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BUREAU OF MINERAL
RESOURCES, GEOLOGY
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Record No. 1972/139

A REVISION OF THE SEQUENCE AT GLENBAWN, N.S.W.

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1 Bureau Mineral Resources, Canberra.
2 University of N.S.W. Sydney.

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INTRODUCTION

Branagan et al. (1970) outlined the stratigraphy and structure at Glenbawn in the upper Hunter Valley. We have recently studied the same area as part of a project involving mapping of 950 km^2 centred on the villages of Rouchel Brook and Upper Rouchel, 10 km east-southeast of Glenbawn. The results of this project will be published by us in B.M.R. Bulletin 147, probably in 1973.

LITHOSTRATIGRAPHY

Branagan et al. (1970) divided the Glenbawn sequence into seven informal units and described the main lithological characteristics of each. We have named the units formally and established type sections where appropriate.

We assign units 1 and 2, and the lower part of 3, to the Kingsfield Beds (new name), named from "Kingsfield", 2.5 km southwest of Glenbawn (Fig. 1). The base of the nonmarine Kingsfield Beds is not exposed; the top is at the upper limit of purple shale and siltstone which are sharply overlain by brown shale and thin-bedded sandstone. In the type section (Fig. 2), at the southern end of Lake Glenbawn (Fig. 1), the Kingsfield Beds are about 150 m thick. There appear to be complex facies relationships within the Kingsfield Beds; unit 1 of Branagan et al. probably occurs as lenses in units 2 and 3. The marine Dangarfield Formation (new name), corresponding to the upper part of unit 3 plus

units 4 and 5, overlies the Kingsfield Beds. The formation is named from Dangarfield, 4 km south of Glenbawn (Fig. 1), and its type section extends east from the southern end of Lake Glenbawn (Fig. 1). About 1,000 m of Dangarfield Formation are present in the type section (Fig. 2). Unit 4, the Brushy Hill Limestone (Osborne, 1950), is a member of the Dangarfield Formation. Limestones in the upper Dangarfield Formation occur as lenses rather than continuous beds shown by Branagan et al. Units 6 and 7 belong to the nonmarine Isismurra Formation (Manser, 1968) whose base is drawn at the lower limit of coarse zeolitic lithic sandstone and conglomerate, or ignimbrite. The top of the Isismurra Formation is not seen at Glenbawn, the exposed thickness being about 500 m. A cement of pink zeolite (mordenite or clinoptilolite) is common in the sedimentary rocks of the Isismurra Formation. The Ayr Conglomerate (Manser, 1968) occurs in the lowermost part of the formation around Lake Glenbawn. At Dangarfield the Ayr Conglomerate is locally absent and the ignimbrite-dominated Native Dog Member (new name) occurs at, or close to, the base of the Isismurra Formation. This member is named from Native Dog mountain, 10 km south-southeast of Glenbawn (021181, Woolooma 1:63,360 Sheet). The Native Dog Member is at least 500 m thick west of Dangarfield; northwards the member thins and splits into two ignimbrite-dominated tongues, the Curra Keith and Oakfields Tongues (new names). The type sections of both ignimbrite tongues are near Curra Keith Creek (Fig. 1). The Curra Keith Tongue, named from Curra Keith Creek, consists of 70 m of buff ignimbrite and sedimentary rock in the type section (Fig. 2). The Oakfields Tongue is named from Oakfields hill, 6 km southeast of Glenbawn (058268, Woolooma 1:63,360 Sheet). The type Oakfields Tongue is 30 m thick and consists of

a lower red, and an upper purple, ignimbrites separated by sandstones and conglomerate (Fig. 2). Thin red ignimbrite units occur in the Isismurra Formation above the Oakfields Tongue but have not been named. Ignimbrites in the Isismurra Formation are markedly silica-oversaturated.

The Waverley Formation (Manser, 1968), which is a lateral equivalent of the upper Dangarfield Formation, consists of marine and nonmarine lithic sandstone and conglomerate. North of Lake Glenbawn, outside the area of Fig. 1, marine Goonoo Goonoo Mudstone (Crook, 1961) occurs; the upper part of this unit is probably laterally equivalent to the Kingsfield Beds and lower Dangarfield Formation. East of Glenbawn marine siltstone, mudstone and sandstone which intertongue with the Isismurra Formation are assigned to the Woolooma Formation (new name) whose type section is along Back Creek between 11 and 14 km east of Glenbawn.

