

the axis of the Amphitheatre Basin was parallel to the Darling River Lineament. Structural deformation evidently occurred in the Middle Devonian as reflected in angular unconformity up to 30°, but the existence of a possible localised conformable transition between the Amphitheatre Beds and the Late Devonian Mulga Downs Group causes some uncertainty. Deformation could have occurred during sedimentation. Regional unconformity clearly exists at the base of the Late Devonian in adjacent regions.

The Kanimblan Orogeny caused mild deformation in the area. However, stronger deformation was associated with major faults along which dextral strike-slip movement occurred and the cover sediments were warped and folded.

The importance of fossil fracture zones, showing up as lineaments, has to be carefully evaluated. They influenced the tectonic and later structural development, and also the distribution of mineralization.

Mineralization

In the Cobar region major mineralization is associated with the Girilambone Beds, the Cobar Group and its equivalents, and the granites. The associations can be summarised as follows:

- (i) Cupriferous deposits associated with basic volcanics and sediments of the Girilambone Beds, e.g. at Girilambone, Budgery, Budgerygar, and Tottenham.
- (ii) A complex association of copper pyrite (pyrrhotite), gold, and lead-zinc-copper mineralization in the Cobar Group and its equivalents. The mineralization occurs in sedimentary rocks some distance from volcanic rocks (Cobar-Nymagee zone), and in or near acid volcanics (Canbelego-Bobadah-Melrose-Mineral Hill zone).
- (iii) Tin-tungsten and minor uranium is associated with the (?) Middle Silurian Erimeran Granite, the former at Tallebung, Marobee and Nangerybone, and the latter at Blackfellows Dam.

MINERALIZATION IN THE GIRILAMBONE BEDS has been discussed by Smith (1974) and Suppel (1974). The stratiform cupriferous pyrite deposits occur close to basic volcanics and, in the Girilambone area, other rocks of a dismembered ophiolite suite. A volcanic-exhalative origin similar to that proposed for Cyprus-type deposits has been suggested. The deposits are considered to have developed within the lower parts of layer 1 and in layer 2 of the oceanic crust.

MINERALIZATION IN COBAR GROUP AND EQUIVALENTS:

- (a) Cobar-Nymagee: "Cobar-type" ore bodies occur in turbidite sequences in the Cobar field and at Nymagee. Brooke (1976) suggested that the mineralization at the C.S.A. mine, Cobar, was deposited syngenetically and subsequently remobilized into crosscutting positions during deformation. It may be possible to apply this model to the whole Cobar field. At Cobar, evidence of bedding control of the mineralization is abundant on a small scale but the overall geometry of the bodies is crosscutting. "Pure shear" deformation may have occurred on a large scale, with subsequent fracturing and brecciation.

- (b) Canbelego-Bobadah-Melrose-Mineral Hill: Many of the deposits in this zone may have a volcanic exhalative origin, e.g. Mineral Hill, Yellow Mountain, Bobadah and possibly Canbelego (Mount Boppy gold mine). Deposits associated with the Mount Hope Volcanics are probably also of this type; for example, Bryan (1974) suggested that the May Day prospect at Gilgunnia is similar to the Captains Flat deposit.

Both local and regional structural controls are important in considering the deposits of the Cobar Group and its equivalents. The deposits appear, on a regional scale, to be associated with zones of tension and/or rifting, and, on a local scale, subsequent structural modification has played an important part in their present geometry.

GEOLOGY AND MINERALIZATION BETWEEN WEST WYALONG AND CONDOBOLIN, NEW SOUTH WALES

K.J. Kemezys

*Samedan of Australia,
Ethos House,
28 Ainslie Avenue, Canberra, ACT 2600*

Investigation of a belt of sedimentary rocks about 25 km wide and 75 km long which are generalized on the 1972 edition of the Forbes 1:250,000 geological sheet has indicated a stratigraphic succession at least 25,000 m thick probably of Silurian and Lower Devonian age. The basal conglomerate (Manna Conglomerate) overlies Ordovician andesitic volcanics which do not outcrop, but can be inferred from aeromagnetic maps to be present, and which are probably continuous under the Tullamore syncline with the Goonumbla Volcanics at Forbes and Parkes.

