prospects lying in or near the Silurian (?) Babinda belt in the Cobar trough section of the Lachlan Geosyncline.

Fossiliferous sediments with interbedded tuffs, volcanic detritus, ignimbrites and lahar indicate near shore deposition in shallow marine basins with a nearby, probably partially subaerial, volcanic source.

Mineralization occurs in two broad types: structurally controlled stockwork zones consisting of open space infillings and replacements in pyroclastics; and stratabound massive sulphide lenses and ferruginous cherts in sediments overlying the stockworks.

The mineralization has a crude stratigraphic zonation ranging upward through central stockworks from Py-Au, Cpy-Py to Bo-tet-sph-Ag-trace hematite and partially martitized magnetite. Overlying sediments have Py-Sph-Ga assemblages and hematitic zones. Cluster analysis of thirty elements in 15 samples from a laterally zoned section of stockwork at intermediate depth delineates element groups corresponding to a central Py-Cpy-trace molybdenite and arsenopyrite assemblage, a marginal Ga-Sph-carbonate zone, and distal unmineralized host pyroclastics. Chlorite and sericite are found in all zones and extend well beyond areas of mineralization. Adularia is present in one central stockwork area.

Fluid inclusion homogenization temperatures are bimodally distributed with peak values at 250° (considered primary) and 160°C (considered secondary).

5. GEOLOGY AND MINERALIZATION IN THE SOUTHERN LACHLAN FOLD BELT

GEOCHEMICAL-PETROGRAPHIC INVESTIGATIONS OF ROCKS FROM AROUND THE WOODLAWN Cu-Pb-Zn ORE BODY, SOUTHEASTERN NEW SOUTH WALES.

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The Woodlawn ore body, which is being developed by Jododex Australia, is near Tarago, about 45 km northeast of Canberra. It consists of massive Cu-Pb-Zn sulphide lenses, plus stringer and disseminated mineralization.

Chemical, X-ray diffraction and microscopic studies have been carried out on two hundred and fifty representative samples from diamond drill cores at various distances up to approximately 1 km from the ore body.

These investigations have confirmed the general geological description evolved during joint studies by Jododex, the Geological Survey of NSW and CSIRO Division of Mineralogy, and they have further elucidated details of rock distributions, alteration minerals and geochemical anomalies in the Woodlawn area.

The two main rock types in the vicinity of the ore are felsic volcanics, which are dominant to the south and the west of the ore, and fine-grained sedimentary rocks, which are most abundant in the immediate vicinity of the ore body and to the north. The sedimentary rocks seem to be mainly derived from the acid volcanics. Dolerite intrusions are common to the north.

There is an extensive aureole of silicification, chloritization, sericitization and stringer mineralization around the ore body, in which feldspars and primary ferromagnesian minerals are virtually absent. The main chemical changes within the hydrothermally altered rocks appear to be addition of Si, Mg, Fe, (Mn), Al, (K), Ag, Cd, Zn, Pb, (Bi), Cu, S and (Sn), and depletion of Na and Ca, with the elements in brackets showing less systematic trends.

The aureole of chemical and mineralogical anomalies can be divided into several distinct zones as summarized in Fig. 1.

Zone 1 represents the most intense alteration and may include precipitates from the metal-rich ore-forming solution. It is characterized by abundant stringer mineralization, chlorite schists and cherts, together with altered volcanic and sedimentary rocks. This zone occurs in the immediate vicinity of the massive sulphide lenses and extends deeper into the footwall under the southern parts of the ore, along what are considered to be "feeder" zones for the mineralization. The rock chemistry is dominated by high Mg and Fe values with low SiO_2 in the schists, and almost pure SiO_2 in the cherts; the altered volcanics and sediments are chemically intermediate between these extremes. Ca, Na and K contents of all rocks are very low, as evidenced by the absence of feldspars in this zone.

Zone II is a relatively extensive zone of less intense hydrothermal alteration, characterized by less common stringer and disseminated mineralization and a virtual absence of feldspars, apart from some basic rocks. Chemical changes include widespread silification of the felsic volcanics; Mg content is significantly higher than in the unaltered felsic volcanics and sediments and tends to increase towards the ore body; Na and Ca are much depleted, but K contents are fairly normal, reflecting the abundance of sericitic muscovite.

Zone III, which comprises the Central Volcanic Pile, evidently was not permeated throughout by hydrothermal solutions. It contains patchy development of chlorite-rich rocks and stringer to disseminated base metal and pyrite mineralization. Elsewhere the felsic volcanics tend to be silicified, but they generally contain albitic felspar. The chemical features of the rocks in this zone are therefore highly variable.

Outside these zones there is some silicification of the felsic volcanics and other mild chemical changes which can be ascribed to deuteric alteration and low grade metamorphism, rather than to mineralization.

