a. Typical medium beds in an outcrop of limestone lithofacies in the Thumb Mountain Formation at 92°50' longitude and 76°22' latitude between Sections 5 and 7.

b. A peritidal sequence 160 feet above the base of Section 9 with brown, mudcracked, intertidally deposited beds (I) overlying thicker, grey subtidally deposited beds (S) as indicated by arrows. This and similar peritidal sequences form the upper parts of dolomite pods in the dolomite lithofacies of the Thumb Mountain Formation.

c. Photomicrograph of disoriented skeletal debris 36 feet above the base of the Irene Bay Formation in Section 7. This debris has been churned and comminuted by burrowers to produce a fabric similar to that of the limestone lithofacies of the Thumb Mountain Formation. Crinoids (C), ostracodes (O), brachiopods (B) and gastropods (G) predominate.

d. Photomicrograph of dasycladacean algae from the limestone lithofacies of the Thumb Mountain Formation.

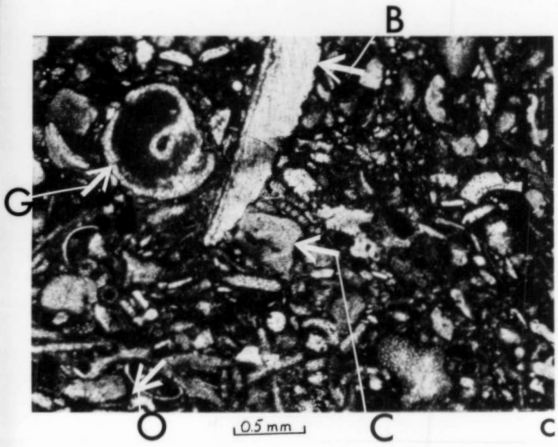

Plate 1. Outcrop and fauna of the Thumb Mountain and Irene Bay Formations

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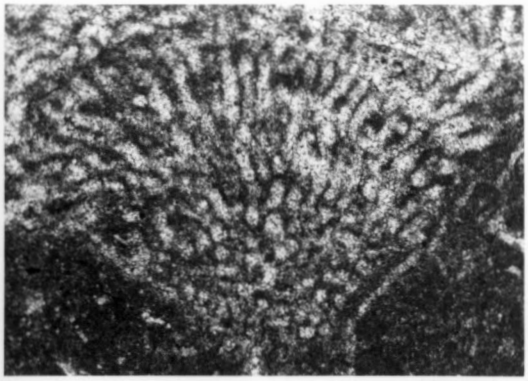
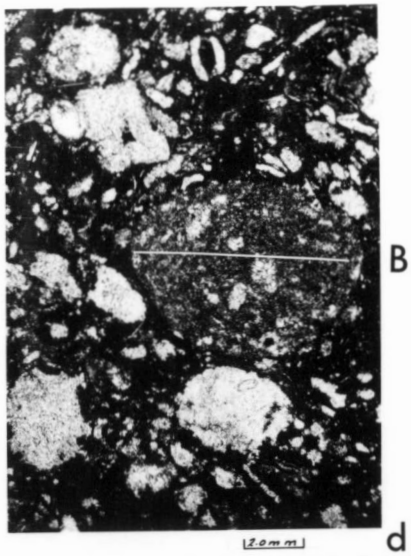
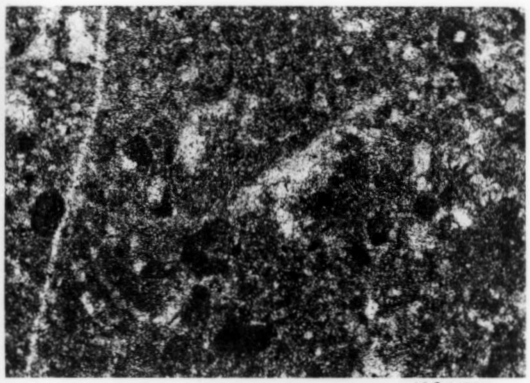
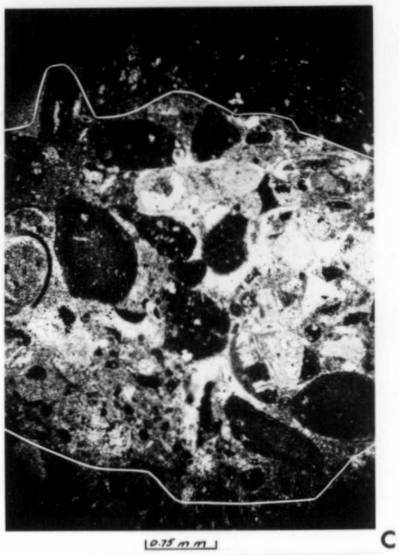








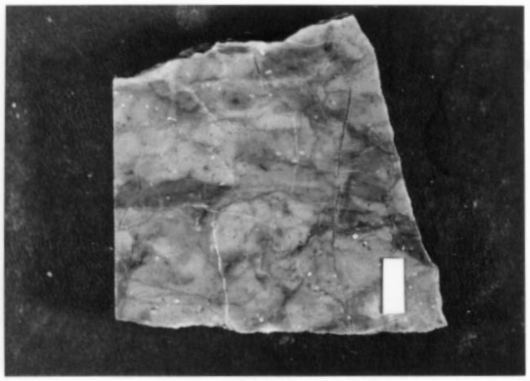
a. Photomicrograph of *Garwoodia*, a variety of Codiacean algae in the limestone lithofacies, 391 feet above the base of Section 9.

b. Photomicrograph of pellets in the limestone lithofacies 340 feet above the base of Section 9.

c. Photomicrograph of intraclasts within a burrow in the limestone lithofacies 340 feet above the base of Section 9. Burrow walls are outlined.

d. Photomicrograph displaying the cross-section of a slightly recrystallized burrow (B) in the limestone lithofacies 302 feet above the base of Section 9.

