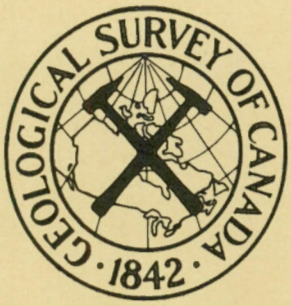

GEOLOGICAL
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DEPARTMENT OF ENERGY,
MINES AND RESOURCES

PAPER 72-15

PALEOZOIC FORMATIONS AND SILURIAN BIOSTRATIGRAPHY, LAKE TIMISKAMING REGION, ONTARIO AND QUEBEC

(Report, 11 figures and 13 plates)

Thomas E. Bolton and M. J. Copeland

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ABSTRACT

Strata of Middle Silurian age from Lake Timiskaming, Ontario and Quebec, contain numerous diverse fossils. One hundred and thirty-five taxa are listed and ninety-three illustrated in this report. Some comparative fossils from Middle Silurian formations of the Michigan Basin are also illustrated. Strata of older Silurian age occur in the subsurface of the Lake Timiskaming area; these have not yet yielded fauna of proved stratigraphic value.

RÉSUMÉ

Les couches du Silurien moyen du lac Témiscamingue, en Ontario et au Québec, recèlent une grande variété de fossiles. Ce rapport présente une liste de 135 groupes de fossiles et en illustre 93. Il décrit également certains fossiles similaires de la formation du Silurien moyen du bassin du Michigan. On trouve des couches siluriennes plus anciennes sous-jacentes à la région du lac Témiscamingue, mais elles n'ont jusqu'ici livré aucun fossile ayant une valeur stratigraphique.

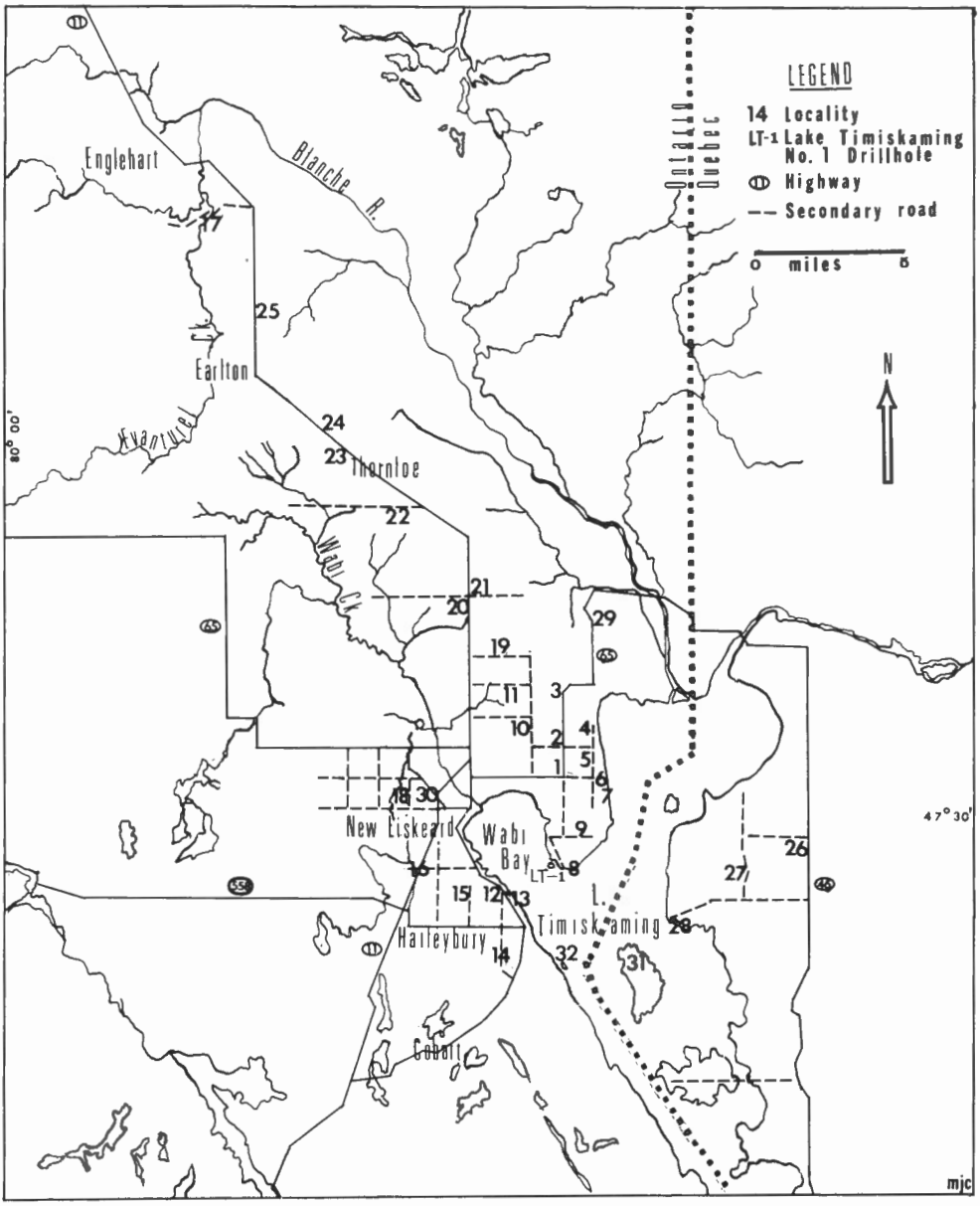

Figure 1. Index map of Ordovician and Silurian localities, Lake Timiskaming, Ontario and Quebec.

PALEOZOIC FORMATIONS AND SILURIAN BIOSTRATIGRAPHY, LAKE TIMISKAMING REGION, ONTARIO AND QUEBEC

INTRODUCTION

During the summers of 1963 and 1965, Copeland and G.W. Sinclair visited Ordovician rock exposures of the Lake Timiskaming rift valley, Ontario and Quebec. Reports of these investigations (Copeland, 1965; Sinclair, 1965) resulted in clarification of the stratigraphy of the Liskeard Group (Ordovician), erection of new formational terminology for exposed and drillhole sections and description of contained Ostracoda. Bolton and Copeland, accompanied by C.R. Barnes (University of Waterloo), investigated new Ordovician localities and did detailed work on exposed Silurian rocks of the area in 1968. Several papers resulted (Bolton, 1970; Copeland, 1970a, 1971; Munro, *et al.*, 1971) on specific faunules; the present paper presents a general stratigraphic and faunal summary, particularly of the Silurian rocks.

No new stratigraphic terminology is presented for Silurian strata of the area. Hume's (1925) term, Wabi Formation, is, however, extended downward in Lake Timiskaming No. 1 drillhole to the top of the underlying Dawson Point Formation (Sinclair, 1965). The contact of these formations is sharp and, presumably, disconformable. The Thornloe Formation and its relation to the Wabi Formation is retained as originally established.

STRUCTURE

Sedimentary rocks of Middle Ordovician to Middle Silurian ages occur in a northwest-trending belt about 30 miles long and 12 miles wide within the Lake Timiskaming rift valley (Lovell and Caine, 1970) of northern Ontario and Quebec (Fig. 1). These strata, some 1,000 feet thick, lie, to the east, in Quebec, as scattered patches of Ordovician limestone, sandstone and conglomerate on metamorphosed Precambrian rocks. Their major occurrence is in a large block that dips gently southwest across Blanche River and Wabi Creek valleys and northern part of Lake Timiskaming on the downthrown side of the Lake Timiskaming fault (Thomson, 1965, p. 42). West of Lake Timiskaming, on the upthrown side of this fault, Ordovician strata reappear for a short distance west of Haileybury and New Liskeard, Ontario, resting on rocks of the Canadian Shield.

STRATIGRAPHY

Stratigraphy of the Paleozoic rocks of this area was largely determined by Hume (1920, 1925: see references therein for earlier publications). Subsequent investigations have been undertaken by Henderson (1936), Goudge (1938), Ollerenshaw and MacQueen (1960), Thomson (1965), Sinclair (1961, 1965), Copeland (1965, 1970a, b, 1971), Bolton (1965, 1966, 1970), and Munro, *et al.* (1971). Refinement of these stratigraphic observations was confirmed only with completion of Lake Timiskaming No. 1 drillhole (Thomson, 1965; Fig. 1). There, a locally complete sequence of rocks was intersected comprising strata from the middle part of the Middle Silurian Thornloe Formation to Precambrian basement. This was detailed by Thomson (1965, p. 27-30) and stratigraphic determinations on the Ordovician part of this sequence were presented by Sinclair (1965) and Copeland (1965). The resulting stratigraphic sequence is shown on Figure 2 with the rock sections examined by the present authors placed in relative stratigraphic positions.

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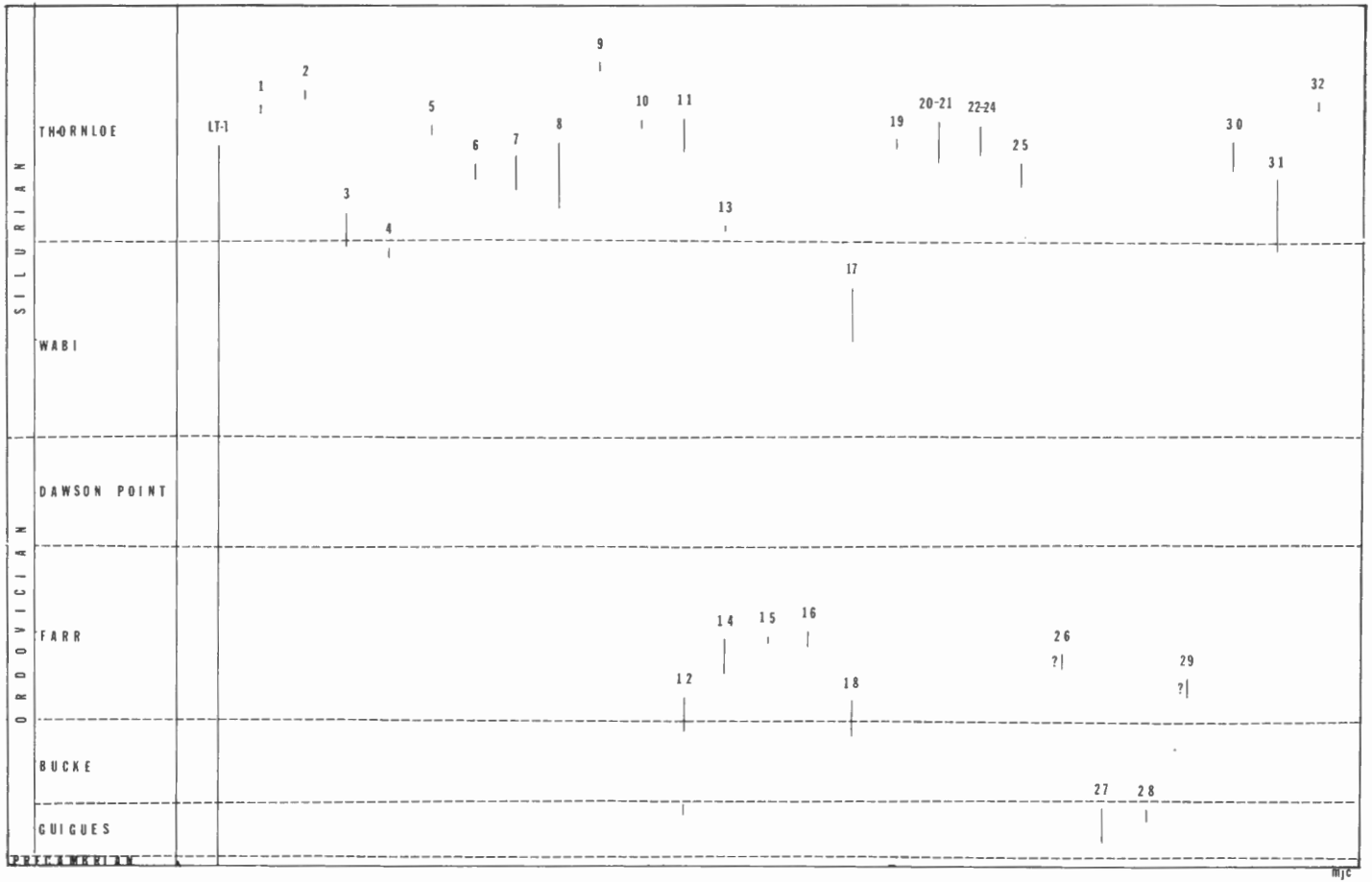


Figure 2. Relative stratigraphic positions of rocks at localities shown on Figure 1.

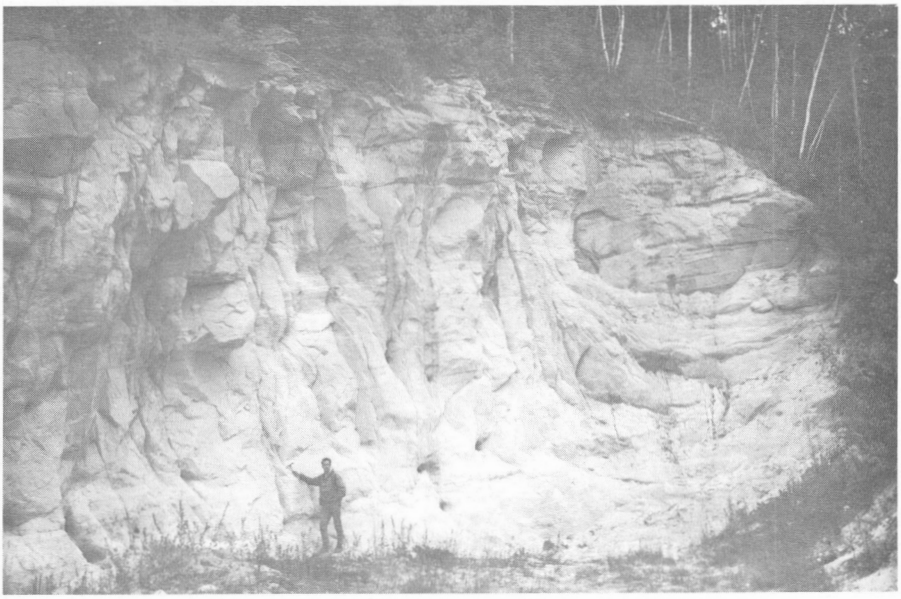


Figure 3.

