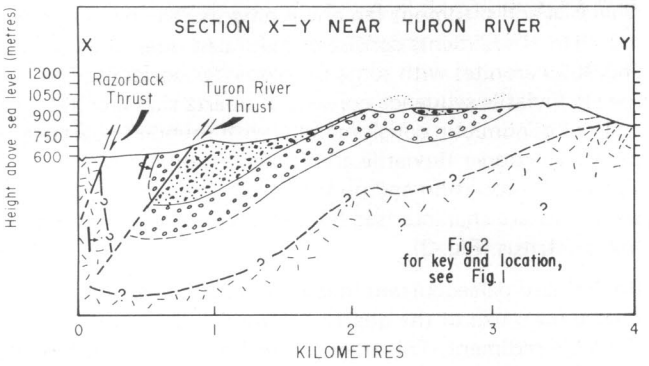

FIG.3 STRATIGRAPHIC COLUMN (measured along the Turon River)

Thickness in metres			
320	Red, purple and green fine-grained arenites		
290	Interbedded fine to coarse arenites, pebble, cobble and boulder polymictic rudites	Clasts consist of vein quartz, plutonic quartz, quartzite, graywacke, subgraywacke, limestone and the matrix contains a high percentage of lithics.	UPPER FLUVIATILE
108	Red and purple fine-grained arenites		
80	Oligomictic rudites and pebbly arenites	Clasts consist of predominantly well-rounded quartzite. Texture varies from cross-bedded pebbly arenites at the base to orthoconglomerates at the top	LOWER FLUVIATILE
885	Interbedded red, green and black fine arenites and lutites	Small slumps and soft-sediment disruption common. Wormburrows and carbonaceous material present	PARALIC
715	Interbedded medium- and fine-grained quartz arenites	Coarser bands are cross-bedded	
653	Medium-grained quartz arenites	Prominent cross-bedding	
555	Fossiliferous quartz arenites	*Cyrtospirifer* fossils which are poorly preserved and commonly fragmented. Some lepidodendron plant fossils at the base of this unit.	LITTORAL AND NERITIC
455	Indurated medium to fine quartz arenites	Similar to lower unit	
	Cyrtospirifer horizon		
340			
330	Fine-grained quartz arenites	Thinly bedded	
	Indurated medium to fine quartz arenites	A bimodal grainsize with 15% clay fraction, and a high degree of secondary enlargement are characteristics of this unit. Ripples and cross-lamination are common.	
	Cyrtospirifer horizon		
115	*Cyrtospirifer* horizon. Thinly interbedded fine-grained quartz arenites and lutites.	Oscillation ripples and micro cross-lamination common	
10	Mud-chip breccia	Derived from underlying andesitic volcanics.	
0	Unconformity		

Regional folds have subhorizontal, north-south fold axes and are overturned towards the east. The west-dipping axial surfaces are parallel to a well-developed slaty cleavage. The overturned limbs are commonly associated with high-angle thrust faults which, in places, truncate the overturned western limbs of synclines (Figs. 1 and 2). This structural style is also observed in the Upper Devonian Cookbundoon Syncline, near Taralga, and in the Catombal ranges, near Wellington. The structure is consistent in symmetry and orientation with the regional deformation of the Hill End Trough, and implies that the deformation was post-Late Devonian, and (depending on the age of the uppermost volcanolithic conglomerates) possibly post-Early Carboniferous.

3. PORPHYRY COPPER MINERALIZATION IN MOLONG HIGH

WALL-ROCK ALTERATION IN THE YEOVAL COPPER PROSPECT

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The Yeoval copper prospect is located 3.5 km north of the township of Yeoval in central western NSW. The predominant rock type in the prospect is granodiorite, which is part of a diorite complex forming the eastern margin of the Yeoval Batholith. The occurrence of copper sulphides and other hydrothermal minerals is related to the intrusion of porphyritic dacite into the granodiorite. A large body of dacite occurs in the north-eastern part of the prospect and consists of phenocrysts of plagioclase, quartz, hornblende and biotite set in a fine-grained matrix. Dacite dykes occur to the west of the main mass.

Hydrothermal alteration is patchy in its occurrence, and varied in its intensity. The outer part of the dacite has undergone pervasive sericitic alteration followed by several episodes of vein formation. Copper sulphides occur with all vein types, but are most common with a late epidote-sericite-chlorite vein type. Granodiorite has undergone alteration about fractures; the widths of alteration envelopes vary markedly and are dependent on the spacing of fractures. An initial sericitic alteration was followed by K-feldspar flooding, and then by chalcopyrite-epidote-sericite vein formation. In both dacite and granodiorite, barren calcite and calcite-sericite veins are the last to form.

Sulphide mineralogy is simple: chalcopyrite is the most common sulphide present with minor amounts of bornite, molybdenite, digenite and galena. Pyrite is very rare and has been observed only in zones of intense potassic alteration. Sulphides occur as vein minerals and as disseminated grains at sites of mafic mineral alteration.

The occurrence of prehnite and clays as common constituents of alteration mineral assemblages suggests an upper temperature limit of approximately 350°C for the formation of the deposit.