Dipping steeply to the west are the following formations from the base up (Fig. 1):

- (a) Manna Conglomerate, up to 5,000 m thick, contains milky quartz, quartzite, schist pebbles, boulders and coarse sandstones ("Manna Conglomerate" replaces the invalid name "Womboyne Conglomerate" used on the Forbes 1:250,000 sheet);
- (b) Ina Volcanics, 2,000 m andesitic and rhyolitic volcanoclastics, shales, sandstones, conglomerates and carbonates with poorly preserved marine fossils; containing the Cowal Member, a horizon 1,000 m thick of massive coarse rhyolitic tuff porphyry;
- (c) Banar Formation, 4,000 m lithologically very uniform finely laminated tuffaceous quartz greywackes;
- (d) Corrangle Formation, 100 m thick fine sedimentary breccia;
- (e) Burcher Greywacke, 4,000 m thick massive quartz greywackes and shales, containing rare crinoid stems and including the Blow Clear Member of sandstones and conglomerates;
- (f) Sandal Formation, 1,500 m thick sequence of sandstones and siltstones, conglomerates, possibly andesites; containing poorly preserved shelly marine fossils;

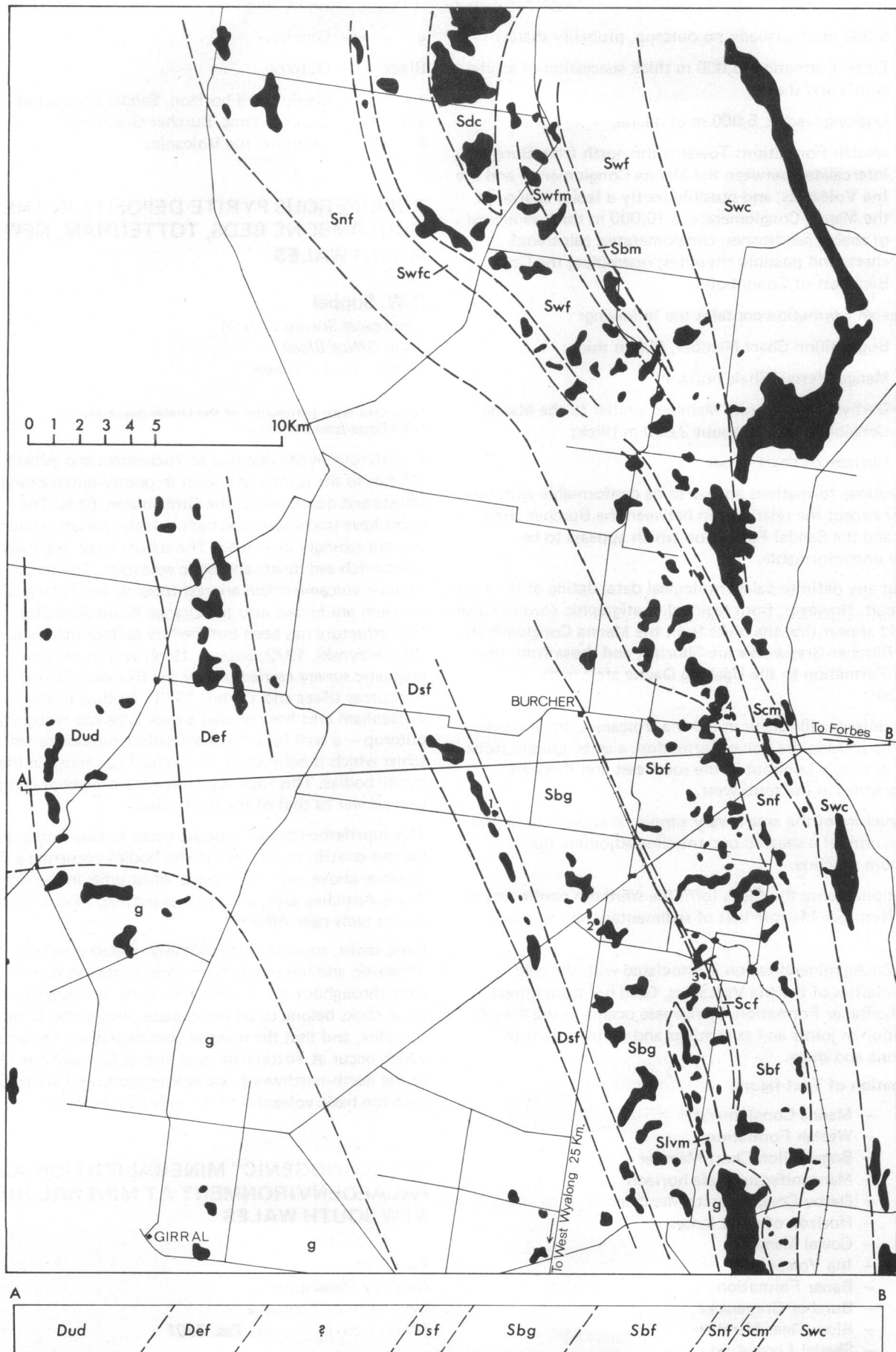


FIGURE 1
North of West Wyalong

- (g) 5,000 m of virtually no outcrop, probably shales;
- (h) Euglo Formation, 3,000 m thick succession of sandstones and shales;
- (i) Ugalong Dacite, 5,000 m of dacite;
- (j) Weelah Formation: Towards the north from Burcher, intercalated between the Manna Conglomerate and the Ina Volcanics, and possibly partly a facies change of the Manna Conglomerate, a 10,000 m thick sequence of shales, sandstones, conglomerates, calcareous cherts and possibly rhyolites; resembling the Ootha Beds east of Condobolin.

