tons, yielding 24.5174 oz. of gold, from the *Talisman* on the Mount Peter Field.

WARDEN'S REPORT FOR MARCH, 1943.

The only recovery reported for the month was 47 tons from the *Golden Crown*, on the Mount Peter Field, which yielded 21 oz. of gold, valued at £190. The parcel from the *Talisman* mentioned in the previous report was valued at £257 5s. 10d.

CROYDON FIELD.

WARDEN'S REPORT FOR APRIL, 1942.

During the month of April, 19 tons of stone were treated at the Waratah battery for a yield of 8 oz. 17 dwt. of bullion.

WARDEN'S REPORT FOR NOVEMBER, 1942.

During the month of November, 5 tons 5 cwt. of ore, obtained from the *Defiance* mine, were treated at the Waratah battery for a return of 6 oz. 18 dwt. of bullion.

WARDEN'S REPORT FOR JANUARY, 1943.

During the month of January, 1943, 12 tons of stone from the *No. 7 North Golden Gate* dump were treated at the Waratah battery for a return of 5 oz. 14 dwt. 12 gr. of bullion.

STANTHORPE.

MINERAL RETURNS—FEBRUARY, 1942.

The following returns were received for the month of February, 1942:—

ALLUVIAL TIN PURCHASED.

Owner.	Yield.	Value.
	T. C. Q. L.	£ s. d.
Riley, Newman Pty. Ltd.	0 11 3 18	120 2 9
LIMESTONE.		
Gore Lime Products	224 0 0 0	168 0 0

MINERAL RETURNS—MARCH, 1942.

The following returns were received for the month of March, 1942:—

ALLUVIAL TIN PRODUCED.

Owner.	Yield.	Value.
	T. C. Q. L.	£ s. d.
Kyoomba Tribute Syndicate..	3 13 3 5	792 0 0
Kyoomba Tribute Syndicate..	2 15 1 3	583 0 0
Rich Reward Syndicate	2 7 0 19	509 0 0
	8 16 0 27	£1,884 0 0

ALLUVIAL TIN PURCHASED.

Owner.	Yield.	Value.
H. Arentz	0 9 0 23	£89 4 9
LIMESTONE.		
Gore Lime Products	316 0 0 0	£237 0 0

MINERAL RETURNS—APRIL, 1942.

The following returns were received for the month of April, 1942:—

ALLUVIAL TIN PRODUCED.

Owner.	Yield.	Value.
	T. C. Q. L.	£ s. d.
Rich Reward Syndicate	1 12 2 2	351 0 0
Kyoomba Tribute Syndicate..	4 4 3 4	929 0 0
	5 17 1 6	£1,280 0 0
ALLUVIAL TIN PURCHASED.		
Riley, Newman Ltd. (March)	0 3 2 13	38 7 11
Riley, Newman Ltd. (April)	0 13 1 12	132 5 1
	0 16 3 25	£170 13 0

Two applications for alluvial claims for tin were granted during the month, covering areas in the town of Stanthorpe.

MINERAL RETURNS—MAY, 1942.

The following returns were received for the month of May, 1942:—

ALLUVIAL TIN PRODUCED.

Owner.	Yield.	Value.
	T. C. Q. L.	£ s. d.
Chinaman Flat Syndicate, December 12 ..	0 17 2 9	134 10 0
Chinaman Flat Syndicate, December 23 ..	6 12 2 18	1,463 19 2
Chinaman Flat Syndicate, April	5 2 0 11	1,091 3 11
Rich Reward Syndicate	1 12 2 5	356 0 0
Broadwater Dredging Pty. Ltd., January ..	0 10 0 0	110 0 0
Broadwater Dredging Pty. Ltd., February	3 10 0 0	750 0 0
Broadwater Dredging Pty. Ltd., March ..	Nil	Nil
Broadwater Dredging Pty. Ltd., April ..	2 19 0 14	750 0 0
	21 4 0 1	£4,655 13 1
ALLUVIAL TIN PURCHASED.		
H. Arentz	0 10 3 24	£106 12 0
LIMESTONE.		
Gore Lime Products, April	303 0 0 0	227 5 0
Gore Lime Products, May	320 0 0 0	240 0 0
	623 0 0 0	£467 5 0

[TO BE CONTINUED.]

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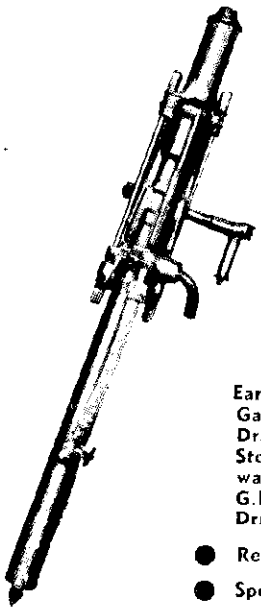

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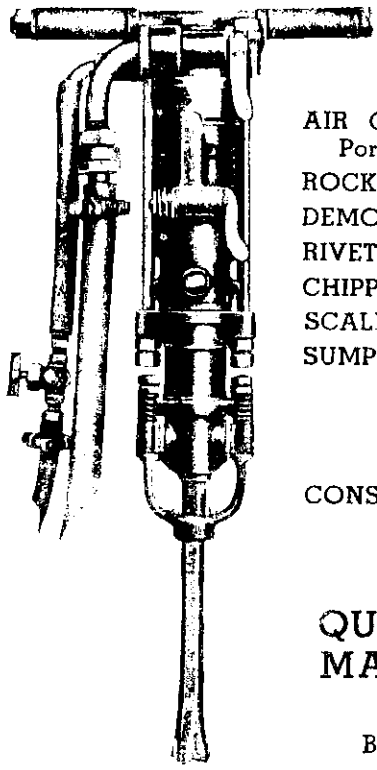

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   These are available for perusal at the Department of Mines, Treasury Building, Brisbane; at the principal Wardens' Offices throughout the State; and at Public Libraries in Queensland, in other States and in other countries.

2. **Geological Survey Publications** covering the general geology of the State, of particular areas, of Gold, Mineral, and Coal Fields, of individual mines, and of special mineral resources.

   Information in regard to the cost of the various available publications may be obtained on application, either personally or by letter, to the Geological Survey Office, Old Railway Offices, George Street, Brisbane, B. 4.

3. **"Queensland Government Mining Journal,"** published monthly from June, 1900, to February, 1942, and again from August, 1943.

4. **Queensland Mining Guide.** This small book, which was published in 1932, contains a great deal of information of interest to miners and prospectors. The Guide is obtainable at the Department of Mines, Brisbane, and at all Wardens' Offices throughout the State. Price **1s.,** plus **3d.** postage.

5. **The Mining Acts and Regulations** of Queensland, printed in consolidated form in 1932, and obtainable, complete with amendments, at the Department of Mines, Brisbane, and at all Wardens' Offices. Price **5s. 6d.** for the complete set, or **6s. 1d.** if posted.

The following Acts have been published separately and are obtainable from the Department of Mines, Brisbane, with amendments to date, at the prices stated:—

"The Mines Regulation Acts, 1910 to 1939" .. Price **2s. 6d.**
"The Coal Mining Acts, 1925 to 1940" .. Price **2s. 3d.**

In addition, copies of "The Coal and Oil Shale Mine Workers (Pensions) Acts, 1941 to 1942," with Regulations and amendments to date, are obtainable from the Registrar, Pensions Tribunal, Department of Mines, Brisbane—Price **1s. 6d.**