Plate 2. Fauna and non-skeletal grains in the Thumb Mountain Formation



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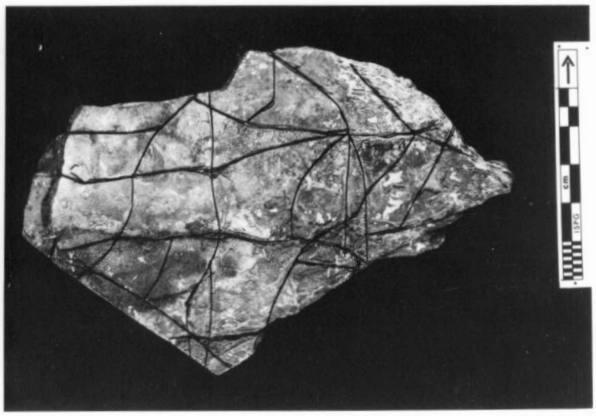


c

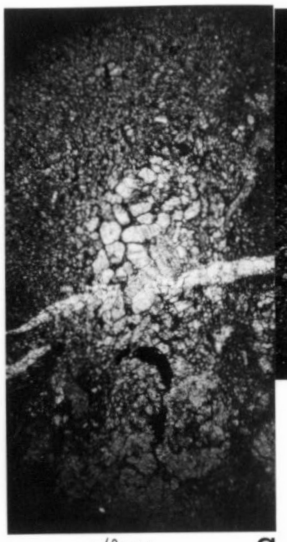
a. Polished slab of burrow-mottled grey biopelmicrite from the limestone lithofacies at 430 feet above the base of Section 8.

b. Photomicrograph of calcite pseudomorphous after blades of selenite oriented perpendicular to bedding in a graded bed of intrapelsparite. This occurs in an intertidal sequence in the dolomite lithofacies 50 feet above the base of Section 9.

c. Mudcracks on the upper bed surface of a platy slab from the intertidal part of the peritidal sequence displayed in Plate Ib.

d. Polished slab of light brownish grey, finely crystalline dolomite with bird's eye structure (B) 214 feet above the base of Section 9. Dark seams parallel to bedding are limonitic.

Plate 3. Sedimentary structures in the Thumb Mountain Formation



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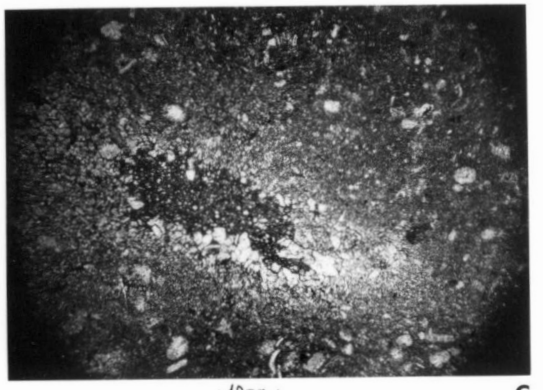


c

d

a. Photomicrograph of a possible burrow cross-section that has recrystallized to microspar at 210 feet above the base of Section 8 in the limestone lithofacies of the Thumb Mountain Formation.

b. Photomicrograph of finely crystalline dolomite along a solution seam in the limestone lithofacies at the top of the Thumb Mountain Formation in Section 7.

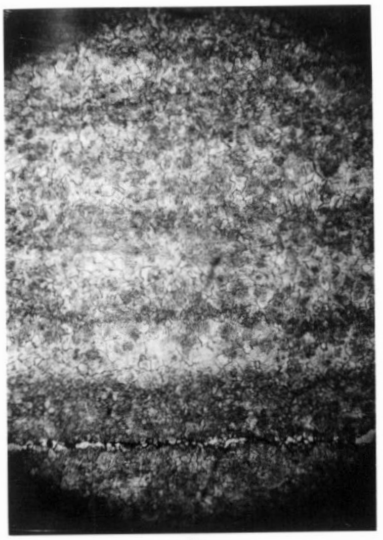
c. Photomicrograph of a dolomitized burrow surrounded by a halo of microspar in the limestone lithofacies of the Thumb Mountain Formation 205 feet above the base of Section 8.

d. Massive beds of subtidally deposited medium brown dolomite in the massive-bedded lithofacies of the Allen Bay Formation 425 feet above the base of Section 1.

e. Massive bedded dolomitized stromatoporoid biolithite in the massive-bedded lithofacies of the Allen Bay Formation 1,711 feet above the base of Section 9. Stromatoporoids (S) weather white.

Plate 4. Diagenetic features of the Thumb Mountain Formation and outcrop of the Allen Bay Formation

a



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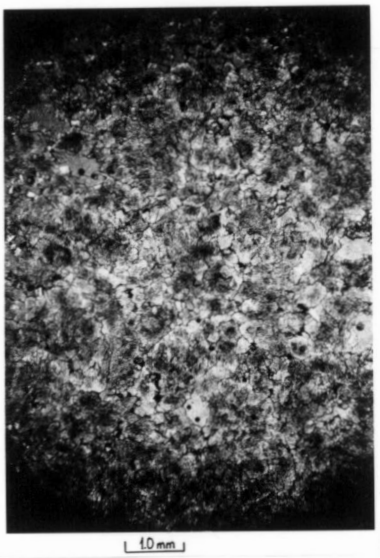


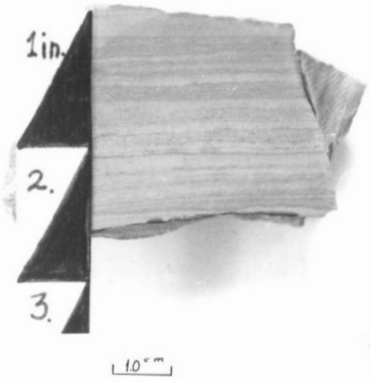
b

a. Thin, wavy light brown stromatolitic beds in the medium-bedded lithofacies at 1,625 feet above the base of Section 7.

b. Photomicrograph of pellet and intraclast remnants in medium crystalline dolomite in the massive-bedded lithofacies at 1,425 feet above the base of Section 7.

