

UR 1954/91-107

WORK PROGRAMME

LORINNA 15th July, 1954.

- 1 Check boundaries, faults, etc. on the map sheets which are nearing completion. Record general dips etc. on these sheets and adjust boundaries and interpretations to more nearly represent factual positions especially in areas of special interest.
- 2 Enlarge map of Round Hill area check in detail the interpretation, position of faults, boundaries etc. Combine with all available data including previous surveys and mine information, a new detailed investigation. Draw sections, structural contour maps to depict the geometry of the ore bodies and attempt prediction of their possible repetition.
- 3 Investigate the Shepard and Murphy fault. Attempt an interpretation of its movement and age by seeking new evidence at various places along its length. Combine this with a detailed sectioned mapping project of the actual ore deposits (vein system) to predict a continuation or otherwise of the ore on the other side of the break.
- 4 Complete a larger scale map of the 5 Mile Rise area with the various known ore deposits marked up. Mark up fractures, dips, and values including alluvials with a view to indicating the source of economic minerals and possible future investigation.
- 5 Investigate likely areas as indicated by the regional geological map paying special attention to known workings and doing routine chemical testing by the established methods of qualitative analysis with greater frequency in likely areas. Include known mineral bearing areas such as Commonwealth Creek, Barn Bluff copper, Canning River tin, zinc deposits near Zig-Zag, Bond Peak area, Stormont gold mine, Welcome Home mine, Campbell's Reward, Olivers Hill etc. Follow up the indications with more detailed sampling and investigation of the nature and potential of each one including the several favourable indications already recorded. Do detailed mapping where it is warranted.
- 6 Carry the regional mapping further southwards. Photo surveys by the established methods with special attention to recurrence of granite and Cambrian areas in the upper Forth and Mersey valleys. Indicate the geological environment of the Pelion wolfram and zinc areas.
- 7 A detailed investigation and map is already indicated for the Pelion wolfram deposits. This should be undertaken to determine the nature of the vein system, number of veins, length, depth, continuation and values. Suggest an economic means of proving and working this deposit.
- 8 The Dove River silver lead deposits merit special attention and investigation procedure should be similar to that for the Pelion wolfram mine.

The purpose of this report is to outline the progress of the survey at Lorinna to August 1954 and to indicate the steps necessary for its completion.

The aim of this survey is by systematic scientific investigation to develop a new mineral industry in this part of the State.

Several phases of the work are planned:-

- i. An overall regional geological survey resulting in accurate geological maps which give a knowledge of the locality, topography, stratigraphy, mineralisation, favourable hostrocks, source rocks and general mineral potential. This phase of the work to be undertaken irrespective of productive results.
- ii. Detailed geological investigation of favourable areas as indicated by the regional survey. This part of the work includes a reinvestigation of former workings and known mineral deposits.
- iii. Detailed geophysical and geochemical work as applicable to follow up in any area of sufficient merit.
- iv. Design and supervision of a drilling programme to investigate anomalies, ore bodies and reserves.
- v. According as any mining industry may develop the facilities of the survey should assume the function of resident mining geologist responsible for continued production.

Through every phase of the work the investigation is pursued until the result is clearly negative or production achieved.

The work of the unit to date is summarised chronologically:-

1952	February to July	)	Building, fitting and installing base headquarters including plumb- ing and sewerage.
	August to December	)	Detailed work at Round Hill. Track making on the Five Mile Rise and detailed investigation of Sayer's Lease.
1953	January February	)	Erecting trig stations.
	March April	)	Trig observations.
	May		Stanhope Colliery at Avoca
	June to October	)	Trig observations, photo geology, marking up photos, templet making, photo traverses, adjustment of control survey. ) Report on Interview River Track.
	November to	)	All Nations area at Moina.
1954	January	)	Science Exhibition.
	February March	)	River Traverses, calculation of angles, Photo traverses.
	April		Calculations of co-ordinates and templet laydown. Stanley River Tin Field.
	May		Erection and setting up of the South West Unit.
	June July	)	Map Making - based on field work.
	August		Map Making - rough interpretation.

