THE UNIVERSITY OF ADELAIDE

DEPARTMENT OF GEOLOGY AND MINERALOGY

GEOLOGY OF THE MT. CHAMBERS GORGE REGION, FLINDERS RANGES, SOUTH AUSTRALIA

Report on Geological Investigations
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by

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Read + Noted for PhD.

MT. CHAMBERS GORGE

GEOLOGICAL MAPPING

APPENDIX II

HAND SPECIMEN AND THIN SECTION DESCRIPTIONS

APPENDIX IIa

HAND SPECIMENS:

Rocks listed and described in this section have been collected at the various 'Stations', Map-Zones 1 and 2, and do not include specimens from the measured stratigraphic sections which are listed in Appendix I. Both sets are included in a single tray of specimens presented with this thesis and stored in the Geology Department of Adelaide University under the accession number A343. (The other nine trays of specimens collected may be held by the author). Rocks from this appendix also bear a Station number; e.g. A343/C.G.4., and the superscript 'T.S.' indicated that a thin section has been cut, and described in Appendix IIb.

Only selected, representative and unusual lithologies have been included.

Specimens for which thin sections have been described are listed first:

1. A343/C.G.22, "Green marker" (T.S.)

   Probable rhyolitic vitric TUFF, from the base of Unit 6, the upper unit of the Upper Parara Limestone (Station 22).

2. A343/C.G.34.a (T.S.)

   Dolomitized intraclastic calcarenite. From mid Unit 9 (South).

3. A343/C.G.34.E. (T.S.)

   Concentric growths of fibrous calcite about a dolomitic, archaeocyathid nucleus. Not stromatolitic. Unit 9.

4. A343/C.G.38 (T.S.)

   One half of a symmetrical vein that cuts Unit 6 vertically near Station 38. Central zone weathered (gossan). Diapir associated. Outer zone of large, twinned, calcite crystals.

5. A343/C.G.43.b (T.S.)

   Shows granule influx into green calcareous siltstones, and the weathering out of the central, calcitic, less siliceous layer. Note characteristic brown weathering colour.
   Location: base of Unit 8 in the 'South'.

6. A343/C.G.51.E (T.S.)
   (Compare with A343/C.G.70.D)

   Heavy mineral banded and crossbedded arkosic sandstone from south 'Central-Diapir'. This is typical diapir material for this area.

7. A343/C.G.52.A (T.S.)

Probable diapiric material.

8. A343/C.G.54.A (T.S.)

From top of Unit 7, just west of 'Central Diapir'. Fine calcirudite or pelletal (clastic) limestone. Quartz granules weather out.

9. A343/C.G.70.D (T.S.)

Heavy mineral banded and crossbedded sandstone. Coarse arkosic bands of pink orthoclase. From top of 'Double diapir'.

10. A343/C.G.78 (Float) (T.S.)

Pyrolusite-banded calcite (travertine?). Near major fault zone, Wookata Ck.

11. A343/C.G.94.B (T.S.)

Ferruginous and calcitic siliceous (lithic) greywacke. Base of Unit 9, adjacent to 'Double Diapir'. May evidence exposure of diapir in Oraparinna time (?).

12. A343/C.G.98.A (T.S.)

Partially altered basic intrusive rock. Vesicular weathering surface. From northern end of 'Central Diapir'.

13. A343/C.G.104a(T.S.)

Altered basic intrusive rock from plug near 'Single Diapir'.

14. A343/C.G.107 (T.S.)

Secondary copper mineralization from Moorowie Mine. Malachite, azurite, cuprite and limonite.

15. A343/C.G.132 (T.S.)

Light grey, yellow mottled, archaeocyathid limestone from Unit 9, north of Mt. Chambers Gorge. Note sandy fill in some archaeocyathids and possible preferred orientation of their long axes.

Other specimens:

1. A343/C.G.4

Typical mottled-Parara-type Limestone from Unit 2, the Lower Parara Limestone. Shows grey limestone core with khaki mottling.

2. A343/C.G.10

Archaeocyathid with sideritic infill in a red limestone matrix; base of Unit 9. Few granules in matrix.

3. A343/C.G. '17½ Mine'.A

Chrysocolla (blue) in silicified limestone breccia with minor cuprite(?).

A343/C.G. '17½ Mine'.B

Chrysocolla and malachite in altered limestone

4. A343/C.G.22.B

Rhyolitic, vitric tuff (?) from 2ft. 'green-zone' at base of Unit 6, the upper member of the Upper Parara Limestone.

5. A343/C.G.26.A

A343/C.G.26.B

Enigmatic burrow-like cores of a lighter, buff, limestone in a grey, Parara-type Limestone (Unit 2). Cores may be siliceous and are interpreted by Daily (pers. comm.) as solution phenomena.
(There may be other explanations)

6. A343/C.G.28.A

Silicified archaeocyathid, weathered out from 'marker-bed' at the top of Unit 7. Lay in bedding plane.

A343/C.G.28.B

Part of wall of a silicified, cap shaped archaeocyathid from same bed as 28.A., top of Unit 5.

7. A343/C.G.41.D

A green siltstone from Station 41. Occurs as a highly brecciated, 20ft. pod in the fractured limestones of Unit 7. Lies south of diapiric axis of 'Central Diapir' and classified by Daily (pers. comm.) as "diapiric shale".
(Refer Figure 6, Plate 4, in thesis).

8. A343/C.G.43.A

Archaeocyathid in dark grey, mottled limestone from a megaclast in the brecciola-zone, top of Unit 6, the Upper Parara Limestone. Very similar facies to A343/C.G.102 from the base of Unit 9, to the north east. (Could these zones have been laterally equivalent with derivation of the megaclasts from a more, northerly and shoreward mega-breccia (reef?) zone?).

9. A343/C.G.50.A

Deformed galena from a prospect on a shear just south of Station 50, near the 'Central Diapir'.

A343/C.G.50.B

Possible cerussite with galena in limestone; location as above, C.G.50.A.

10. A343/C.G.51.A

Crossbedded, heavy mineral banded and arkosic sandstone from the 'Central Diapir' with abundant halite pseudomorphs on the bedding planes. Probable Willouran age.

11. A343/C.G.51.C

Sandstone from diapir with possible organic traces (Annelid trace fossils?).

12. A343/C.G.53.A

Typical 'mottled Parara-type' limestone from top of Unit 6. with medium grey cores in a yellowish silty matrix. Note secondary calcite veins.

13. A343/C.G.56.C

Portion of conglomerate lens in Unit 10 showing:

1. Clasts of red-granule rich (sand) facies.
2. Red, archaeocyathid limestone.
3. Secondary calcite.
4. Silty, red and sandy matrix.

14. A343/C.G.57.A

Probably in some a faulted block. Stratigraphic position probably basal dolomitic units of Billy Creek Formation. Typical of dolostones from near Stations 143 and 117. Note minor granule fraction.

15. A343/C.G.57.B

Archaeocyathid in red limestone matrix. Note core with granule rich fill, a different lithology to the matrix.

16. A343/C.G.57.C
(Relate to C.G.57.D)

Typical red, quartz granule rich, pelletal limestone found at the base of Unit 9 as cobbles in the mega-breccia or in this case as cobbles within the thin conglomerate interbed in Unit 10.

17. A343/C.G.57.D

From a boulder within the conglomerate bed in Unit 10, near Station 57, south of Pack Creek. Large archaeocyathid, complete, in a red, ferruginous limestone matrix. Geopetal structure in core of archaeocyathid indicates fill while in a horizontal (?) position. Core contains reworked, (intraclastic) archaeocyathid limestone fragments, quartz granules and other fragments in a red limestone matrix. Matrix of archaeocyathid can be divided into two types, the upper bed containing more granules of the type that fill the fossil. It is suggested that the archaeocyathid lay on the bedding plane of the lower unit, half buried and then acted as a cup in which part of the coarse fraction of detritus introduced with the overlying bed accumulated.

18. A343/C.G.58.A

Typical buff, brown weathering, quartz-granule rich and pelletal limestone from the top of Unit 7 in 'Subfacies A' area of Unit 9, north of Pinyatta Creek. Beds of this facies persist into Unit 9 and occur as cobbles in the mega-breccias.

19. A343/C.G.60.A

Irregular archaeocyathid from a megaclast at the base of Unit 9, the mega-breccia horizon. Matrix is a red-limestone, typical of the base of this unit. Note calcite and limonitic (geopetal) infill to fossil.

20. A343/C.G.76.B

Silicified iron oxides? (limonite) from the same deposit as 76.C.

A343/C.G.76.C

Silicified manganese oxide? (pyrolusite) associated with Pleistocene silcrete developments and red and yellow jaspers. Very hard.

A343/C.G.76.D

Agate with concentric banding from silcrete developments.

21. A343/C.G.80.A

Stratigraphic position uncertain. Isolated fault block, 30ft. long. Archaeocyathid limestone, typical of megaclasts in upper Unit 9.

22. A343/C.G.89.A

From mineralized zone (just north of 'Mine-Pick Mine'. Shows weathering of carbonate from silicified and mineralized limestone leaving an open boxwork. Traces of copper in unaltered limestone.

22. A343/C.G.89.B
(Cont)

Siliceous gossan from mineralized zone as for C.G.89.A.

23. A343/C.G.93

Coarse arkose from west of Station 93, in the 'Double Diapir'. Quartz grains are highly spherical and well rounded. Feldspar is orthoclase. Heavy mineral banding (with minor crossbedding). Suggests possible source for 'quartz-granules' that are common in the Cambrian limestones.

24. A343/C.G.93.B

Diapiric material from 'Central Diapir'. Heavy mineral banded, crossbedded and arkosic, coarse sandstone. Pseudomorphs after halite are a feature of this rock. Age probably Willouran.

25. A343/C.G.95 (Float)

Secondary copper minerals with a core of primary ore including chalcopyrite, probably derived from prospects in 'Central Diapir' area.

26. A343/C.G.101.a

Interpreted as hydrothermally altered (ferruginized) Wockerawirra Dolomite (Sturtian) from above the fault zone and on the Protero-zoic side at Station 101. Pinkish, dolomitic cores can be seen in rock with sideritic (?) and limonitic matrix.

27. A343/C.G.102

Location: base of Unit 9 north of 'Double Diapir'. Archaeocyathids in a dark to medium grey limestone. Note core of drussy and fibrous calcite.

28. A343/C.G.107.Mm.1

Typical secondary copper minerals from the Moorowie Mine area. Note boxworks in gossan.

A343/C.G.107.Mm.2

Again, typical 'Moorowie' ore with malachite veinlets in an altered limestone matrix.

29. A343/C.G.109.A

Limestone from Moorowie fault area. Shows some silicification and mineralization. Note granule content.

30. A343/C.G.112.a

Thin, local bed at top of Unit 8 near Station 112, Kandramooka Creek. Texture is sedimentary with angular to rounded lithic clasts, very poorly sorted in a limonitic, dolomitic (?) and sideritic (?) matrix. May evidence local exposure of diapir.

31. A343/C.G.113.a

Possible trilobite tracks from top of Unit 8, just west of Station 113, in a coarsely silty ferruginous shale.

32. A343/C.G.123

Specularite in a dolomitic (?) and limonitic matrix from the southern edge of the diapir, due south of Station 123, Brillig Catch Creek.

33. A343/C.G.126.a

Cleavage fragment from 7 inch dolomite or calcite crystals in a 2ft. vein running north west from Station 126.

33. (Cont) A343/C.G.126.b

Pseudomorphs after pyrite (?) in a brecciated matrix of the vein at Station 126.

34. A343/C.G.128

Excellent preservation and exposure by weathering of two archaeocyathids. Spitz well shown on specimen A. Crystalline calcite infill for both. Matrix is a red carbonate. Fossils may be in growth position. Cut from megaclast at base of Unit 9, the megabreccia horizon, in the Moorowie area.

35. A343/C.G.129.a

Possible (trilobite?) organic trace fossils on bedding plane of Wookata Shale, Unit 8, Kandramooka Creek.

A343/C.G.129.Delta

As above, 129.a

36. A343/C.G.129,B

Shows reworking of green calc. siltstones by currents associated with influx of allochthonous material (quartzitic silt and clay). From Unit 8, 'South-zone'.

37. A343/C.G.135

Fault breccia of limestone from top of Unit 9, north of Mt. Chambers Gorge. Note quartz granules in limestone.

38. A343/C.G.140a

Typical, light grey archaeocyathid limestone, relatively clean, (granule free) but with minor yellow silt or clay. From a megaclast within Unit 9, the mega-breccia horizon.

39. A343/C.G.146

Malachite veins in limestone fault breccia, half way between Stations 146 and 148 and in a small fault.

40. A343/C.G.149

Archaeocyathid, complete, in a light grey limestone matrix. Infill is a ferruginous and silty limestone with a zone of recrystallization extending into it. From upper (?) Unit 9.

41. A343/Chi.1

Haematitic rock from 'Frome Diapir'.

42. A343/Chi.2

Enigmatic rock from a bed within the 'Double Diapir' and south west of Station 94. Concretionary silica or a deformed conglomerate of sedimentary origins. Occurs in 'beds'.

43. A343/Chi.3 (Float)

Typical geopetal infill in archaeocyathid of granule rich limestone while matrix is granule free.

APPENDIX IIb

THIN SECTIONS:

Thin sections listed and described in this section have, with two exceptions marked with the superscript "O", accompanying hand specimens presented with this thesis and are of two groups: (a) sections of rocks from the Stations (see Overlay 2) and (b) from the measured stratigraphic Sections described in Appendix I. Thin sections from the latter bear a black triangle in the upper right hand corner, above the code number and are described first.

Some carbonate sections have been stained with an Alazarin-red S - potassium ferricyanide solution to differentiate between calcite; pink stain, ferro-carbonates; blue and dolomite; no stain. All carbonates have been cut thick to enhance textures and to avoid loss of the section by solution in the acidic staining medium. Conoscopic viewing may accent certain structures, especially in T.S. A343/C.G.107.

A. Thin sections from the Stratigraphic Sections:

1. A343/B.267ft.

Two archaeocyathids from top of Section B, top of Unit 7 (?). Extensive overgrowths around original calcite of skeleton. Matrix is a calcareous, quartzitic and ferruginous siltstone. Sparry calcite void fill common.

2. A343/C.265ft. (stained)

This rock consists of two lithologies:

(1) Calcarenite: well rounded intraclasts, (calcite) in micritic matrix. Some patchy secondary replacement by dolomite.

(2) Dolarenite: well rounded lithiclasts in dominantly dolmicrite matrix. Selective dolomitization of calcitic intraclasts is suggested, however the contact zone contains both types of clast and in a calcitic matrix. The dolomitic clasts in this zone may be confused with secondary, neomorphic dolomite.

3. A343/K.220ft. (C.G.148).

Hydrothermal silica with trace of chalcopyrite from the Moorowie area. Quartz occurs as irregular and interlocking crystals, euhedral into vugs which may be filled with calcite, chalcopyrite, cuprite or malachite. Calcite is colloform and grows into vugs. Texture may indicate replacement of carbonate by silica.

4. A343/M.160ft. (stained) (cc. 60%,dol. 40%,qtz. -)

Intraclast calcimicrite: 1 to 7mm. medium rounded, spherical to elongate and dolomitic clasts ($<$ 40%) in a calcitic matrix.

4. (Cont) Matrix is finely crystalline with 0.1 to 0.2mm. interlocking grains of calcite and occasional euhedral dolomite crystals. Clasts are recrystallized with dolomite (rhombs) replacing calcite. Contacts diffuse.

5. A343/M.165ft. (cc. 98%, dol. 2%, qtz. -)

Calcarenite: finely pelletal calcitic allochems, (lithiclasts), 0.1 to 1mm. in diameter, well rounded and spherical to elongate. Dolomite replaces calcite within the clasts in rare cases. Overall matrix is calcitic micrite. Rare fringing crusts of dolomite.

6. A343/R.138ft. (C.G.10.A) (cc. 60%, dol. 15%, qtz. 25%)

Lithic calcarenite:
Quartz: 0.2 - 1.2mm. Av. 0.6mm. Well rounded, moderately spherical. Some hexagonal (authigenic) sections rimmed with bladed calcite or dolomite.
Dolomite: as fringing crusts or as finely pelletal intraclasts, the matrices of which contain black grains and clay.
Calcite: as 0.6mm. well rounded pellets in a calcite matrix. Matrix may be replaced by dolomite (rhombs).