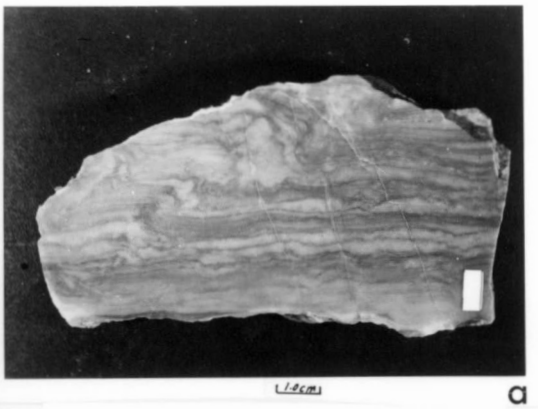
c. Polished slab of intertidally deposited laminite formed of interlaminated, dolomitized dark grey pelmicrite and light grey intrapelsparite from the medium-bedded lithofacies at 1,486 feet above the base of Section 1.

d. Photomicrograph of specimen in Plate Vc, displaying pellet and intraclast remnants that form the laminae.



c

Plate 5. Sedimentary structures and grain remnants in the Allen Bay Formation



a

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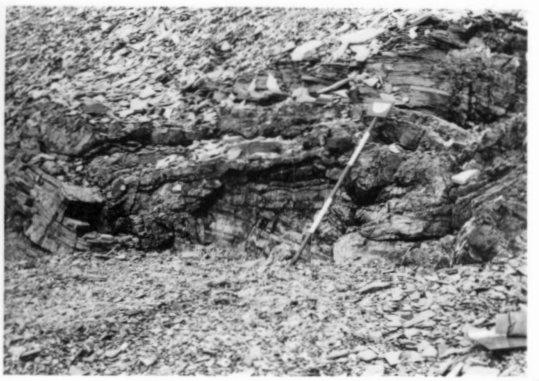


c

d

a. Polished slab of a possible algal mat overfold in laminated dolomite from the medium-bedded lithofacies of the Allen Bay Formation at 2,048 feet above the base of Section 9.

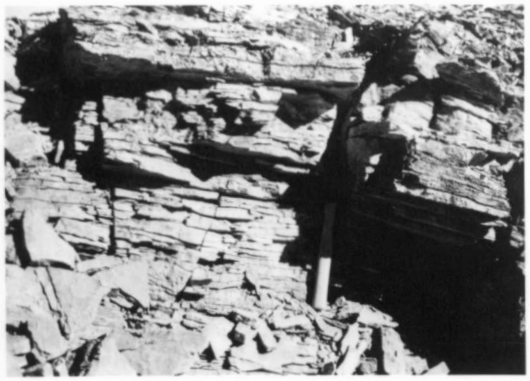
b. Photomicrograph of calcite shown by arrow replacing dolomite in coarsely crystalline dolomite from the massive-bedded lithofacies of the Allen Bay Formation 2,074 feet above the base of Section 2.

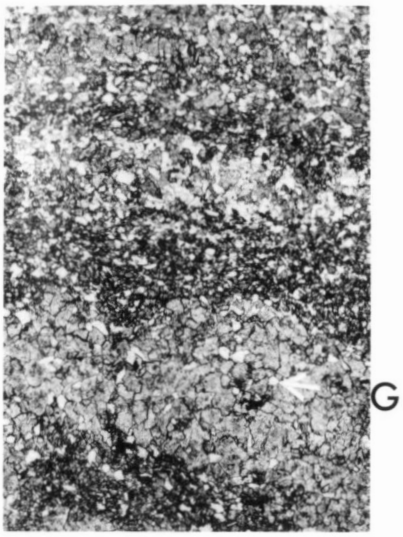
c. Large slump fold in the shaly greenish grey limestone of the Cape Phillips Formation on Shiells Peninsula at 95°10' longitude and 76°13' latitude.

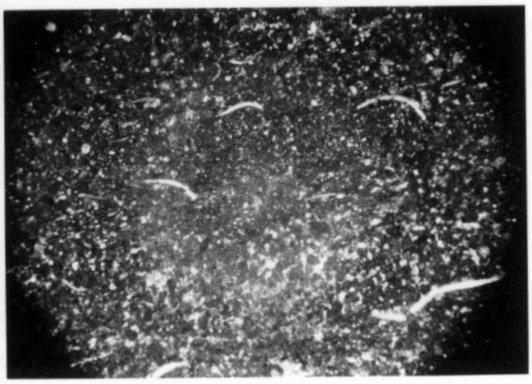
d. A large allochthonous limestone block within shaly limestone of the Cape Phillips Formation on Shiells Peninsula at 95°10' longitude and 76°13' latitude.

e. Large-scale crossbeds , outlined by black lines, in lenticularly bedded, greyish yellow partly dolomitized biopelmicrite from the dolomitic pelmicrite lithofacies of the Cape Storm Formation 919 feet above the base of Section 3.

Plate 6. Structures and diagenetic features in the Allen Bay Formation. Structures in the Cape Phillips and Cape Storm Formations







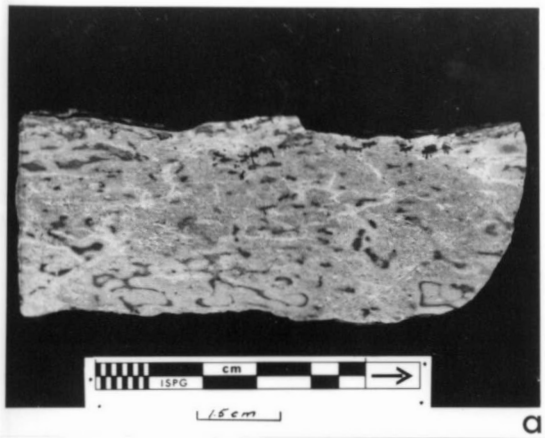
a. A thin and medium bedded intertidally deposited grey pelmicrite sequence in the dolomitic pelmicrite lithofacies 3,464 feet above the base of Section 7.

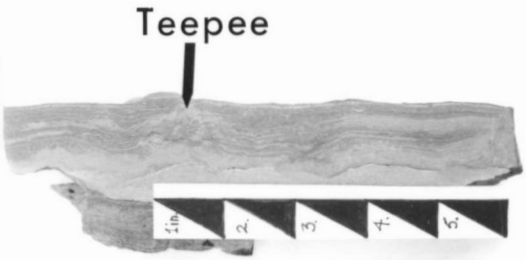
b. Thick and massive bedded subtidally deposited dark grey beds of intrapelsparite in the limestone intraclast lithofacies 2,578 feet above the base of Section 7.