Guigues Formation, locality 27. GSC photo 146938

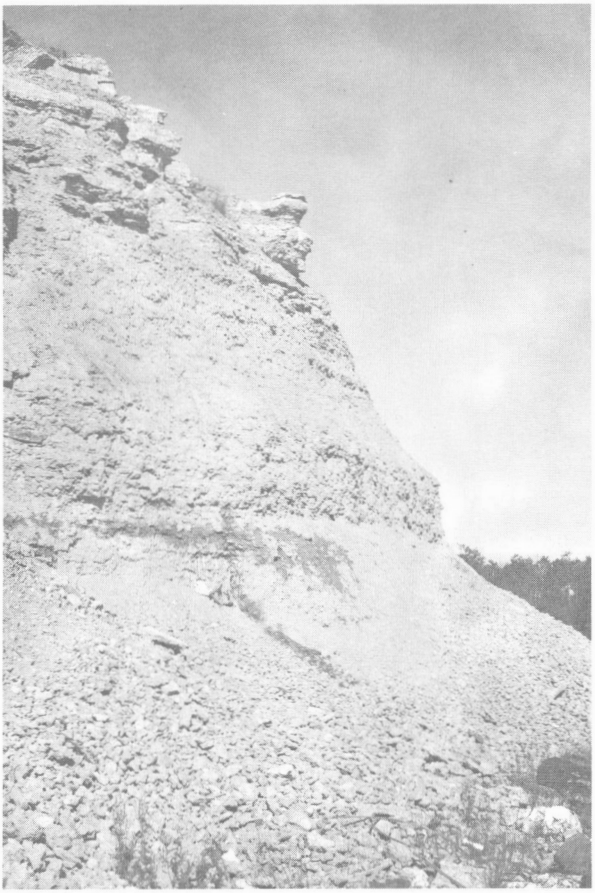


Figure 4.

Bucke and Farr Formations, locality 18. GSC photo 146935

Figure 5. Farr Formation, Farr Quarry, locality 14. GSC photo 146932

Figure 6. Farr Formation, locality 16. GSC photo 146930

Figure 7. Wabi Formation, locality 17. GSC photo 146934

Ordovician

Hume (1925) considered the entire exposed Ordovician sequence as comprising the Liskeard Formation. Sinclair (1965), on additional information from Lake Timiskaming No. 1 drillhole, considered that all Ordovician rocks of the area were contained within the Liskeard Group which comprises, in ascending order, the Guigues, Bucke, Farr and Dawson Point Formations. The Guigues Formation everywhere rests unconformably on Precambrian basement rocks. It consists of clean sandstone (Fig. 3) and conglomerate with some anthozoans and cephalopods [*Liskeardia sola* (Wilson)] of Wilderness age. The disconformably overlying Bucke Formation (Fig. 4) comprises ostracode-bearing shale and shaly limestone of late Wilderness age (Copeland, 1965). The overlying Farr Formation (Figs. 4 to 6) of interbedded shaly limestone and thick-bedded mottled limestone bearing anthozoans, brachiopods, echinoderms and gastropods is considered of late Barneveld age (Sinclair, 1965; Copeland, 1965; Bolton, 1970). Edenian strata of the shaly Dawson Point Formation are known only from Lake Timiskaming No. 1 drillhole, where they contain graptolites, brachiopods [*Lingula* sp., *Leptobolus insignis* Hall] and trilobites [*Triarthrus* cf. *rougensis* Parks]. Their contact with the overlying Wabi Formation of Silurian age is sharp and, presumably, disconformable.

Silurian

Silurian strata of the area, divisible into the lower Wabi and overlying Thornloe Formations, represent the main subject of the present report. These strata, wholly contained within the central block of the Lake Timiskaming rift valley, dip gently southwest into the Lake Timiskaming fault, against which they assume northeast attitudes as at localities 13, 30 (Fig. 1) and in pentamerid-bearing beds at Haileybury wharf. It is postulated that the stratigraphic displacement, upward toward the west, of rocks along this fault is approximately

750 to 800 feet. Apparently undisturbed younger Thornloe strata exposed on Farr (Percy) Island (Fig. 1, loc. 32) lie close to, but east of the fault; these strata are older than the highest Silurian beds on Dawson Point (Fig. 1, loc. 9) so they may belong to a subsidiary fault block east of the main displacement. Strata of the Thornloe Formation were also encountered in a similar position at a depth of 490 feet in Ontario Department of Highways drillhole 67-F-57 near the New Liskeard bridge over Wabi Creek.

SILURIAN SEDIMENTATION

The combined thickness of the Wabi and Thornloe Formations is approximately 450 feet. The Wabi Formation (278.7 feet thick in Lake Timiskaming No. 1 drillhole; Thomson, 1965, p. 27-29) consists of buff limestone with interbeds of varicoloured shale and gypsum in its lower 165 feet, and interbedded, fine-grained limestone and shale in its upper part. Oolites are present from 38 to 74 feet below the top of the Wabi Formation. The lower evaporite-bearing beds represent restricted marine conditions of deposition, possibly the result of local adjustment of the Canadian Shield. Shallow water conditions also prevailed during deposition of much of the upper part of the Wabi Formation (ca. 100 feet thick). At localities 3 (basal part) and 17 (Fig. 7) mudcracked, ripple- and rain-marked siltstone with oolitic limestone occur, typically with lamellibranch and ostracode accumulations.

The Thornloe Formation apparently conformably overlies Wabi strata at localities 3 and 31. At locality 3 the sequence of shallow water Wabi beds passes upward into Thornloe limestone and shale with oolitic interbeds (Pl. IV, fig. 4; Pl. VII, fig. 11) and turbinate stromatolites (Figs. 10, 11). Similar oolitic beds with "*Leperditia*" *fabulina* Jones are present from 6 to 12 feet above the base of the Thornloe in Lake Timiskaming No. 1 drillhole as defined by Thomson (1965). At locality 31 (Mann Island, Fig. 8) massive, fine-grained limestone of the Wabi(?) Formation is abruptly succeeded by 80 feet of thinner bedded, fine-grained to sublithographic, fossiliferous, nodular limestone and shale of the Thornloe. These lower strata of the Thornloe Formation are typical, fossiliferous marine limestone and shale similar to those exposed at localities 25 (Macnamara Quarry) and 8 (Dawson Point, Fig. 9). The uppermost Thornloe is typified by massive, saccharoidal limestone (locs. 9, 11, 20-24). Coral concentrations predominate in this interval, particularly in the upper strata at locality 11, indicating conditions favourable for biostromal accumulation. About 175 feet of Thornloe strata are estimated to occur in the area.

BIOSTRATIGRAPHY AND CORRELATION

Wabi Formation

Two faunal assemblages are present in the exposed sequence of the Wabi Formation (Table I; Pl. I). The lower (loc. 17, 0.0-36.5 feet), associated with argillaceous limestone, is characterized by *Pterinea* sp., *Zygocosta williamsi* (Ulrich and Bassler), *"Leperditia" hisingeri* Schmidt, and *Icriodella* n. sp. A similar assemblage is found to the south in the Michigan Basin within the Dyer Bay and Wingfield Formations of Manitoulin Island and Bruce Peninsula, Ontario, and the Lime Island Formation of northern Michigan. These formations are included in the *Virgiana decussata* zone (Ehlers and Kesling, 1962, p. 9; Bolton, 1968, p. 39), the *Icriodina irregularis* Assemblage Zone (Rexroad and Nicoll, 1971, p. 212), and are assigned a Middle Llandovery age (Berry and Boucot, 1971, p. 32). The *Z. williamsi - V. decussata* assemblage is equivalent to the *Zygobursa praecursor - Virgiana anticostiensis* assemblage within the Becscie Formation of Anticosti Island, Quebec; the zygobolbid ostracode genera are considered valid indices to the base of the Clinton Group (Copeland, 1971, p. 1, 6). *Virgiana* is also known from: Fisher Branch Formation of southern Manitoba; Division D

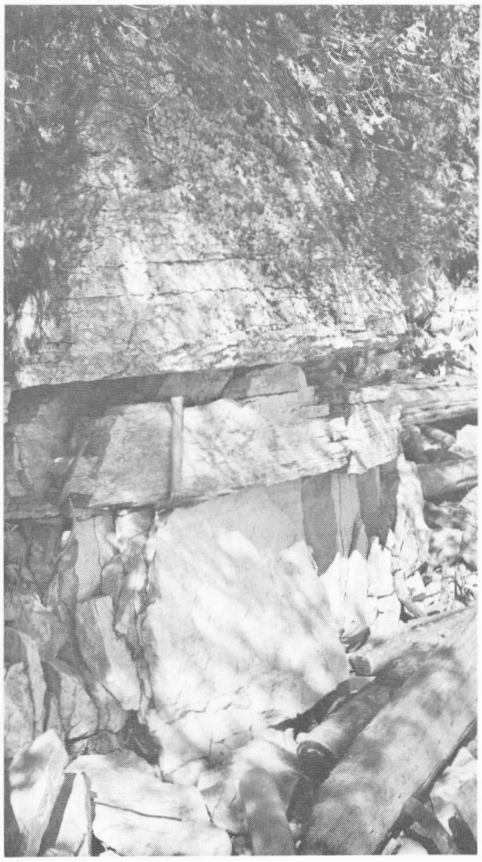


Figure 8.

Wabi? and Thornloe Formations,
locality 31. GSC photo 201954

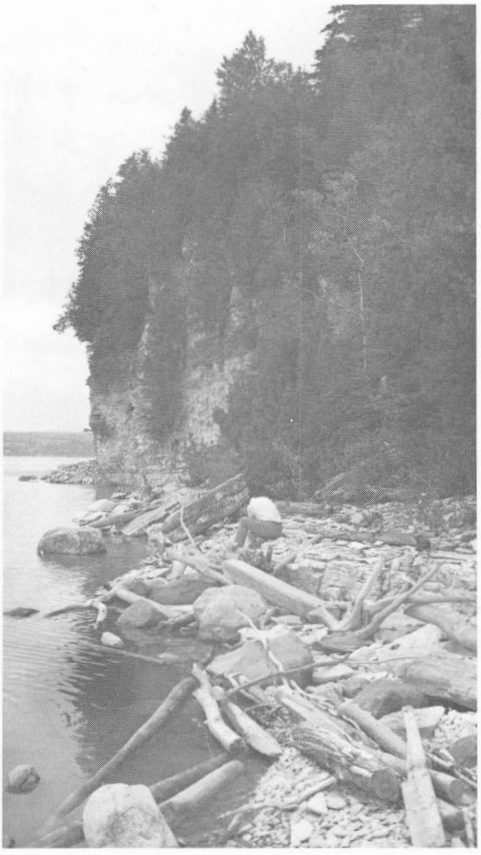
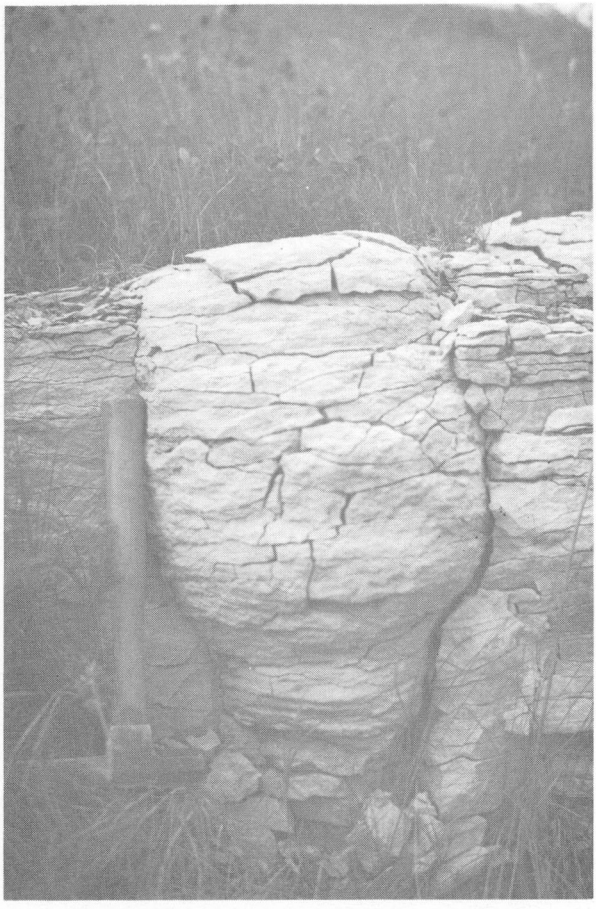


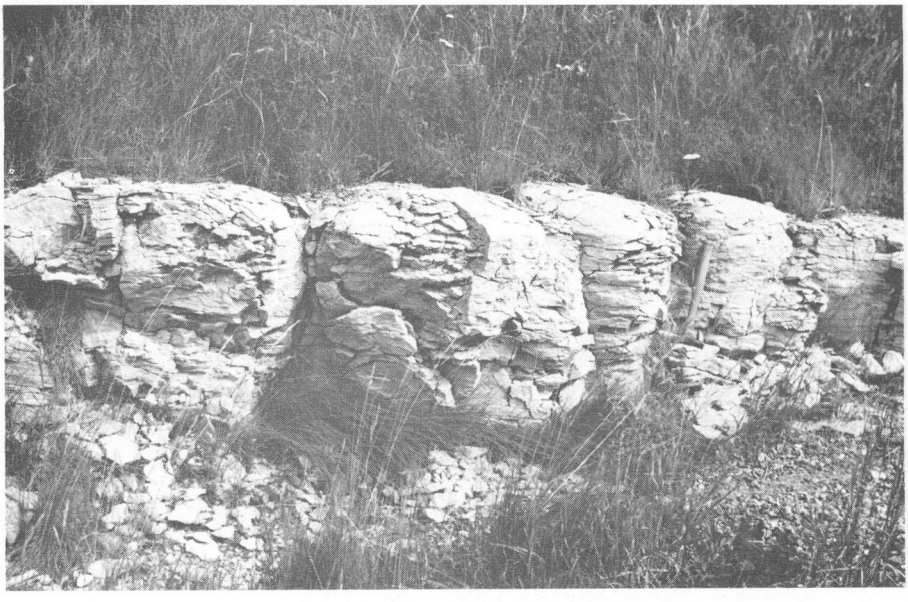
Figure 9.