7. A343/R.150ft. (stained) (qtz. 60%, cc. 15%, dol. 15%, other 10%)

Sandstone: dolomitic (pelletal)
Quartz: well rounded, spherical grains 0.1 to 1.2mm. in diameter. Av. 0.6mm.
Dolomite: as 0.6mm. well rounded grains and as alteration rims to most grains.
Calcite: as interlocking crystals in the matrix. Fringing crusts to allochems extend into matrix and replace micrite.

8. A343/R.150ft.

Quartz sand influx into greenish siltstone environment. Siltstone beds above and below. Granule band with silt as matrix in central band. Quartz is 95% with straight extinction, with abundant (fluid) inclusion,

8. (Cont) re-entrant borders and 5% are composite grains with undulose extinction in individual grains. Mixed source suggested. Grains are 0.2 to 2mm., moderately sorted, and mature to super-mature. Very well rounded and with high sphericity to subrounded and of medium sphericity. Lithic fragments and 0.8mm. grains common. Source for granules may include diapirs on this and other evidence. Compare with (A343/C.G.51,70D).

B. Thin sections from the Stations:

1. A343/C.G.1 (dol. 80%, cc. 15%, qtz. 5%)

   Calcimicritic dolmicrite
   Dolomite: occurs as finely crystalline replacement of calcitic micrite matrix.
   Quartz: 0.1 to 0.2mm., subangular grains. Poorly sorted. Only 5%.
   Dendritic pyrolusite (rare). Calcite veins cuts rock.

2. A343/'Green zone', Unit 6 (base) Upper Parara Fm. (Station 22)

   Probable TUFF.
   A rhyolitic vitric tuff with typical vitroclastic texture. Arcuate glass shards, 0.2mm. long, commonly triaxial. Matrix is siliceous dust. Chips with concave borders. Rare haematite crystals, 0.02mm. Secondary calcite as patches.

3. A343/C.G.34.a (stained) (cc. 5%, dol. 95%, qtz. -)

   Dolarenite: 0.4 to 0.6mm. (relic) spheres of carbonate replaced by crystalline dolomite (0.1 - 0.2mm. rhombs). Dolomite cuts grain boundaries and has also replaced the matrix. Some calcite remains in matrix (< 5%) as 0.8mm. interlocking crystals. Rare patches of pyrolusite. Progressive dolomitization of intraclastic pelleted limestone.

4. A343/C.G.34.E (stained)

Concentric growths of fibrous calcite (PF_5C), around an archaeocyathid nucleus. "Not stromatolitic" (Walter, pers. comm.). Core is dolomitized with thin stringers of dolomite extending into fractures in the corona. Thin bands of dolmicrite define concentric layering in some cases; a thin dark line in others. Patchy dolomite is present in corona. Core of archaeocyathid with pelletal dolomite in dolomitic matrix, may be selectively altered or clasts as a source of dolomite for alteration of corona.

5. A343/C.G.38

Section across contact of central 'gossan' core and outer fibrous calcite zone on one side of a symmetrical vein, 2ft. wide near Station 38.
Core: 2mm. long accicular pseudomorphs, now an iron oxide, after an unidentified mineral, in a granular, interlocking, equant calcite matrix. Minor limonite.
Contact: layered with oxide debris in calcite matrix. Secondary pyrolusite band at base of fibrous calcite layer.
Fibrous calcite layer: crystalline calcite, commonly twinned up to 5mm. but to 5 inches in hand specimen.

6. A343/C.G.43.b

Three layers (bedding) can be observed in this rock, cut perpendicular to S1.
Layer 1 (base): calcite, 25%, as matrix, probably recrystallized from carbonate grains. To 0.2mm. Quartz, 70%, 0.1 to 0.3mm., spherical but angular to subrounded. Clay 5%.
Layer 2: Quartz 30%, as angular to subrounded grains. Subspherical to elongate. Poorly sorted. 0.1 to 0.4mm.
Calcite: 50% as 0.04 to 0.1mm. grains, often recrystallized.
Dark grains: less than 15%.
Black grains: less than 2%.

6. (Cont) Layer 3:

Quartz 60%, 0.01 to 1mm. Very poorly sorted, bimodal (?) and probably polygenetic. Larger 1mm. grains tend to be spherical and better rounded than smaller grains which are angular to subrounded and often tabular.

Calcite ~20%, crystalline with relic detrital grains.

Lithic frags. 20%. Poorly sorted and includes feldspar.

7. A343/C.G.51.E

Crossbedded and heavy mineral banded quartzite from southern end of 'Central Diapir', Station 51. Quartz is 'common' plutonic with straight extinction, occasional re-entrant faces and abundant inclusions. Sorting is poor but better in individual layers. <0.1 to >1.0mm. Heavy mineral banding defines bedding. Mica flakes, 0.5mm. very rare. Matrix is quartzose and with abundant clay, inclusions and voids. Porosity low.

Plagioclase: rare, 2%, multiple twinned grains, 0.02mm.

Other:
1. Rounded, quartzitic siltstone clasts, 1.2mm., 2 only
2. Tourmaline grains, 0.2mm., 3 grains
3. Haematite, 5 micron grains, abundant
4. Amphiboles, few 0.2mm. grains
5. Clay

8. A343/C.G.52.A

Quartz: 50%, highly irregular, very poorly sorted, angular to interlocking grains, av. 0.5mm. max. 1.0mm. Some grains with undulose extinction, others composite.

Feldspar: few grains.

Rock fragments: ~30%, includes siltstone clasts

Mica: rare, 0.2mm.

Other: opaques 15%, carbonate

Name: Sub greywacke (?).

9. A343/C.G.54.A (stained) (cc. 97%, dol. trace, qtz. 3%)

Fine calcirudite: 0.1 to 6mm., poorly spherical to elongate, subrounded clasts in a calcitic (micrite) matrix. Clasts are recrystallized calcite. Also 1-2mm., quartz sand. ≤3%. Grains are very well rounded, spherical and commonly with straight extinction and abundant fluid inclusions. Less than 5% of quartz grains are composite and with undulose extinction.

10. A343/C.G.70.D

Crossbedded, heavy mineral banded sandstone with coarse arkosic bands.

Quartz: angular to subrounded, spherical to elongate, 80%, very poorly sorted but sorting improves in individual beds. 0.2 to 1mm. Plutonic.

Feldspar: < 10%, plagioclase, orthoclase, commonly angular, ∽ 0.2mm. More abundant and coarser in bands.

Muscovite: 0.2mm. flakes. < 1%.

Amphibole: very rare, 0.01mm. grains

Dark opaque grains, ∽ 7%, 0.4mm. and less.

Haematite: rare crystals. < 0.01mm.

Clay: rare, in matrix.

Other: (< 2%)

A 2.5mm. rounded, ovoid grain, infraclast of laminated, quartzitic siltstone. Facies identical with A343/C.G.51.E.

11. A343/C.G.78 (float)

Fibrous and colloform calcite with pyrolusite banding. Some bands with calcite crystals to 0.3mm. Pyrolusite may occur as fibrous, occicular crystals (?). Travertine vein cuts one side of section.

12. A343/C.G.94.B

Quartz: 40%, < 0.1 to 1mm. grains, av. 0.4mm., probably bimodal, very poorly sorted but larger grains are often very well rounded and spherical.

12. (Cont) Smaller grains are less so and may be angular and elongate. Feldspar and rock fragments ~ 30%, includes grains of carbonate, plagioclase, amphiboles (rare), mica (rare) and composite, sedimentary, grains, the latter usually well rounded (reworked?). Matrix 15% is dominantly a fine carbonate, probably calcite and includes clay. Opaques account for about 15% of the rock.
Name: lithic greywacke (?).

13. A343/C.G.96

Secondary epidote from dolerite plug. (Hydrothermal alteration). Euhedral to fibrous or columnar crystals to 7mm. long. Minute magnetite (?) inclusions (rare). Forms 98% of rock.
Other minerals:
Actinolite: fibrous to asbestiform and pleochroic aggregates, with inclusions of magnetite. Interstitial with respect to epidote.
Magnetite: rare inclusions, commonly in actinolite.

14. A343/C.G.98.A

Basic igneous intrusive rock, strongly altered. Relic ophitic texture with clinopyroxene (augite) (40%), magnetite (5%) and amphiboles. Accessory apatite, few acicular crystals.

15. A343/C.G.104.a

Altered dolerite from intrusive plug at Station 104. Pyroxene is clinopyroxene, probably pigeonite (40%) and diopsidic augite (60%). Rare haematite grains and about 10% opaques, probably magnetite or ilmenite. Plagioclase is An_{60} (labradorite). Very rare quartz may be present (0.1mm.). Apatite rare. Possible minor chlorite and kaolinite.

16. A343/C.G.107 (use conoscope)

Secondary Copper Minerals (Moorowie Mine)
Azurite:
Malachite: (replaces azurite)

16. (Cont) Cuprite: minor disseminations

Quartz: veinlets and euhedral crystals. Corroded rims.

Calcite: microcrystalline veinlets cut both copper carbonates

Limonite:

17. A343/C.G.132 (stained) (cc. 90%, dol. 10%, qtz. -)

Dolomitic calcimicrite

Rare dolomitic pellets, lithiclasts, in finely crystalline calcitic matrix. Other dolomite is secondary and replaces the matrix. Vugs with drussy calcite fill. Archaeocyathid.

ADDENDUM:

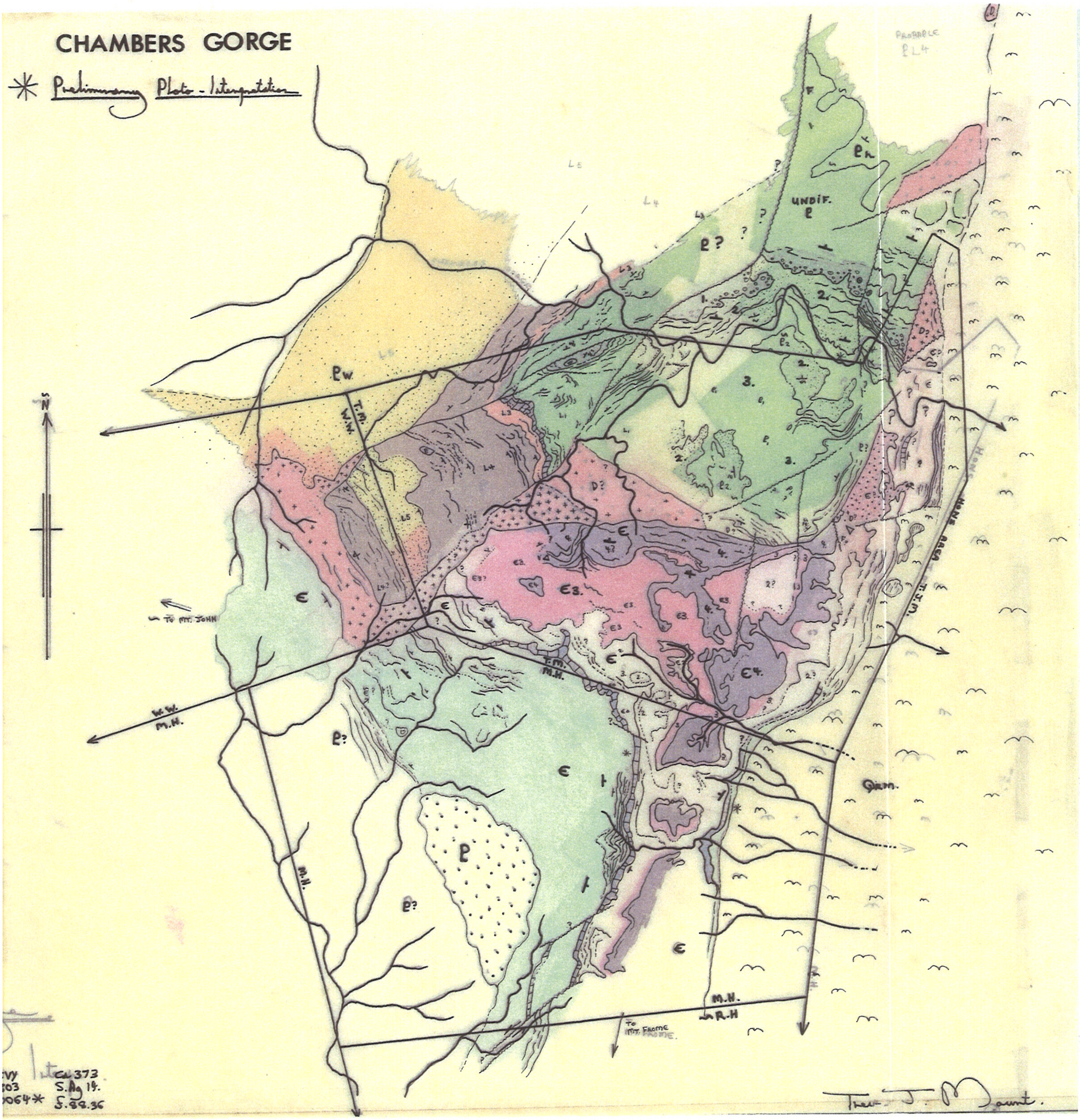
Since the writing of the thesis further work has been done on the heavy minerals from the diapirs and the Cambrian. Five chip samples containing heavy mineral banding were taken from the Central and Double Diapirs, 300g. in all, and were combined, crushed and the heavy minerals extracted using the Frantz Isodynamic separator. (Sample presented in tube "C.G. (D.H.M.)").

An X-ray powder photograph (submitted) taken on the heavy mineral fraction shows it to be ILMENITE (with minor quartz and clay).

The Cambrian limestone A343/R.90ft. was digested with conc. HCl and the magnetic residue (heavy minerals) was found to be ilmenite (Tube C.G. (C.H.M., R.90ft.)).

20/10/70

Miscellaneous maps, stratigraphic sections (remnants of field sketches; see full set of final sections in large folder), and photographs that support the thesis.


CHAMBERS GORGE
* Preliminary Photo-Interpretation
N
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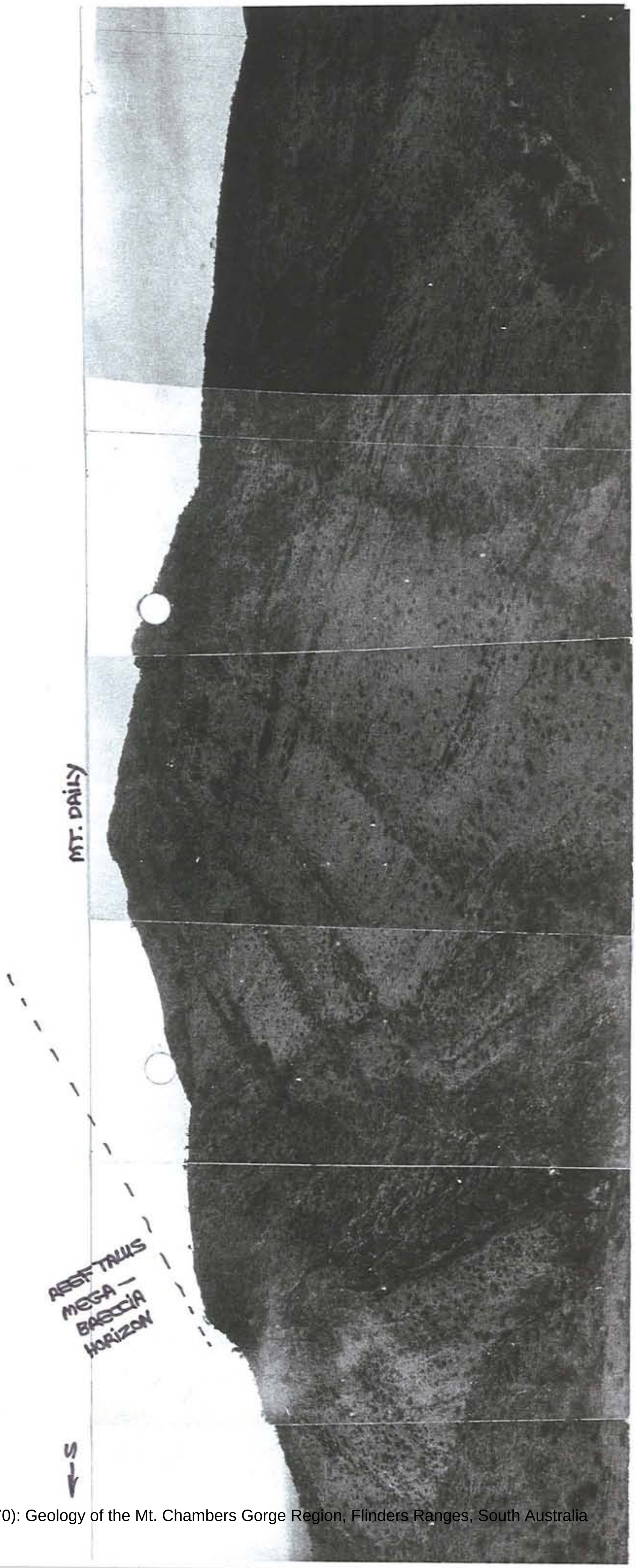
PROBABLE
TO MT. JOHN
To MT. FROME
W.W.
M.H.
T.M.
M.H.
R.H.
Qrm.