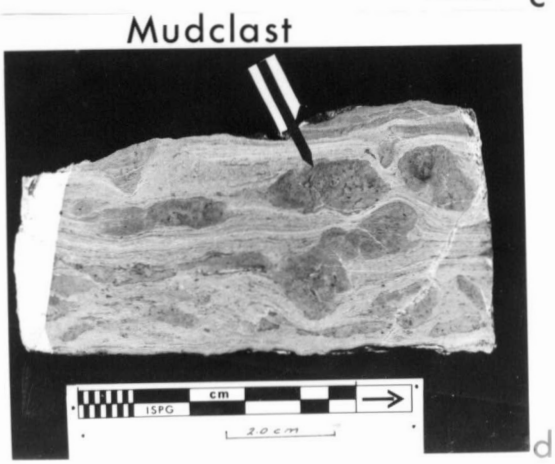
c. Photomicrograph of silty, packed fossiliferous pelmicrite with disarticulated ostracode shells in the dolomitic pelmicrite lithofacies 3,842 feet above the base of Section 7.

d. Photomicrograph of silty, interlaminated very finely and medium crystalline dolomite in the dolomitic pelmicrite lithofacies, 1,151 feet above the base of Section 3.

Plate 7. Outcrop and petrography of the Cape Storm Formation







a. Polished slab of burrowed yellow silty dolomicrite from the dolomitic pelmicrite lithofacies 2,677 feet above the base of Section 9. Reddish brown limonite stain defines the burrows.

b. Bedding plane view of thin, greyish yellow mudcracked dolomite beds in the dolomitic pelmicrite lithofacies 4,558 feet above the base of Section 1.

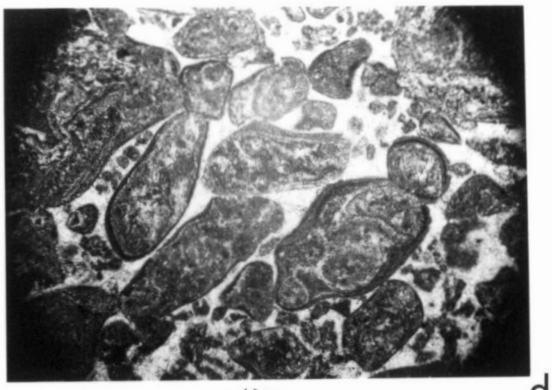
c. Polished slab of finely algal laminated, light greenish yellow dolomicrite from the dolomitic pelmicrite lithofacies 4,171 feet above the base of Section 1. These laminations are crinkled and commonly deformed into small teepee structures.

d. Polished slab with mudclasts of grey biomicrite set in a matrix of yellow dolomicrite from the dolomitic pelmicrite lithofacies 2,643 feet above the base of Section 9. This may be a storm deposit of eroded mudclasts.

e. Polished slab of grey mudcracked biomicrite from the dolomitic pelmicrite lithofacies 2,466 feet above the base of Section 9. Yellow dolomicrite has infiltrated the shrinkage cracks.

Plate 8. Sedimentary structures in the Cape Storm Formation

a



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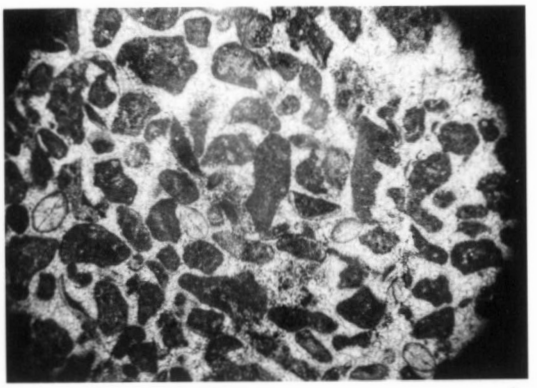

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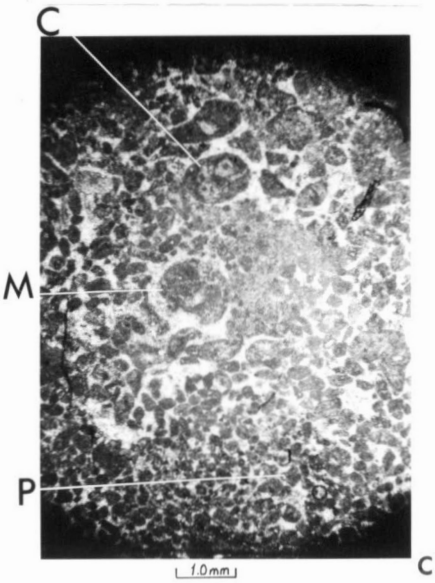


c

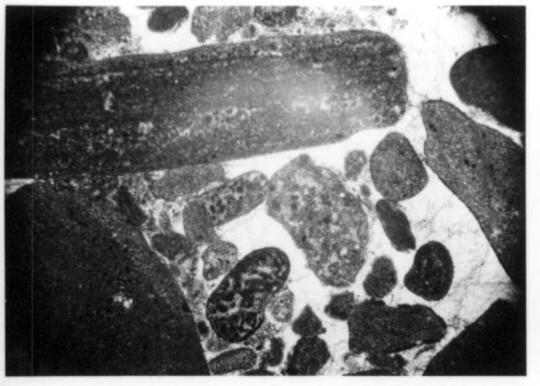
a. Stromatoporoid in a massive bed in the limestone intraclast lithofacies 2,674 feet above the base of Section 7.

b. Photomicrograph of ostracode-bearing biointrasparite with grapestone-like intraclasts in the limestone intraclast lithofacies 3,192 feet above the base of Section 7.

c. Photomicrograph of intrapelsparite containing compound grains (c), mud lumps (m) and pellets (p) from the limestone intraclast lithofacies 2,921 feet above the base of Section 7.

d. Photomicrograph of intrasparite containing oolitically coated botryoidal grains from the limestone intraclast lithofacies 2,869 feet above the base of Section 7.