We consider tht seawater descended into the volcanic pile and was heated and chemically modified to a minor degree as it circulated and ascended to the surface, where it gave rise to Zone II alteration by reaction with the volcanics and sediments. Ore formation and Zone I alteration could have occurred fairly rapidly following assimilation by this circulating seawater of highly metalliferous solutions. The latter would be analogous to those which form porphyry copper deposits and could have been generated during sub-volcanic magma fractionation and/or by extensive rock leaching at moderate to high temperatures. Explosive volcanic activity

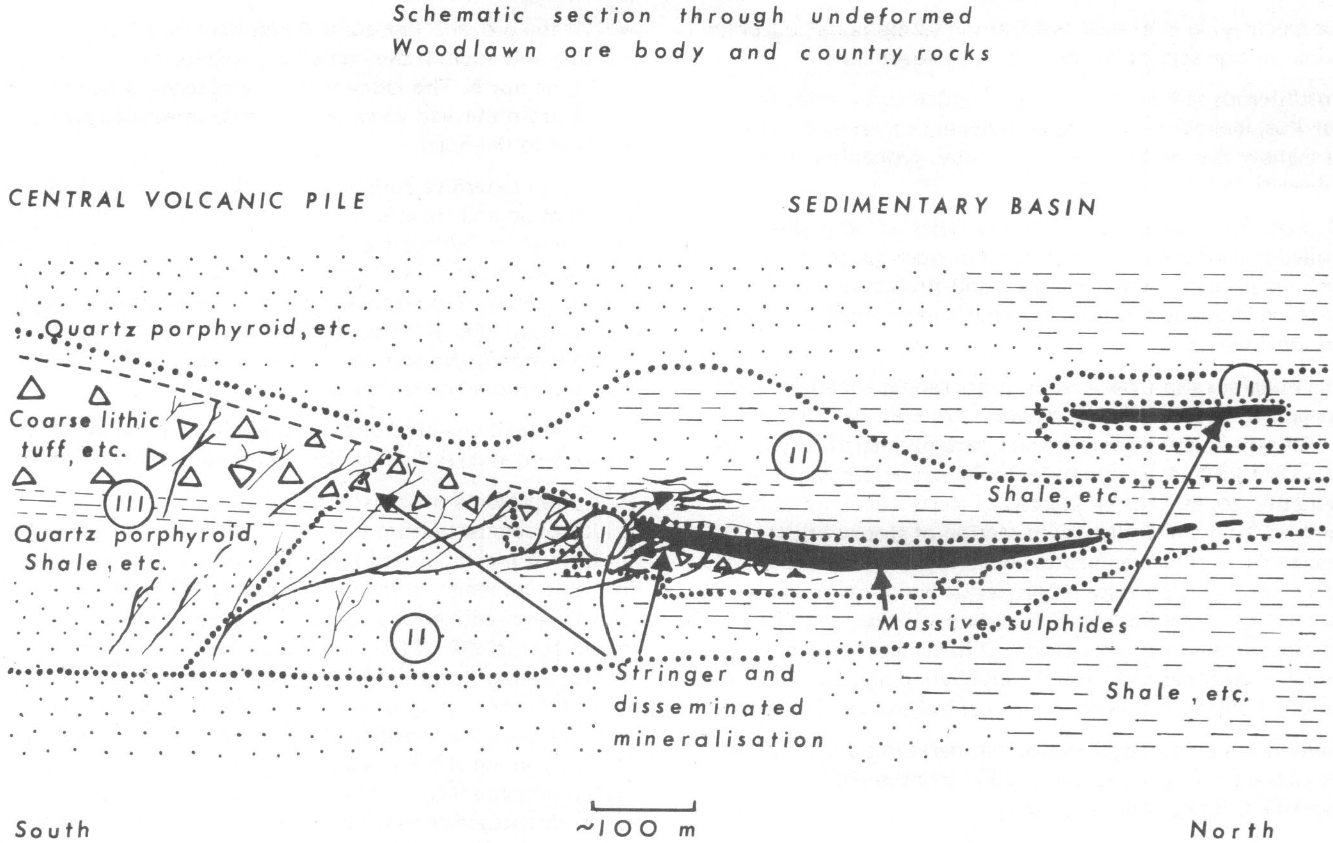

FIGURE 1
Schematic section showing zones of alteration around the Woodlawn ore body prior to folding. The features of the zones are explained in the text.

offers a feasible means of "tapping" the metalliferous solution and enabling rapid ascent of the resultant mixed solution which carried adequate metals to form the mineralization at and near the submarine surface.

The Woodlawn deposit appears to be similar to the much younger Kuroko deposits of Japan, in terms of ore mineralogy, host rocks and alteration zones.

COLO CREEK – A BARITE ZINC-RICH SETTING IN THE HILL END TROUGH

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The Colo Creek setting, some 66 km south of Bathurst, is situated on the very western margin of the Hill End Trough. Zinc-rich sulphides have been deposited rapidly, in a high energy depositional environment close to a zone of active submarine acid volcanism.

Host lithologies belong to the Colo Creek Formation, considered to be of Middle to Late Silurian age. Two major cycles of deposition are recognized: a lower cycle, characterized by predominantly pyroclastic-rich rocks and volcanic slurries, and an upper cycle, comprising graded, bedded, tuffaceous sediments.

Mineralization is found in both cycles. The principal sulphide is sphalerite, the iron content of which exhibits both a vertical and lateral gradient. Barite is ubiquitous in the pyroclastic-rich facies. In the overlying sedimentary series, stratiform barite occurs at the top of the mineralized sequence. Sphalerite, galena and pyrite show a sympathetic grain size relationship with the host sediment.

The depositional environment is considered to be part of a volcanic rift complex.

THE MINERALIZATION OF THE KANGIARA MINE, NEW SOUTH WALES

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The Kangiara deposit is located 32 km north-west of Yass in the Cowra-Yass Synclinorial Zone of the Lachlan Fold Belt. The mine occurs within the Middle to Upper Silurian Hawkins Volcanics of the Douro Group.

The ore minerals comprise pyrite, sphalerite, galena and