FIELD DRAFT MAP
1/2
MT JANE
MT VIE
FAULT


FIELD DRAFT MAP
2/2
DIAPIR
DIAPIR
MSV.
DRA
DRA
DRA
DRA
SL
SL.
MT.VIE.
Purple Shale

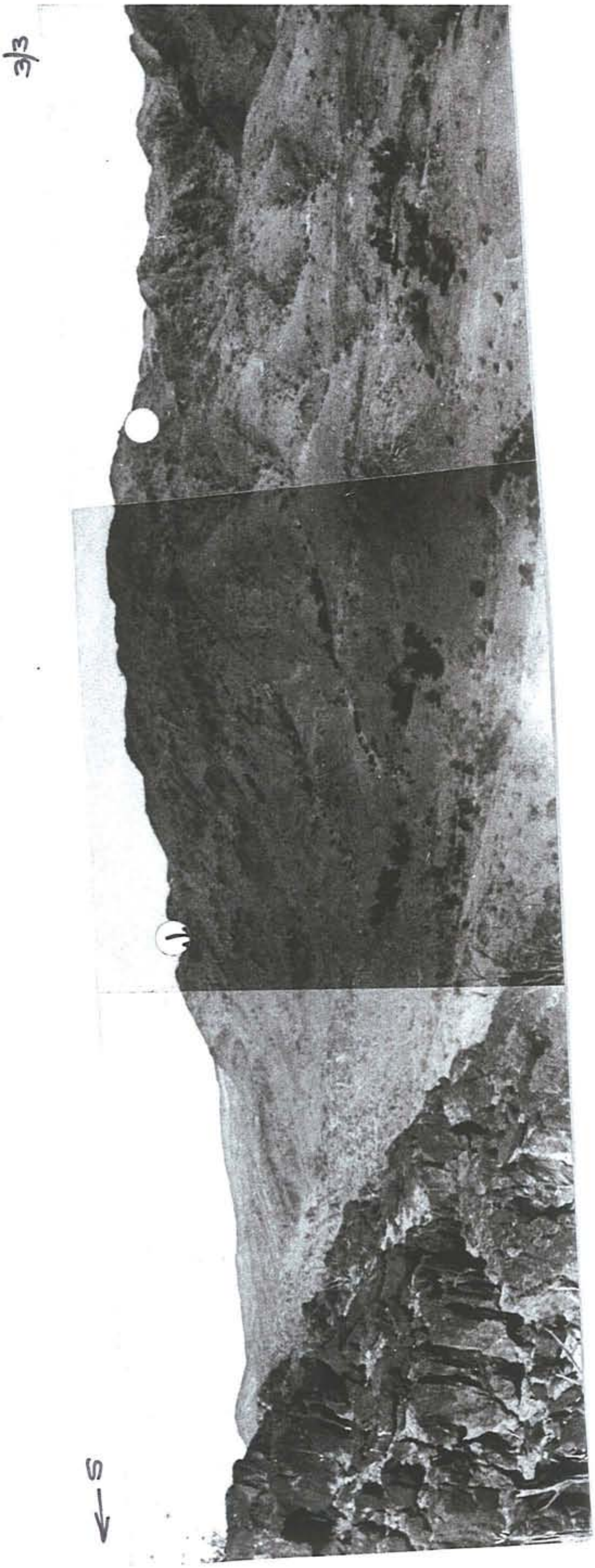
FAUNAL LIST. Note.

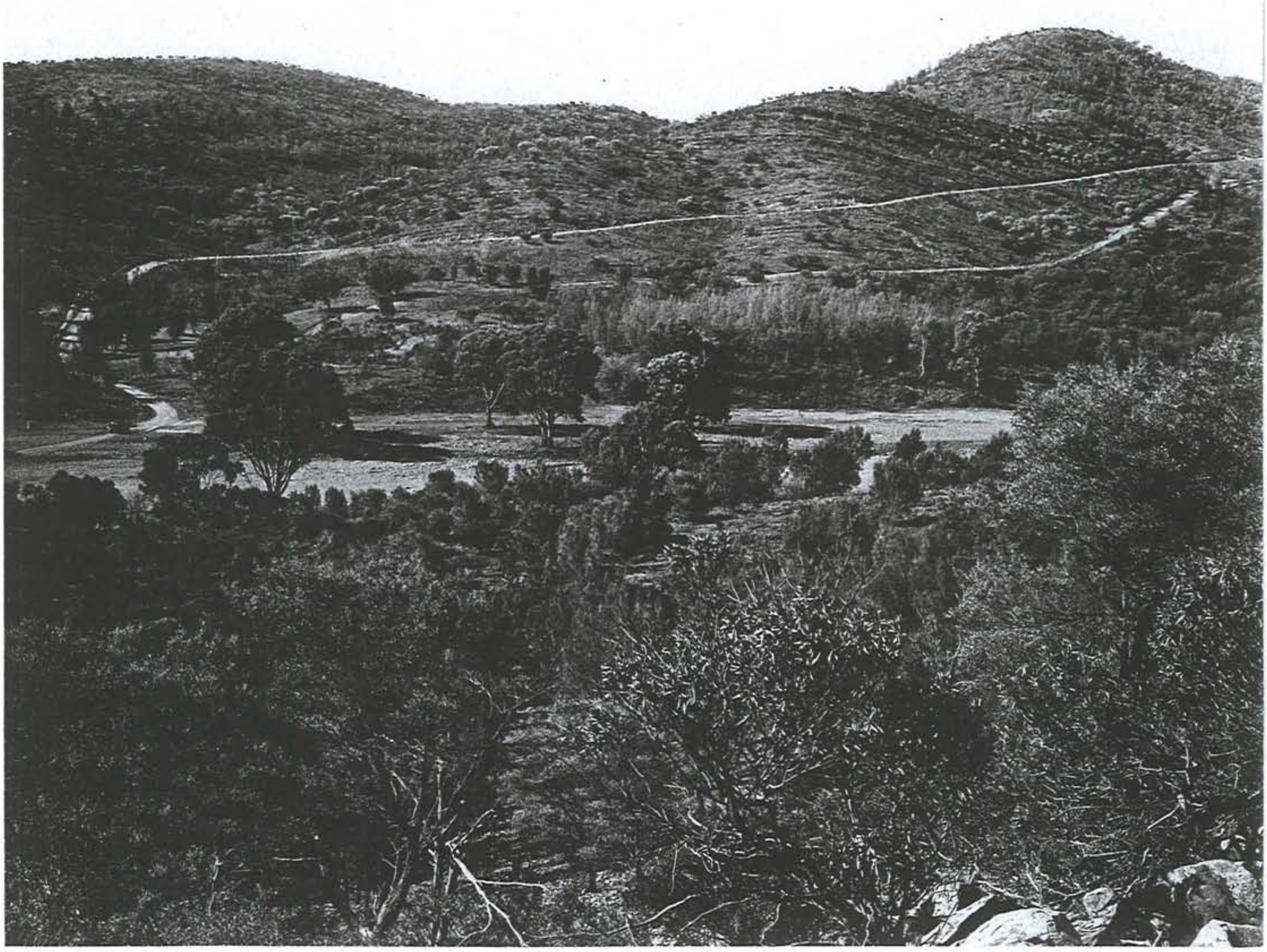
Argentine (?) Ants.
Black ½" ants.
Red Ants. ½"
Red + Black + White Striped (Abd.) Gum ants.
Spotted Pardalott. G.G.
White Parrots 5. (Cockatoos) ? G.G.
2 Green Rosella type parrots. C.G.
Many Galahs.
Many Roos. est. ~100–200 for area
Tawny Frogmouth 3.
. Emus (C.G. Bore). ~5.
Fox. x 1.
Yellow Footed rock wallaby. 3.
Wallaby. x ~ 4–5.
Flies - "House" and few larger greenish "March" flies. ?
Midges.
"Top-knot" Doves.. (Crested Pigeon ?)
"Admiral" Butterfly. C.G.
Dingo ? tracks ??
Crows. ~ 20.
Eagle ~ 2. Aquila Audax ?
Red "Xmas(?)" beetle. (Wilsons Bore). (W.B.)
"Basket web spiders".
(Sheep.)
Zebra Finches x 600.
Finches.
Red. Robin x 1(?) (W.B. camp)
"Rainbow" Lizards x5.
Skinks (?) <4". Many.
Carpet (?) Snake >x2..
Cricket (camp).
Mosquitoes (C.G.) Bore.
1 Willy wagtail. (W.B.)
(Nocturnal) Moths (Various).
Centipede.
White ants. (?)
Rabbits.
Brown Beetle
Water Beetle. 371
~~Red Robin~~.
White Ants.


MT. DAILY
REEF TALUS MEGA-BRECCIA HORIZON
S


1/3
LAKE FROME
MT. CHAMBERS ?

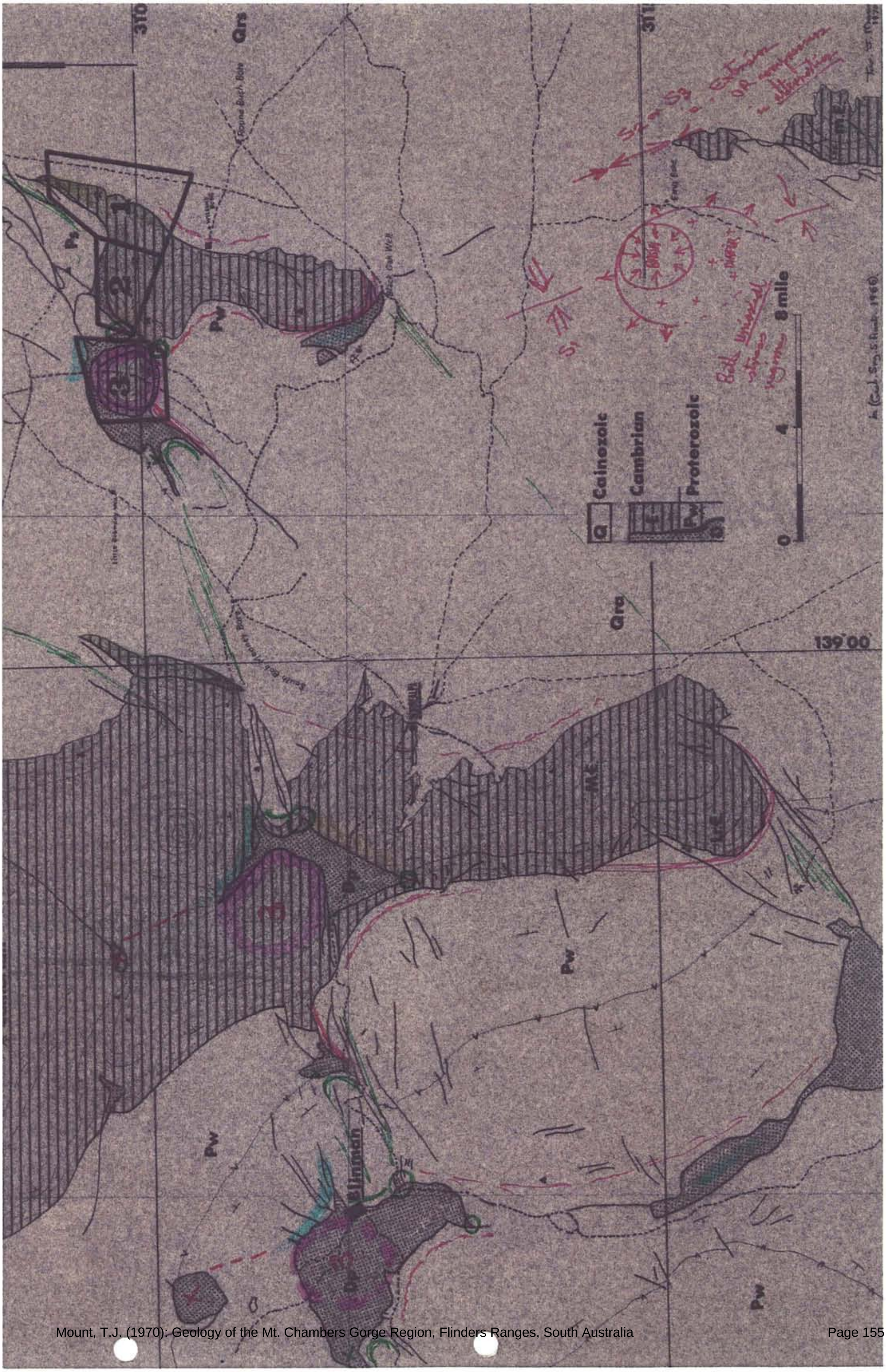

2/3
MT. CHAMBERS?
SOUTH

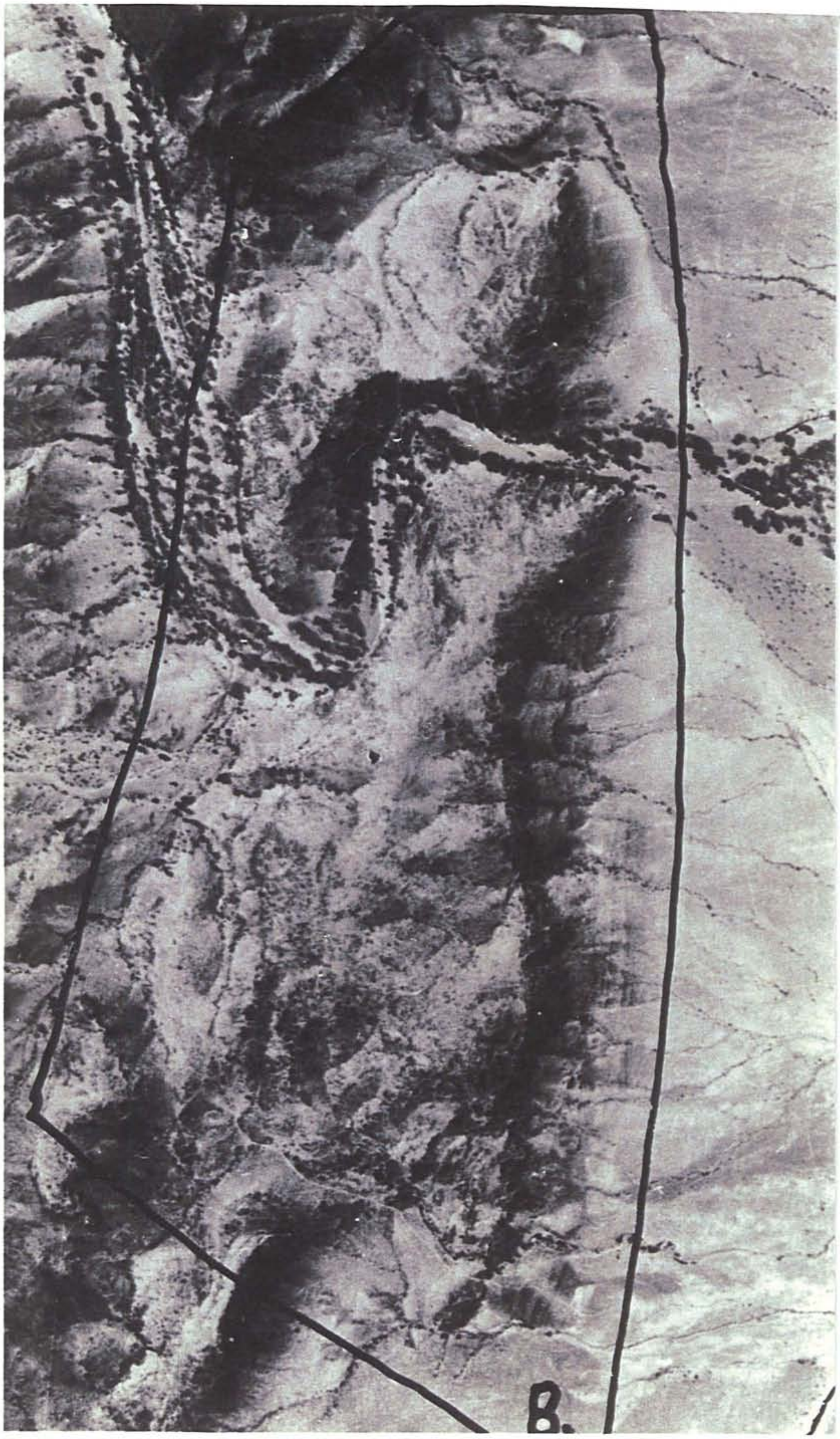

3/3
S



WIRREALPA HILL FROM ERENGUNDA
(Sp.?)

