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EXPLANATORY NOTES ON THE DOBBYN 4-MILE GEOLOGICAL SHEET

Compiled by E.K. Carter

The Urandangi, Cloncurry, Dobbyn and Westmoreland Geological 4-mile Sheet in the Mt. Isa-Cloncurry Region, have now been published by the Bureau of Mineral Resources.

The 2nd Edition of the Urandangi Sheet, with accompanying explanatory notes has been distributed; a preliminary distribution of the other sheets, with roneoed Explanatory Notes, is made herewith, so that the information will be available to interested organizations in the current field season. Printed Explanatory Notes will follow in 3-4 months time when general distribution of maps and notes will take place. Requests for additional copies should be made to the Chief Geologist, Bureau of Mineral Resources, Canberra.

Figure I (Dobbyn Sheet Notes) is not included as the original drawing is with the printer.

Bureau of Mineral Resources,
Geology and Geophysics,
Childers Street,
Turner,
CANBERRA.

July, 1959.

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GEOLOGICAL INVESTIGATIONS

Like the Cloncurry area immediately to the south, the Dobbyn Sheet area was, in the last decades of the nineteenth century and the first of the twentieth, an important source of copper; and consequently attracted the attention of Government geologists. Copper deposits were investigated by many geologists, and their publications are listed in the bibliography (p.).

The general geology of the area was not studied in as much detail, but the reports of Hodgkinson (1877), Jack (1885), Ball (1908), Shepherd (1928, 1931, 1932, 1935), and the Aerial, Geological and Geophysical Survey of Northern Australia (see A.G.G.S.N.A., 1936-40; Jensen, 1939; Nye and Rayner, 1940; Rayner, 1936; and Rayner and Nye, 1936) describe and interpret the geology of part or all of the area.

Whitehouse (1954) has been the main contributor to our knowledge of the Mesozoic in the area.

A joint survey team of the Bureau of Mineral Resources and the Geological Survey of Queensland mapped the Sheet area as part of a regional survey of the Precambrian of North-western Queensland. The Sheet was mapped mainly in 1951 and 1952, and the present map and these notes are based on this survey.

PHYSIOGRAPHY

Physiographically, the area may be divided into two: uplands, which generally coincide with the Precambrian outcrop, and plain, which covers the rest of the area (Fig. 1). Rivers drain generally northwards towards the Gulf of Carpentaria: the main watercourses are the Cloncurry and Leichhardt Rivers. No streams are perennial, but more-or-less permanent waterholes are found in the major watercourses. The Cloncurry/Dismal Creek/ Flinders system drains the eastern part of the area - the plain -

and is deeply entrenched and extensively anastomosed. The Leichhardt system, which mainly drains the uplands, and therefore has a greater fall than the Cloncurry system, does not contain as many anabranches and distributaries, but is equally deeply incised. The main western tributaries of the Leichhardt cut across the strike of the Precambrian rocks; the secondary ones tend to follow it.

The uplands are deeply dissected and are being actively eroded. Soil cover is slight or absent. Valleys are generally steep, particularly in quartzite, where gorges are common. The highest points, in the south-west, reach about 1,200 feet. The edge of the uplands ranges from 300 to 450 feet. Although the topography is rough everywhere except on the margin of the uplands and along some of the larger watercourses, relief is much greater in the metasediments than in the altered lavas and granite. Locally, relief is as much as 500 feet, but is generally 200 - 400 feet in the metasediments and 50 - 100 feet in the igneous rocks.