Plate 9. Outcrop and non-skeletal grain types of the Cape Storm Formation



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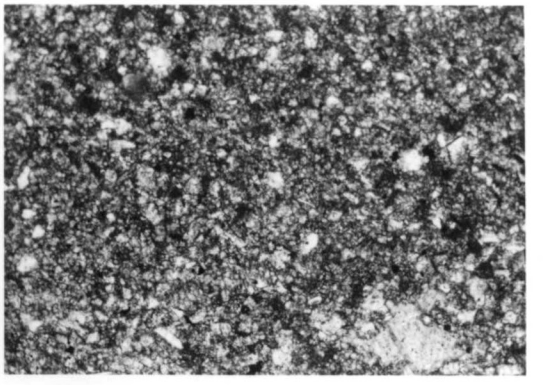

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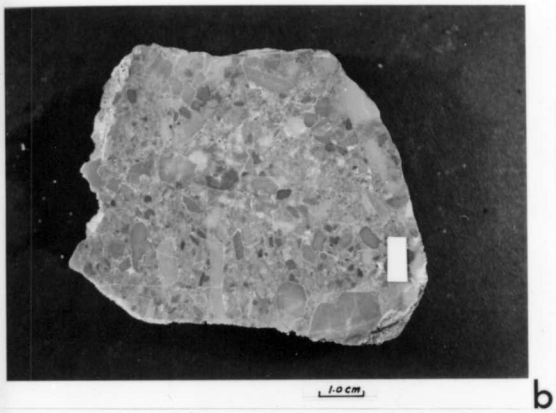

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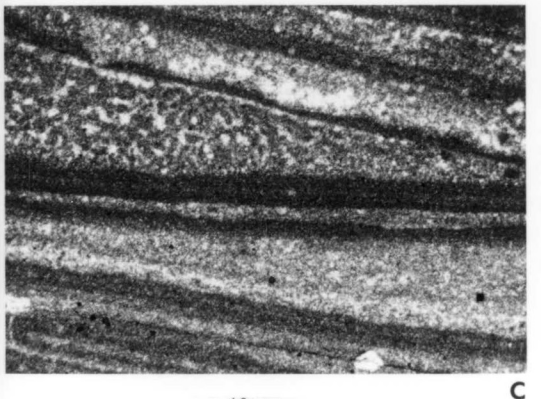

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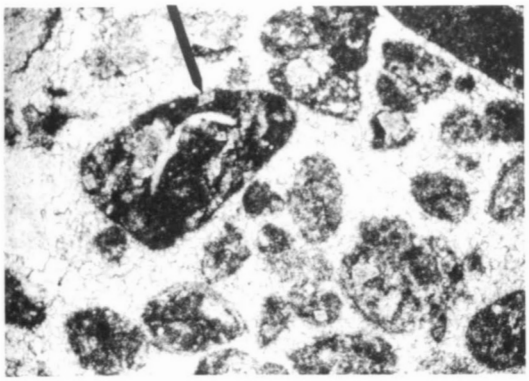
a. Photomicrograph of intrasparite containing large tabular clasts of laminated beachrock from the limestone intraclast lithofacies 3,406 feet above the base of Section 1.

b. Polished slab of the same intrasparite specimen shown in Plate Xa.

c. Photomicrograph of algal laminations enclosing lenticles of pelsparite from the stromatolite lithofacies 2,326 feet above the base of Section 9.

d. Photomicrograph of pellets that have been partly replaced by finely crystalline dolomite in the dolomitic pelmicrite lithofacies 4,441 feet above the base of Section 7. Dolomite has replaced interpellet material.

Plate 10. Non-skeletal grain types and structures in the Cape Storm Formation



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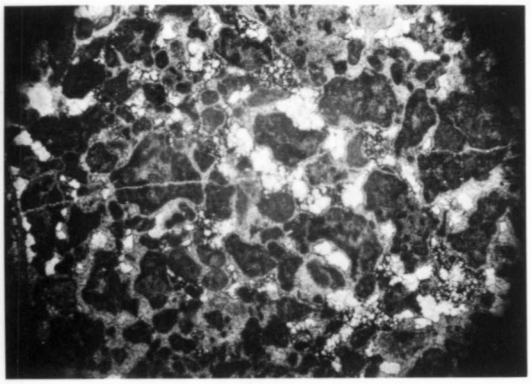

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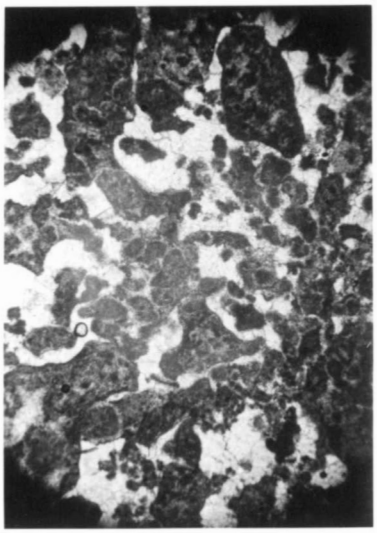

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a. Photomicrograph of slightly dolomitized intrasparite from the limestone intraclast lithofacies of the Cape Storm Formation 2,643 feet above the base of Section 7. Note truncation of dolomite rhombs at the edges of some intraclasts as indicated by the arrow.

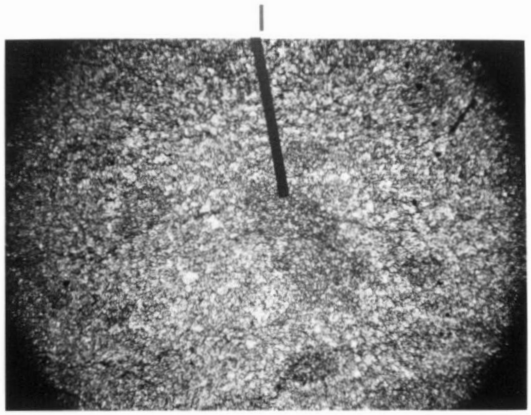
b. Photomicrograph of intrasparite from the limestone intraclast lithofacies of the Cape Storm Formation 2,711 feet above the base of Section 7. Dolomite (D) has partly replaced the spar cement. Note clear calcite rinds around intraclasts.

c. Photomicrograph of intrasparite from the limestone intraclast lithofacies of the Cape Storm Formation 3,066 feet above the base of Section 7. Note the caries replacement texture of the clear pseudospar.

d. Contact between the thick-bedded Douro Formation and the overlying shaly Devon Island Formation at Section 3. Arrow points to an allochthonous limestone block in the Devon Island beds.