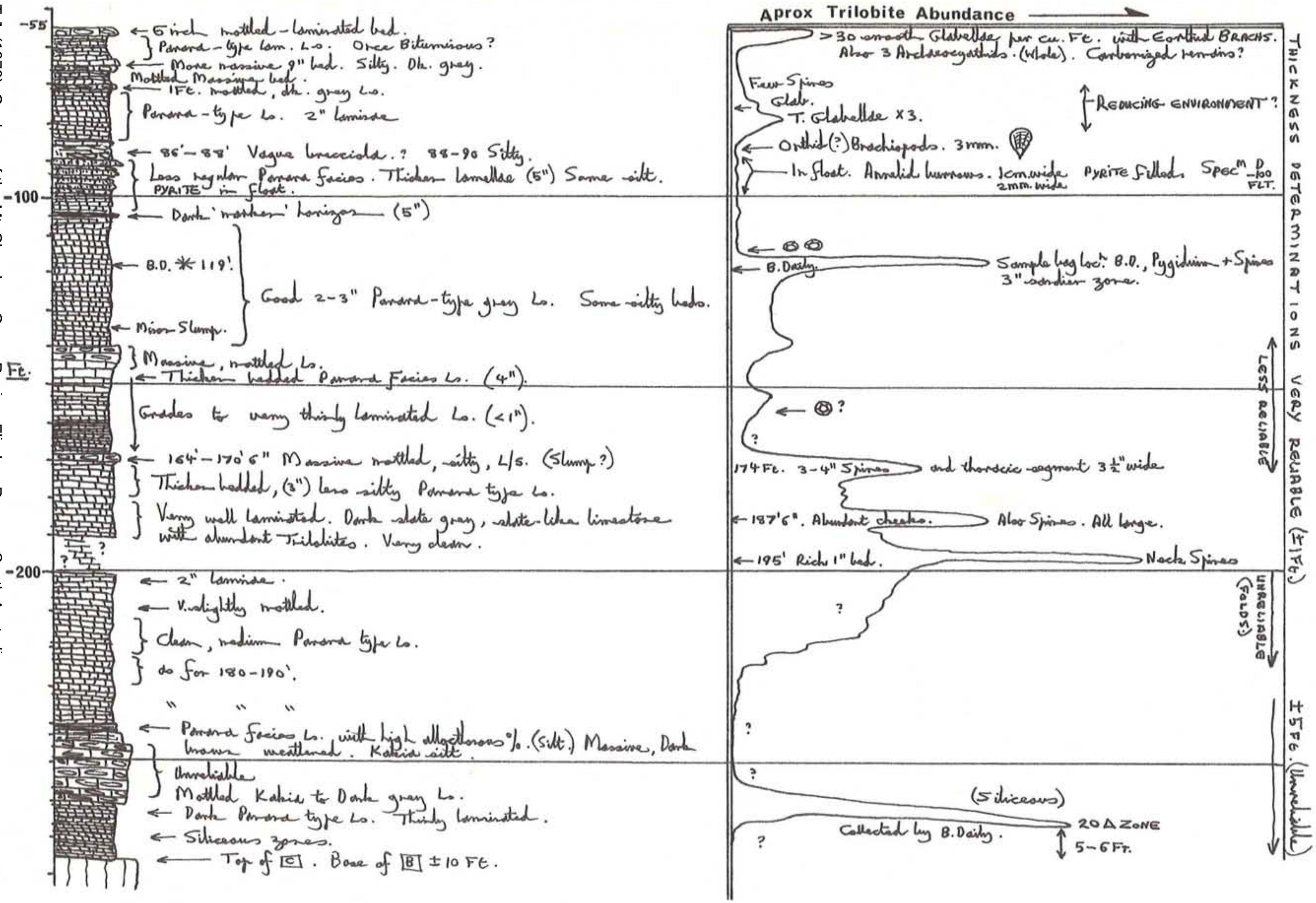
NOTES ON STRUCTURE AND TECTONICS

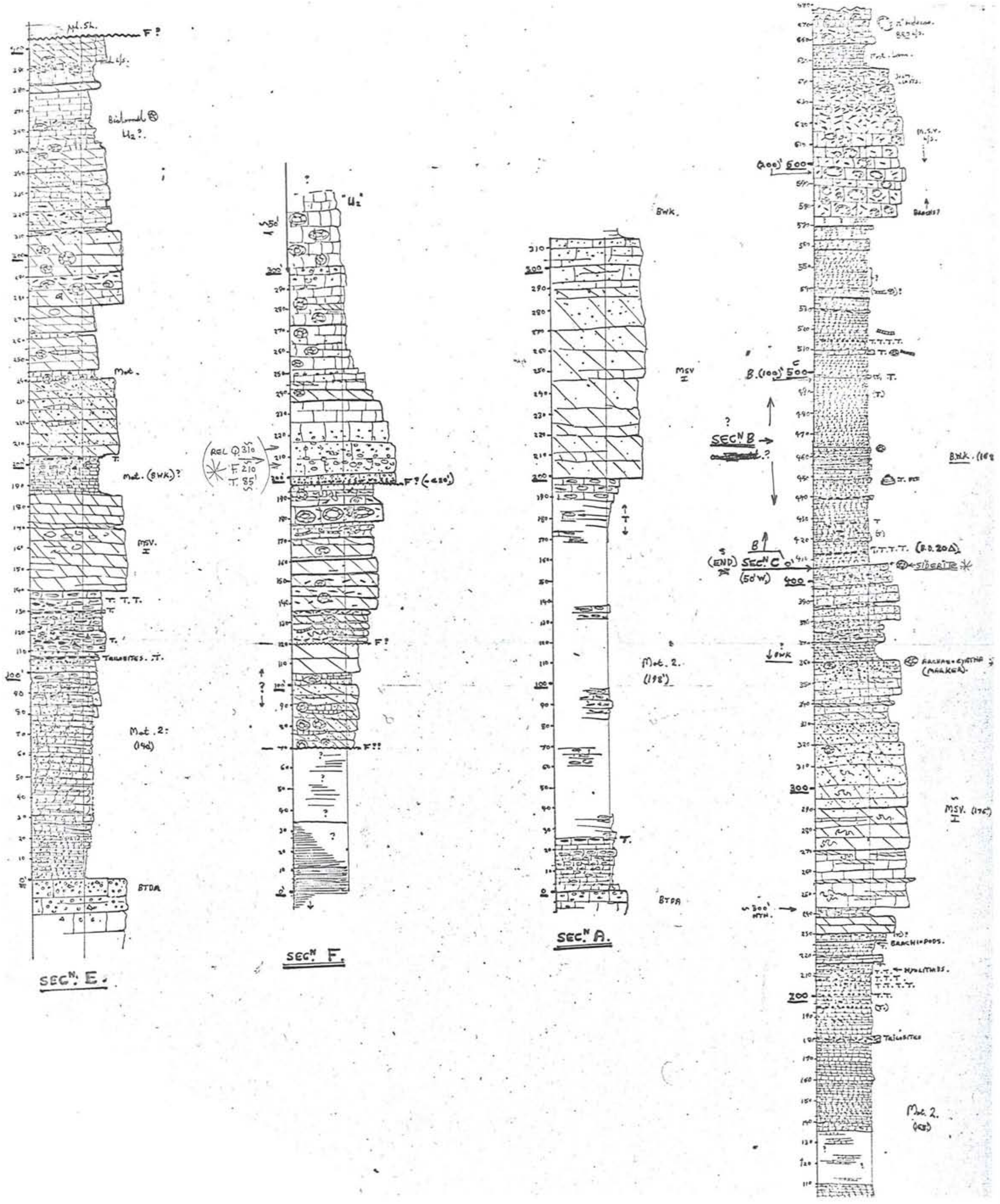




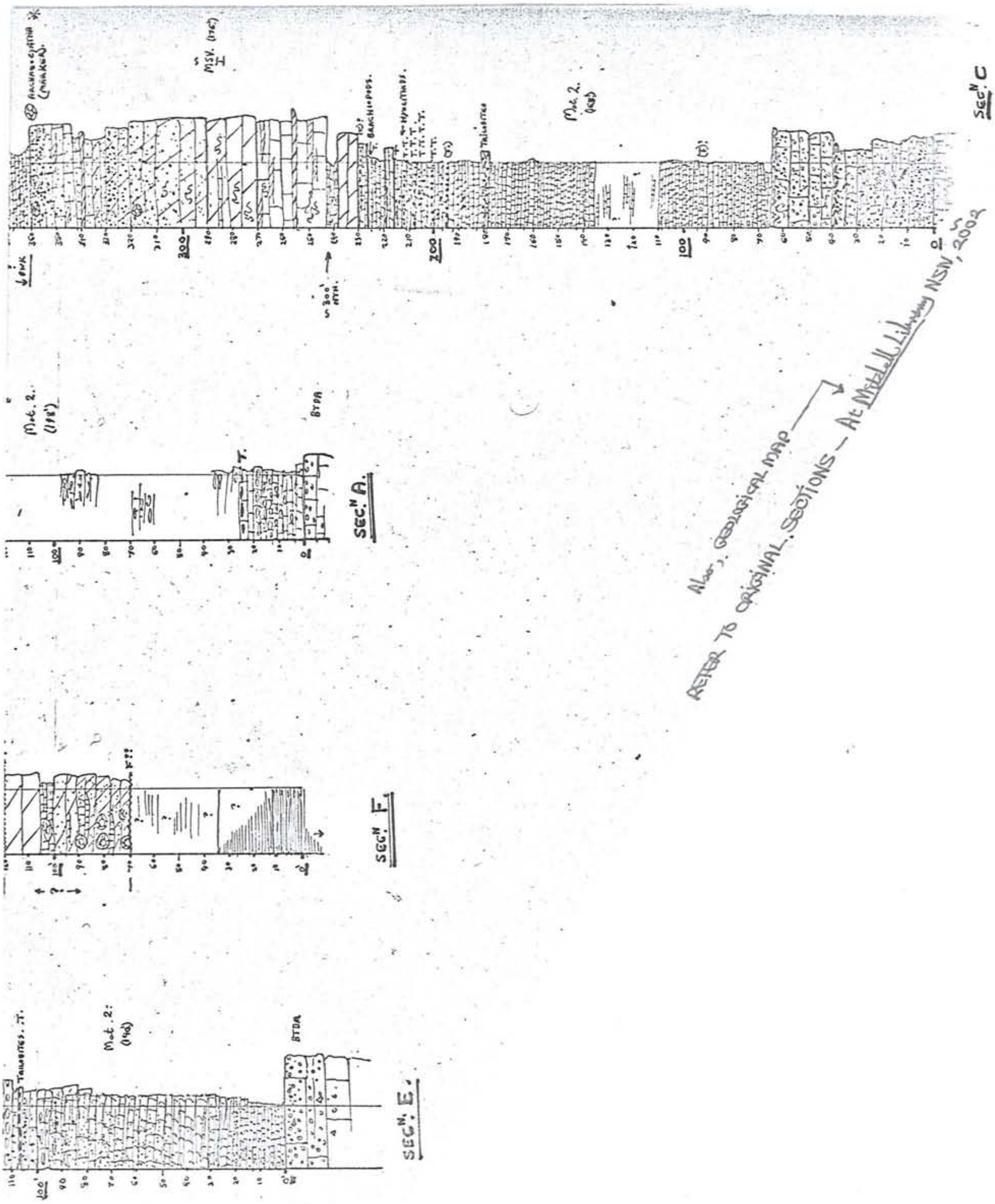
← EASTERN MOUTH OF CHAMBERS CREEK, TO LAKE FROME →

SECTION D (continued)