Thornloe Formation,
locality 8. GSC photo 146928



Figures 10 and 11.

Stromatolites, Thornloe Formation, locality 3. GSC photos 146941 and 146940.



of the Severn River Formation of northern Manitoba (Norford, 1970, p. 4); Severn River Formation of Hudson Bay Lowland (Sandford, *et al.*, 1968, p. 23); lowest beds of the Severn River equivalent on Southampton Island; Prince Charles Island (Berry and Boucot, 1971, p. 99); faunal assemblages II and lower III of the Baillarge Formation, Baffin Island; Greely Haven on the east coast of Victoria Island; and Yukon Territory and District of Mackenzie (Berry and Boucot, 1971, p. 248, 254).

The upper faunal assemblage of the Wabi Formation (locs. 3, 0.0-6.5 feet; 4; and 17, 36.5-52.0 feet), within oolitic granular limestone, is defined by *Hemicystites hawkesi* Bolton, *Intexodictyon* sp., *Stegerhynchus*(?) *winiskensis* (Whiteaves), *"Leperditia" fabulina*, and *Eoplectodonta*(?) sp. This brachiopod-ostracode assemblage defines the *Camarotoechia winiskensis - Dihogmochilina latimarginata* zone (Ehlers and Kesling, 1962, p. 9; Copeland, 1970b, p. 12; Bolton, 1968, p. 40) of the St. Edmund and Mindemoya Formations (Liberty, 1968, p. 34) of Manitoulin Island, Ontario (Pl. I, figs. 21, 27), and the Hendricks Formation of northern Michigan (Pl. I, figs. 26, 28). *Intexodictyon brodeurense* Petryk has been described by Petryk (1968, p. 22) from faunal assemblage III of the Baillarge Formation, overlying *Virgiana* beds on Brodeur Peninsula, Baffin Island. *Intexodictyon* sp. in association with *D. latimarginata* (Jones) is present in the Severn River equivalent of Southampton Island, and the greatest development of the genus in Estonia is within Upper Llandovery rocks.

Thornloe Formation

At least four faunizones have been delineated in the Thornloe Formation. The lowest assemblage, associated with oolitic granular limestone (loc. 3, 11.5-22.5 feet), is composed of *Alispira lowi* (Whiteaves), *Zygospiraella* sp., *Stegerhynchus*(?) *winiskensis*, *Bolbinoessia punctata* (Ulrich and Bassler), and *"Leperditia" fabulina*, and is a continuation of the *C. winiskensis - D. latimarginata* zone. *A. lowi* has been identified from the Hendricks Formation of northern Michigan, Atikameg Formation of southern Manitoba, Severn River and Ekwan River Formations of James Bay - Hudson Bay Lowlands, and the Severn River equivalent on Southampton Island (associated with *Mendacella*(?) sp. and *Costistricklandia* sp.). In addition to the Hendricks and Mindemoya occurrences, *S.*(?) *winiskensis* is present in the East Arm Formation and overlying Cross Lake Member of the Cedar Lake Formation of southern Manitoba, and the Severn River and Ekwan River Formations of the James Bay - Hudson Bay Lowlands. Berry and Boucot (1971, p. 32) assign an early (C_1 - C_2) Late Llandovery age to most of this assemblage.

The dominant elements in the second assemblage (locs. 6-8; 11, 0-15.0 feet; 25; 31, 12.0-92.0 feet) are *Clathrodictyon vesiculosum* Nicholson and Murie (lined variety), *Multisolenia tortuosa* Fritz, *Protaxocrinus amii* Bolton, *Zygobolba logani* Copeland, *Z. twenhofeli*(?) Ulrich and Bassler, *Pentameroides subrectus* (Hall and Clarke), *Discosorus humei* Foerste, *Leptostrophia* (*Eostropheodonta*) sp., *Macnamaratylus murrayi* Bolton, *S.*(?) *winiskensis*, *Pentamerus* sp., *Eocoelia* sp., *Encrinurus* sp., *Scutellum* n. sp., and *Donacoceras* spp.

The brachiopod *Eocoelia* sp. from the Dawson Point wharf beds (loc. 8) is conspecific with *Coelospira* sp. at or near the top of the *Pentamerus*-bearing Schoolcraft Formation of northern Michigan (Ehlers and Kesling, 1957, Pl. 7, figs. 7-9 = *Eocoelia* cf. *intermedia* (Hall) by Berry and Boucot, 1971, p. 222). A similar form is reported from Unit II (Severn River) in the James Bay region underlying *"Camarotoechia" winiskensis* Whiteaves and is assigned a middle (C_3 - C_4) Late Llandovery age by Berry and Boucot (1971, p. 234).

According to Copeland (1971, p. 5), *Zygobolba logani* and *Z. twenhofeli*(?) represent the *Z. anticostiensis* fauna, the middle of the three faunizones of the Lower Clinton Group, Ontarian Stage. This widespread fauna occurs also at the top of the Schoolcraft Formation and in the Ekwan River Formation of James Bay Lowland.

The corals and *Pentamerus - Pentameroides* assemblage is abundant in the *Favosites favosus* zone (Ehlers and Kesling, 1962, p. 10; Bolton, 1968, p. 41) of the Fossil Hill and Cordell Formations of the Michigan Basin. The stricklandid brachiopods prevalent in those formations, but to date not recognized within the Thornloe, include *Plicostricklandia manitouensis* (Williams), *P. castellana* (White), and *Microcardinalia pyriformis* (Savage). The latter genus has an Upper Llandovery C_1 - C_5 range zone and the other brachiopods are restricted to the C_6 - early Wenlock zone (Berry and Boucot, 1971, p. 32; Chiang, 1971, p. 850). *Porpites*, a coral restricted in central North America to strata of C_6 - early Wenlock age, is associated with this pentameracean community (Bolton, 1968, p. 41). The *Discosorus - Huronia* assemblage (Flower, 1968, p. 7), also present at this stratigraphic level in the Thornloe, attains its fullest development in the Cordell Formation, and is found in the Severn River (*Discosorus*) and overlying Ekwan River (*Discosorus - Donacoceras*) of the James Bay and Hudson Bay Lowlands.

The widespread distribution of the coral *Multisolenia* has been detailed by Bolton (1965, p. 26-28). Additional North American mid-continental occurrences have been reported within divisions E - F of the Severn River Formation of northern Manitoba (Norford, 1970, p. 5), and the Severn River exposures of the Ekwan River Formation, Hudson Bay Lowland (Nelson and Johnson, 1967, p. 556).

The uppermost coral fauna, the third assemblage (locs. 10; 11, 15.0-20.0 feet) in the Thornloe Formation (Pls. XI, XII), again is represented in the Fossil Hill Formation and, in addition, in the Attawapiskat Formation of the Hudson Bay Lowland. Within this coral fauna the dominant elements are *Arachnophyllum pentagonum* (Goldfuss), *A. striatum* (d'Orbigny), *Catenipora huronensis* (Teichert), *C. louisvillensis* (Stumm), *Favosites favosus* (Goldfuss), *Heliolites romingeri* Stumm, and *Propora glabra* (Owen). A C_6 - early Wenlock correlation is suggested by this assemblage.

The fourth Thornloe assemblage (locs. 1, 2, 9) is quite different. It is dominated by the brachiopods *Antirhynchonella* sp., *Plicostricklandia* n. sp. aff. *P. manitouensis*, *P. multilirata* (Whitfield), and *Pentameroides* sp. The *Scutellum laphami* zone of the lower Engadine and Amabel Formations (Pl. X, figs. 11, 14) within the Michigan Basin contains conspecific forms; these range into basal Guelph strata on Manitoulin Island (Pl. XIII, figs. 17, 18, 20, 22, 23, 25). Boucot (pers. comm., 1969) interpreted the specimens herein designated *P.* n. sp. aff. *P. manitouensis* as *P.* cf. *castellana*, describing them as a *Plicostricklandia* intermediate in rib strength between the late Llandovery (C_6) - early Wenlock age form *P. castellana* and the late Wenlock *P. multilirata*. The affinities appear to be closer to the late Llandovery - early Wenlock stricklandid *P. manitouensis*. Thus a Wenlock age for this uppermost Thornloe assemblage appears reasonable - whether middle or late Wenlockian can only be confirmed by better preserved material.

Correlatives of *Huroniella timiskamingensis* Foerste (Pl. XIII, figs. 1, 24), a species found at the very top of the Thornloe Formation, are *H. inflecta* (Parks) and *H. subinflecta* Foerste of the Ekwan River and/or Attawapiskat Formations of the Hudson Bay Lowland. The only other known species of *Huroniella*, *H. persiphonata* (Billings) and *H. ehlersi* Foerste, have been recorded from the older Jupiter Formation of Anticosti Island, Quebec, and the Cordell Formation of northern Michigan, respectively (Flower, 1968, p. 15).

In summary, the stratigraphic and faunal sequences recognized in the Silurian rocks of the Lake Timiskaming region are a duplication of the Manitoulin Island Silurian to the south. Equivalents of the early Silurian Manitoulin and Cabot Head Formations are present in the Lake Timiskaming No. 1 drillhole within the Wabi Formation. Rocks and faunas of the Dyer Bay - Wingfield and St. Edmund - Mindemoya Formations can be related to the exposed Wabi and lower Thornloe. This Middle and/or early Late Llandoverian fauna is representative of the Middle Silurian Lower Clinton Ontarian Stage (early Niagaran) of the central North American faunal province. Most of the Thornloe is of Late Llandovery to Early Wenlock age. The uppermost faunal assemblage of the Thornloe suggests a Wenlockian age, similar to that found essentially in the Amabel Formation.

TABLE I

Distribution of Silurian Fauna, Lake Timiskaming, Ontario and Quebec

FAUNA \ LOCALITY	1	2	3	7 (0 - 6')	7 (18 - 25')	8 (wharf)	8 (Dawson Pt.)	9	10	11 (0 - 5')	11 (15 - 20')	13	17 (0 - 8')	17 (18 - 33.5')	17 (36.5-52')	20 21	22 24	25	30	31	32
PORIFERA																					
Astylospongia sp.																		X			
hexactine spicules					X													X			
•sponge undet.									X											X	
STROMATOPOROIDEA																					
•*Clathrodictyon drummondense* Parks																		X		X	
Clathrodictyon minutum Parks			X						X		X										
•*Clathrodictyon variolare* Rosen																				X	
•*Clathrodictyon vesiculosum* N. and M.			X																		
•*Clathrodictyon vesiculosum* N. and M. (lined var.)				X												X				X	
•*Intexodictyon* sp.															X						
•*Stromatopora* sp. aff. *S. antiqua* (N. and M.)									X												
•*Stromatopora* sp. cf. *S. constellata* Hall																				X	
Stromatopora sp. indet																X					
ANTHOZOA																					
Alveolites undosus Miller											X										
•*Arachnophyllum pentagonum* (Goldfuss)		X							X		X										
•*Arachnophyllum striatum* (d'Orbigny)									X		X										
Arachnophyllum sp.	X					X															
•*Catenipora huronensis* (Teichert)											X										
•*Catenipora louisvillensis* (Stumm)											X										
•*Catenipora microporus* (Whitfield)											X										
•*Catenipora* sp.		X							X											X	
•*Cladopora* (?) sp.									X												
•*Coenites crassus* (Rominger)											X										
Coenites sp.		X							X												
cup coral indet.	X	X	X	X			X		X		X					X	X			X	
Cystihalysites sp.																			X		
•*Cystiphyllum niagarense* (Hall)									X									X			

TABLE I (continued)

FAUNA \ LOCALITY	1	2	3	7 (0 - 6')	7 (18 - 25')	8 (wharf)	8 (Dawson Pt.)	9	10	11 (0 - 5')	11 (15 - 20')	13	17 (0 - 8')	17 (18 - 33.5')	17 (36.5-52')	20, 21	22, 24	25	30	31	32
ANTHOZOA (continued)																					
Cystiphyllum sp.		X																			
Dinophyllum (?) *umbonata* (Rominger)																	X	X			
Favosites favosus (Goldfuss)									X	X	X					X					
•*Favosites hispidus* Rominger									X		X							X			
Favosites niagarensis (Hall)											X										
•*Favosites* spp.	X	X	X	X		X		X	X		X	X				X	X	X	X	X	
Halysites sp. cf. *H. magnitubus* Buehler											X										
Halysites spp.											X	X				X			X		
Heliolites romingeri Stumm											X										
Heliolites sp. cf. *H. subtubulatus* (McCoy)											X									X	
•*Ketophyllum* (?) *rectus* (Hume)						X												X			
•*Multisolenia tortuosa* Fritz						X														X	
Multisolenia sp.																		X			
•*Palaeofavosites* sp.	X																	X		X	
•*Propora glabra* (Owen)									X		X										
Ptychophyllum stokesi E. and H.						X											X	X			
•*Ptychophyllum* (?) sp.											X										
cf. *Romingerella major* (Rominger)								X			X										
•*Strombodes* sp.																				X	
•*Syringopora dalmanii* Billings		X							X	X	X									X	
•*Syringopora* sp. cf. *S. retiformis* Billings											X							X			
•*Syringopora verticillata* Goldfuss																				X	
Syringopora sp.																X		X	X		X
•"*Vermipora niagarensis* Rominger"											X										
"*Zaphrentis*" *stokesi* E. and H.																	X		X		
ECHINODERMATA																					
Caryocrinites (?) sp.																		X			
Dimerocrinus sp.																				X	
•*Hemicystites hawkesi* Bolton															X						