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The total area under investigation at Lorinna is divided into two halves. For the geological investigation of each half it was estimated that it would take at least five years with the present staff and facilities. The eastern half is being mapped first and the map making is nearly completed but only about one third of the geology is done.

The whole area is divided into 20 mapsheets each  $1\frac{1}{2}$  map squares in size (10,000 by 15,000 yards). These are numbered and lettered H-L and 24-28 according to the State Mineral investigation plan.

The photo geological interpretation on the four sheets K28, K27, L28, L27, is based on field work and apart from minor corrections can be regarded as factual.

The work of the Unit is now discussed under its separate headings.

#### CONTROL SURVEY:

A survey providing sufficient photo control for the eastern ten map sheets has been completed.

Fifteen trig. stations have been erected on various prominent features convenient to an even distribution over the area. Two of these include the Lands Departments second order stations on Mount Roland and Cradle Mountain from whose co-ordinates the breakdown has been computed.

The trig. stations were observed in groups of four as braced quadrilaterals the angles of which were then adjusted together by forming the correlative normal equations and doing a least squares adjustment.

The readings were taken with a Watts No. 1 Microptic theodolite using a rounds of angles system with 16 rounds of angles taken from every station. The vertical angle was recorded eight times.

The averaging and the adjustment method which is more elaborate than usually applied to this class of instrument has compensated for the use of the less suitable instrument and the results have been very satisfactory. The horizontal mis-closure on to Bott's Trig. taken through two Chains of quadrilaterals of about 50 miles in length was about  $7\frac{1}{2}$  inches.

4.

The vertical heights of stations were not so good. Most heights fall to within two feet but some heights at present assigned are probably out as much as 10 feet. The figures in hand could be used to narrow these limits considerably without further observation but it seems unwarranted as the task of contouring the geological maps is not to be undertaken.

The calculations for each quadrilateral are filed and methods of calculations, actual figures, etc., available.

Three well marked major trig. stations are situated conveniently on the western side of the area for continuation of the control survey westwards over the Mackintosh Valley. They are Canning Bluff (post in a cairn of stones), Cradle Mountain (steel beacon) and Black Bluff (steel beacon).

The survey already completed used these to form large quadrilaterals covering the whole area which were then broken down further. A similar pattern could perhaps be used to extend the control survey westwards.

#### REGIONAL PHOTOGRAMMETRY & MAPMAKING:

The photogrammetry of the Lorinna area has been made very difficult by photography at unsuitable scales.

At the time that the survey commenced about one third of the area was covered by photographs - some 7 runs of DuCane & Middlesex at 20 chains to the inch to the south and a strip 3 runs wide of Middle-photos at 30 chains to the inch across the centre of the area.

Early in 1953 the whole area to the central dividing line was re-photographed at 40 chains to the inch. Although this scale is unsuitable for map making at 20 chains to the inch and is also unsuitable for recording the information when traversing it has been used for the compilation of maps because it is the only complete coverage available.

The photos were marked up in the usual way and slotted templets made from the 40 chain prints.

The control points were plotted from their calculated co-ordinates on a gridded base board (in two sections) at 40 chains to the inch and the templet laydown made at this scale. All the photo points were pricked through and recorded on the grid from which they were scaled on to the 20 chains to the inch plotting sheets.

The size of the plotting sheets is 22.727272 inches by 34.090909 inches representing the 10,000 yard and 15,000 yard sides respectively. These are divided by grid lines spaced every 1,000 yards i.e. 2.272727 inches.

The sheets from which the information will eventually be published are already draughted for several of the northern map areas but for convenience in working pending completion of the field work the information is plotted on copies of the grid which serve as working sheets. Working sheets are also made of areas of interest which may be cut by the junction of two or more sheets prepared in accordance with the systematic coverage.

For the four sheets K28, L28, K27, and L27 working sheets have been completed from field data

recorded on the photo traversing and plotted with the Kail Plotter.