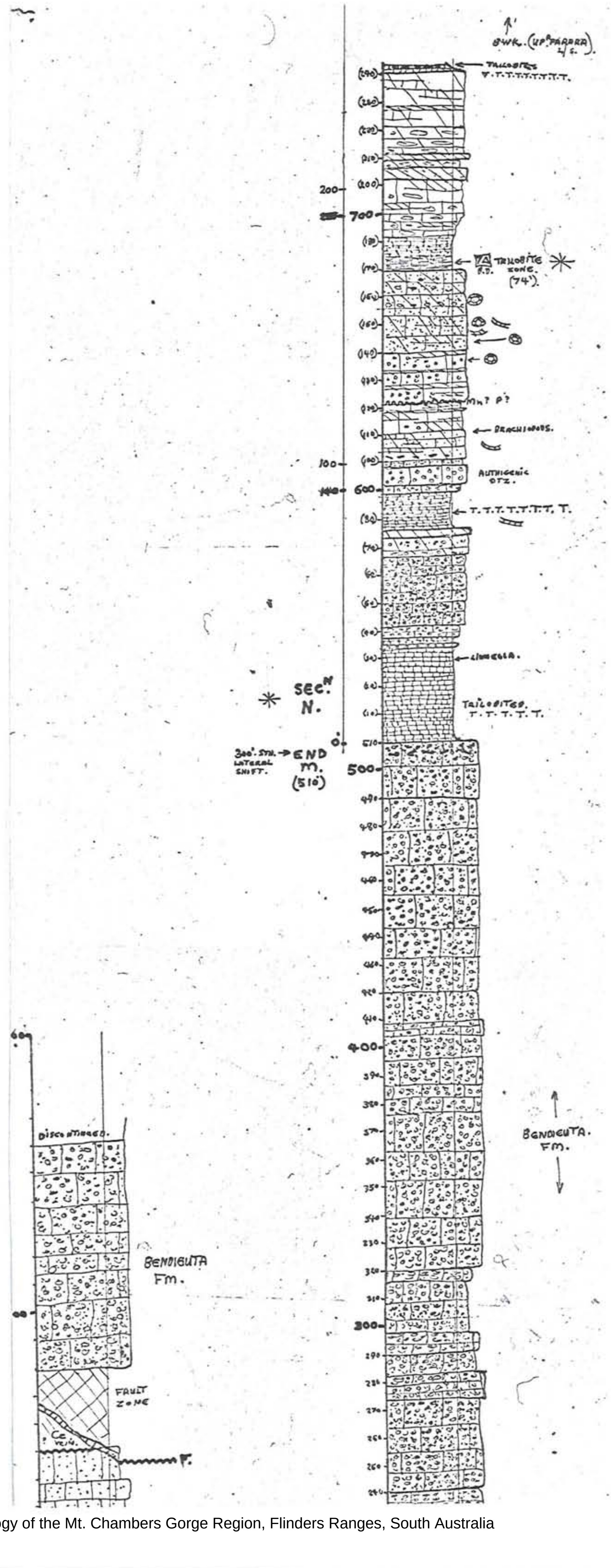


PT. SEC. E, F, A, C 1/2



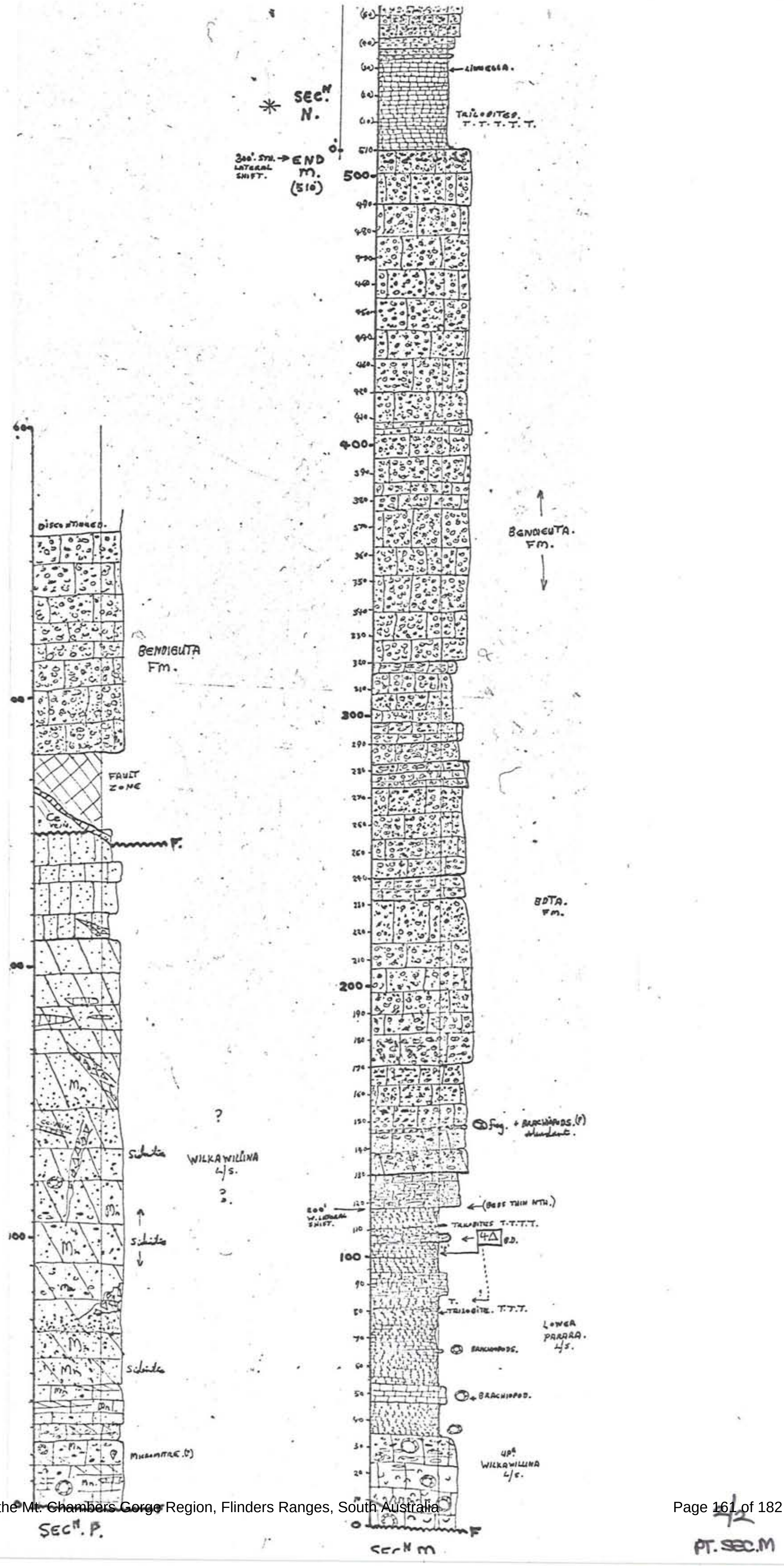
Also, GEOLOGICAL MAP —
REFER TO ORIGINAL SECTIONS — At Mitchell Library NSW, 2002

PT. SEC. E, F, A, C 2/2



BWK. (UP° PARARA)
TRILOBITES
TRILOBITE ZONE
(74')
BRACHIOPODS.
AUTHIGENIC QTZ.
TRILOBITES.
SEC.N N.
END M. (510')
300'. STH. LATERAL SHIFT.
BENDIGUTA FM.
DISCONTINUED.
BENDIGUTA Fm.
FAULT ZONE
F.
700
600
500
400
300
200
100
0

PT. SEC. M 1/2


SECN. N.
300'. STH. LATERAL SHIFT. → END M. (510')
TRILOBITES. T. T. T. T. T.
500
400
BENDIEUTA. FM.
300
BDTA. FM.
200
Frag. + BRACHIOPODS. (?) abundant.
200' W. LATERAL SHIFT.
(BEDS THIN NTH.)
TRILOBITES T.T.T.T.
4Δ B.D.
100
T. TRILOBITE. T.T.T.
LOWER PARARA L/S.
BRACHIOPODS.
+ BRACHIOPOD.
UPR WILKAWILLINA L/S.
0
F
SECN M
DISCONTINUED.
BENDIEUTA FM.
FAULT ZONE
F.
?
WILKAWILLINA L/S.
?
100
SECN. P.
PT. SEC. M

Miscellaneous records relating to the establishment and administration of the thesis.

HONOURS PROJECTS, 1970

Hatcher, M.I.	The geology of the Cambrian south of Moorowie Mine, Central Flinders Ranges.
Mount, T.	The geology of the Mount Chambers Gorge region.
Harris, R.	The geology of the Late Proterozoic and Cambrian of the Mt. Frome Region.
Wigglesworth, K.F.	(1) The geology of the Mount John region. (2) Aerial photo interpretation of the Aroona-Beltana area.
Cobb, M.) Morris, B.)	Geology and petrology of amphibolite body, Weekeroo.
Coin, C.	A study of granulite-amphibolite facies terrain near Amata.
Moriarty, K.	The petrology of some bottom sediment cores from the Southern Ocean.
Hill, V.J.	The atomic structure of scholzite.
Thomas, A.	Joint study and relationship to tin mineralisation of the Stannery Hills Area, Herberton, Qld.
Sibernaler, X.P.	Geochemical project, Tunk Head area.
Smith, P.B.	Geochemical project near Kalgoorlie.
Holt, G.E.	Copper mineralisation Paratoo diaper.
Thompson, R.L.	Kittacoola ores.
Lipple, S.L.	
Drew, G.	Geophysical investigation in the Middlebank Ranges. (Southern Area).
Hone, I.	Geophysical study of the gold bearing magnetite bodies at Tennant Creek.
Kopcheff, J.	Basin study in South Australia.
Price, D.	Geophysical investigation in the Middlebank Ranges (Northern Area).
Pridmore, D.	Investigation of the Edwin Shoot, W.A.
Taylor, R.	

Dr. Nesbitt

Briggs, Davidson, Herstridge, Watmuff, P.C. Smith : Petrology and Geochemistry of the granites of the S.E.

THE UNIVERSITY OF ADELAIDE

SCHOOL OF GEOLOGY

Thesis Material

When submitting your thesis you are also required to submit a representative collection of your material (including rock and ore samples, thin and polished sections).

Please observe the following points:

(1) Submit no more than one steel tray of hand-specimen material.

(2) All material (hand specimens and micro-sections) is to be numbered and the numbers must correspond to a list in the appendix of your thesis. All thin sections must also bear your name.

(3) All other specimen material is to be removed from the Department before 1st December, 1970.

Plates and Dyelines for Thesis

The Department will provide sets of up to ten plates or dyelines for 4 copies of the thesis (up to six plates or dyelines if the thesis is over thirty pages long).

The charge for any additional plates, dyelines or extra copies is 10¢ per plate and 5¢ per square foot of dyeline.

Maps and photographs for copying must be submitted to Dr. Gostin or Mr. Both by Monday, 5th October.

MEMORANDUM TO: Postgraduate and Honours Students.

FROM: D.M. Boyd and R.W.R. Rutland.

Various abuses of the facilities of the School of Geology have been reported to us during the past few weeks. If such abuses were to continue they would raise the question as to whether we could continue to open the School to students during the evenings. We would therefore ask all postgraduate and honours students to confine their evening work to their own rooms or to those laboratories which they have had express permission to use in the evenings. It should also be obvious that special care should be taken in the use of facilities in the absence of academic and technical staff and that laboratories should be left in a tidy condition. Any mishaps should be promptly reported.

To all Honours, M.Sc. and Ph.D. students:

Use of photographic facilities in the School of Geology

1. All postgraduate students (Honours, M.Sc. and Ph.D.) must obtain the approval of their supervisor in order to use the School photographic facilities, and all work so approved must be submitted through the staff member in charge of photographic work.

2. Normally students will be required to develop their own negatives.

3. All photographic prints are to be made by the appropriate photographic technician unless special written permission is obtained from one's supervisor. The quantity and type of paper used should be recorded.

4. For the inclusion of photographs in a thesis, prints have to be submitted to the supervisor for approval. After approval, plates may be prepared by the appropriate photographic technician.

5. The Department will provide the plates for four copies of a Ph.D. or M.Sc. thesis free of charge but only if the four copies are assigned two copies to the University as required by the Board of Research Studies, one to the Department and one to the supervisor. Additional copies can be produced by the photographic technician at the student's expense.

R.W.R. Rutland

GEOLOGY DEPARTMENT

Memo to all staff and research students:

Situation Desperate!

We are rapidly running out of maintenance funds and therefore ask all concerned to co-operate in limiting the use of photographic and copying facilities.

Transparencies for the overhead projector cost at least 25 cents each! So please economize. The maximum number of transparencies allowed for any one seminar shall be 5, or else a strong case needs to be presented to me personally.

V. Gostin.

15/5/70.

University of Adelaide - Department of Geology.

USE OF THE MINERAL SEPARATING ROOM.

Equipment available:

Franz isodynamic separator.

[illegible] funnel
[illegible]
[illegible]

[illegible]

[illegible]

Whatever procedure is followed it is important to commence with well sized material, ie. with the range of grain size as restricted as the amount of crushed material available will allow. The particular grain sizes chosen are influenced principally by the maximum particle size of the pure mineral concerned that it is possible to obtain.

Mineral separation procedures are empirical. Trial and error are applied to determine the best settings on the Franz. For rough, rapid separation, the Franz may be used vertically. Heavy liquids available are clerici (S.G. 4.3) and tetrabromoethane (S.G. 2.9). Others may be purchased if thought necessary. Note that Clerici is washed with water, and tetrabromoethane with acetone. These liquids, and dimethylsulphoxide which may be used to dilute tetrabromoethane, are poisonous and must be handled with care (see notice on wall of separating room) and with the fan on. Do not use naked flames in the vicinity of acetone fumes.

Material smaller than 200 mesh grain size does not separate easily by gravity in the separating funnel and needs to be centrifuged.

The elutriator is useful for the separation of micas and other flaky minerals from minerals of greater density.

The superpanner is suitable for the separation of heavy ore minerals from each other and from lighter silicates.

Use of the separating room is rostered. See sheet on wall.

Richard Hottershead is available for limited advice and assistance in the separating room.

Further reading:

J. Zussman (Edit). Physical Methods in determinative Mineralogy. 1967. Chapter 1.

R.L. Oliver
13th March, 1969.

University of Adelaide. Department of Geology.

Cutting, grinding and polishing.

Facilities are located in:

1. a "student" area,

2. a "technicians" area.

Honours students are obliged to use the "student" area; others may do so.

Thin sections and polished mounts are prepared for staff and research students by technicians Richard Mottershead and Wayne Mussared. Research students requiring thin sections should provide cut blocks ready for mounting.

Polishing will be done also for Honours students on blocks already mounted.

Staff and research students submitting work to Richard Mottershead should do so with the sanction of Dr. Oliver and to Wayne Mussared with the sanction of Mr. Both.

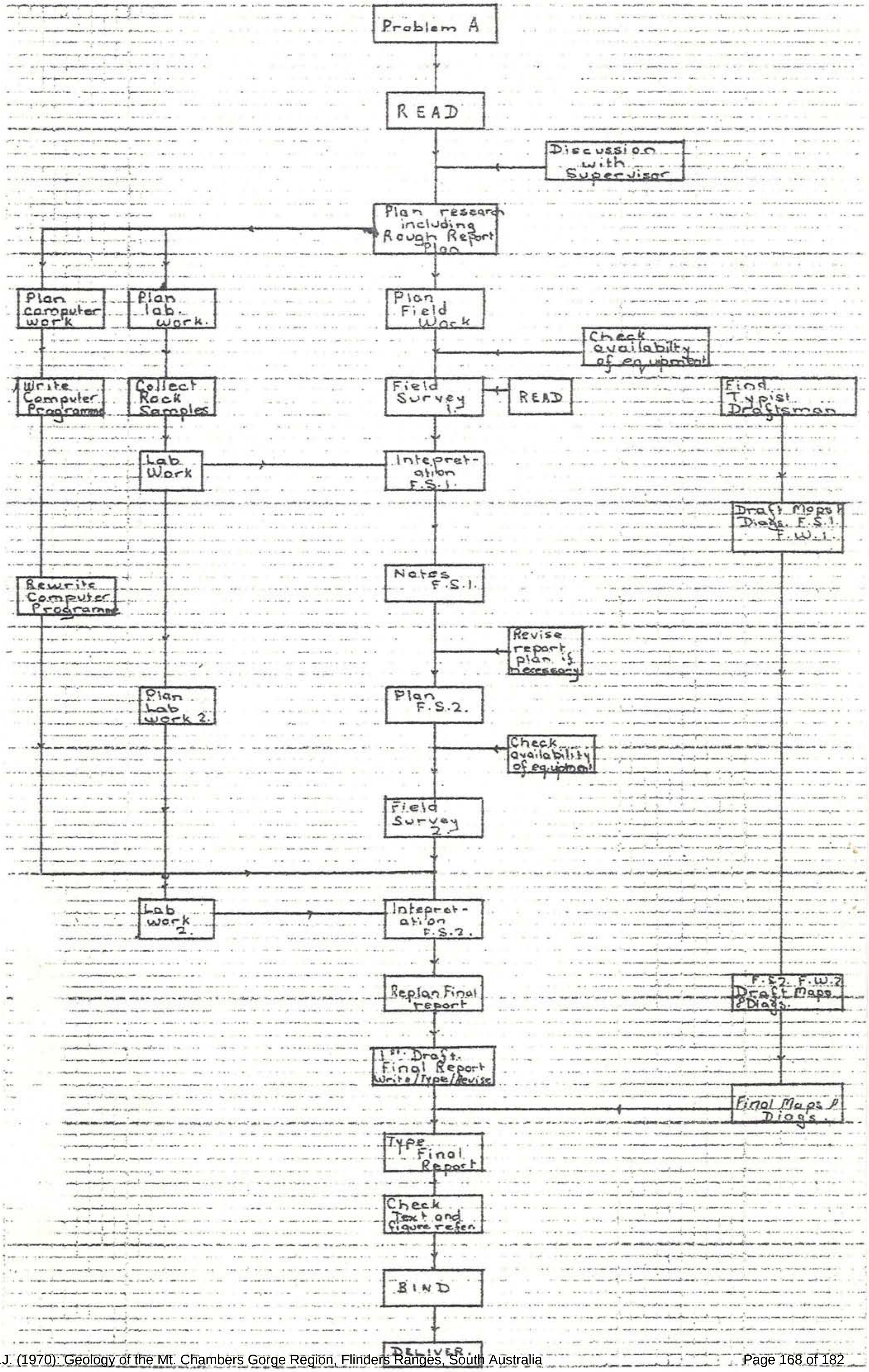
The maximum thin section entitlement for staff and research students is approximately 20 normal size thin sections per three weeks. The ration is smaller for larger thin sections.

Honours students should not use equipment in the "technicians" area. Research students may use the surface grinder or speed fam in the evenings or in the weekends after fully aquainting themselves with the use of these items of equipment, and after signing the book provided.

R.L. Oliver.

R.A. Both.

17th March, 1970.


Problem A
READ
Discussion with Supervisor
Plan research including Rough Report Plan
Plan computer work
Plan lab. work.
Plan Field Work
Check availability of equipment
Write Computer Programme
Collect Rock Samples
Field Survey 1.
READ
Find Typist Draftsman
Lab Work
Intepretation F.S.1.
Draft Maps & Diags. F.S.1. F.W.1.
Notes F.S.1.
Rewrite Computer Programme
Revise report plan if necessary
Plan Lab work 2.
Plan F.S.2.
Check availability of equipment
Field Survey 2.
Lab work 2.
Intepretation F.S.2.
Replan Final report
F.S.2. F.W.2. Draft Maps & Diags.
1st. Draft. Final Report Write/Type/Revise
Final Maps & Diags.
Type Final Report
Check Text and figure refer.
BIND
DELIVER

THE UNIVERSITY OF ADELAIDE
ADELAIDE, SOUTH AUSTRALIA 5001
Telephone: 23 4333

Professor E. A. Rudd, Economic Geology
Professor D. M. Boyd, Geophysics
Mr. R. A. Both, Mineragraphy, Ore Deposits

DEPARTMENT OF ECONOMIC GEOLOGY

16th June, 1970

Trevor Mount,
Geology Dept.,
University of Adelaide

Typing Fees

40¢ is charged for each page of typescript This amount includes cost of ribbons, carbon paper & depreciation on the typewriter used.