TABLE I (continued)

FAUNA \ LOCALITY	1	2	3	7		8		9	10	11		13	17			20	22	25	30	31	32
				0 - 6'	18 - 25'	wharf	Dawson St.			0 - 5'	15 - 20'		0 - 8'	18 - 33.5'	34.5-52'	21	24				
ECHINODERMATA (continued)																					
Hemicystites sp.												X									
•*Macnamaratylus murrayi* Bolton																		X			
•*Protaxocrinus amii* Bolton																				X	
GRAPTOLITHINA																					
•*Dictyonema* sp.																				X	
BRYOZOA																					
Helopora (?) sp.							X			X								X		X	
pachydictid bryozoans					X		X											X			
Phaenopora sp.									X											X	
Polypora sp.									X												
Trematopora (?) sp.							X											X			
BRACHIOPODA																					
•*Alispira lowi* (Whiteaves)			X									X									
•*Antirhynchonella* sp.	X	X			X																X
•"*Atrypa*" *parva* Hume						X	X										X	X		X	
•*Brachyprion* sp. aff. *B. robustum* Twenhofel			X																		
•*Brachyprion* (?) sp.												X					X	X			
•chonetid aff. *Strophochonetes* sp.																		X			
•*Dolerorthis* sp.		X		X	X				X	X								X		X	
•*Eocoelia* sp.						X															
•*Eoplectodonta* (?) sp.			X																		
•*Leptostrophia* (*Eostropheodonta*) sp.																		X			
•*Leptostrophia* sp.			X								X									X	
•*Mendacella* (?) sp.									X												
•*Pentameroides subrectus* (H. and C.)																				X	
•*Pentameroides* sp.	X	X																			
Pentamerus sp.					X	X	X													X	

TABLE I (continued)

FAUNA \ LOCALITY	1	2	3	7 (0 - 6')	7 (18 - 25')	8 (wharf)	8 (Dawson Pt.)	9	10	11 (0 - 5')	11 (15 - 20')	13	17 (0 - 8')	17 (18 - 33.5')	17 (34.5-52')	20, 21	22, 24	25	30	31	32
BRACHIOPODA (continued)																					
•*Plicostricklandia* n. sp. aff. *P. manitouensis* (Williams)	X																				X
•*Plicostricklandia multilirata* (Whitfield)		X																			
•*Resserella* (?) sp.					X																
•"*Rhynchotreta*" *cabotensis* Williams																		X			
•*Stegerhynchus* (?) *neglectum* (Hall)																X		X			
•*Stegerhynchus* (?) *winiskensis* (Whiteaves)			X									X		X				X		X	
•*Stegerhynchus* (?) spp.							X			X		X		X				X		X	
•*Whitfieldella nitida* (Hall)									X												
•*Zygospiraella* (?) sp.		X	X																		
GASTROPODA																					
•*Euomphalopterus* sp.						X												X			
•*Hormotoma* sp.	X		X	X		X	X		X	X		X		X	X			X		X	
Lophospira (?) sp.					X																
•*Naticonema* sp. cf. *N. niagarense* (Hall)					X																
Naticonema sp.	X	X										X									
PELECYPODA																					
•*Amphicoelia* sp.		X																			
•*Pterinea* sp.			X				X						X	X							
CEPHALOPODA																					
Amphicyrtoceras sp.		X																			
•*Discosorus humei* Foerste																				X	
Discosorus (?) sp.		X																		X	
•*Donacoceras arundineum* Foerste																X		X			
•*Donacoceras timiskamingense* Foerste																		X			
•*Huroniella timiskamingensis* Foerste								X													
•*Kionoceras* sp. cf. *K. loxias* (Hall)	X																				
•*Kionoceras* sp.															X						

TABLE I (continued)

FAUNA \ LOCALITY	1	2	3	7 (0 - 6')	7 (18 - 25')	8 (wharf)	8 (Dawson St.)	9	10	11 (0 - 5')	11 (15 - 20')	13	17 (0 - 8')	17 (18 - 33.5')	17 (36.5-52')	20	21	22	24	25	30	31	32
CEPHALOPODA (continued)																							
•*Megadiscosorus crassisegmentatus* Foerste																				X			
•*Michelinoceras* sp.			X										X		X								
•*Oonoceras* (?) sp.			X																			X	
cf. *Ormoceras vadocameratum* (Foerste)																				X			
TRILOBITA																							
•*Acernaspis* sp.																						X	
•*Cheirurus* sp. cf. *C. welleri* Raymond																						X	
•*Diacalymene* sp.																				X		X	
•*Encrinurus* sp. cf. *E. ornatus* H. and W.																				X			
•*Encrinurus* sp.					X	X											X					X	
•*Otarion* sp.																						X	
•proetid trilobite free cheek																				X			
•*Scutellum* n. sp.																				X			
Stenopareia sp.																				X			
OSTRACODA																							
•*Apatobolbina* sp.			X			X														X			
•*Bairdiocypris* sp.			X											X						X		X	
beyrichiid ostracode indet.			X																				
•*Bolbibollia* sp.				X																		X	
•*Bolbineossia didictyosa* K., H., K. and O.				X					X	X										X			
Bolbineossia punctata (U. and B)			X											X									
Bolbineossia sp.						X														X			
•"*Leperditia*" *caeca* Jones										X													
•"*Leperditia*" *fabulina* Jones			X		X									X									
•"*Leperditia*" *hisingeri* Schmidt			X											X	X								
•"*Leperditia*" sp. cf. "*L.*" *marginata* (Keyserling)																	X			X			
"*Leperditia*" sp.				X	X								X		X							X	
•thlipsurid ostracode indet.																				X			

TABLE I (continued)

FAUNA \ LOCALITY	1	2	3	7 (0 - 6')	7 (18 - 25')	8 (wharf)	8 (Dawson Pt.)	9	10	11 (0 - 5')	11 (15 - 20')	13	17 (0 - 8')	17 (18 - 33.5')	17 (36.5-52')	20-21-24	22	25	30	31	32
OSTRACODA (continued)																					
Zygobolba logani Copeland					X					X											
Zygobolba twenhofeli (?) U. and B.							X											X		X	
Zygobolba sp.			X																		
Zygocosta williamsi (U. and B.)														X							
VERMES																					
Cornulites sp.					X													X			
CONODONTS																					
Icriodella n. sp. Pollock, *et al.*, 1970													X								
Ligonodina (?) sp.										X											

*Species illustrated herein

LOCALITY REGISTER

LT-1 Lake Timiskaming No. 1 drillhole, 4,420 feet south, 1,700 feet west of northeast corner lot 2, concession A, Harris Township, Ontario (Thomson, 1965, p. 27-30).

1 Corner of lots 2-3, concessions II-III, Harris Township, Ontario; northwest side Highway 65. Ten feet, massive, blue-grey, mottled limestone; Thornloe Formation. GSC Loc. 82525.

2 Lots 3-2, concessions III-IV, Harris Township, Ontario; both sides of Highway 65. Eight feet, massive, very fine-grained to granular, blue-grey, mottled, fossiliferous biohermal dolomite; Thornloe Formation. GSC Locs. 82559, 82560.

3 Lots 2-3, concession V, Harris Township, Ontario; both sides Highway 65. GSC Loc. 82524.

Thornloe Formation

22.5 - 25.5 feet	Stromatolitic, brown, granular limestone
11.5 - 22.5 feet	Platy to thin bedded, buff to blue-grey, granular limestone with intraformational conglomerate; oolite beds
6.5 - 11.5 feet	Thick-bedded, brown to grey, granular limestone; 15-inch oolite bed 4 feet from base of unit

Wabi Formation?

0.0 - 6.5 feet	Thin-bedded, buff, very fine-grained limestone, greenish argillaceous partings, *Eoplectodonta*(?) sp.

4 Lot 4, concession IV, Harris Township, Ontario; west side of gravel road. Isolated outcrops of thin-bedded, brown to grey-blue limestone with shale partings; leperditiid ostracodes; Wabi Formation.

5 Lot 4, concession III, Harris Township, Ontario; west side of gravel road. Two feet, massive, brown, granular limestone with pentamerid brachiopods; Thornloe Formation.

6 Lot 5, concession II, Harris Township, Ontario; on road to gravel pit at shore, Lake Timiskaming. Two feet, massive, dense, brown, fossiliferous limestone; Thornloe Formation.

7 Lot 5, concession II, Harris Township, Ontario; near middle of escarpment above gravel pit at shore, Lake Timiskaming. Thornloe Formation. GSC Loc. 82526.

18.0 - 25.0 feet	Thin-bedded, granular, brown limestone, shaly partings near top, silicified fossils
6.0 - 18.0 feet	Thinner bedded, argillaceous, brown to grey limestone
0.0 - 6.0 feet	Massive, buff to grey limestone, thin oolite bed

8 Lot 3, concession A, Harris Township, Ontario; *ca.* 75-foot section along shore of Lake Timiskaming from Dawson Point wharf (GSC Loc. 82529) east to Dawson Point (GSC Loc. 82530; Goudge, 1938, p. 348, Pl. XLVI). Massive to thin-bedded blue-grey limestone with thin shale partings; thin bed of intraformational conglomerate near middle of section; Thornloe Formation.

9 Southwest corner lot 4, concession I, Harris Township, Ontario. Two feet, massive, rubbly, brown dolomite along north side of gravel road; Thornloe Formation. GSC Loc. 82531.

10 Northeast corner lot 12, concession IV, Dymond Township, Ontario and northwest corner, lot 1, concession IV, Harris Township, Ontario; 5 feet quarry and roadside exposure along gravel road. Thin- to thick-bedded, granular, brown, fossiliferous limestone; Thornloe Formation. GSC Locs. 82527, 82528.

11 Roadside exposure, lot 12, concessions V-VI road, Dymond Township, Ontario; Thornloe Formation. GSC Loc. 82536.

15.0 - 20.0 feet	Thick-bedded, brown, granular, fossiliferous limestone
5.0 - 15.0 feet	Thin- to thick-bedded, brown, granular limestone; pentamerid brachiopods at 12 feet
0.0 - 5.0 feet	Thin- to thick-bedded, dense to sublithographic, brown limestone

12 Roadside exposure along Highway 11 near Wabi Iron Works (Match Factory), and Shipyards quarry and railroad cut, lot 10, concession V, Bucke Township, Ontario. Ten feet, friable, brown sandstone (Guigues Formation) along Highway 11, separated by 50 feet covered interval from Bucke and Farr Formations exposed in Shipyards quarry (Copeland, 1965, p. 2; Sinclair, 1965, p. 3). GSC Locs. 82541, 82542.

13 Lot 11, concession V, Bucke Township, Ontario. Five feet, steeply dipping, thick-bedded to platy, fine-grained, brown limestone; lower Thornloe or upper Wabi(?) Formations.

14 Lot 11, concession III, Bucke Township, Ontario; Farr quarry and roadside exposures on road between lots 10 and 11. About 35 feet massive to thick-bedded, mottled, grey, granular limestone; Farr Formation. GSC Locs. 82540, 82549.

15 Northeast corner lot 8, concession IV, Bucke Township, Ontario. Two feet, thick-bedded, mottled, grey limestone; Farr Formation. GSC Loc. 82543.

16 Highway 11 bypass, junction with lots 5, 6, concessions V-VI, Bucke Township, Ontario. Twenty-five feet massive, mottled limestone, in places rubbly or nodular; Farr Formation. GSC Locs. 82544, 82545, 82546.

17 Evaatural Creek, north and south of road between Heaslip and Kap-Kig-Iwan Provincial Park, south of Englehart; Wabi Formation.

36.5 - 52.0 feet	Thin- to thick-bedded, brown to grey, granular limestone; thin oolite beds and shale partings (GSC Loc. 82567)
33.5 - 36.5 feet	Massive to thick-bedded brown limestone
18.0 - 33.5 feet	Thin- to thick-bedded, grey-blue granular limestone with thin green shale beds, intraformational conglomerate, mud cracks (GSC Loc. 82566)
8.0 - 18.0 feet	Covered interval
0.0 - 8.0 feet	Thin- to thick-bedded, blue-grey granular dolomite with interbeds of dense dolomite, ripple marks, mud cracks (GSC Loc. 82565)

18 New Liskeard town dump, southwest corner, lot 5, concession II, Dymond Township, Ontario. GSC Loc. 82551.

Farr Formation

40.0 - 50.0 feet	Massive, mottled limestone
20.0 - 40.0 feet	Nodular brown limestone, thin shale partings

Bucke Formation

0.0 - 20.0 feet	Nodular, grey-blue limestone with thin shale interbeds

19 Lots 11, Harley-Dymond Townships road, Ontario. Thin-bedded to platy, white, granular, unfossiliferous dolomite; Thornloe Formation.

20 Road-cut and quarry, Highway 11, lots 8-9, concession II, Harley Township, Ontario, north of Hanbury. Thirty feet massive, white to buff weathered, porous, granular dolomite; Thornloe Formation. GSC Loc. 82561.

21 Quarry, southwest corner lot 9, concession III, Harley Township, Ontario. Thirty feet massive to thick-bedded, thinner bedded near base, buff, porous, granular dolomite, lenses of chert in upper fifteen feet; Thornloe Formation. GSC Loc. 82532.

22 Lots 3, concessions V-VI, Harley Township, Ontario. Road and power line exposures, ten feet massive, porous, buff dolomite; Thornloe Formation. GSC Loc. 82533.