BIOSTRATIGRAPHY

The Kingsfield Beds are unfossiliferous and their exact age is uncertain, although they are probably at least partly late Devonian. Fossils which probably belong to the early Tournaisian Spirifer sol Zone occur in the Brushy Hill Limestone. The Dangarfield Formation also contains the late Tournaisian Schellwienella cf burlingtonensis Zone and the early Viséan Pustula gracilis Zone (new). The Pustula gracilis Zone is characterised by the nominate species, Schellwienella n. sp. with coarser ribbing than S. cf burlingtonensis, and Schuchertella n. sp., associated with species from the burlingtonensis Zone. Marginatia patersonensis first appears in the Pustula gracilis Zone. Tongues of Woolooma Formation in the Isismurra Formation indicate that the interval between the Curra Keith and Oakfields Tongues is of Orthotetes australis Zone age (middle

Viséan), and that rocks immediately above the Oakfields Tongue are of early Delepinea aspinosa Zone age (also middle Viséan).

STRUCTURE

We disagree with the conclusion of Branagan et al. (1970) that the Brushy Hill Fault and Anticline constitute a thrust and related asymmetrical fold. The Brushy Hill Fault is a high-angle structure at the present level of exposure; its regional dip and attitude at depth are unknown. The fault is one of many which trend north-northwest in the Rouchel district and it probably does not have any unique significance. The Brushy Hill Anticline appears to be symmetrical overall, although strata on its limbs are oversteepened adjacent to faults. The Brushy Hill Anticline and Fault define the north-northwest Brushy Hill Trend. At Dangarfield the structures intersect ones along the northeast Woolooma Trend. The Davis Creek Trend consists of more nearly east-trending structures to the east of Glenbawn. The three trends probably formed synchronously under the influence of a regionally constrictive stress field during the Hunter-Bowen Orogeny.

CONCLUSIONS

The rocks at Glenbawn have been assigned to several formations and members which have been defined in accordance with current stratigraphic practice. The ages of most of the units have been established or inferred palaeontologically, and the faunal succession has been clarified. Control provided by fossils and ignimbrites has enabled regional facies relationships to be demonstrated. Folds and faults are all steep and may have formed in response to regional constriction.

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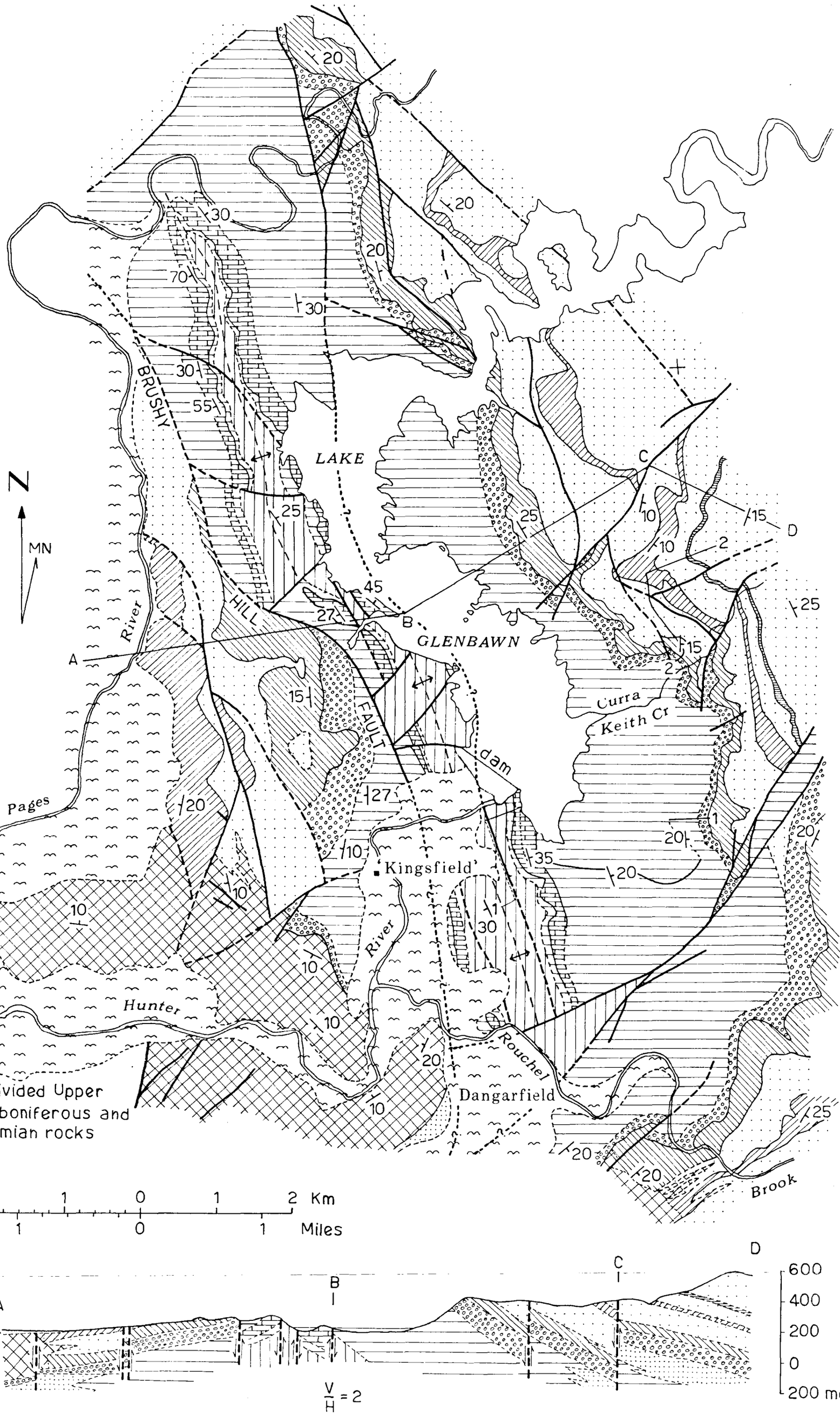
Fig. 1 - Simplified geological map and cross section, Glenbawn, N. S. W.