Therefore fee due for 35 pages $14.00

Helen Ball

No. 14]

SOUTH AUSTRALIAN RAILWAYS

RECEIVED the undermentioned goo[illegible] livestock for conveyance between the stations shown, subject to the p[illegible]ions of the South Australian Railways Commissioner's Act, 1936-1965, and the Act[illegible] [illegible]rporated therewith, and all Acts amending the same, and to the By-la[illegible] Regulations and Conditions published by the Commissioner and to the terms and conditions of the Consignment Note.

PT AUGUSTA

RECEIPT FOR SENDER

Consigned to Mr. T. J. MOUNT. Date Wed. Mar. 25th

Station FROM ADELAIDE Station TO

Number and Description of Packages or Livestock	At Whose Risk	Weight
		LB.
Honda 90 Motorbike		
TR - 927.		
ACCOM		

$5.42

27 / 60

Cash

Name of Sender T. J. MOUNT. Charges Payable by ....

Address 5 LISHERNE AVE. MITCHAM Signature of Sender or Agent

7:35. 25th March 5062 70

The Railways PROMPTLY deliver Parcels and Goods in Adelaide and Suburbs at Cheap Rates.

Railway Employee's Signature

M.27

COMMONWEALTH OF AUSTRALIA

Commonwealth Railways PORT AUGUSTA

№ 294788

25. 3. 1970.

Received from Mount (W + Hatcher)

the sum of

Six dollars Sixty Six cents,

being

Parachilna

$ 6.66

Cheque No.

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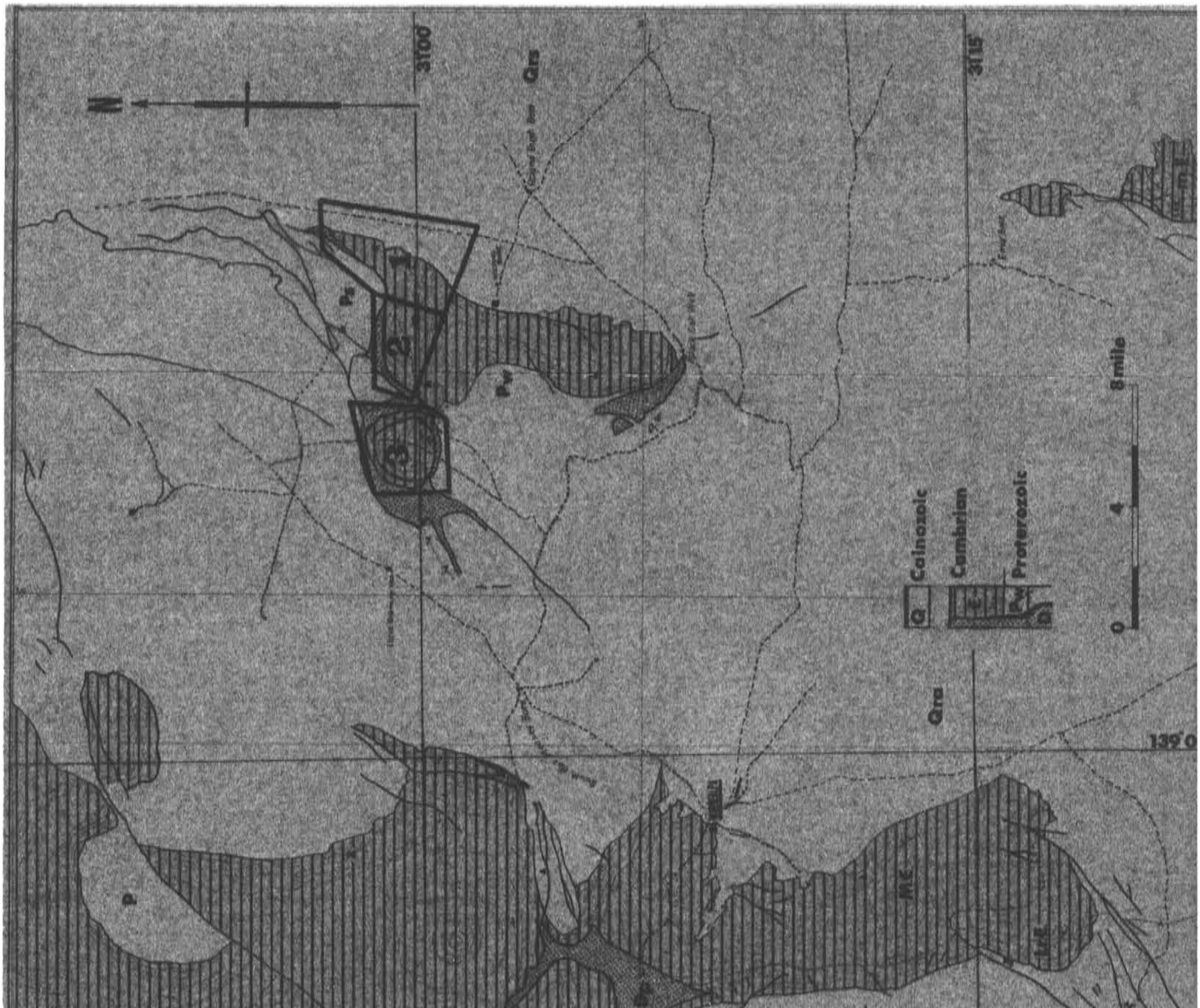
NAME T. J. MOUNT

ADDRESS HONS. GEOLOGY No. XS 2811

DATE 14-10-70

Description of Work	No. of Exposures	Cost	
Thesis 3600.	134	6	20
Total Cost $		6	20


N
1
2
MT CHAMBERS GORGE
GEOLOGICAL MAPPING
JUNE 1970


LOCALITY MAP
N
31°00'
31°15'
139°0'
Cainozoic
Cambrian
Proterozoic
Q
Pw
0
4
8 mile
Cambrian
Blinman
Pw
Qra