The geological information and topographic details as necessary was first marked on the photographs and then transferred to the map, stereo-pair by stereo-pair, directly from the machine using the panto-graph arm to enlarge from the 40 chain photographs to the 20 chain plot. The photo points already plotted at 20 chains and marked on the map sheets are used to form the photo base lines for the Kail plotter.

Further confirmatory work is required on the four sheets on which the geology has been plotted. Boundaries faults, etc. require checking and the recording of general dips, structural features, the main axes, etc. from the mass of recorded data is desirable. Points which especially need checking are the central Moina limestone extent, McCoys area, and two areas at Liens. The quartzites forming the ridge on the road to the Board Mill may be Crotty but are more probably tubicular. They should be determined and an appropriate structure worked out. Similarly an area a mile or two further eastwards which is thought to be limestone forms a series of small wooded hills and may be the quartzite.

The southern boundary of the Dalcoath Granite mass is an interpretation with the only accurately fixed points on the Forth River and under Dalcoath hill. Although it must be close to its actual position it requires checking at intermediate points if further work of importance is dependant on it.

The boundary of the granite mass in the

Mersey Valley, just south of Liena, is also not completely traversed. There is a short section of the river a mile or so upstream from Liena which has not been mapped. The southern boundary of the granite mass is in this stretch.

The plotting which has been done on the remaining six sheets of the eastern half of the area is a photo interpretation by L. G. Nixon. It is based on no field information and is of little value as a geological map. Nixon was to have prepared an accurate topographic map with such geological features as could be properly determined from the photos plotted as well. This mapping was to have formed a basis for field work during the summer 1954-55 which would give necessary geological information to complete the mapping.

Nixons work has been unsupervised and he has made an attempt to complete an interpretation without supporting field work for the whole area to the detriment of accuracy of topographic detail.

#### PHOTO TRAVERSING

For building the regional geological maps the geological data is first built up on the photos by direct interpretation and recording of observed field data directly on to the photos by pricking the position of the recorded information.

To get good outcrop, obtain basic geological data, and to undertake systematic routine prospecting the stream beds of all but the minor creeks in the area covered by the completed 4 sheets have been traversed.

Intermediate traverses over hill slopes, spurs, roadways and along contacts were then undertaken to

complete the geological structures.

#### ASSAYING AND GEOCHEMICAL WORK

A system of qualitative testing has been introduced for the following reasons.

- i. To enable systematic prospecting.
- ii. To test observed mineralisation more fully than mere visual inspection which may sometimes miss economic minerals.
- iii. To indicate economic concentrations.
- iv. To enable by systematic recording in conjunction with the regional geological maps an interpretation of basic geochemistry. To determine host rocks, source rocks, types of mineralisations associated with the various rock types and which of these may be economic.
- v. To trace the metallogenesis when undertaking a detailed study of a particular mineral deposit.

The work done so far consists of chip sampling of almost every type of mineralisation quartz vein, etc. encountered in the routine geological traverses. These fragments of rocks are submitted to the Launceston laboratories for qualitative analysis and an indication of the concentration in cases where any economic mineral is discovered.

The samples, their positions, environment and qualitative results are indexed and among the groups already submitted are several which warrant further close attention and detailed sampling. Quartz veins occurring in several localities have been found to contain gold at concentrations which may prove economic.

Since the regional maps are so recent plotting up of assay data or any geochemical results has not yet been undertaken but it was planned to devise a system of symbols representing the elements and concentrations which could be plotted directly on the maps.

SUMMARY OF GEOLOGICAL SUCCESSION

Proper names and correlations have not yet been assigned to the rock units in the stratigraphic succession since further information will be obtained as the survey proceeds.

