NEWMAN

AUSTRALIA 1:250 000 GEOLOGICAL SERIES — **GEOLOGICAL SURVEY OF WESTERN AUSTRALIA** — **SHEET SF 50-16**

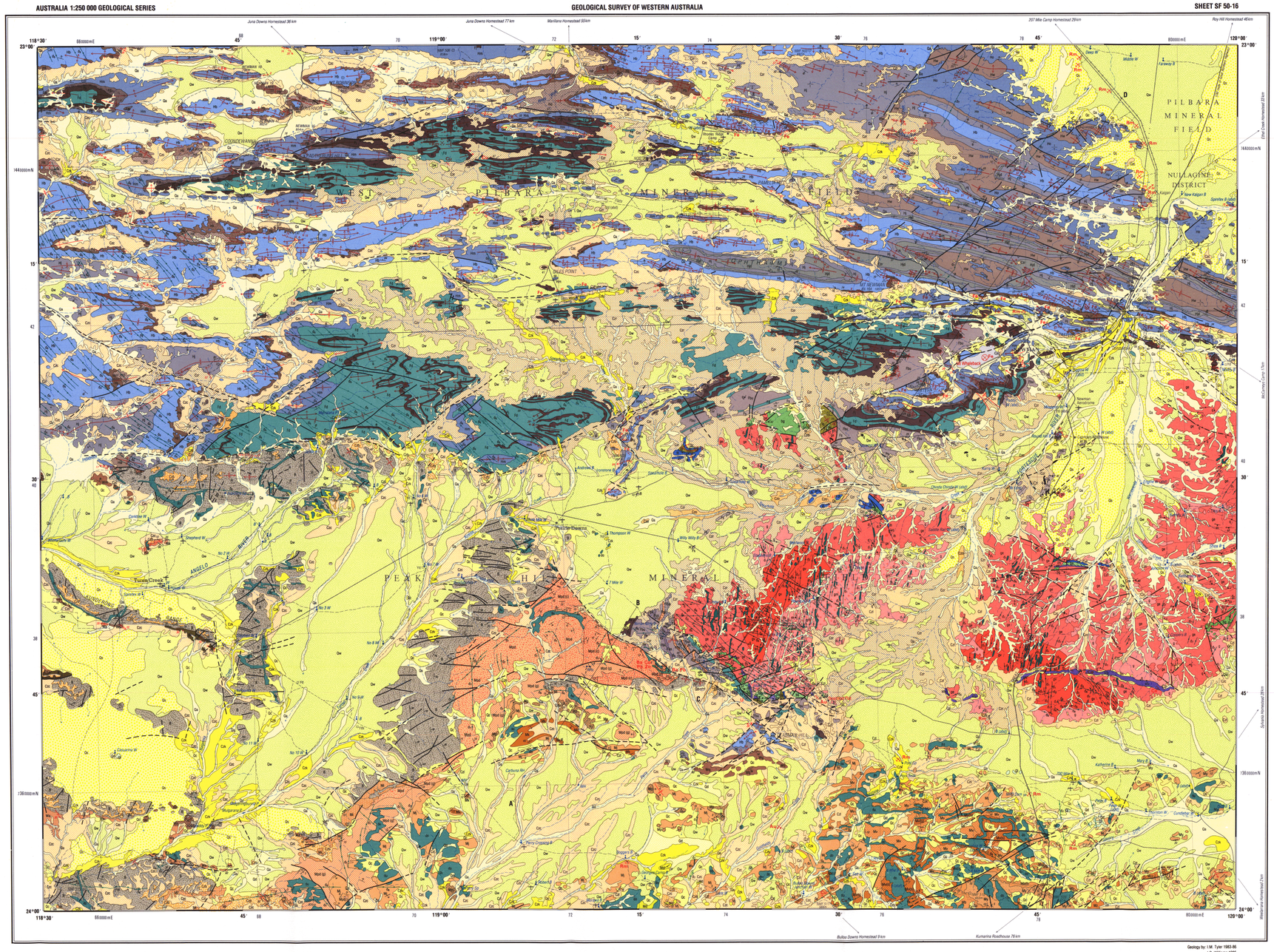
SYMBOLS

- Geological boundary
- Fault
  - accurate
  - normal
  - reverse
  - concealed
  - shear zone
- Folds, showing direction of plunge
  - anticline
  - syncline
  - overturned anticline
  - overturned syncline
  - minor anticline
  - minor syncline
  - locality of superimposed folds
  - pre-Capricorn Orogeny
    - trend and plunge of small-scale folds
  - Capricorn Orogeny
    - Ophthalmia Fold Belt
      - small-scale folds showing orientation of axial surface, direction of plunge and nature of vergence (Z, S or M)
      - $D1c_1$
        - inclined
      - $D2c_1$
        - inclined
        - vertical
        - plunge of $D2c_1$ fold axis
    - Ashburton Fold Belt
      - plunge of minor anticline
      - plunge of minor syncline
  - Late, post-orogenic folds, usually associated with faulting
    - inclined
    - vertical
- Bedding
  - inclined
  - vertical
  - strike and dip of overturned strata
  - dip estimated from aerial photographs
    - horizontal
    - 0°-15°
    - 15°-45°
    - 45°-90°
    - vertical
  - general trend of bedding
- Younging
  - top of bed
  - pillow lava
- Foliation, gneissic banding
  - inclined
- Foliation, metamorphic
  - pre-Capricorn Orogeny
    - inclined
    - vertical
  - Capricorn Orogeny
    - inclined
    - vertical
    - general trend of foliation
- Cleavage, slaty or spaced
  - Capricorn Orogeny
    - Ophthalmia Fold Belt
      - inclined
      - vertical
      - showing trend and plunge of bedding-cleavage intersection
    - Ashburton Fold Belt
      - inclined
- Lineation
  - Capricorn Orogeny
    - Ashburton Fold Belt
      - trend and plunge
- Stromatolite locality
- Isotopic age determination site

- Mineral field boundary
- Highway with national route marker
- Formed road
- Track
- Railway with siding — Kagan
- Townsite, pop. 1 000-10 000 — NEWMAN