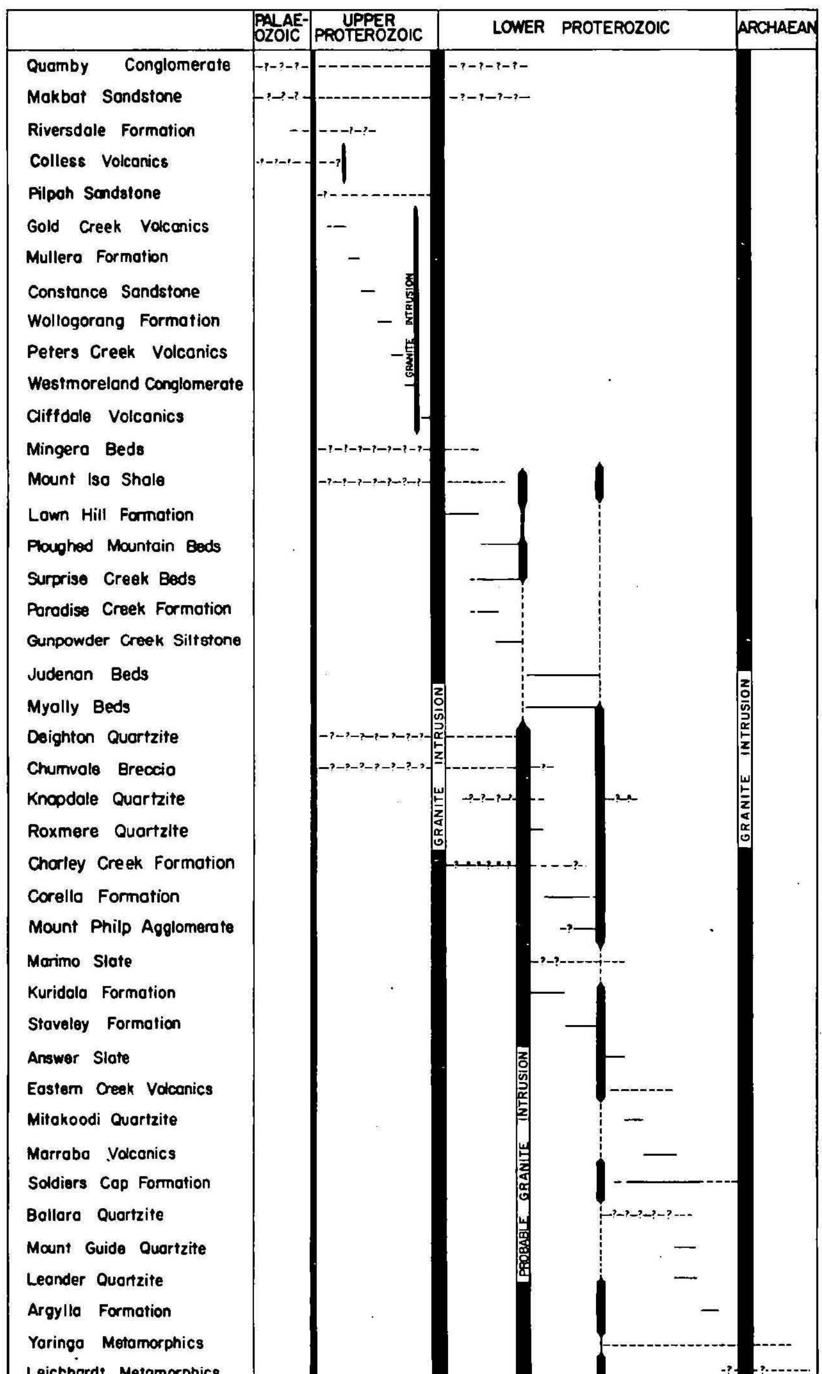
The uplands are lightly to moderately covered with vegetation. Snappy gum and scrubby mountain gum are the common trees on the hills, and river gum, bauhinia, silver-leaf box, bloodwood and gidyea on the flats. Scrub consists mainly of acacias such as "turpentine" and yellow-wood. Spinifex is locally abundant, but not as plentiful as it is farther south. Pasture grasses are generally sparse and poor, but grow thickly along the river flats.

The plain lies at altitudes of 200 to 450 feet, falling to the north and north-east except in the centre of the area, where the ground falls away in all directions from a fairly level surface of lateritic residuals 400 to 450 feet high. Local relief is slight. Soils range from light sandy soil, through grey loams, to heavy-textured "black soil". On the higher ground are patches of poor, gravelly skeletal soil.