Plate 11. Diagenetic features in the Cape Storm Formation and outcrop of the Douro and Devon Island Formations

a



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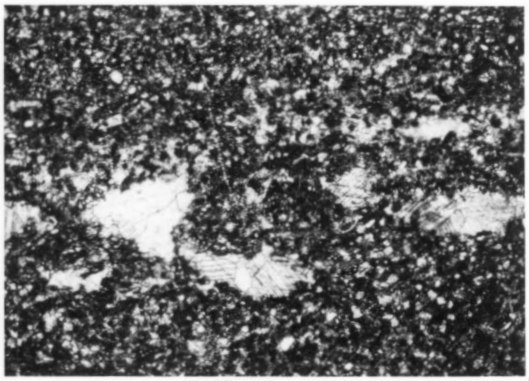

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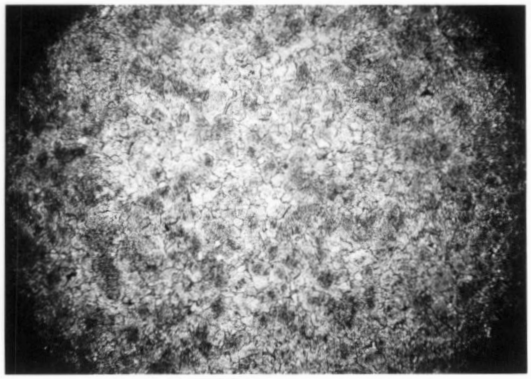


c

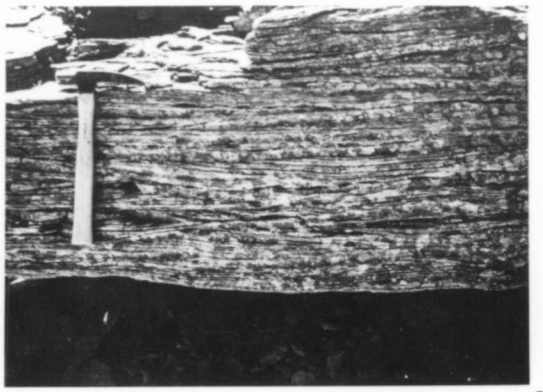
a. Bed surface of a thin, light green slab of biomicrite from the unburrowed dolomitic lithofacies 1,312 feet above the base of Section 5. Atrypellid brachiopods crowd the bed surface.

b. Photomicrograph of silty pelmicrite with laminar fenestrate fabric in the unburrowed dolomitic lithofacies 1,323 feet above the base of Section 3.

c. Photomicrograph of pellet and intraclast remnants in medium crystalline dolomite from the unburrowed dolomitic lithofacies 3,770 feet above the base of Section 8.

d. Photomicrograph of intraclast remnants (I) in finely crystalline dolomite from the unburrowed dolomitic lithofacies 3,790 feet above the base of Section 8.

Plate 12. Fauna, sedimentary structures, and remnants of non-skeletal grains in the Douro Formation



a

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b

c

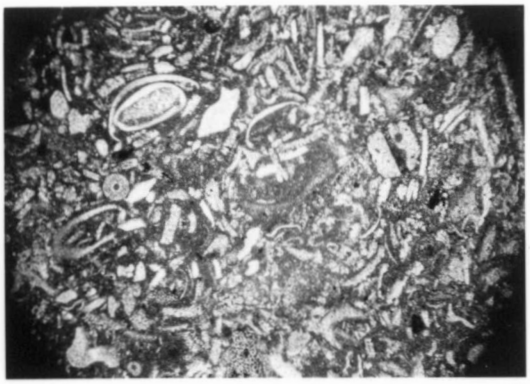
a. Low angle, festoon crossbeds in silty, slightly dolomitized biomicrite in the unburrowed dolomitic lithofacies 6,299 feet above the base of Section 2.

b. View of face from the same outcrop but perpendicular to the face shown in Plate XIIIa. Pick end of hammer points southwest towards the inferred direction of sediment transport.

c. A sequence of thin bedded and laminated, mudcracked dolomitic pelmicrite underlies thin but lumpy bedded, atrypellid-bearing biomicrite in the unburrowed dolomitic lithofacies 1,247 feet above the base of Section 5.

d. Upper bed surface of a slab from the top of the Douro Formation in Section 3. Pyritized fish (F) and cephalopods (C) are abundant on this bed surface.

Plate 13. Outcrop, sedimentary structures and fauna of the Douro Formation



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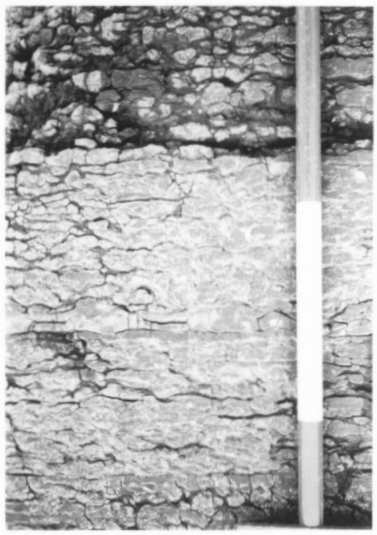

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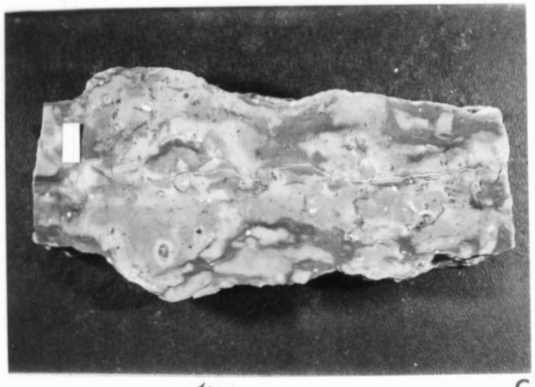

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c

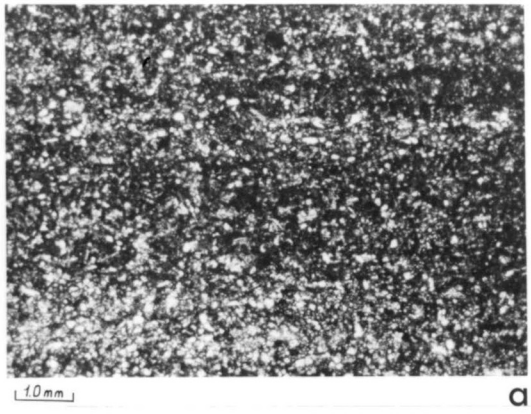
a. Photomicrograph of biogenic material disoriented by burrowers in biopelmicrite from the burrowed limestone lithofacies of the Douro Formation 5,220 feet above the base of Section 7. Ostracodes and crinoids are abundant.