- Homestead — Prairie Downs
- Building
- Yard
- Airfield
- Landing ground
- Horizontal control, major, minor

- Watercourse, intermittent
- Pool
- Well — W
- Bore — B
- Windpump
- Rockhole — RH
- Waterhole — WH
- Spring — Sp
- Abandoned — (abd)
- Position doubtful — (PD)

- Mine, opencut or quarry
  - major
  - minor
- Alluvial workings
- Prospect
- Made ground, mining area
- Petroleum exploration well, dry, abandoned
- Mineral occurrence
  - Barite — Ba
  - Copper — Cu
  - Crocidolite — Ad
  - Chrysoprase — Ce
  - Gold — Au
  - Iron — Fe
  - Lead — Pb
  - Ochre — Oc
  - Uranium — U
  - Zinc — Zn
  - Road metal — Rm



Geology by: I.M. Tyler 1983-86
I.R. Williams 1986
W.M. Hunter 1986

REFERENCE

PHANEROZOIC — CAINOZOIC — QUATERNARY

- Qa, Ql, Qd, Qs — Alluvium — unconsolidated silt, sand and gravel; Lacustrine deposits — clay, silt, saline in part; Mixed lacustrine and eolian deposits — clay, silt, sand; Eolian sand — in sheets and dunes
- Qb, Qw, Qc, Qe — Qb: Elurium — gilgai, swelling clay soils; Qw: Alluvium and colluvium — red-brown sandy and clayey soil; Qc: Colluvium — unconsolidated quartz and rock fragments in soil; Qe: Colluvium and eluvium — clay hardpan
- Czc, Czb, Czl, Czr, Czp, Czk, Czo
  - Czc: Colluvium — partly consolidated valley-fill deposits
  - Czb: Silcrete — siliceous duricrust
  - Czl: Laterite — massive and pisolitic ferruginous duricrust
  - Czr: Laterite,includes surficial hematite-goethite deposits on banded iron-formation; forms Hamersley Surface
  - Czp: **ROBE PISOLITE** — pisolitic limonite deposits developed along old river channels
  - Czk: Calcrete — sheet carbonate usually formed in major drainage lines
  - Czo: Opaline silica — vuggy white opaline silica developed within calcrete and on partially consolidated valley-fill
- q: Quartz veins; $d_{1,2}$: Dolerite and metadolerite dykes; numbers identify different swarms, lowest number oldest
- Do: Dolerite — in sills and small intrusions