TABLE I - STRATIGRAPHY

Era	Period	Formation	Strati-graphic symbol	Lithology	Maximum Thickness	Correlation	Mineralization	Topographic Expression
Caino-zoic			Cza	Soil and alluvium; some laterite		-	-	Flat to undulating; deeply incised water courses
Mesozoic	Cretaceous Lower	Tambo Formation	Klt	Siltstone, silty greywacke, limestone	2,000' ?			Small outcrops, generally in water courses
	Jurassic ?	Undifferentiated	M	Conglomerate, sandstone, siltstone	150' ?	? Blythesdale Group		Generally as mesas
Palaeo-zoic								
		Unconformity		Granite Intrusion				
Proterozoic	Lower	Ploughed Mountain Beds (Penecontemporaneous)	Blz	Feldspathic and micaceous sandstone, quartzite, and siltstone; conglomerate (Dolomite important farther west).	15,000' ?	Surprise Creek Beds and Ploughed Mountain Beds roughly equivalent to Gunpowder Creek Formation and Paradise Creek Formation jointly. Possibly equivalent in part to Mount Isa Shale.	Sparse copper gold, iron. Generally poor source of water.	Rough, moderate to strong relief; gorges in quartzite. Slate and dolomite produce lower relief.
		Surprise Creek Beds (Penecontemporaneous)	Blu	Siltstone, sandy shale and slate, sandstone, quartzite, dolomite.	20,000' ?			
		Unconformity		Probable Granite Intrusion				
		Myally Beds (Penecontemporaneous)	Bly	Sandstone, quartzite, siltstone, conglomerate; acid to basic lavas and pyroclastics (at top of succession)	20,000' +	Judenan Beds (see also Corella Formation)	Probably copper, water in joints, bedding planes. Gold (Cloncurry Sheet)	Rough; generally high relief, with strike ridges and gorges
		Corella Formation (Penecontemporaneous)	Blc	Moderately high grade, thinly interbedded, calc-silicate rocks, quartzite and schist; some granulite, gneiss and hornfels.	10,000' ?	Marimo Slate in part Kuridala Formation) jointly; in Staveley Formation) Answer Slate) part. Mount Philp Agglomerate near base of Corella F.	Calcite Copper. Water in joints and bedding planes. Uranium) Silver-lead) Cobalt) Other minor metals) Other 4-mile Sheets	Generally rough, moderate to low relief; produces plains of heavy-textured soil where poorly exposed.
	Slight Angular Regional Unconformity							
	Eastern Creek Volcanics		Blc	Interbedded metabasalt and metasediments - quartzite, epidote quartzite, slate and schist.	20,000' +	Mitakooki Quartzite) jointly Marraba Volcanics) Portion of Soldiers Cap Formation	Copper, uranium. Fair supplies of water in joints and bedding planes. Gold and other metals in other Sheet areas.	Rough, except where poorly exposed. Low relief.
		Argylla Formation	Bln	Altered rhyolite and dacite, with tuff, metabasalt and metasediments in places, near top of succession.	10,000' ?	? Lower portion of Soldiers Cap Formation	Copper Gold, silver-lead? (poor) Poor water supplies Calcite in other Sheet areas	Generally rough; low to moderate relief.
		? Unconformity ?						
?Archaean		Leichhardt Metamorphics	pЄl	Gneiss, schist, recrystallized acid lavas (mainly dacite) and amphibolite, some metasediments.	?		Copper Cobalt Poor water supplies.	Generally rough; low to moderate relief.

TIME RELATIONSHIP OF PRECAMBRIAN UNITS
NORTH-WEST QUEENSLAND



Reference

- Unconformity.
- Relative position established.
- Probable limits of range.
- Possible limits of range.

Notes :

1. The metabasalts in the Eastern Creek Volcanics, Marraba Volcanics, and Soldiers Cap Formation are assumed to be contemporaneous.
2. Lines representing deposition of Formations are not to scale.
3. The probable importance of unconformities (in terms of degree of angular unconformity or time break represented) is indicated schematically by the thickness of the symbol.
4. Distribution of the unconformities which do not extend throughout the region is largely interpretative: an attempt has been made to show the geographical distribution by reference to outcropping units.
5. An unconformity separates Middle from Lower Cambrian; and there may be several in the late Upper Proterozoic.

The heavy-textured soil supports a vegetation mainly of Mitchell and Flinders grasses, and large eucalypts and coolibahs along the creek beds. Areas of poor drainage are marked by heavy growths of silver-leaf box and other small trees and rank grasses. On well-drained elevated areas gidyea and bloodwood are common.

STRATIGRAPHY

The stratigraphy of the area is fully described and discussed in Carter, Brooks and Walker (in preparation). Table 1 summarizes the stratigraphy and lithology of units mapped on the Dobbyn Sheet, and Table II indicates their time relationships.