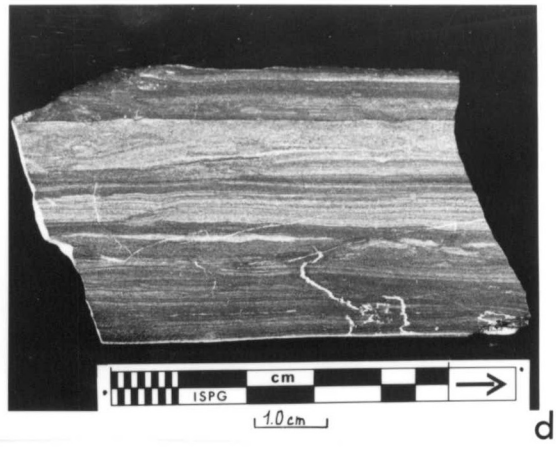
b. The thin, nodular and irregular bedding displayed here in dark green argillaceous biomicrite may result of burrowing. Outcrop of burrowed limestone lithofacies in the Douro Formation 1,489 feet above the base of Section 3.

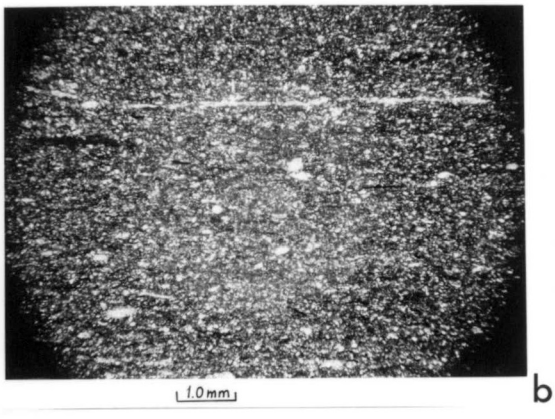
c. Polished slab of burrowed biomicrite from the burrowed limestone lithofacies of the Douro Formation 352 feet above the base of Section 4.

d. Photomicrograph of strongly recrystallized biomicrite from a bed of medium thickness in the Devon Island Formation in the laminated lithofacies 576 feet above the base of Section 4. The abundant brachiopods (B) and crinoids (C) tend to be oriented parallel to bedding.

Plate 14. Fauna and sedimentary structures in the Douro and Devon Island Formations







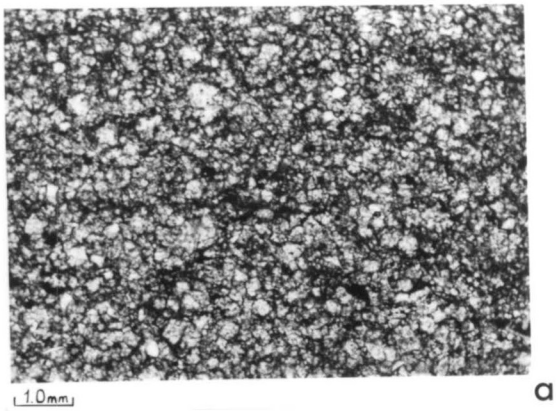
a. Photomicrograph of silty lime grainstone that contains abundant dark brown organic material as wisps oriented parallel to bedding, in the laminated lithofacies 621 feet above the base of Section 4. Variation in quartz silt content between laminae are evident.

b. Photomicrograph of silty lime grainstone in the laminated lithofacies 786 feet above the base of Section 4. Dark brown wisps of sapropelic organic material are abundant.

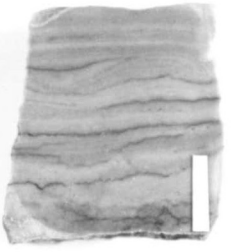
c. Thin bedded, yellow-weathering, silty and organic-rich dolomitic limestone in the laminated lithofacies 2,282 feet above the base of Section 3.

d. Polished slab of organic-rich, silty lime grainstone from the laminated lithofacies 1,051 feet above the base of section 4. Note the crossbedding within and the slightly erosional basal contacts of the silt-rich light laminae.

Plate 15. Outcrop, petrography and sedimentary structures of the Devon Island Formation

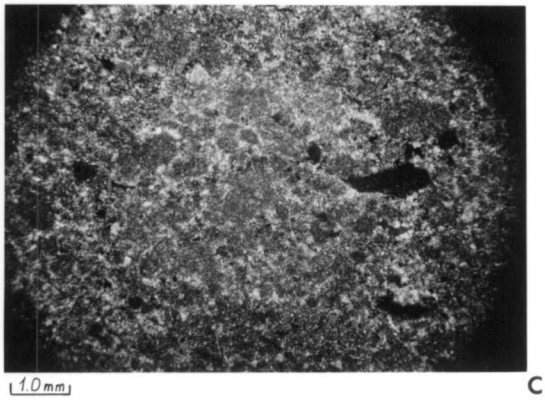


a



d

b



c

a. Photomicrograph of silty, organic-rich dolomite from the upper part of the laminated lithofacies of the Devon Island Formation 1,055 feet above the base of Section 4.

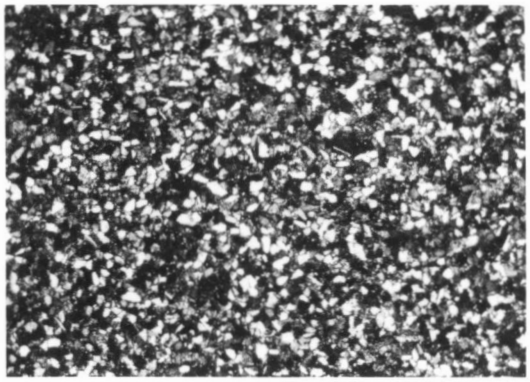
b. View upstream towards the northwest of the contact between argillaceous light green and red thin-bedded dolomite of the Prince Alfred Formation (Dpa) overlying light grey thin-bedded dolomite of the Sutherland River Formation in Section 7.

c. Photomicrograph of pellet and intraclast remnants in dolomite from the fossiliferous dolomite lithofacies of the Sutherland River Formation 165 feet above the base of Section 6.

d. Polished slab of stromatolitic laminations in light grey dolomite from the unfossiliferous dolomite lithofacies of the Sutherland River Formation 5,695 feet above the base of Section 7.