PROTEROZOIC

- Collier Subgroup
  - Mc: **ILGARARI FORMATION:** shale, some manganiferous; siltstone, claystone, fine-grained sandstone; minor chert
  - Mcy: **CALYIE FORMATION:** quartz arenite; flaggy to massive pebbly sandstone, minor conglomerate, siltstone and shale
  - Mb, Mb(f): **BACKDOOR FORMATION:** shale, siltstone, minor fine-grained sandstone, dolomite and chert; Silicified marker horizon
- Bangemall Group — Edmund Subgroup (c. 1100 Ma)
  - Mv, Mv(s): **DEVIL CREEK FORMATION:** laminated and massive dolomite, interbedded shale, dolomitic breccia, chert and siltstone; Shale, siltstone
  - Md: Black chert, banded chert; may be a correlate of DISCOVERY CHERT
  - Mj: **JILLAWARRA FORMATION:** shale, siltstone, minor sandstone, chert, claystone
  - Mk: **KIANGI CREEK FORMATION:** quartz arenite, pebbly sandstone, minor conglomerate, siltstone
  - Mp: **CHEYNE SPRINGS FORMATION:** dolomite, dolosiltite, dolomitic breccia
  - Mpd: **PRAIRIE DOWNS FORMATION:** quartz arenite, quartz wacke, pebbly sandstone, interbedded conglomerate; Mpd(c): Boulder conglomerate interbedded coarse-grained sandstone; Mpd(d): Dolomite; Mpd(g): Medium-grained glauconitic sandstone, siltstone, shale
  - Mi: **IRREGULLY FORMATION:** dolomite, dolosiltite, chert
- Bangemall Group — Bangemall Subgroup (c. 1500 Ma)
  - B: Boulder conglomerate, conglomeratic sandstone, pebbly sandstone, interbedded fine sandstone and mudstone
  - **CAPRICORN FORMATION:** fine- to medium-grained sandstone, siltstone and mudstone
- Wyloo Group (c. 2000 Ma)
  - Wo: Unassigned; dolomite, usually stromatolitic
  - Wa: **ASHBURTON FORMATION:** mudstone interbedded with sandstone and dolomite; intruded by dolerite sills
  - Wm: **MOUNT McGRATH FORMATION:** coarse sandstone
  - Wq: **BEASLEY RIVER QUARTZITE:** fine- to coarse-grained sandstone; may be silicified
- Turee Creek Group
  - Tu: Undifferentiated; mudstone
  - Ro: **BOOLGEEDA IRON FORMATION:** fine-grained, finely laminated, dark grey-brown to black, flaggy iron-formation; minor chert, jasplite and shale
  - Hw: **WONGANIRA VOLCANICS:** quartz- or feldspar-phyric rhyolite and rhyodacite as sills or flows; tuff and minor jaspilitic banded iron-formation (2470 ± 30 Ma, U-Pb; 2370 Ma, Rb-Sr)
- Hamersley Group
  - Pj: **WEELI WOLLI FORMATION:** interlayered banded iron-formation and metadiabase sills, minor shale; Pjd: Medium- to coarse-grained massive grey-green metadolerite sills, usually foliated
  - Hb: **BROCKMAN IRON FORMATION:** banded iron-formation, chert and minor shale (2490 ± 20 Ma, U-Pb)
  - Hn: **MOUNT McRAE SHALE** and **MOUNT SYLVIA FORMATION:** interbedded shale, chert and banded iron-formation
  - Hd: **WITTENOOM DOLOMITE:** dolomite; interbedded thin chert, shale and dolomite in upper part
  - Hm: **MARRA MAMBA IRON FORMATION:** chert, ferruginous chert and banded iron-formation with minor shale
  - Fd: Metadolerite sills intruded into Fortescue Group; medium- to coarse-grained, massive grey-green rock, usually foliated
- Fortescue Group (2500 Ma)
  - Jf: **JEERINAH FORMATION:** interbedded mudstone, siltstone and chert with minor felsic tuff, dolomite and sandstone; Jfp: Metabasalt; pillows locally well developed
  - Fbu: Upper mafic volcanic unit; metabasalt with minor metadiorite sills
  - Fbs: Spinifex-textured komatiitic metabasalt, ultramafic schist
  - Fus: Serpentinite
  - Fbp: Felsic pyroclastic unit; felsic metatuff with minor banded chert
  - Fbl: Lower mafic volcanic unit; interbedded metabasalt and mafic metatuff
  - Fs: Basal metasedimentary unit; phyllite, quartz- muscovite schist, metasandstone and metaconglomerate, minor carbonate
- c. 2750 Ma
- $\approx$ 2750 Ma