Fig. 2 - Stratigraphic section, Glenbawn, N. S. W.

Fig 1



alluvium

Isismurra Fm.

red ignimbrite

Oakfields Tongue

Curra Keith Tongue

Native Dog Member

Ayr Conglomerate

Waverley Fm.

Dangarfield Fm.

Brushy Hill Limestone

Kingsfield Beds

fault

stratigraphic contact

axial trace of anticline

dip and strike of strata

1——1 measured section

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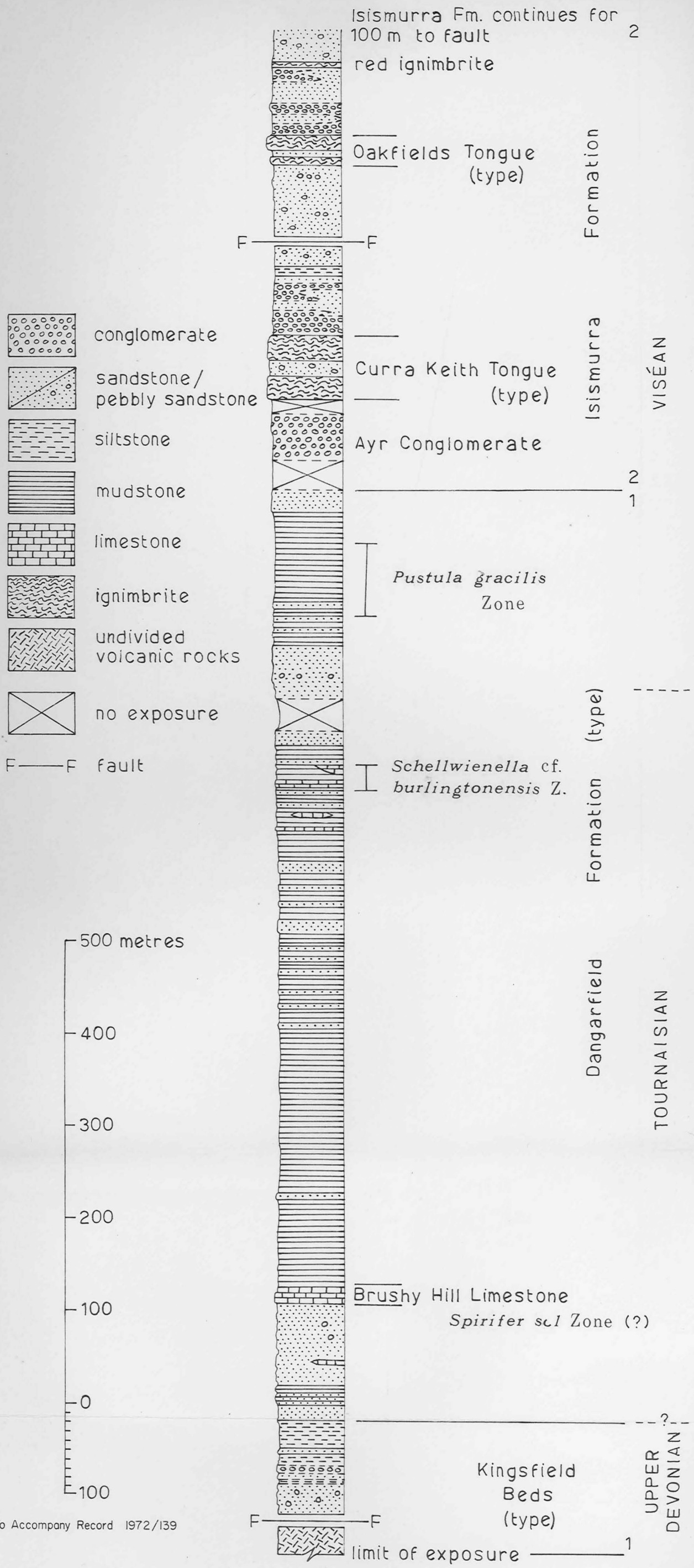
Fig 2



To Accompany Record 1972/139

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