Memorandum
on
The Cambrian–Silurian Contact
of the
Florence Hill.
Zeehan

I The Interpretation of 1946.

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I The Interpretation of 1946.

In my concise statement on the Zeehan Field presented in June 1946, the Cambrian – Silurian contact (therein termed the Ordovician – Silurian contact) was regarded as extending from the Despatch in the north to the North Oceana Hill in the south. This contact was termed the Waller Upthrust and was interpreted as the plane of movement in the breaking of a major anticline near the top of its eastern limb. This Waller Upthrust was shown as broken by 19 Tear Faults along which differential easterly movement took place.

In the Florence Hill area the Tear Faults were shown as having a general strike of 290°. The Silurian Blocks were shown with beds paralleling in strike the variously oriented Waller Upthrust. It was interpreted from this that the limestone bed would be found at depths not greater than a few hundred feet.

II Professor Carey's Photogeological Map.

It was immediately noticed when Professor Carey's photogeological map was completed that any details of the Waller Upthrust – Tear Fault complex on the Florence Hill were absent. The Cambrian – Silurian contact is shown as an unbroken curved line with the strike of the Silurian beds parallel and sub-parallel to it. The contact

here is shown as located on the Argent Flat just west of the Florence Hill. It was shown as curved but unbroken although intersected by one transverse fault near the Florence shaft.

However, Professor Carey's map disclosed outstanding highlights of the geologic structure of the Zeehan Field. The syncline became clearly delineated and assumed the role of the Zeehan Basin. The major tear faults received emphasis and clarification. And there appeared a new structural feature — a northeast — south-west fault extending from the 4 mile on the Emu Bay Railway to Howard's mill. This fault drastically affects the Zeehan Syncline, in that it divides it into a northern relatively narrow portion and a southern wider portion. This is due to a vertical upthrow on the north side of the order of magnitude of 3000 feet. This fault will in future be referred to as the Brickfields Fault.

Of special significance to the Florence Hill structure problem is Professor Carey's delineation of the Montana Tear Fault in its course from the Western mine to Howards Mill.

III. Dr Prider's Detailed Mapping.

Extending from Main Street southwards to the Florence Dam this detailed work showed the Cambrian-Silurian contact to be beyond doubt a major fault, dissected and displaced by a series of transverse faults of the nature of tears. The direction of these transverse faults, however, is approximately north-east.

Dr Prider's map shows the strike of the Silurian beds within the Florence Hill as at nearly 90° to the orientation of the Cambrian-

Silurian contact within the respective blocks. In fact it was this relationship which convinced Dr Prider that the contact was a major fault. This relative orientation persists from the northern end of the Florence Hill to as far south as Kestle's shaft. It does not extend, however, to the north and south of these limits. This is definite to the north but somewhat obscure to the south as Dr Prider's accurate mapping does not extend beyond Kestle's shaft.

Another feature to be noted in Dr Prider's map is the non-persistence of the north-east trending transverse faults to as far as the Green Hill, wherein is shown an unbroken and undisplaced quartzite bed of the Nuberna formation.

An important fact to be recognised is that Dr Prider's map does not extend beyond Main Street at the Rotunda Hill.

IV The Conflicting Factors.

The completion of Professor Carey's map confirmed the general tectonic fault structural picture but conflicted with the 1946 fault conception on the Florence Hill. Not only did Professor Carey not show the transverse faults dissecting & displacing the Cambrian-Silurian contact, but he regarded the latter as the break between two rock systems which were conformable although having a big gap as to age.

Dr Prider's work not only proved the latter conception incorrect but also established the Cambrian-Silurian faulted junction, the dissected stepped character of the latter and the numerous transverse faults. Nevertheless at this stage two aspects appeared which conflicted with the 1946 conception. These were:-

① The right-angled relationship between the

strike of the Silurians and the Cambrian-Silurian fault line. This indicates that the fault is not a break parallel or even sub-parallel to the anticlinal axis.

② The orientation of the Silurian blocks is now seen as north-east instead of east-south-east. A vertical section within any such block, as for example from the Florence shaft north-eastwards towards the Rotund Hill, will show the dark grey slates & sandstones high in the Silurian dipping steeply eastwards on the eastern slope of the Florence Hill. The section continues towards the Rotunda Hill with steep easterly dip until the limestone of King Extended mine with steep easterly dip is reached. This is in complete discordance with the overwhelming summation of all field evidence as to the stratigraphical succession of the Ordovician-Silurian-Devonian.

I The Structural Interpretation.

Clearly therefore a structural interpretation is called for, which must go further than any so far depicted. Such interpretation demands attention to the relative age of the various fault types.