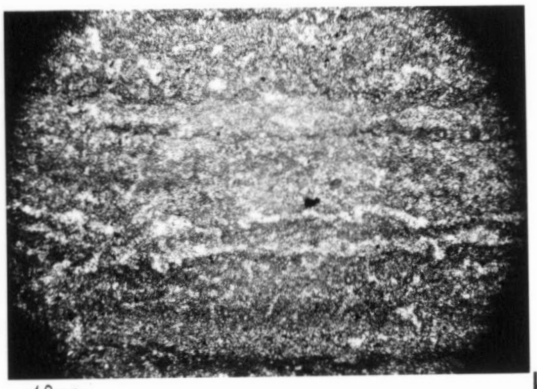
Plate 16. Features of the Devon Island, Sutherland River and Prince Alfred Formations

a



1.0 mm

d



1.0 mm

b

c

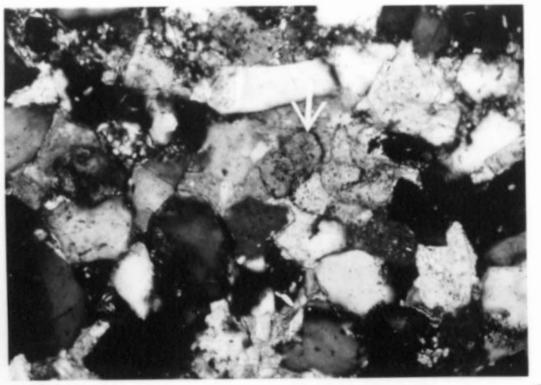
a. Thin and medium bedded, intertidally deposited light grey dolomite in the unfossiliferous dolomite lithofacies of the Sutherland River Formation 60 feet above the base of Section 6.

b. Photomicrograph of fenestrate fabric in finely crystalline dolomite from the unfossiliferous dolomite lithofacies of the Sutherland River Formation 5,695 feet above the base of Section 7.

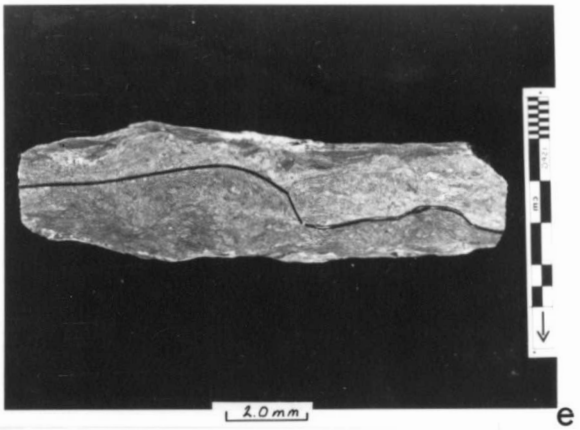
c. View of the northeast side of a 50 foot thick exposure of medium to massive, tabular red beds in the sandstone lithofacies of the Prince Alfred Formation of Section 8. These sheetflood sandstones are separated by thin dark reddish brown mudstone beds as indicated by the arrow.

d. Photomicrograph of typical submature dolomite-cemented fine impure quartzarenite from the sandstone lithofacies of the Prince Alfred Formation 4,519 feet above the base of Section 8. A few microcline grains are scattered throughout.

Plate 17. Outcrop and petrography of the Sutherland River and Prince Alfred Formations

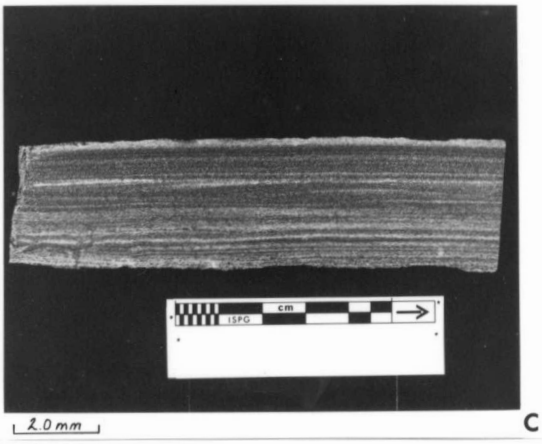


a



e

b



c

d

a. Photomicrograph under crossed nicols of a limonite-coated detrital dolomite grain as shown by arrow in dolomite-cemented fine sandstone from the sandstone lithofacies 4,516 feet above the base of Section 8.

b. A pod of dolomite breccia in a yellow sandstone matrix overlying thin beds of light grey dolomicrite in the silty dolomite lithofacies 5,743 feet above the base of Section 7. Arrow points to a typical dolomite clast.

c. Polished slab of light red laminated fine sandstone from the sandstone lithofacies 4,562 feet above the base of Section 8.

d. Polished slab of light red sandstone with slightly assymetric current ripples on the upper bed surface from the sandstone lithofacies 4,512 feet above the base of Section 8.

e. Polished slab from a thin dark reddish brown clay-rich bed in the sandstone lithofacies 4,627 feet above the base of Section 8. Dark line outlines contortions caused by sheetfloods passing over the bed.

Plate 18. Petrography and sedimentary structures of the Prince Alfred Formation

a

c

b

a. Shallow scour-fill infilled with coarse sand and dark reddish brown mudflake conglomerate in the sandstone lithofacies 4,516 feet above the base of Section 8.

b. Platy fragment of the laminae in the scour-fill shown in Plate XIXa. Note the disc-shaped reddish brown mudflakes as indicated by the arrows.

c. Trough-fill in sheetflood sands in the sandstone lithofacies 4,552 feet above the base of Section 8. Note the continuity of beds in the trough with adjacent beds.

Plate 19. Sedimentary structures in the Prince Alfred Formation

a

Poorly sorted conglomerate at 95°32' longitude 76°25' latitude typical of the Prince Alfred Formation west of Section 8. Arrows point to large clasts of probable lower Paleozoic dolomite and limestone in a sandy dolomite matrix.

b

b. Bedding plane view of discontinuous mudcracks in thin dolomicrite beds of the silty dolomite lithofacies 5,728 feet above the base of Section 7.

Plate 20. Outcrops of the Prince Alfred Formation