The Weelah Formation contains the following:

- (i) Bogandillon Chert Member, 500 m thick;
- (ii) Manganiferous Shale horizon;
- (iii) Darby Conglomerate Member, similar to the Manna Conglomerate and about 2,000 m thick;
- (iv) Horizon of chert lenses.

All the above formations appear to be conformable with one another except the relationship between the Burcher Greywacke and the Sandal Formation which appears to be slightly unconformable.

Without any definite palaeontological data, dating of the rocks is difficult. However, from regional stratigraphic considerations it would appear that the units from the Manna Conglomerate to the Burcher Greywacke are Silurian, and those from the Sandal Formation to the Ugalong Dacite are Lower Devonian.

Pyritic dolerite sills occur in the Ina Volcanics; small stocks of diorite intrude the Banar Formation; a small granite stock occurs at Billy's Lookout in the southeast and there are other granites in the southwest.

The structure of the area is very simple: it appears to be the western limb of a sheared-out anticline adjoining the Tullamore syncline.

In a regional sense the rocks form the southern continuation of the Nymagee-Melrose belt of sedimentary and volcanic rocks.

Cu-Pb-Zn-Ag mineralization is associated with the acid volcanics of the Ina Volcanics. Gold has been mined from the Banar Formation. Manganese occurs in the Weelah Formation in joints and as coatings and replacements in sandstone and shale.

Explanation of Text-figure.

Swc	— Manna Conglomerate
Swf	— Weelah Formation
Sbm	— Bogandillon Chert Member
Swfm	— Manganiferous shale horizon
Sdc	— Darby Conglomerate Member
Swfc	— Horizon of chert lenses
Scm	— Cowal Member
Snf	— Ina Volcanics
Sbf	— Banar Formation
Sbg	— Burcher Greywacke
Slvm	— Blow Clear Member
Dsf	— Sandal Formation
Def	— Euglo Formation
Dud	— Ugalong Dacite

g	— Granite
Black	— Outcrop
1	— Shelly fossil horizon, Sandal Formation
2,3	— Crinoid stems, Burcher Greywacke
4	— Trilobite, Ina Volcanics

CUPRIFEROUS PYRITE DEPOSITS IN THE GIRILAMBONE BEDS, TOTTENHAM, NEW SOUTH WALES

D.W. Suppel

*Geological Survey of NSW,
State Office Block,
Phillip Street, Sydney.*

Published with permission of the Under-Secretary,
NSW Department of Mines

Cupriferous pyrite deposits at Tottenham and Albert (19 km to the southeast) occur in poorly outcropping schists and quartzites of the Girilambone Beds. The rocks have undergone greenschist facies metamorphism and are strongly deformed. The schists were originally quartz-rich sediments and basic volcanics. The schists of basic volcanic origin are restricted to the Tottenham area and are folded into the Orange Plains Anticline. This structure has been outlined by surface mapping (Skrzeczynski, 1972; Suppel, 1974) and by an aeromagnetic survey carried out by the Bureau of Mineral Resources (Rees and Taylor, 1973). Drilling in the Tottenham area has revealed a rock type not recognized in outcrop — a well foliated quartz-albite-muscovite (chlorite) schist which is believed to be the host for many of the pyrite bodies. This rock type has a trace element composition similar to that of the basic schist.

The cupriferous pyrite deposits occur in two forms: as narrow stratiform, massive pyrite bodies occurring a short distance above, or within, basic schist units in the Orange Plains Anticline area, and as cross-cutting, fissure-filling quartz reefs near Albert.

Basic schist, together with spatially related quartzite, and ultrabasic and intermediate to basic intrusives occur sporadically throughout the Girilambone Beds. It is suggested that these rocks belong to an incomplete, dismembered ophiolite complex, and that the massive cupriferous pyrite deposits which occur at Tottenham, and also at Girilambone (120 km to the north-northwest), are volcanogenic and are associated with the basic volcanics of the ophiolite complex.

"VOLCANOGENIC" MINERALIZATION AND PALAEOENVIRONMENT AT MINERAL HILL, NEW SOUTH WALES

A. Bush

*Geology Department,
University of Tasmania,
PO Box 252C, Hobart, Tas. 7001*

The Mineral Hill district, located 50 km north of Condobolin, central NSW, is one of several volcanogenic copper-lead-zinc