Correlation of the structural interpretations at Zeehan and neighbouring regions shows that the earliest faults were those of the sub-vertical Wallin Upthrust type and that the last were the Tow Fault type with the associated conjugate fractures. The Brickfields Fault must be intermediate in age between these two.

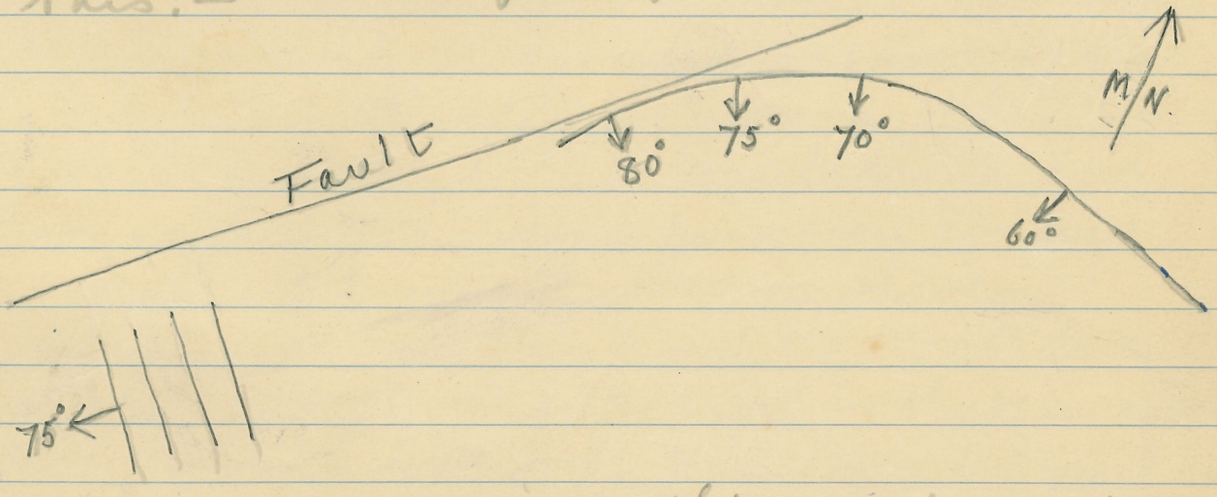
There thus emerges a solution of the Florence Hill problem which can be stated as follows.

The Cambrian-Silurian contact from a few feet north of the quarry facing the northern continuation of Wilson St to the vicinity of Kestlis Shaft is part of the Brickfields Fault. North of the Druid's Hall the contact is the Waller Upthrust. South of Kestlis Shaft the contact is apparently also the Waller Upthrust but detailed surface mapping is required before this can be definitely confirmed.

There is thus a pronounced offsetting of the Brickfields Fault between Howards Hill and the Wilson St Quarry. This is due to the effect of the Montara-Donahs Tear Fault combination. Movement eastwards on the northern side of this fault zone crossing the general direction of the already formed Brickfields Fault has brought about this discontinuity.

This seems to be the inescapable general picture but there remain several places which require elucidation. These are:-

① The nature of the movement on the Brickfields Fault. Professor Carey gives this a nett vertical movement of the order of magnitude of 3000 feet. But it has not been a simple vertical movement. This is evident when the north-eastern end of fault within the Zeehan Basin is examined. In that locality on the south side of the fault the structure is this:-



A possible explanation of this is that the

northern side has moved south-westwards with a definite horizontal component. Where however is the corresponding swing of the Silurians at the south-western part of the fault? It may be of course that this has been largely obliterated by a reverse effect due to the easterly drag on the south side of the Montana – Oorah Tear Faults.

(2) The nature and origin of the Transverse Faults in Florence Hill. The north-east orientation of these faults is in contrast to the general east to east-south-east trend of the neighbouring highly developed tear faults. Their longitudinal persistence is apparently quite small compared with those which cross and displace the Waller Upthrust.

It is suggested that they are sympathic horizontal thrusts associated with the drag effects on the south side of the Montana – Oorah Tear Faults. Thus we have at one end of the Brickfields Fault a curved drag whilst at the other end is a sliced and dissected shoulder.

(3) The precise effect of this structure and the suggested interpretation on the position and depth of the limestone bed within the Florence Hill must remain obscure until the detailed mapping of the gap between Kestle's Shaft and the Bell is completed. Bed correlation and horizon key beds identification cannot be achieved until that is done.

The next conclusion based on the recorded facts and the above interpretation is that in the present state of knowledge, the limestone below the Florence Hill is appreciably deeper than seemed to be the case in 1946.

14th October 1948.

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