ARCHAEAN

- υu_1, υu_2: Serpentinite forming southern ultramafic intrusion; Chalcedonic and opaline silica developed on υu_2
- $A_{1,2}$: Metadiorite and amphibolite dykes
- g: Granitoid rocks, undifferentiated, deeply weathered
- gp: Medium, even-grained, metagranite to metagranodiorite
- gv: Medium-grained, metagranite to metagranodiorite with sparse feldspar phenocrysts
- go: Mesocratic to melanocratic metamorphosed to metaquartz-diorite, coarse cumulate phase locally present
- gm: Mixed granitoid unit; extensive veins and patches of gp and gv intrude into a strongly foliated or banded metagranite to metagranodiorite
- la: Quartz-muscovite schist
- lq: Interbedded chert, fuchsitic metaquartzite, minor pelitic and semi-pelitic schist
- i: Chert and banded iron-formation, undifferentiated
- ic: Grey and white banded chert
- ih: Hematite-magnetite-quartz banded iron-formation
- im: Magnetite-quartz banded iron-formation; recrystallized, higher grade equivalent of ih
- ba: Amphibolite; fine-, medium- and coarse-grained varieties derived from extrusive and intrusive rocks
- bg: Metagabbro; medium- to coarse-grained
- us: Serpentinite; cumulate textures may be preserved
- ua: Tremolite-chlorite-talc schist

BANGEMALL BASIN — **BREMAN BASIN** — **ASHBURTON BASIN** — **HAMERSLEY BASIN** — **SYLVANIA INLIER**

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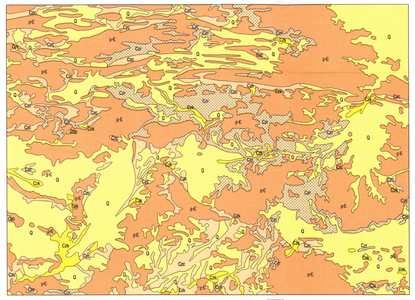
(The mean declination varies with the seasons. TBD = means declination is east and correction must be added to compass bearing to give true bearing. – means declination is west and correction must be subtracted from compass bearing to give true bearing.)

Annual change is ~1' westerly.

CAINOZOIC GEOLOGY



- Q — Alluvium and colluvium, lacustrine deposits, eolian sand
- Czc — Colluvium — partly consolidated
- Czr — Laterite, silcrete, opaline silica
- Czk — Calcrete
- Czp — ROBE PISOLITE
- pЄ — Rock outcrop

SCALE 1:1 000 000 — 0 10 20 30 40 50 Kilometres

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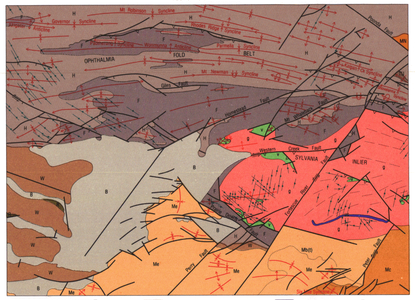
OF WESTERN AUSTRALIA

SCALE 1:250 000

5000 0 5 10 15 20 25 30
Metres — Kilometres

TRANSVERSE MERCATOR PROJECTION
ZONE 50 AUSTRALIAN MAP GRID

TECTONIC SKETCH MAP



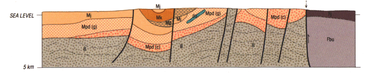
- Mc, Mcy — Collier Manganese Subgroup; Me — Edmund Subgroup — BANGEMALL BASIN
- B — BRESNAHAN BASIN
- B — BLAIR BASIN
- Wa — ASHBURTON BASIN
- Tu — Turee Creek Group; H — Hamersley Group; F — Fortescue Group — HAMERSLEY BASIN
- υ — Southern ultramafic intrusion; g — Granitoid; v — Greenstone belt — SYLVANIA INLIER
- Wrench fault
- Marker horizon

SCALE 1:1 000 000 — 0 10 20 30 40 50 Kilometres

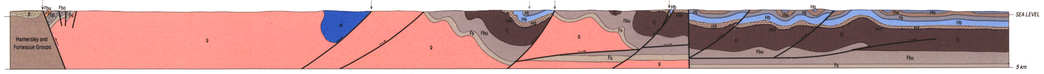
DIAGRAMMATIC SECTIONS

NATURAL SCALE

SECTION A-B



SECTION C-D



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