To summarise the column to date using unsystematic field names in places:-

<u>Recent</u>	Scree and Alluvium.
<u>Tertiary</u>	Pleistocene glacial varves and moraines.
	Basalt
	Lake sediments
	Plateau Basalts and Miocene faulting
<u>Jurassic</u>	Dolerite
<u>Triassic</u>	Felspathic sandstones
<u>Permian extending to Carboniferous</u>	Coal Measures
	Mudstones and glacial till
<u>Devonian</u>	Granitisation and mineralisation of Cambrian and older sediments
<u>Silurian</u>	?
<u>Ordovician</u>	Gordon Limestone
	{ Tubicolar sandstones, quartzites and shales
	{ "Dead Horse" conglomerate
Tubicolar Series	{ Tubicolar sandstones, quartzites, grits and sharpstone conglomerate
	{ West Coast Range conglomerate
	{ "Ghost" conglomerate.
	Cethana Unconformity
<u>Cambrian</u>	Cethana Group (Dundas Group)
<u>Precambrian</u>	Dove Schists
	Forth Valley quartzites, quartz schists and schists

Forth Valley Quartzites and Schists

These rocks are part of the Precambrian central

shield exposed through the dolerite and Permian capping along the Forth and Mersey Valleys.

#### Dove River Schists

The typical "Dove" rock is a dark grey micaceous irregularly laminated schist. There may be no age difference between these and the Forth schists but the lithology is fairly distinct.

Areas of these rocks are found both in the Dove and Mersey valleys and there may be further areas higher up the Forth Valley. Granite is marginal to these schists in both the Mersey and Dove exposures and the silver lead deposits on the Dove River may occur in them.

#### Cethana Group

The sheared "porphyroidal" and partly recrystallised slates, tuffs, conglomerates, etc. are almost certainly metamorphic Dundas Group of Cambrian age. No locality sufficiently undisturbed to yield recognisable fossils has yet been found since the distribution in the north is widespread it is probable that correlative and age evidence will be forthcoming.

Since these rocks are partly and often wholly recrystallised large areas have been previously mapped as "porphyroids" and granites. The present maps delineate the completely reconstituted areas as granite but no differentiation between the rock members or the areas of the various degrees of metamorphism has been attempted.

The phases of partial recrystallisation are superimposed on the original variable beds in this group. They appear to have been derived from the redistribution of a somewhat basic volcanic suit but they do contain siliceous conglomerates, stretched pebbles

beds, quartzites and breccias. Lavas and pumice have also been observed.

The "porphyritisation" or recrystallisation is largely due to the silicification and reaction of the rather basic rocks with acid zones advancing outwards from the granitic centres.

It appears that the deposition of the group does not extend over the central shield to the south.

#### Tubicolar Series

These rocks will have to be properly subdivided and named. They are a series of quartzites, shales and conglomerates. The many tubicolar quartzite beds occur throughout with the thin shale beds as a minor constituent and the very variable conglomerate lenses occurring at various levels.

The development of the basal conglomerates is often such as to make the tubicolar quartzites minor. It is the West Coast Range Conglomerate which where it occurs in this locality as a basal conglomerate to the tubicolar series is found unconformably directly overlying the Cethana Group.

However there is often a thin or no development of basal conglomerate and the tubicolar sandstones and quartzites in direct unconformable contact with the Cambrian rocks.

The tubicolar sandstone series are more correctly depicted as a facies variant extending from the West Coast Range Conglomerates. Where the column is dominantly tubicolar quartzites with these rocks basal it is usual to find several higher conglomerate horizons. Field names such as "Ghost", "Dead Horse", "Pig and Whistle", "Barretts" have been assigned to these lenses

pending systematic naming.

A sharpstone conglomerate occurs in the tubicolar series. It should not be mistaken for a breccia or a fault breccia which it resembles. Examination will show the interstices between the angular quartzite fragments as consolidated sands and gravels with occasional pebbles.

The tubicolar series appears to extend over the Dove schists but not further southwards over the central shield or Forth Group.

#### GORDON LIMESTONE

Fossils have been found in the limestones which follow the tubicolar quartzites.

It is a dark blue grey limestone resembling and equivalent to the Gordon Limestone.

#### Granite

There is one granite mass outcropping in the Mersey Valley and at least four in the Forth Valley. The two masses already mapped are the Dove granite and the Dalcoath granite. Both are reconstituted Cambrian Group sediments although the Dove Granite has ramifications extending into the Dove Schists.

The remaining granite masses probably intrude the older rocks.