The age of the Precambrian sequence is to some extent conjectural. David (1932) showed the 'Corella Limestone' and 'Mount Isa Shale' as ?Older Proterozoic, and everything below them as 'Archaezoic'; Nye and Rayner (1940) regarded all but the 'Mount Isa Series' as Archaeozoic; Carter, Brooks and Walker, on whose work this map is based, consider that most of the Precambrian sequence is Lower Proterozoic. The Leichhardt Metamorphics are shown as ?Archaean, but the most recent work (Joplin & Walker, pers. comm.) suggests that they may have been deformed by the same two orogenies that affects the other strongly folded strata. If so, no criterion remains to separate them from the remainder of the succession. The whole succession may be Archaean, but this is considered unlikely.

Only the Myally Beds are defined from their outcrops on the Dobbyn Sheet; the type areas of the Leichhardt Metamorphics, Argylla Formation, Eastern Creek Volcanics, Corella Formation and Surprise Creek Beds lie on the Cloncurry Sheet, and that of the Ploughed Mountain Beds on the Lawn Hill Sheet. The time-relationships in Table II, therefore, are worked out from a knowledge of the succession elsewhere in the region.

Upper Proterozoic sediments are known in surrounding areas, but none crop out in the Dobbyn Sheet area; Cambrian and

Ordovician sediments, too, which cover extensive areas in the south and west of the region, are absent from the Sheet.

Some outcrops about ten miles north-north-east of Dobbyn have been mapped as 'Undifferentiated Proterozoic'. They were not seen in the field, but are clearly visible in air-photographs, where the trend-lines indicate strongly folded strata. They are therefore considered to be probably Lower Proterozoic; and as their outcrop pattern could not be matched with any adjoining units, they were mapped as undifferentiated.

The Mesozoic rocks east of the Leichhardt River are referred to the Lower Cretaceous Tambo Formation by the Geological Survey of Queensland (in Geological Map of Queensland, 40 miles to 1 inch, 1953) and Whitehouse (1954). Those on and near the Precambrian rocks are freshwater sediments with unidentifiable plant remains. The Geological Map of Queensland does not distinguish them from the Tambo Formation, and Whitehouse (1954, Fig.19) shows Blythesdale Group below and to the west of the Tambo Formation. Beyond the limits of the Dobbyn Sheet the freshwater sediments on the Precambrian have been found to underlie marine sediments, as indicated by Whitehouse. They are, however, mapped as 'undifferentiated Mesozoic'.

IGNEOUS INTRUSIVES

Granite

Three granitic masses have been mapped in the Dobbyn Sheet area: the Kalkadoon Granite (granodiorite), the Naraku Granite and the Ewen Granite.

Within the Sheet area the Kalkadoon Granite invades the Leichhardt Metamorphics mainly along the valley and watershed of St. Pauls Creek; it is commonly a massive, coarse-grained, porphyritic, biotite granodiorite, with pink microcline phenocrysts set in a hypidiomorphic groundmass of oligoclase-andesine, microcline and quartz. An adamellite near the Crusader copper mine and a granite which intrudes the Myally Beds west of Dobbyn have also been included in the Kalkadoon Granite.

The Naraku Granite is exposed as scattered outcrops in the Corella Formation between Camel Well and the southern edge of the Sheet area. It is mostly a pink, fine-grained, adamellite - almost micro-adamellite - whose main minerals are microcline, andesine, quartz and biotite. The rock has a hypidiomorphic granular texture. In the Cloncurry Sheet area to the south,where it crops out extensively, the Naraku Granite ranges into granodiorite.

The Ewen Granite, as defined, crops out only on the Dobbyn Sheet area. It intrudes strata mapped as Argylla Formation, west of Dobbyn, and forms several outcrops between Mosquito Creek and Surprise Creek. The only available specimen is a potash granite rich in microcline.

Dolerite

Dolerite dykes in the Sheet area are of two ages. Metadolerites and amphibolites older than the folding occur in the Leichhardt Metamorphics and Argylla Formation, and are probably related to the Eastern Creek vulcanicity - some may have served as feeder dykes. They are generally sheared and, close to granite, recrystallized and partly assimilated. Post-folding dolerites, older than the granite intrusions, occupy the noses of pitching folds and fault-lines. They are commonly sheared or otherwise metamorphosed. An olivine gabbro, of unknown age, occurs 16 miles south-west of Kamileroi Homestead; it is the only known olivine-bearing rock in the Sheet area.