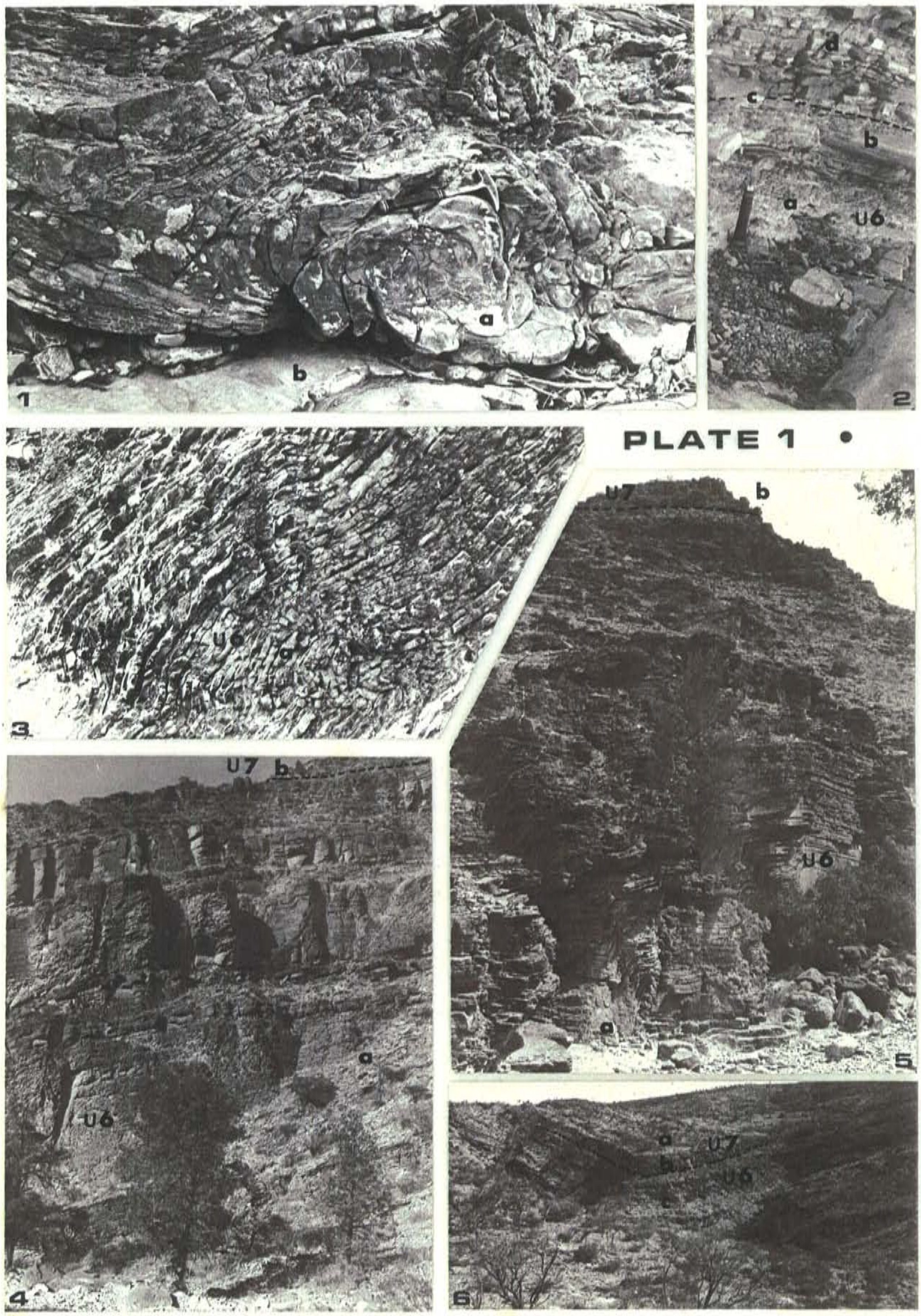


PLATE 1

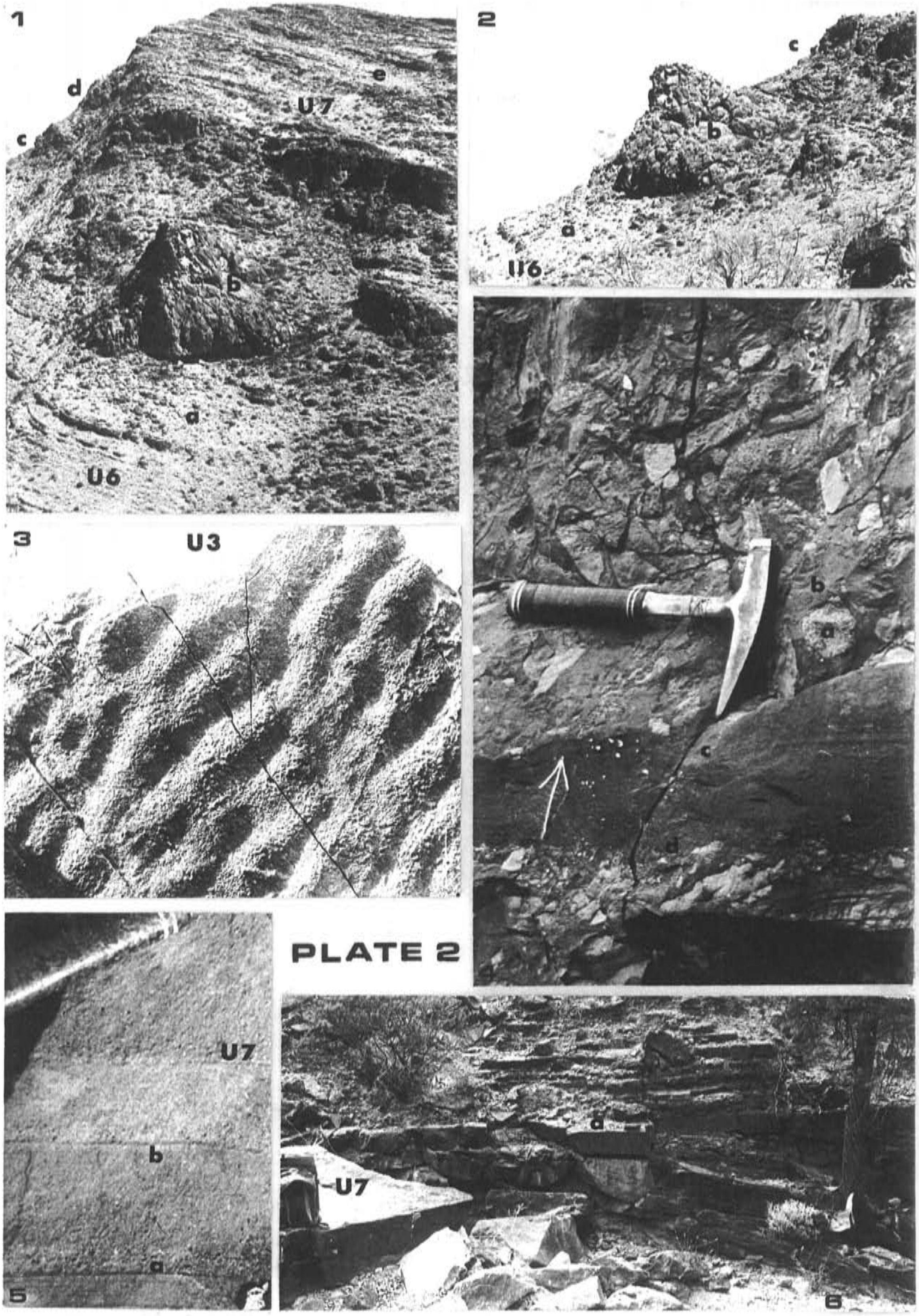


PLATE 2

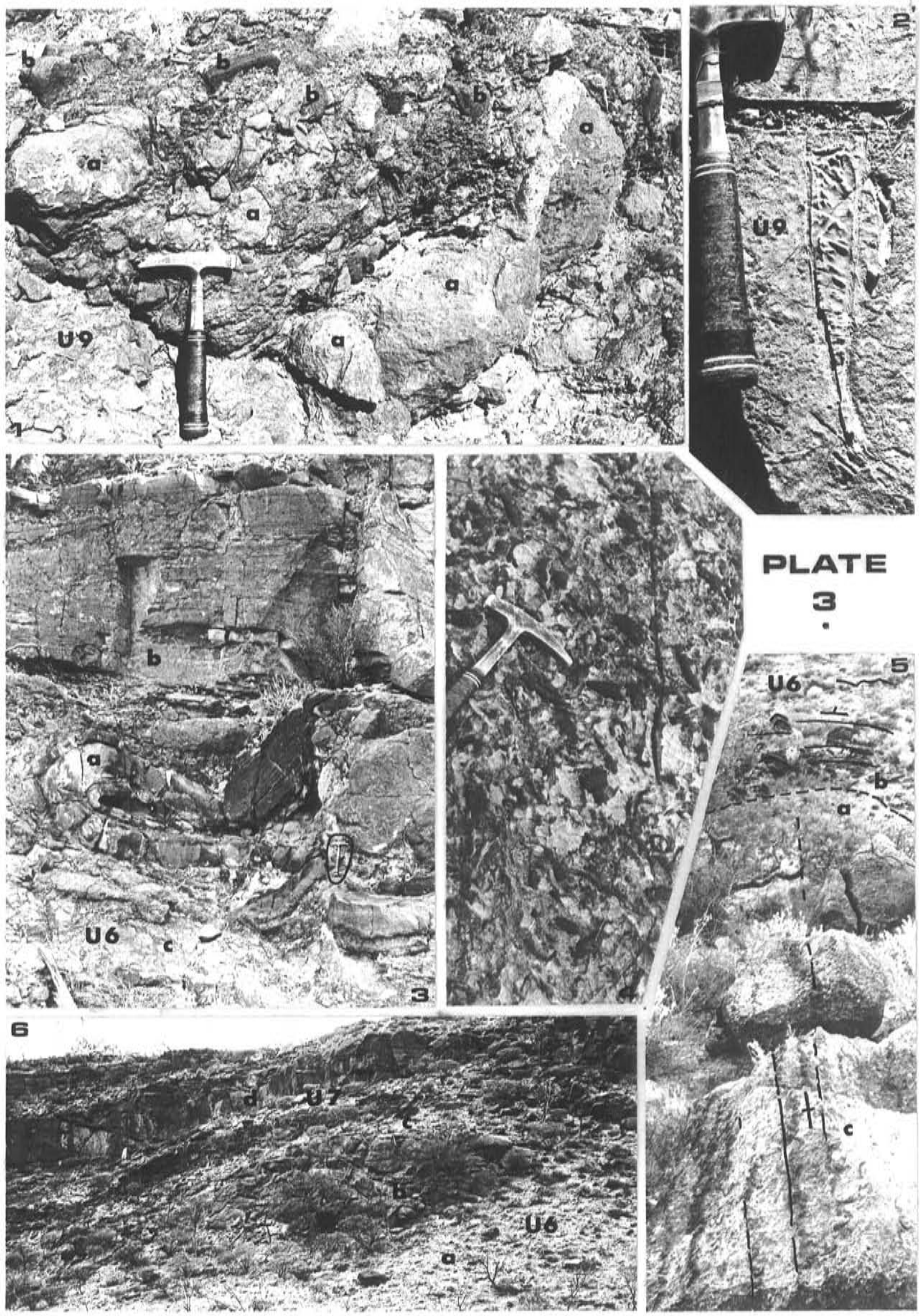


PLATE
3
U9
U6
U7
1
2
3
5
6
a
b
c
d

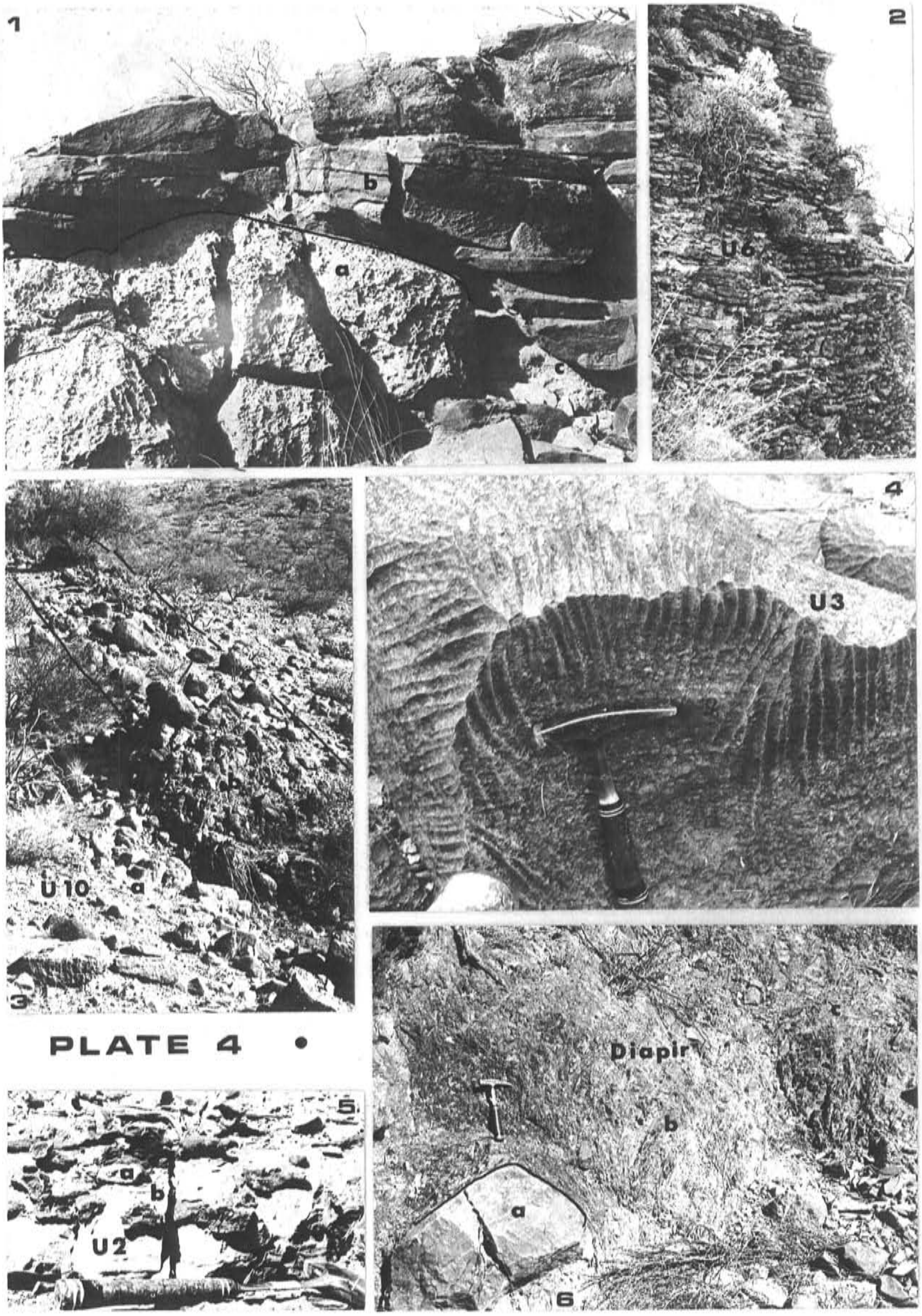


PLATE 4 •

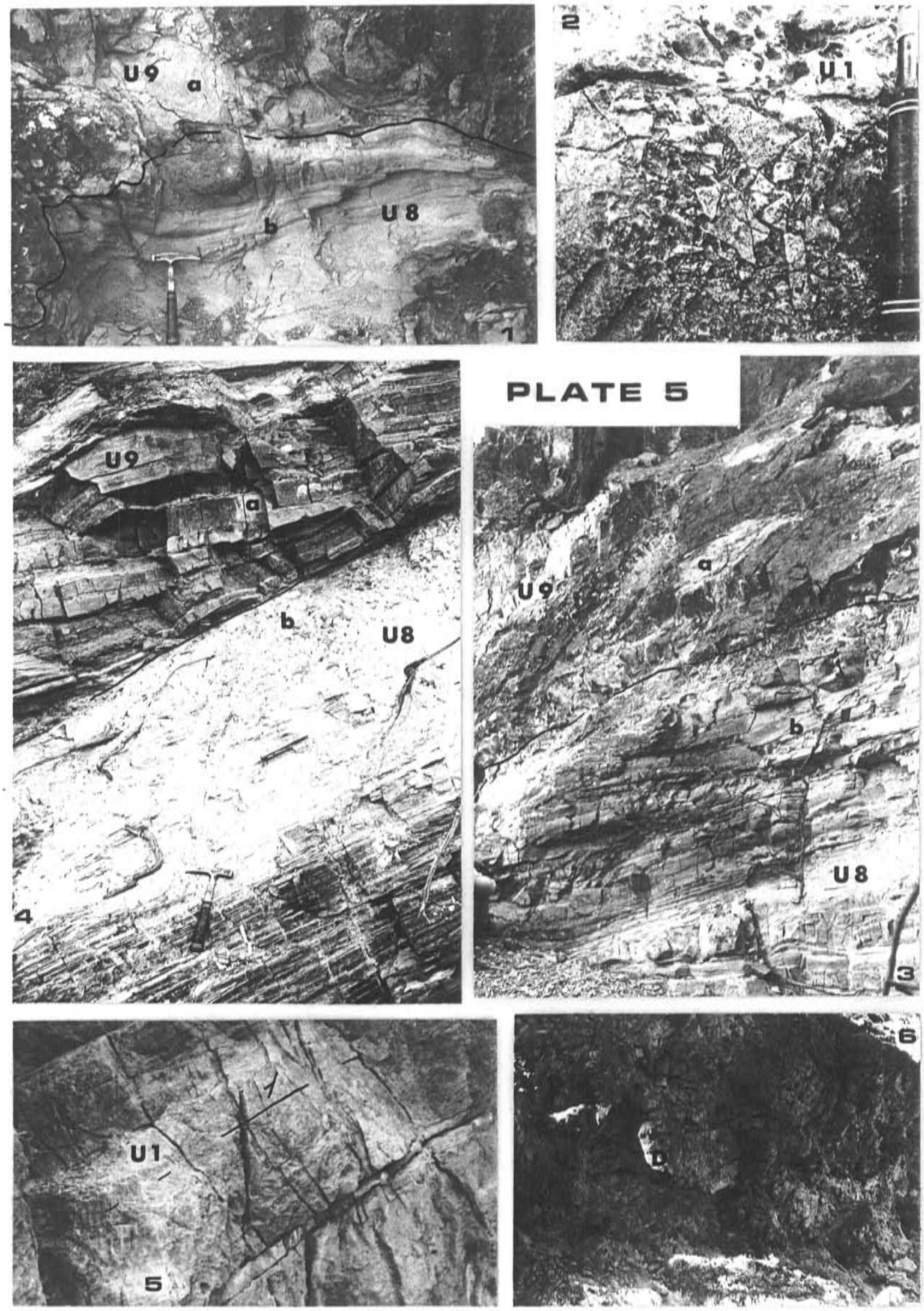


PLATE 5
U9
a
b
U8
1
2
U1
U9
a
b
U8
4
U9
a
b
U8
3
U1
5
6
b

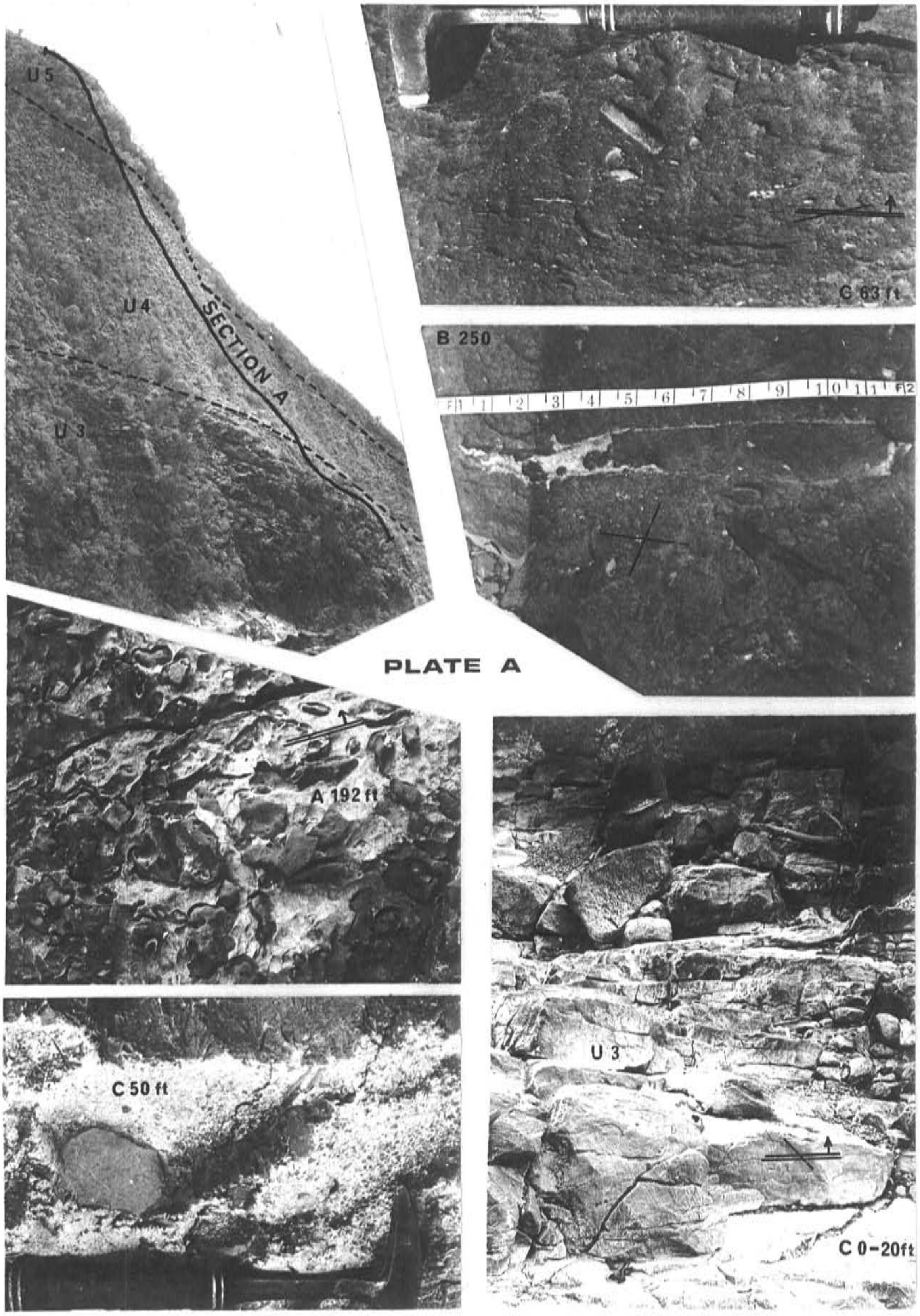
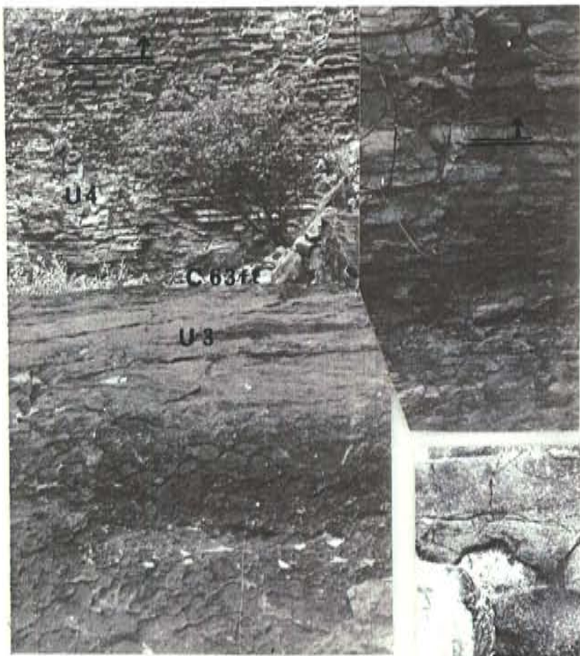