23 Highway 11 road-cut, lots 1, concessions I-II, Armstrong Township, Ontario. Fifteen feet massive, porous, buff dolomite near abandoned lime kiln; Thornloe Formation.

24 Highway 11 road-cut, lot 3, concession II, Armstrong Township, Ontario. Two feet massive white to grey, porous dolomite, rare pentamerid brachiopods. Thornloe Formation.

25 Macnamara Quarry, and road-cut, lot 6, concession VI, Armstrong Township, Ontario. Twenty feet, thin- to thick-bedded, granular limestone, shaly partings, chert nodules, fossiliferous; Thornloe Formation. GSC Locs. 82563 and 82564 (quarry); 82537 (road-cut).

26 Two miles north of St. Bruno de Guigues, Guigues Township, Quebec. Five hundred feet west of Highway 46 on south side of gravel road. Eight to ten feet massive to thin-bedded, granular, mottled, brown limestone; Farr Formation. GSC Loc. 82548.

27 Quarry, lot 19, range II, Guigues Township, Quebec. Forty-five to fifty feet friable, buff sandstone, abundant limy conglomerate in upper twenty feet; Guigues Formation. GSC Loc. 82568.

28 Pointe Piché, shore and road-cut, east shore of Lake Timiskaming, Quebec. Massive brown sandstone and conglomerate; Guigues Formation.

29 Highway 65 road-cut, Casey Mountain, lot 4, concession II, Casey Township, Ontario. Ten to fifteen feet massive, granular, brown limestone with some shaly partings and Precambrian boulder conglomerate; Farr Formation. GSC Loc. 82550.

30 Ridge exposure, lot 5, concession III, Dymond Township, Ontario; Highway 65, one and one-half miles northwest of New Liskeard, Ontario. Twenty-five to thirty feet massive to thick-bedded, porous, granular, fossiliferous limestone, abundant chert nodules in basal 10 feet; Thornloe Formation. GSC Loc. 82534.

31 Mann Island, Lake Timiskaming, Quebec. Shore exposures, northern half of island. GSC Loc. 82562.

Thornloe Formation

12.0 - 92.0 feet	Thin- to thick-bedded, dense to sublithographic, grey, mottled nodular, fossiliferous limestone; grey shale partings

Wabi? Formation

0.0 - 12.0 feet Laminated, granular, brown dolomite

32 Farr (Percy) Island, west side Lake Timiskaming, south of Haileybury, Ontario. About 10 feet massive, grey to white, mottled, porous dolomite; Thornloe Formation. GSC Loc. 82535.

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PLATES I to XIII

PLATE I

Wabi Formation

Figures 1, 2. *Zygocosta williamsi* (Ulrich and Bassler). Left heteromorphic and tecnomorphic valves, X15. Locality 17 at bridge over Evanturel Creek. Hypotypes, GSC Nos. 26328, 26326.

Figures 3, 4. *Bairdiocypris* sp. Right and left views of two carapaces, X18. Same locality as fig. 1. Fig. specs., GSC Nos. 26323,a.

Figures 5-8. *Icriodella* n. sp. of Pollock *et al.*, 1970. Upper and outer lateral views of two specimens, X36. Locality 17, lowest beds at first curve downriver from bridge over Evanturel Creek. Hypotypes, GSC Nos. 30401, 30402 (identified by T.T. Uyeno).

Figures 9, 10. *Pterinea* sp. Left valves, X1. Same localities as figs. 1 and 5. Hypotypes, GSC Nos. 30403, 30404.

Figures 11, 15. *"Leperditia" hisingeri* Schmidt. Left (slightly crushed) and right valves, X4. Same locality as fig. 1 and 1,000 feet upriver. Hypotypes, GSC Nos. 26342, 26339.

Figures 12, 18. *Hemicystites hawkesi* Bolton. Adoral views of convex specimens, X3. Same locality as fig. 15. Paratypes, GSC Nos. 24510, 24509.

Figure 13. *Eoplectodonta*(?) sp. Pedicle exterior view, X2. Locality 3. Fig. spec., GSC No. 30405.

Figure 17. *Kionoceras* sp. X2. Same locality as fig. 15, above *Hemicystites* beds. Fig. spec., GSC No. 30406.

Figures 22-24. *Stegerhynchus*(?) *winiskensis* (Whiteaves). Pedicle (with *"Leperditia" fabulina* Jones), brachial, and pedicle views, X2. Same locality as fig. 17. Hypotypes, GSC Nos. 30407, a,b - 30409.

Thornloe Formation

Figures 14, 16, 19, 20, 25. *Stegerhynchus*(?) *winiskensis* (Whiteaves). Brachial, pedicle, and brachial (with *"Leperditia" fabulina* Jones) views, X2. Locality 3, oolite beds. Hypotypes, GSC Nos. 30410-30414, a,b.

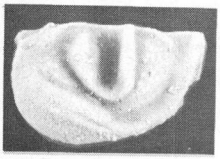
Mindemoya Formation

Figures 21, 27. *Stegerhynchus*(?) *winiskensis* (Whiteaves). Brachial views, X2. Road-cut on western outskirts of the town of Big Lake, Manitoulin Island, Ontario. Hypotypes, GSC Nos. 30415, 30416.

Hendricks Formation

Figures 26, 28. *Stegerhynchus*(?) *winiskensis* (Whiteaves). Pedicle and brachial views, X2. Fiborn Quarry, about 3 miles east and 3 miles north of Rexton, Michigan, U.S.A. (GSC loc. 27835). Hypotype, GSC No. 30417.

Plate I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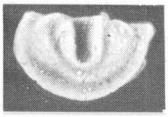
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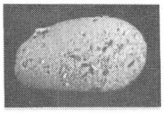
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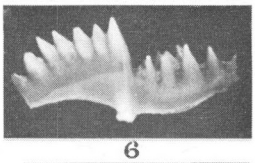
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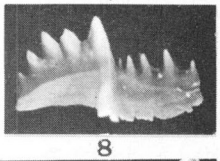
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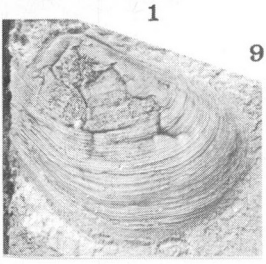
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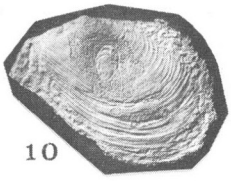
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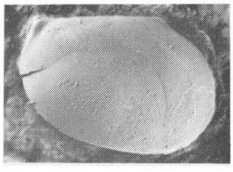
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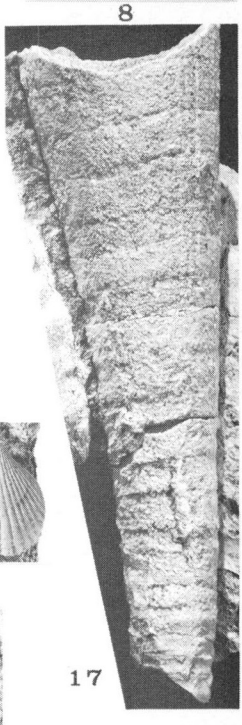
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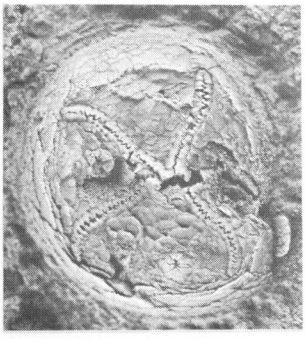
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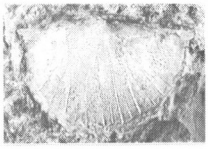
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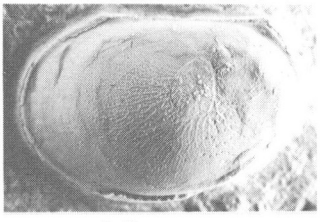
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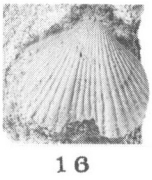
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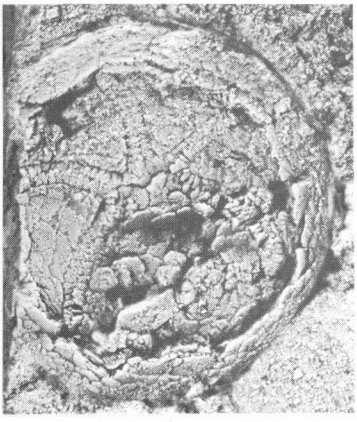
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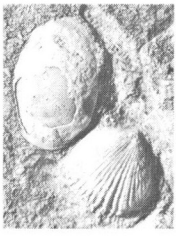
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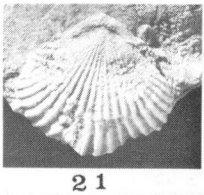
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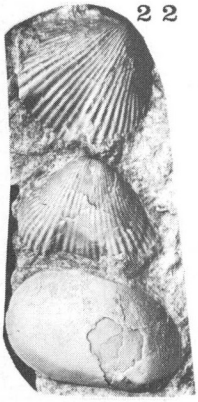
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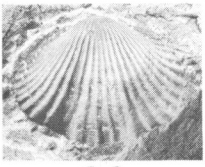
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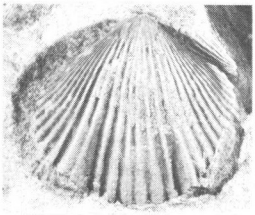
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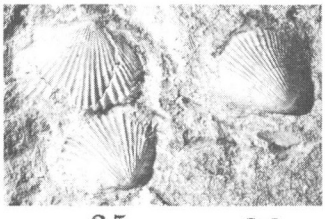
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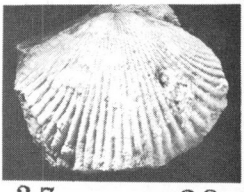
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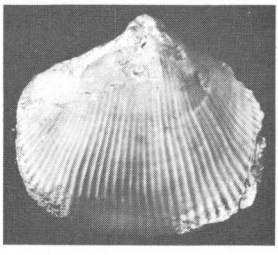


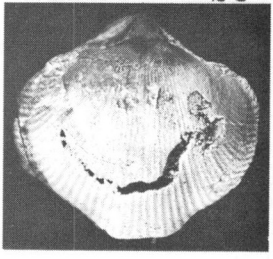


PLATE II

Wabi Formation

Figures 1-3. *Intexodictyon* sp. Vertical sections, X10. Locality 17, 1100 feet upriver from bridge over Evanturel Creek, above *Hemicystites* beds. Fig. specs., GSC Nos. 30418-30420.

Thornloe Formation

Figure 4. *Clathrodictyon variolare* Rosen. Vertical section, X10. Locality 31. Hypotype, GSC No. 30421.

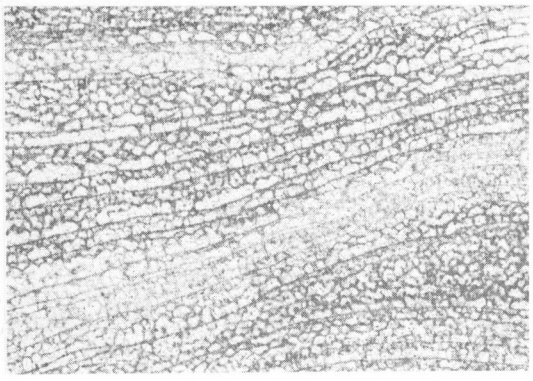
Figure 5. *Clathrodictyon vesiculosum* Nicholson and Murie. Vertical section, X10. Locality 3, 18 feet above base of exposure. Hypotype, GSC No. 30422.

Figure 6. *Clathrodictyon vesiculosum* Nicholson and Murie (lined var.). Vertical section, X10. Locality 31, northeastern shore. Hypotype, GSC No. 30423.

Figure 7. *Stromatopora* sp. aff. *S. antiqua* (Nicholson and Murie). Vertical section, X10. Locality 10 quarry. Hypotype, GSC No. 30424.

Figure 8. *Stromatopora* cf. *S. constellata* Hall. Vertical section, X10. Locality 31. Hypotype, GSC No. 30425.