METAMORPHISM

Rocks west of the line of outcrop of the Leichhardt Metamorphics are much less metamorphosed than those farther east. The acid lavas of the Argylla Formation are recrystallized near granite, but otherwise appear to be little altered. Slaty cleavage and secondary sericite are the only regional metamorphic features developed in the sediments of the Myally Beds, Surprise Creek Beds, and Ploughed Mountain Beds. Quartzites at the surface may have been formed by weathering processes. In the few places where the sediments have been seen to be intruded by granite contact effects are slight.

Little petrological work has been done on the metamorphic rocks of the area. The Corella Formation appears in the field to be of similar metamorphic grade to that farther south - biotite zone, with some higher grades locally (see Joplin, 1955). Schists, crystalline calc-silicate rocks, and quartzite with some hornfels and granulite have been formed. The original carbonate-bearing rocks have been intensely deformed. Metasomatism is probably as extensive as that farther south, but its degree has not been determined. None of the "red rocks" described by Edwards and Baker (1954) have been observed.

The Leichhardt Metamorphics have been extensively metamorphosed, and migmatite developed locally. The dolerite within the Leichhardt Metamorphics is generally sheared, re-crystallized and altered to amphibolite.

Cleavage and schistosity strike parallel to the fold axes throughout the Precambrian; these are generally within a few degrees of north-south.

STRUCTURE

Figure I shows the major structural elements of the Precambrian in the Dobbyn Sheet area. Folding generally is meridional (although fold axes in part of the Myally Beds strike north-west to north-north-west), and there are at least two systems of faulting.

Folding: In detail the structure in the acid lava successions is not readily decipherable because of the paucity of trend-lines in the lavas. Dips are invariably steep and folding is strong, but probably simple. An unconformity between the Argylla Formation and the Myally Beds near Mistake Creek and other unconformities beyond the Sheet boundaries show that there was more than one period of folding. All folding appears to have been due to approximately east-west compression.

Dips in the Surprise Creek and Ploughed Mountain Beds (which have undergone only one period of folding) are up to 80°, but the average dip is probably about 40°. Folding is open and simple. A remarkable feature of the folding of these sediments is the preponderance of north-pitching folds. The persistence of formations in a north-south direction can only be explained by repetition by faulting.

No overturned folds, such as occur farther south, have been observed in the Dobbyn Sheet area; and folding is generally rather simpler.

<u>Faulting</u>: The dolerite dyke swarms in the Leichhardt Metamorphics and Argylla Formation formed at a fairly early stage in the evolution of the orogenic belt. They probably occupy a tensional fault system which developed about the time that the Eastern Creek Volcanics were extruded and while the tectonic land was rising before the first period of orogenic deformation.

The east-west faults in the south-west of the Sheet area are probably older than the faults which form a conjugate shear-fault system in the Myally Beds and younger sediments. From evidence outside the Sheet area it appears that they contributed to the subsidence of the western geosyncline. There was also later movement, as the Surprise Creek Beds are faulted.

The conjugate shear-fault system, with components which strike north-west and north-east, affects all Lower Proterozoic strata, but there may have been two periods of fault movement, one with each of the two orogenic compressive phases (see below).

Outside the Sheet area, high-angle reverse faults have been mapped e.g. Mount Isa Fault. They may form part of the conjugate shear-fault system. Jensen (1939) records a meridional thrust fault (itself much faulted) in the Lochness area, 20 miles west-south-west of Dobbyn.

The importance of strike faulting is difficult to evaluate, but it has undoubtedly taken place.

TECTONIC HISTORY

As the age relationship between the Argylla Formation and the Leichhardt Metamorphics is in some doubt (see p. 3) the tectonic history of the region is here traced from the extensive outpouring of acid lavas to form the Argylla Formation. The lavas appear to have been mainly terrestrial flows in the Dobbyn Sheet area, but interbedded sediments farther south reveal sub-aqueous deposition.

An even more extensive, mainly sub-aqueous, basic volcanic outpouring followed. The lavas in the Dobbyn Sheet area crop out only west of the tectonic land (see below) and overlie the acid lavas. Farther south basalts were widespread east of the tectonic land and a break in vulcanicity after the last acid flows is evidenced by quartzite several thousand feet thick. During the extrusion of the basalt a meridional tectonic land began to rise, probably as a broad arch, now represented roughly by the line of outcrop of the Leichhardt Metamorphics (Fig. I).