PLATE A


U4
C 63 ft
U 3


C 200 ft
U 4

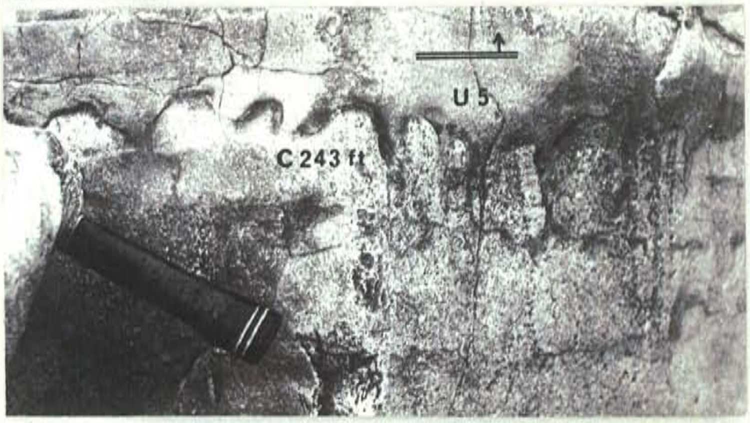
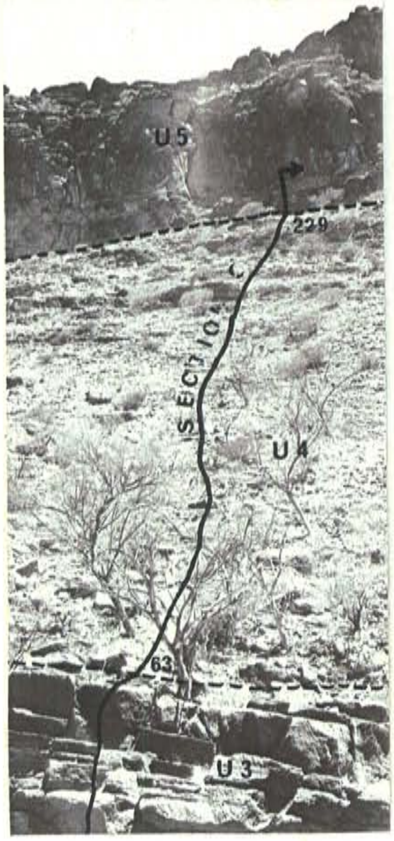
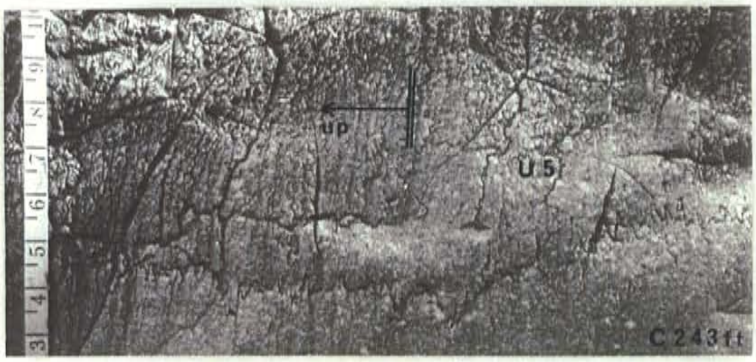
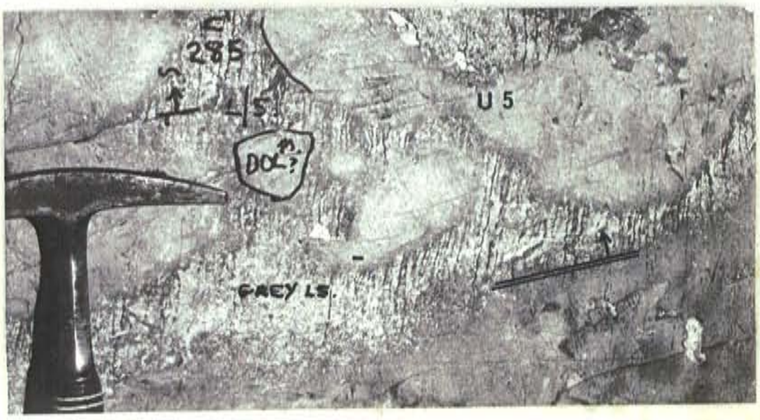

U 5
C 243 ft

PLATE B


U 5
229
U 4
63
U 3


up
U 5
C 243 ft


285
L/S
DOL?
U 5
GREY LS.

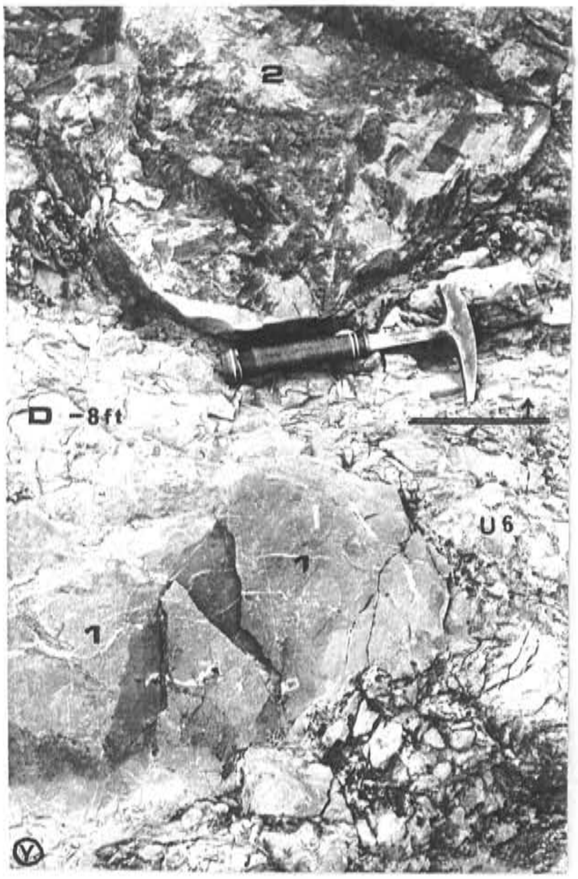
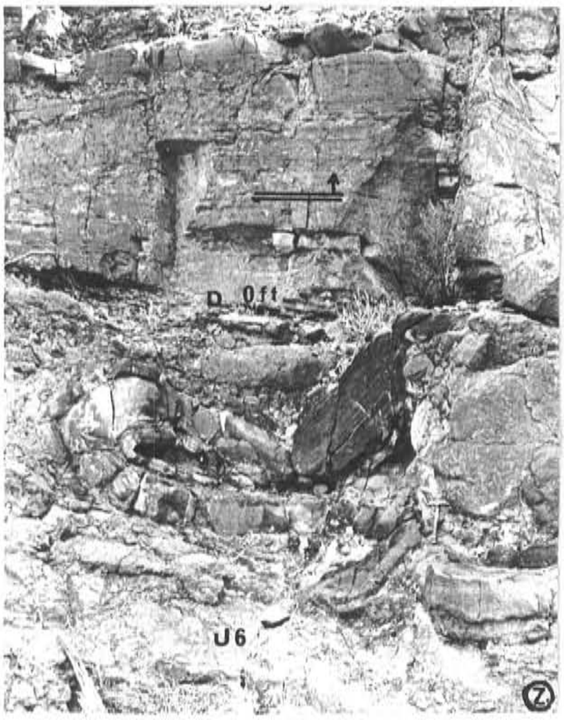
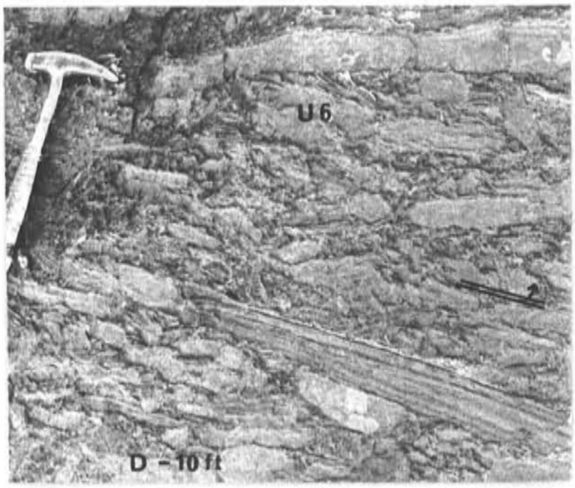
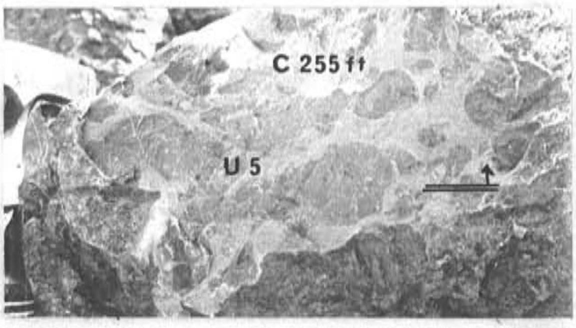
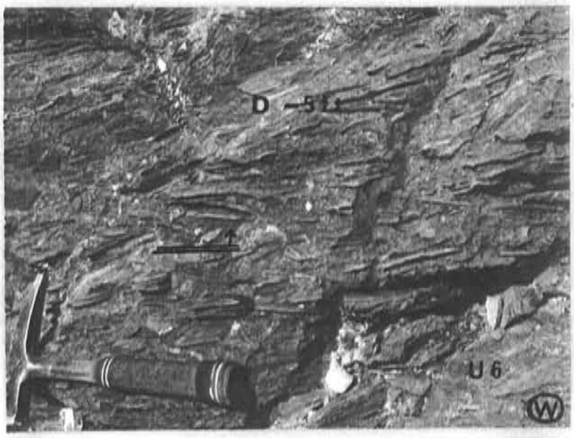


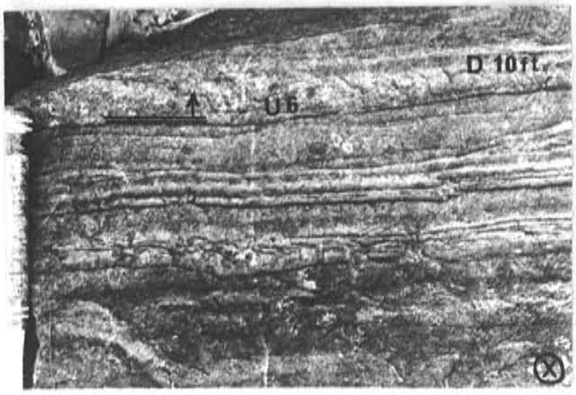
PLATE C •

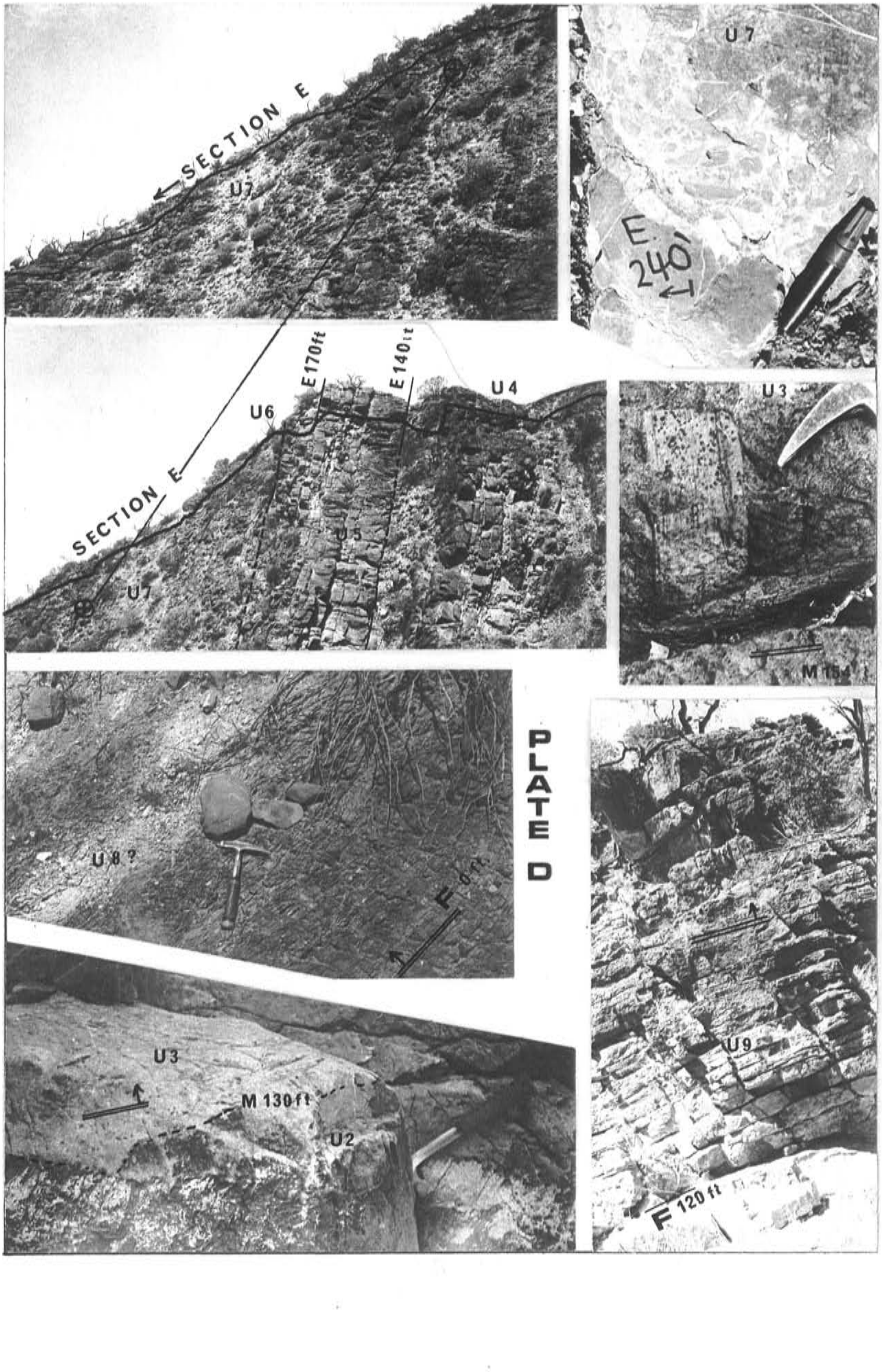











SECTION E
U7
E
240
U6
E 170 ft
E 140 ft
U4
U3
U5
M 154
PLATE D
U 8 ?
F 0 ft
U3
M 130 ft
U2
U9
F 120 ft

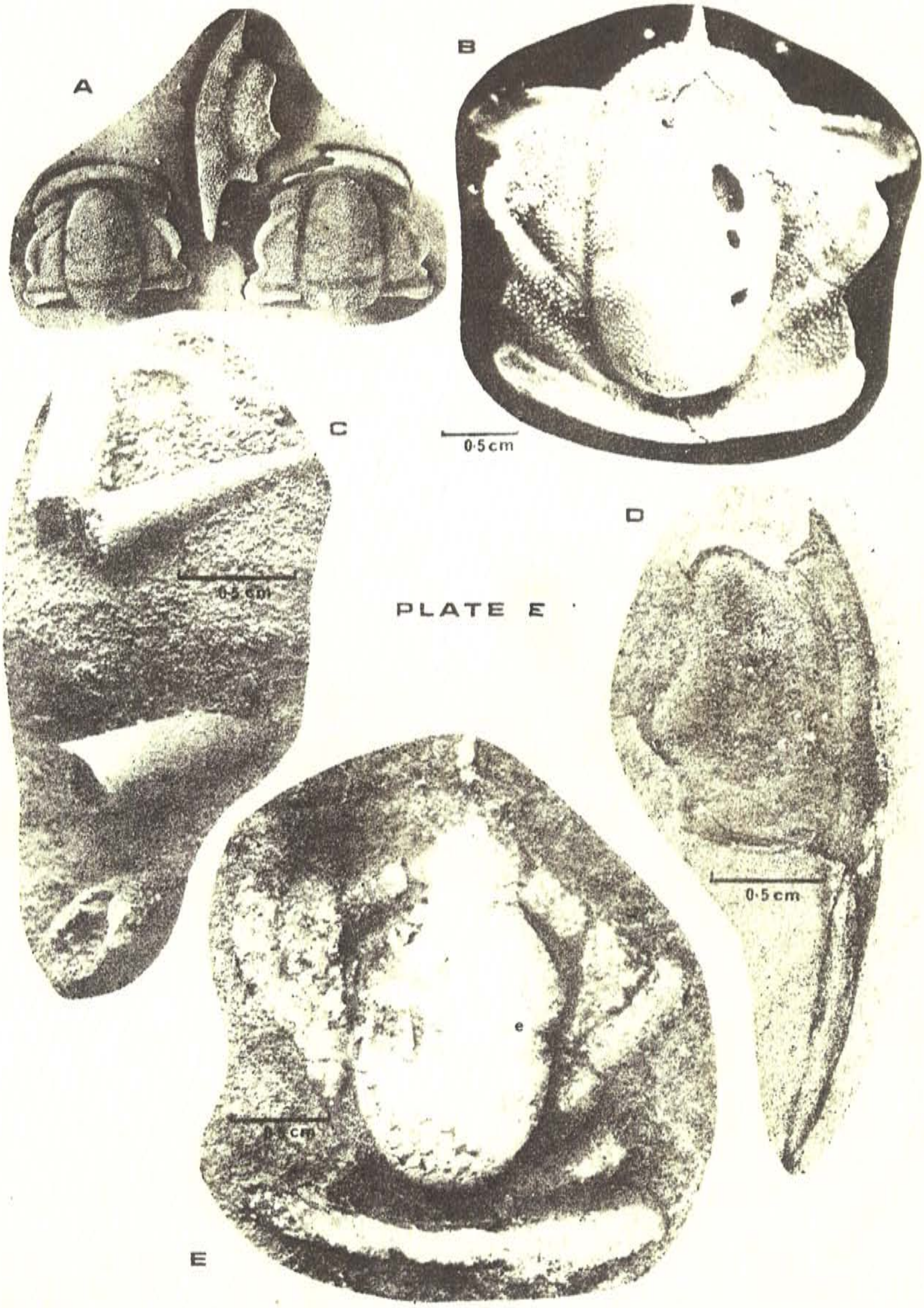


PLATE E