Plate II



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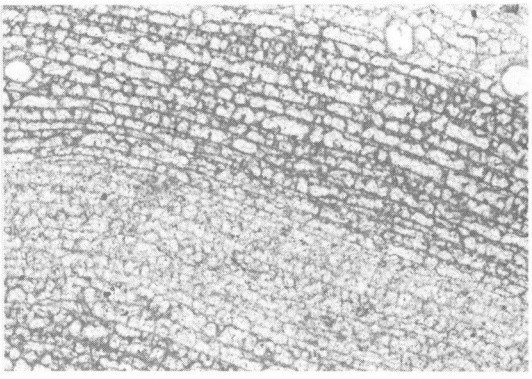

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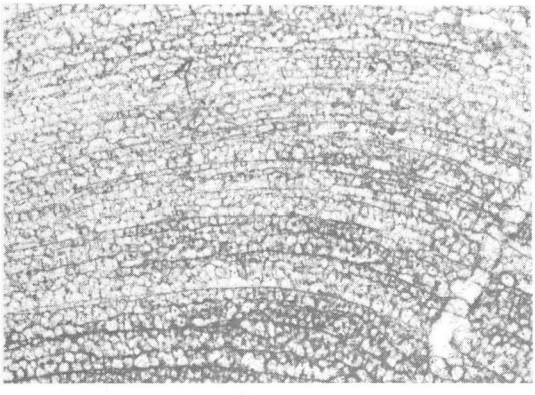

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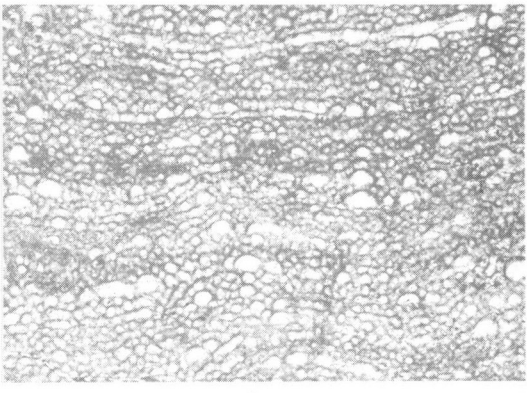

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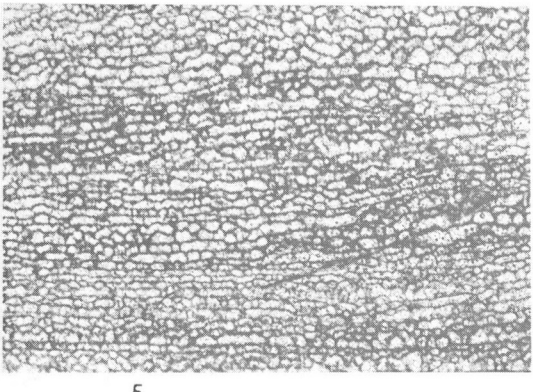

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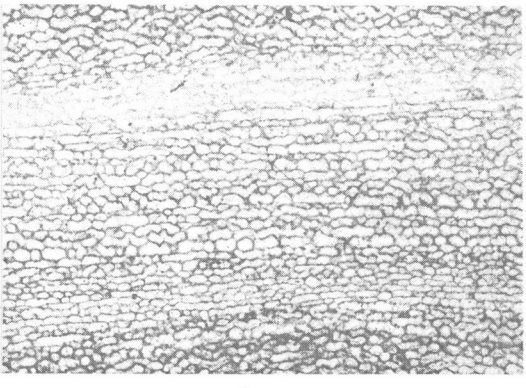

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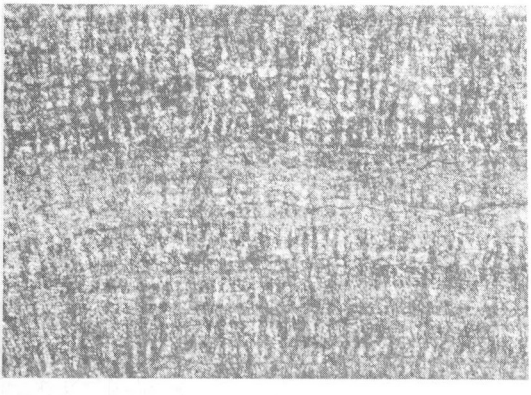

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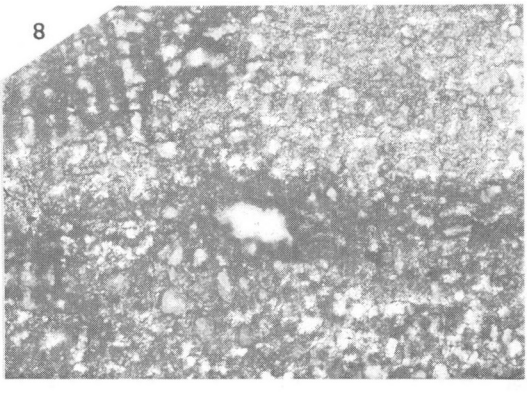


PLATE III

Thornloe Formation

Figures 1-4. *Palaeofavosites* sp. Longitudinal and transverse sections, X4. Locality 25, upper beds. Fig. specs., GSC Nos. 30426a-c, 30427.

Figures 5, 6. *Multisolenia tortuosa* Fritz. Longitudinal and transverse sections, X4. Locality 31. Hypotypes, GSC Nos. 18740, 18739.

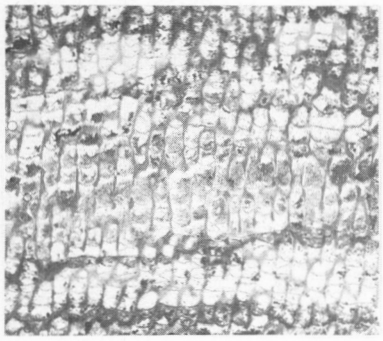
Figures 7, 8. *Clathrodictyon vesiculosum* Nicholson and Murie (lined var.). Vertical sections, X10. Locality 31, northeastern shore. Hypotypes, GSC Nos. 30428, 30429.

Figure 9. *Clathrodictyon drummondense* Parks. Vertical section, X10. Locality 25, upper beds. Hypotype, GSC No. 30430.

Fossil Hill Formation

Figure 10. *Ecclimadictyon microvesiculosum* Riabinin. Vertical section, X10. West shore of Colpoy Bay north of Colpoy Village, Bruce Peninsula, Ontario. Hypotype, GSC No. 30431.

Plate III



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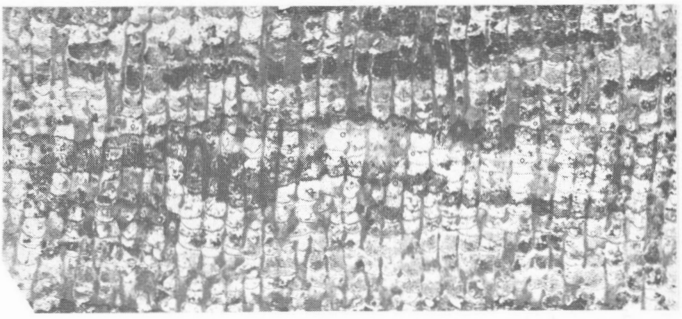

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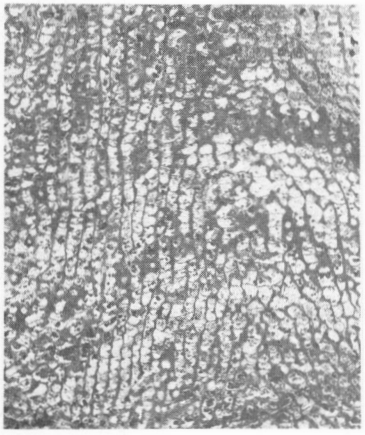

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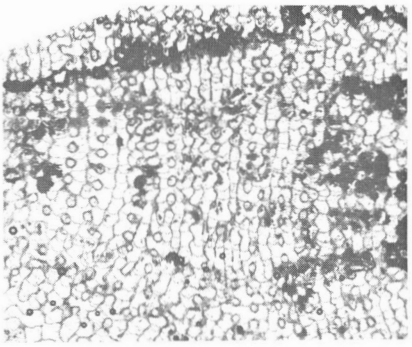

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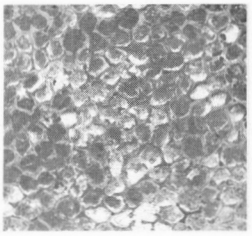

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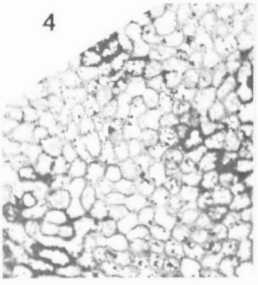

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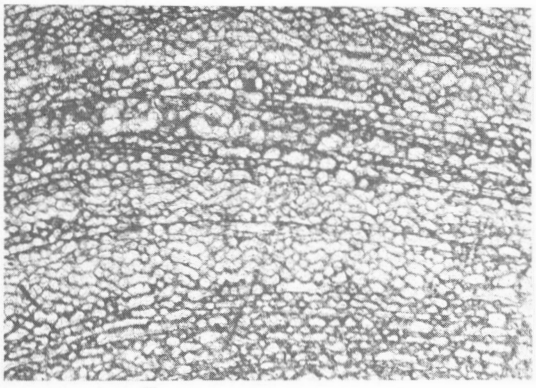

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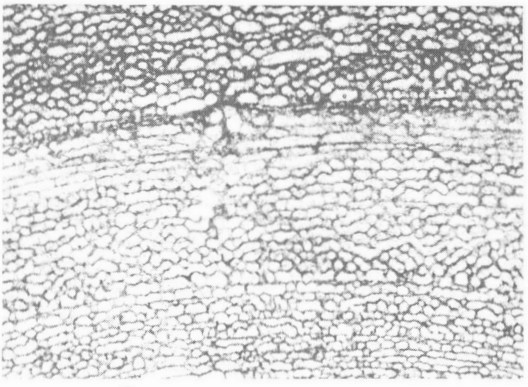

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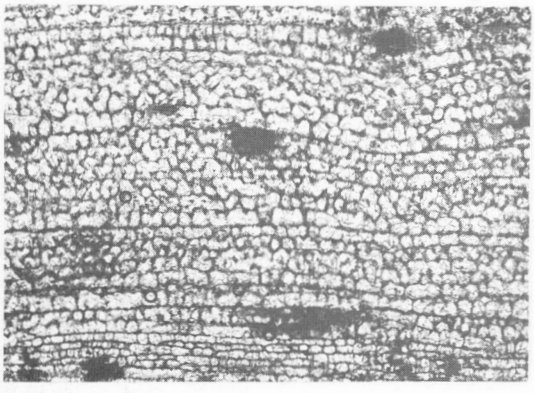


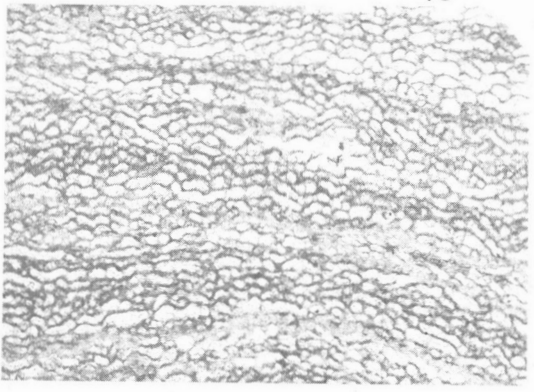


PLATE IV

Thornloe Formation

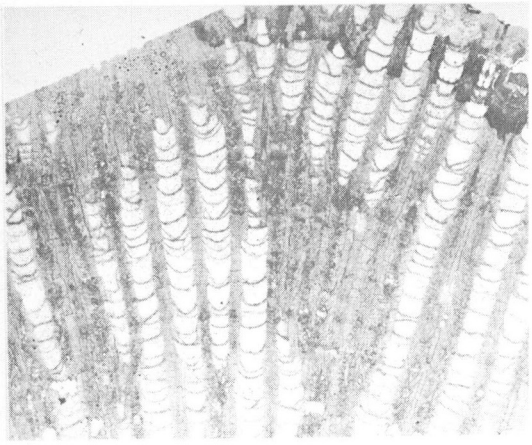
Figures 1, 2. Heliolitid undet. Longitudinal and transverse sections, X4. Locality 31, northeastern shore. Hypotype, GSC No. 30432.

Figure 3. *Syringopora verticillata* Goldfuss. Surface of colony, X1. Mann Island (GSC loc. 2783). Hypotype, GSC No. 30433.

Figure 4. *Michelinoceras* sp. Vertical section in fossiliferous oolite, X4. Locality 3, upper oolite bed. Fig. spec., GSC No. 30434.

Figures 5, 6. *Strombodes* sp. Transverse and longitudinal sections, X2. Locality 31, northeastern shore. Fig. spec., GSC No. 30435.

Figure 7. *Syringopora* sp. cf. *S. retiformis* Billings. Longitudinal section, X4. Locality 25, northwest corner of quarry. Hypotype, GSC No. 30436.



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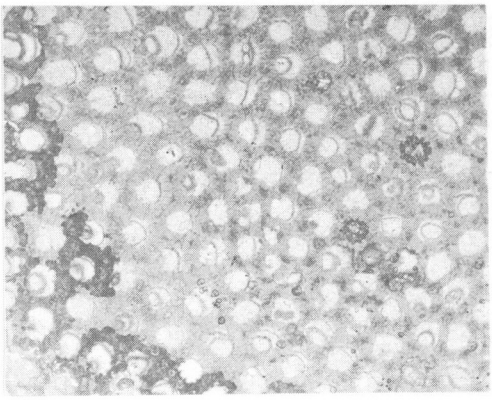

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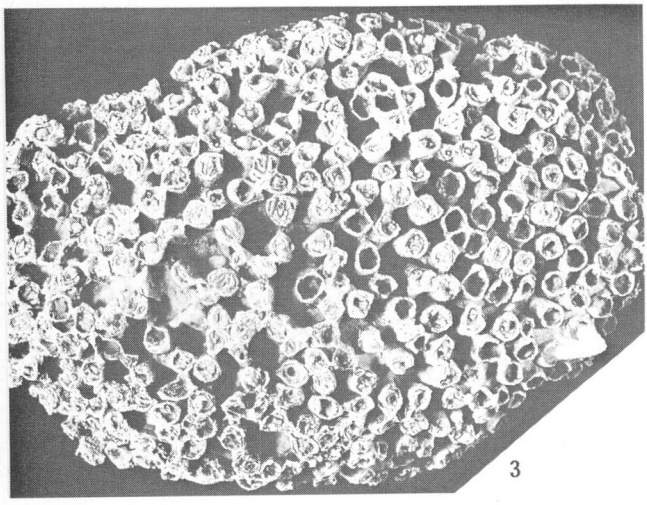

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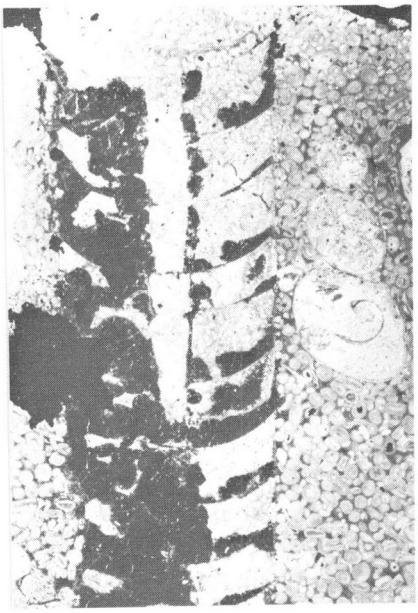

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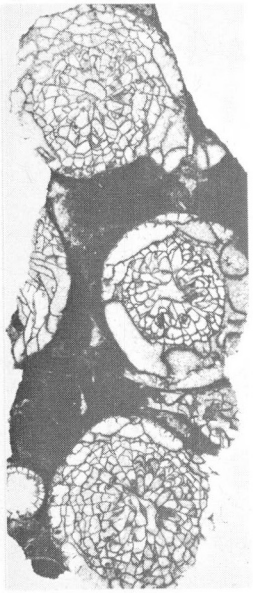

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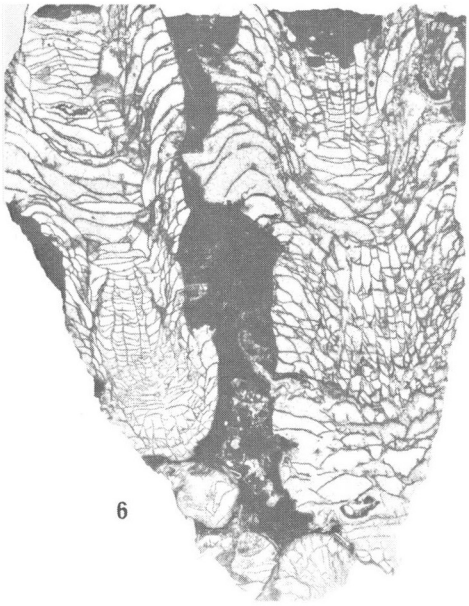

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PLATE V

Thornloe Formation

Figures 1, 6, 7. *Brachyprion* sp. aff. *B. robustum* Twenhofel. Pedicle views, X2. Locality 3. Hypotypes, GSC Nos. 30437-30439.