Rise of the tectonic land continued after the basaltic vulcanicity ceased and resulted in two depositional basins - an eastern geosynclinal belt and a western geosyncline, and local unconformities marginal to the tectonic land. Complex movement east of the tectonic land produced a regional unconformity at the base of the Corella Formation. Sediments accumulated deeply in both depositional areas. The Corella Formation includes most of the sediments east of the tectonic land; it is characterized by thin lamination throughout and abundance of carbonate-bearing sediments. In the west more than 20,000 feet of mainly arenaceous sediments accumulated.

An orogenic episode, centred along and east of the tectonic land, terminated the sedimentation in the east but produced only local unconformity in the west. In the Dobbyn Sheet area there is no record of pre-orogenic sediments younger than the Corella Formation. Structural deformation accompanying the east-west orogenic compressive phase resulted in meridional folding and a conjugate shear fault system. Granite was probably intruded into the strongly folded belt at this time; the lavas at the top of the Myally Beds are probably also related to the orogenic deformation.

The continuing sedimentation in the western geosyncline produced the Surprise Creek and Ploughed Mountain Beds, which display a greater variety of sediments than the underlying Myally Beds. The sediments were derived both from the tectonic land and from a foreland to the west and south. The Deighton Quartzite, east of the tectonic land, in the Cloncurry Sheet area, was probably penecontemporaneous.

Dolerite dykes were intruded over a wide area largely into faults and noses of folds, at some time after the first orogeny and before the final intrusion of granite.

After the deposition of sediments younger than the Surprise Creek Beds in the western geosyncline a second, and final, period of major orogenic deformation, with granite intrusion, strongly folded and faulted the whole region. Compression was from about the same direction as before. Uplift and erosion completed the Lower Proterozoic history.

Upper Proterozoic and Palaeozoic sedimentation is not recorded in the Dobbyn Sheet area, but took place over wide areas farther west and south.

In Mesozoic times subsidence resulted in terrestrial sedimentation on a peneplaned to mature surface, followed by transgression of the sea from the east, as the deeply subsiding basin which produced the Great Artesian Basin, continued to sag.

Uplift in Cretaceous times initiated a further period of erosion and peneplanation, towards the end of which laterite was formed over a wide area. The present land forms were produced by Tertiary warping and a recent eustatic change in sea level, which caused rough upland terrain, alluvial sheets and deeply incised watercourses to form.

ECONOMIC GEOLOGY

Copper is the only metal which has been mined extensively in the Dobbyn Sheet area. Other metals are known to occur, but generally in sub-economic quantities or grades. The area is too remote from centres of population for use to be made, to any marked extent, of such non-metallic resources as may occur. Metallic mineralization is confined to the Precambrian.

Copper: When R.L. Jack visited the area in 1881 the Dobbin (Dobbyn) and Crusader copper lodes were already known and were being tested. The Mount Cuthbert and nearby Kalkadoon mines have been the main producers in the Sheet area. Production, totalling about 16,400 tons of copper, has been recorded from about 60 mines. The recorded production of all mines that have yielded more than 100 tons of copper is listed in Table III. The figures have been compiled by Mr. J.H. Brooks of the Geological Survey of Queensland. The revival of production experienced by the remainder of the field since 1953, when Mount Isa Mines Limited opened its copper smelters, has not been shared by the Dobbyn area because of its distance from the treatment plant. Copper mineralization occurs in both the metamorphics and the sediments.

TABLE III - COPPER PRODUCTION

Mine	Ore treated (Long tons)	Copper Produced (Long tons)	Grade of ore (%Cu)	Gold Recovered (oz.)
Mount Cuthbert	60,680	4,323.9	7.0	174.5
Kalkadoon	45,887	3,494.8	7.6	38.5
Orphan	23,746	2,740.0	11.5	601.7
Dobbyn	16,581	2,819.6	17.0	375.4
Mighty Atom	9,503	1,163.4	12.2	33.6
Crusader	3,640	380.0	10.4	39.9
Little Wonder	1,708	211.4	12.4	16.8
Lady May	1,008 * (977)	202.1	20.7	33.9
Warwick Castle	1,580	174.2	11.0	11.4
Mussolini	707	140.0	19.5	6.9

* Records incomplete. Copper and gold production and percentage yield of copper based on the smaller figure.