THE GEOCHEMISTRY OF THE COPPER HILL DEPOSIT

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The Copper Hill Igneous Complex (near Molong) has three major phases – a quartz diorite and two dacites with

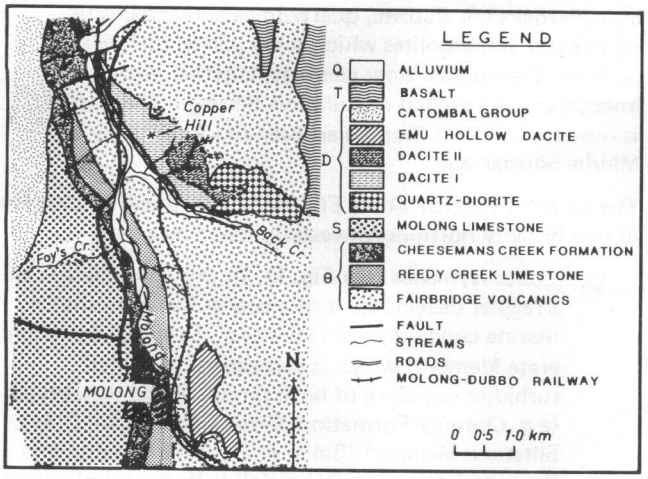

FIG. 1. GEOLOGY OF THE MOLONG–COPPER HILL AREA

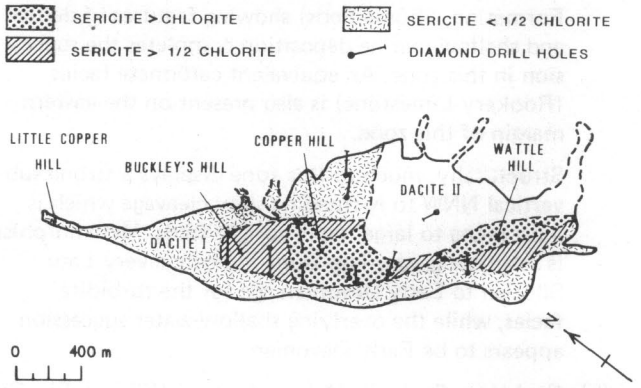

FIG. 2. DEGREE OF SERICITISATION OF DACITE I

the first of these dacites (Dacite I) bearing pyrite-chalcopyrite disseminated mineralization of the "porphyry copper type" (Fig. 1).

The original texture of the mineralized phase was that of an hornblende + plagioclase porphyry, but chlorite + sericite + pyrite + calcite ± epidote alteration has been so highly developed that in some cases the porphyritic nature is not immediately obvious. Several zones within the alteration area may be distinguished by their relative amounts of chlorite, sericite and epidote. These zones are an intensely sericitized core, an envelope where chlorite and calcite are highly developed and a peripheral assemblage bearing epidote and relict magnetite and hornblende (Fig. 2).

Chlorite and sericite become increasingly Fe rich with distance away from the core of the deposit. Hornblende from the boundary of the mineralized dacite appears to be richer in Fe than the hornblende from unmineralized dacites. Plagioclase tends to be more calcic toward the boundaries of the mineralized dacite than in the more altered zones.

The major chemical changes are a loss of Si, Al, K, S, Ba and Rb and gains of Fe, Mg, Ca, Na, CO_2, water, Cu and Sr on passing from the sericitic to the chloritic zone. Pb, Zn and Ba occur on the periphery of the mineralized dacite.

INTRUSIVE ROCK TYPES ASSOCIATED WITH PORPHYRY COPPER MINERALIZATION IN THE NORTHERN MOLONG RISE

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See Programme and Abstract Volume of Conference.

4. GEOLOGY AND MINERALIZATION IN THE WESTERN LACHLAN FOLD BELT

RECENT STUDIES OF THE TECTONICS, STRATIGRAPHY AND MINERALIZATION OF THE COBAR–MINERAL HILL REGION

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Introduction

Studies of the Cobar-Mineral Hill region by the Geological Survey of New South Wales commenced late in 1972, and are planned to continue until at least 1977. Regional mapping has led to a clearer understanding of the stratigraphy. Metallogenic mapping of the Cobar, Nymagee, and Bourke 1:250,000 sheets by the Geological Survey and recent work by exploration and mining companies have resulted in a better appreciation of the controls of mineralization in the Cobar region. However, our understanding is by no means complete, and further advances will depend greatly on a more detailed knowledge of the geology of the region.

Stratigraphy and Structure

The general stratigraphy and facies distribution are summarised in Figs. 1 and 2.

The *GIRILAMBONE BEDS* consist of quartz-mica, quartz-albite, chlorite, and minor epidote-chlorite-actinolite-quartz schists. Original sedimentary features can rarely be observed owing to metamorphic differentiation. Deformation is intense. The rocks show an original slaty cleavage cut by a later crenulation cleavage which commonly forms a new differentiated layering. This layering is deformed by a second crenulation cleavage which trends NNW to N and shows subsequent kinking at some localities. The Girilambone Beds have undergone upper greenschist facies metamorphism. No fossils are known to occur in the sequence; however, the beds are thought to be of Cambro-Ordovician age.

The *NYMAGEE IGNEOUS COMPLEX* comprises foliated and gneissic granite with minor migmatite, together with