Figures 2, 3. *Alispira lowi* (Whiteaves). Brachial views, X2. Limestone rapids, Fawn River, Hudson Bay Lowland, and same locality as fig. 1. Syntype, GSC No. 4403; hypotype, GSC No. 30440.

Figure 4. *Otarion* sp. Incomplete cephalon, X4. Locality 31, west shore near northwest point. Fig. spec., GSC No. 30441.

Figure 5. *Zygospiraella* sp. Brachial view (with "*Leperditia*" *fabulina* Jones and *Zygobolba* sp. ostracodes), X2. Locality 3, upper oolite bed. Fig. spec., GSC No. 30442.

Figures 8, 9, 11, 12, 14. "*Atrypa*" *parva* Hume. Side, anterior, brachial, pedicle, and brachial views, X1. Locality 31. Hypotypes, GSC Nos. 20615, 20614, 20617.

Figure 10. *Leptostrophia*(?) sp. Pedicle interior view, X1. Locality 3, beds below stromatolites, associated with ostracode *Apatobolbina* sp. Fig. spec., GSC No. 30443.

Figure 13. "*Leperditia*" *hisingeri* Schmidt. Right valve, X2. Locality 3, oolite beds. Hypotype, GSC No. 26340.

Figures 15, 16, 22. *Oonoceras*(?) sp. Ventral, lateral (venter right) and septal (venter up) views, X1. Locality 31, northwestern point in *Protaxocrinus* beds. Fig. spec., GSC No. 30444.

Figure 17. *Dictyonema* sp. X1. Same locality as fig. 15. Fig. spec., GSC No. 30445.

Figure 18. *Diacalymene* sp. Incomplete cranidium, X2. Same locality as fig. 15. Fig. spec., GSC No. 30446.

Figure 19. "*Leperditia*" *fabulina* Jones. Lateral view of right valve, X3. Locality 3. Hypotype, GSC No. 26336.

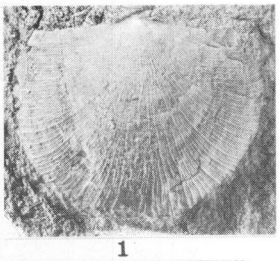
Figures 20, 25. Oonoceras(?) sp. Lateral views, X2. Locality 3, upper oolite bed. Fig. specs., GSC Nos. 30447, 30448.

Figure 21. *Discosorus humei* Foerste. X1. Ventral view showing pronounced flattening of siphuncle segments similar to *D. megistos* Flower. Same locality as fig. 4. Hypotype, GSC No. 30449.

Figure 23. *Bolbibollia* sp. Left tecnomorphic valve, X25. Same locality as fig. 15. Fig. spec., GSC No. 30450.

Figure 24. *Encrinurus* sp. Nearly complete cranidium with pointed glabella, X2. Same locality as fig. 15. Fig. spec., GSC No. 30451.

Plate V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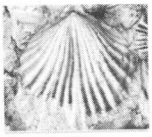
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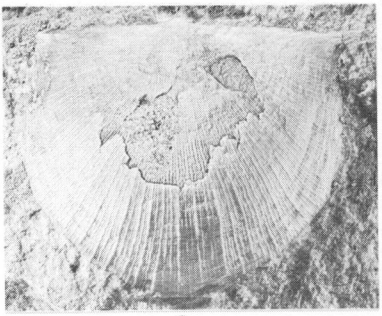
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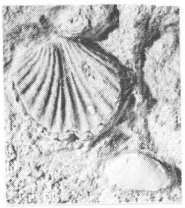
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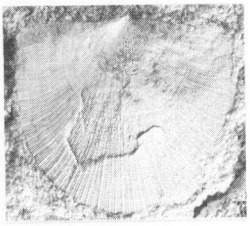
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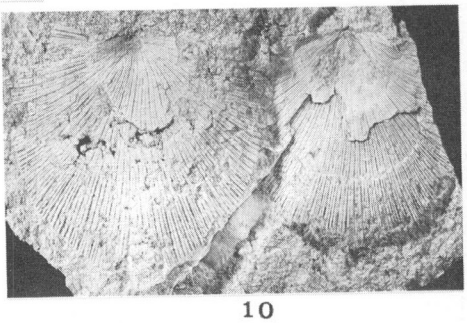
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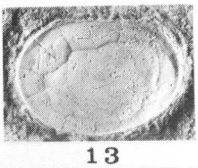
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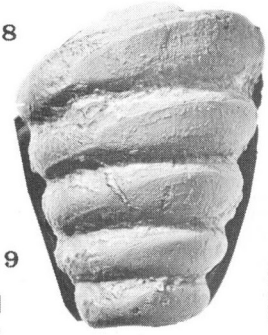
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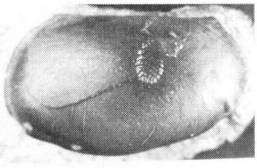
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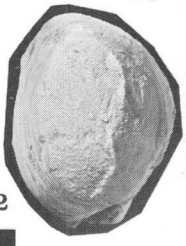
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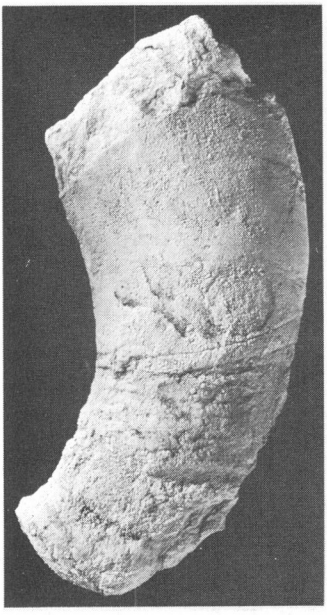
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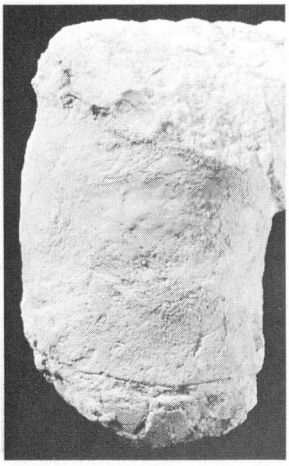
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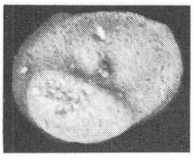
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PLATE VI

Thornloe Formation

Figures 1, 9. Sponge undet. Form and polished surface, X1 and X2. Locality 31, northwestern point in *Protaxocrinus* beds. Hypotype, GSC No. 30452.

Figures 2, 6, 7, 12. *Pentameroides subrectus* (Hall and Clarke). Pedicle, side, and posterior views, X1 and X2. Same locality as fig. 1 and west shore near northwestern point (associated with *Zygobolba twenhofeli*(?) Ulrich and Bassler). Hypotypes, GSC Nos. 30453-30456.

Figures 3, 10. *Protaxocrinus amii* Bolton. X3 and X2. Same locality as fig. 1. Holotype, GSC No. 24520; paratype, GSC No. 24522.

Figures 4, 5. *Discosorus humei* Foerste. X1. Locality 31, halfway along east shore. Hypotype, GSC No. 30457; syntype, GSC No. 8710.

Figures 8, 13, 14. *Eocoelia* sp. Pedicle and brachial views, X2 and X4. Locality 8, Dawson Point wharf area. Fig. specs., GSC Nos. 30458-30460.

Fossil Hill Formation

Figure 11. *Pentameroides subrectus* (Hall and Clarke). Pedicle view, X1. Corner of Manitowaning-South Baymouth and The Slash roads, Manitoulin Island, Ontario (GSC loc. 70815). Hypotype, GSC No. 30461.

Plate VI

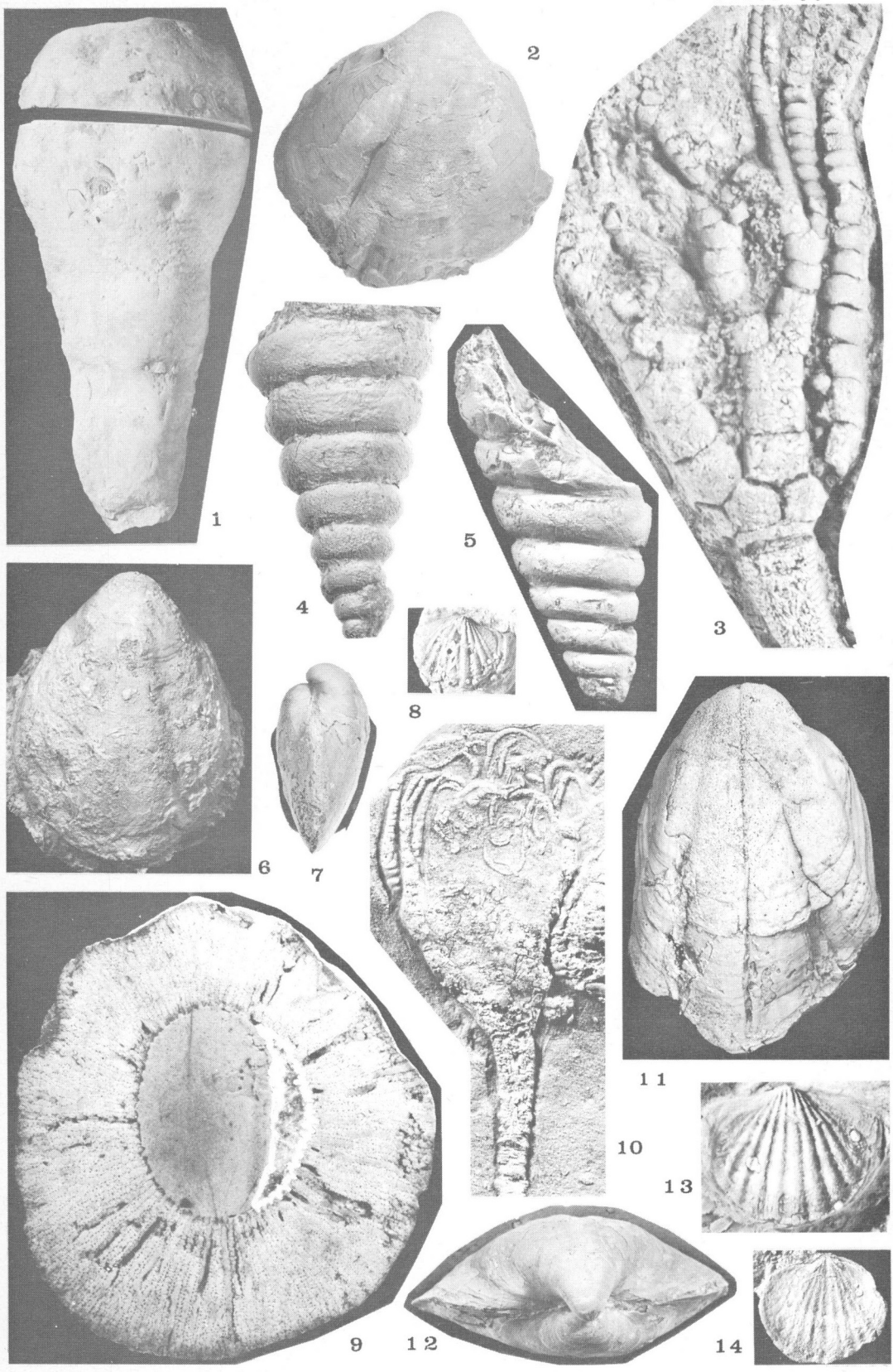


PLATE VII

Thornloe Formation

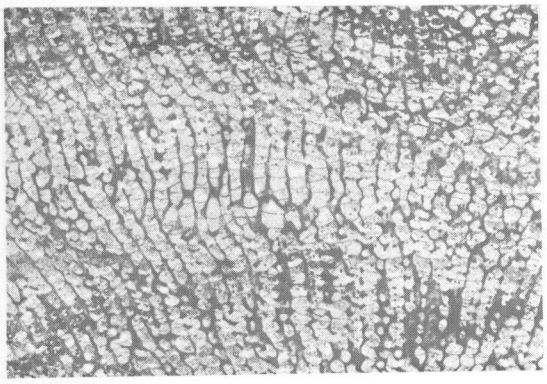
Figures 1, 2. *Palaeofavosites* sp. Longitudinal and transverse sections, X4. Locality 25, upper beds. Fig. spec., GSC No. 30462.