#### Permian

Permian till and conglomerate is found as basal material overlying the Forth Schists round the head of the Forth & Mersey Valleys. The Permian sequence is intruded by the massive Jurassic dolerite sills which form the high mountains in this area.

A permian conglomerate on the plateau under Cradle Mt. resembles the West Coast Range Conglomerate.

#### Tertiary Basalt

It would seem that there are at least two ages of basalt. These are represented by the plateau basalts which have been cut through by the present river system and the newer basalts which occur as ledges on the valley sides and in one or two places on the valley floors. The Tertiary lake sediments appear to have been deposited in lakes behind these basalt barriers.

#### DETAILED INVESTIGATION OF LOCAL AREAS

Large scale geological plans usually 100 feet to the inch or other convenient scale are made in investigating specific deposits or mineral bearing localities.

Twenty chain photos are suitable for enlarging to build some of these plans depending on the requirement but the 40 chain photographs are not of value for any work larger than 600 feet to the inch.

Because of the heavy rainfall, close vegetation, and violent relief the local surveys are best made by stadia. These are very convenient if it is possible to observe the area from a central vantage point and the outcrops and geological detail can be recorded reasonably quickly.

The method offers the advantage of accuracy and the reading systems make it easy to detect and eliminate errors. The tedium of lengthy calculations is very much reduced by the combined use of stadia slide rule and adding machine.

Reports have been completed for the All Nations area and Sayers lease and work on the Golden

Hill area is well advanced.

As the regional survey proceeds the need for detailed surveys of more areas will develop and as a result of the regional work already completed there are several outstanding detailed investigations to be done :-

i. Enlarge the map of Round Hill area checking in detail the interpretation, position of faults, boundaries, etc. This compilation should depict all available data including previous surveys and mine information and be combined with a new detailed investigation. Sections and structural contour maps should be built up showing the geometry of the ore bodies and the folding of the limestone.

Prediction of the possible repetition of the ore bodies and the indication of favourable locations for new ores should be attempted.

ii. Investigate the Shepard & Murphy fault. Attempt an interpretation of its movement and age by seeking new evidence at various places along its length. Combine this with a detailed sectioned mapping project of the actual ore deposits (vein system) to predict a continuation or otherwise of the ore on the other side of the break.

iii. Complete a larger scale map of the 5 Mile Rise area with the various known ore deposits marked up. Mark up fractures, dips, and values including alluvials with a view to indicating the source of economic minerals and possible future investigation.

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#### ACCESS TRACKS AND ROADS

There are about 45 miles of jeep tracks in the area giving good access to most parts. Canning Bluff and Canning River area are most difficult of access but even these are only one day's walk from the jeep track in the Forth Valley via the route up the steep valley side near Double Lakes Lookout. Should much detailed work be required in this locality and Commonwealth Creek area an access track up from Sloane's Bridge is warranted.

The 16 miles of jeep track along the upper Forth Valley give a central access route from which much of the area can be quickly reached.

The 5 Mile Rise gives a link route to Moina and the Cradle road system but has limited use in wet weather. The Department is responsible for maintaining this and the Pelion track for the purposes of the survey.

Eventually it is hoped that the authorities will become aware of the need for a through cross roads inland from the agricultural coastal belt and linking the various pastoral belts which extend back between the rivers from the coast. From Deloraine, Mole Creek, Liena, Lorinna, Cradle Mt. Road, Middlesex and the V.D.L. Road to Guilford is a logical choice for this route. This Department has already investigated the possibility of building a road link from Lorinna to Moina but it is unwarranted unless further mineral industry should develop.

Addison's Road to Liena and the timber tracks on the Plateau give jeep access to Berriedale Plains and the jeep track continues down to the mouth of the Arm River and along the Mersey valley giving access on this side.

#### OFFICE AND ADMINISTRATION

The files are self explanatory and cover the administrative side of the survey. In addition to routine correspondence, forms, staff matters, stores, orders for materials, etc. the details of the qualitative assays and the tolerances of the results are on file.

Copies of reports already completed, survey details, calculations, the procedures and standard symbols etc. to be adopted by the survey are recorded.

(Sgd.) J. Elliston.