Gold: The total recorded production of gold is less than 2,000 oz. practically all of it as a by-product from the production of copper from the main mines. The figures for individual mines are included in Table III. Jensen (1939) has recorded gold from the Lochness area and Rayner (1936) from Silver Ridge, four miles north of Mount Cuthbert. At neither place does it appear to be present in economic quantities or grade. "Colours" have been obtained from a number of places within the area of outcropping Precambrian, from both crystalline and sedimentary strata.

Other Metals: Silver and lead have been recorded from Silver Ridge (with arsenopyrite and pyrite, in association with gold) (Rayner, loc. cit.) and lead from Lochness (Jensen loc. cit.), but none has been produced.

Cobalt mineralization in the Pink Cap (Pinkie) lease, 12½ miles by road west of Kajabbi, near Gereta Homestead, has been worked, but no production has been recorded. Rayner (1938) concludes that a small amount of ore might be won by hand-picking. Cobalt occurs, in assay quantities only, on Boomarra Station, east of the Leichhardt River. Molybdenite has also been recorded from Boomarra Station (Ball, 1915), but not in economic quantities.

Very few radiometric anomalies were recorded in the Dobbyn Sheet area in the course of the intensive search for uranium in recent years. On account of the remoteness and roughness of the area prospecting has not been as thorough as in other Sheet areas. The Impassable and Surprise uranium deposits, of sub-economic grade, occur in the Eastern Creek Volcanics, in the extreme south-west of the Sheet area.

A substantial tonnage of ironstone occurs in the Lochness area. Jensen (1939) estimates the two outcropping lodes to contain between 10,000,000 and 20,000,000 tons of ironstone above the level of the limestone plain west of the range; but the deposits have not been surveyed. A chip sample from the eastern outcrop assayed 44.82% iron and 0.21% phosphorus. The western outcrop contains small quantities of lead and gold.

Non-metallic Minerals: Calcite ("limestone"), which is used by Mount Isa Mines Ltd. as smelter flux, occurs in the Corella Formation, and is being quarried near Kajabbi. Distance from market is a serious deterrent to systematic prospecting.

Veins of strontianite or celestite have been reported from the excavations for an earth tank on Lorraine Station (in Tambo Formation?). The exact site is not known; it may be north of the Dobbyn Sheet area.

Abundant supplies of road-making and building construction materials, such as basalt ("blue metal"), sand, and aggregate, are available within the area of outcropping Precambrian rocks.

WATER SUPPLY

Surface Water: Permanent or near-permanent waterholes occur in most of the larger watercourses, both in the area of outcropping Precambrian and in the plains country. Many of the waterholes and rockholes in the hills are inaccessible to stock or have little fodder grass around them, so are of little use for stock. They are useful, however, to prospectors. Wide areas, both in the hills and on the plains, are without natural surface water for many months of the year. Water can be preserved in many places by the construction of earth tanks or dams for stock purposes. Should the need arise, suitable dam-sites can be found in many gorges in the hills. All but the main streams, such as the Leichhardt River and Gunpowder Creek, and their major tributaries, have rather small catchment areas for other than small water conservation projects.

Underground Water: In the Precambrian area ground water, at the soil-rock interface, should be fairly readily available at shallow depths along the main watercourses, particularly upstream of features such as impermeable rock bars. Faults are generally silicified so that the only water reservoirs in the lavas and granite are joints or deeply weathered "pockets". Of the sediments, the sandstone is probably too highly silicified to provide aquifers though perhaps only superficially; water is therefore probably stored mainly in joints and along bedding planes. Bores should therefore be sited in structural traps, such as pitching synclines or up-dip from impervious fault zones.

In the plains area artesian water is everywhere available, except where the Precambrian basement comes to, or approaches, the surface. In general, the depth at which water may be obtained increases with distance from outcropping Precambrian. In the east of the area the depth of the aquifers decreases because of the basement ridge farther east, of which Mounts Fort Bowen and Brown are the surface expression. Water should everywhere be obtainable at depths of less than 2,000 feet. The subject is treated in some detail in the report of the committee of investigation on the Queensland portion of the Great Australian Artesian Basin (Queensland Department of the Co-ordinator General of Public Works, 1954).

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