Figures 3-8. *Favosites* spp. Transverse and longitudinal sections, X2. Locality 8, just east of wharf, and locality 25, quarry and road-cut. Fig. specs., GSC Nos. 30463-30465.

Figures 9, 10. *Catenipora* sp. Longitudinal and transverse sections, X2. Locality 10, roadside exposure. Fig. spec., GSC No. 30466.

Figure 11. *Hormotoma* sp. Thin-section of fossiliferous oolite, X10. Locality 3. Fig. spec., GSC No. 30467.

Plate VII



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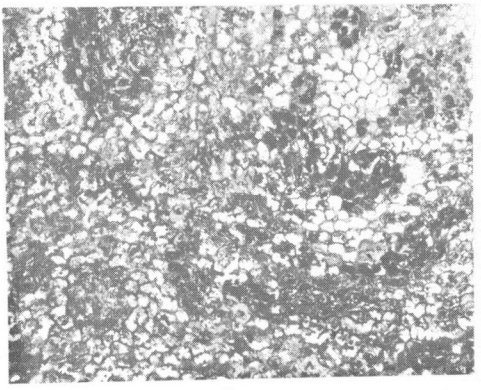

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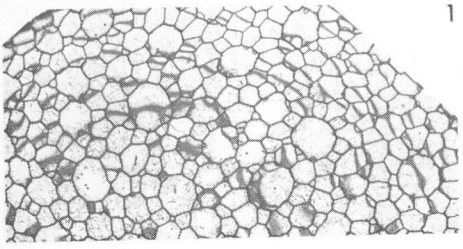

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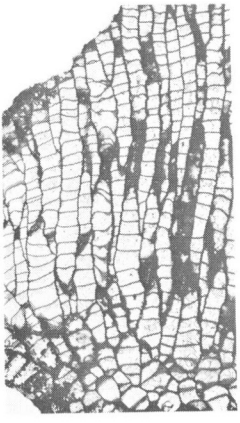

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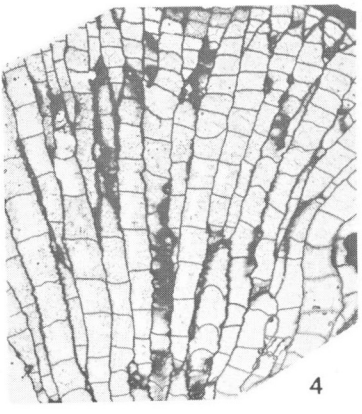

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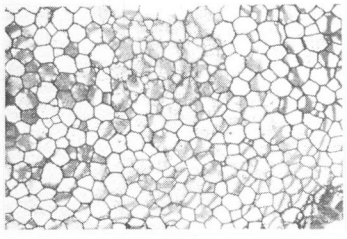

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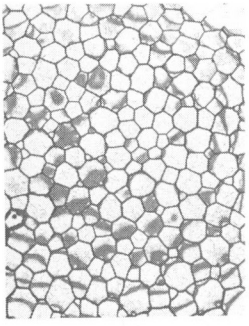

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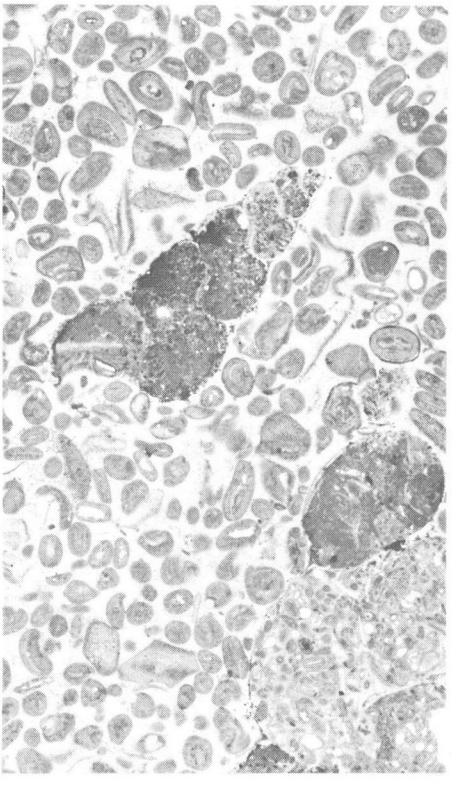

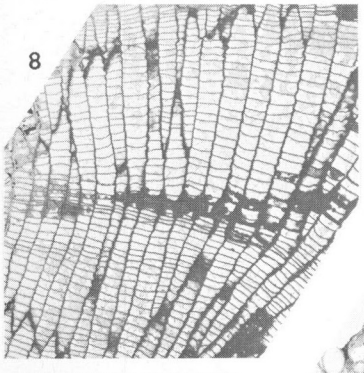

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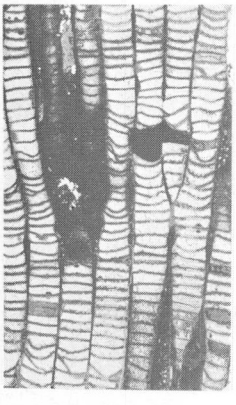

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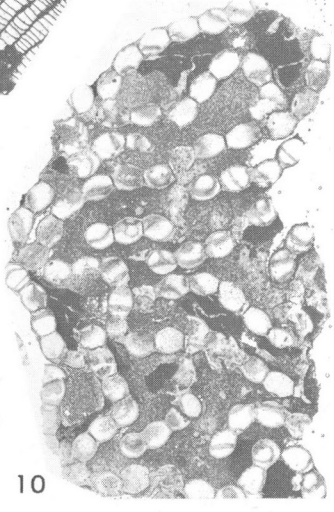

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PLATE VIII

Thornloe Formation

Figures 1, 2. *Cheirurus* sp. aff. *C. welleri* Raymond. Incomplete cranidia, X2. Locality 31, northwestern point in *Protaxocrinus* beds. Fig. specs., GSC Nos. 30468, 30469.

Figures 3, 17. *Dolerorthis* sp. Brachial and pedicle views, X3 and X1. Same locality as fig. 1 and Locality 7, upper 6 feet. Fig. specs., GSC Nos. 30470, 30471.

Figure 4. Pelecypod undetermined. Right valve, X2. Locality 8, Dawson Point. Fig. spec., GSC No. 30472.

Figures 5, 6. *Acernaspis* sp. Incomplete cranidia, X3 and X4. Same locality as fig. 1. Fig. specs., GSC Nos. 30473, 30474.

Figure 7. *Zygobolba logani* Copeland. Right tecnomorphic valve, X15. Locality 7, upper beds. Holotype, GSC No. 26318.

Figure 8. *Leptostrophia* sp. Brachial interior view, X2. Same locality as fig. 1. Fig. spec., GSC No. 30475.

Figures 9, 10. *Antirhynchonella* sp. Brachial and anterior views, X2. Same locality as fig. 7. Fig. spec., GSC No. 30476.

Figure 11. *Cornulites* sp. X10. Same locality as fig. 7. Fig. spec., GSC No. 30477.

Figure 12. *Stegerhynchus*(?) sp. Pedicle view, X2. Locality 25, road-cut opposite northwestern corner of quarry. Fig. spec., GSC No. 30478.

Figure 13. *Resserella*(?) sp. Pedicle view, X2. Same locality as fig. 7. Fig. spec., GSC No. 30479.

Figures 14, 20. *Leptostrophia* (*Eostropheodonta*) sp. Brachial interior and pedicle views, X1 and X2. Locality 25, bottom of quarry northeast corner. Fig. specs., GSC Nos. 30480, 30481.

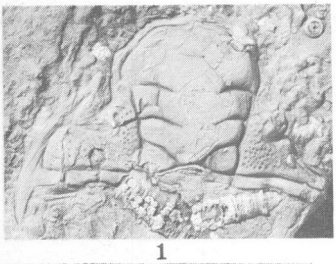
Figure 15. *Macnamaratylus murrayi* Bolton. Crown and column, X2. Same locality as fig. 14. Holotype, GSC No. 24524.

Figures 16, 18. *Naticonema* sp. cf. *N. niagarense* (Hall). Abapertural and inclined apical views, X1. Same locality as fig. 7. Fig. spec., GSC No. 30482.

Figure 19. Chonetid aff. *Strophochonetes* sp. Brachial interior view, X2. Same locality as fig. 14. Fig. spec., GSC No. 30483.

Figures 21, 22. *Brachyprion* sp. Posterior showing abbreviated socket ridges and pedicle views, X1. Same locality as fig. 14. Fig. spec., GSC No. 30484.

Plate VIII



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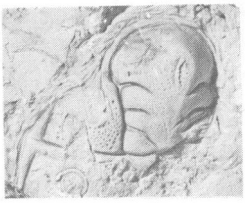

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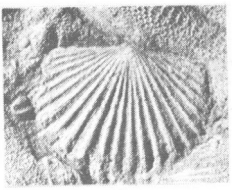

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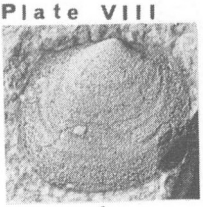

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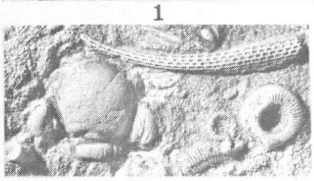

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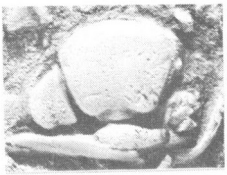

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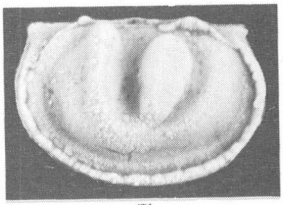

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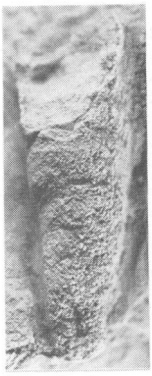

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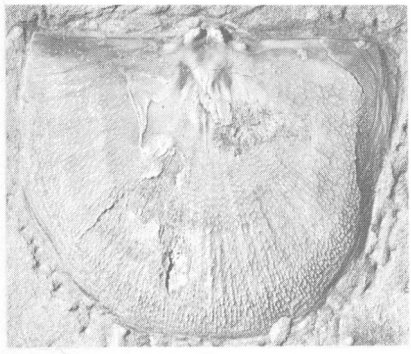

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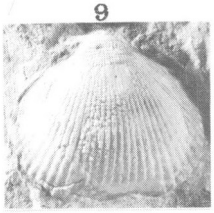

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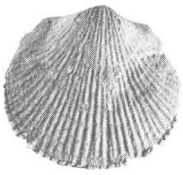

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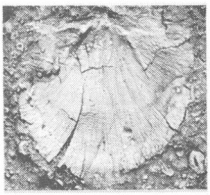

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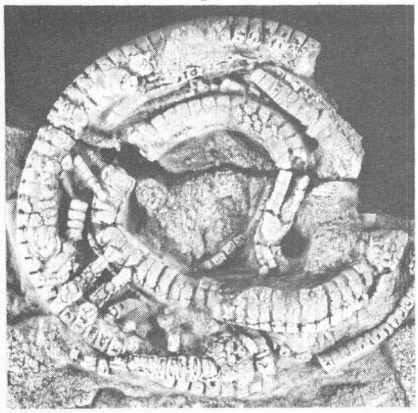

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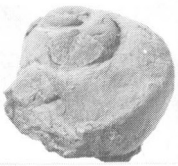

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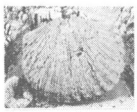

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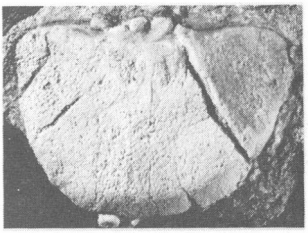

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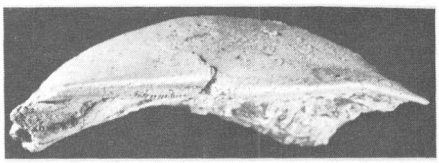

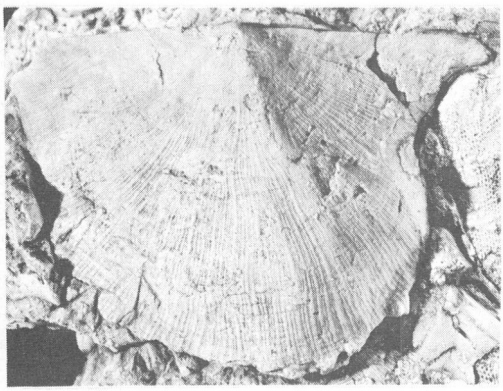

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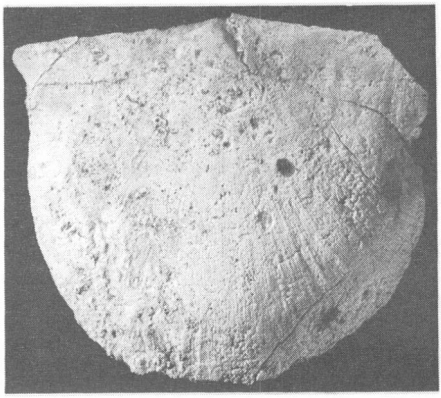


PLATE IX

Thornloe Formation

Figure 1. *Donacoceras arundineum* Foerste. Siphuncle, X1. Locality 21. Hypotype, GSC No. 30485.

Figure 2. Thlipsurid ostracode indet. Right lateral view of a carapace, X25. Locality 25, 5 feet below top of quarry. Fig. spec., GSC No. 26312.

Figures 3, 4. *Ketophyllum? rectus* (Hume). Weathered vertical interior and side views, X1. Locality 25. Hypotypes, GSC Nos. 30486, 30487.

Figure 5. *Stegerhynchus neglectum* (Hall). Brachial view, X2. Locality 25, top of quarry. Hypotype, GSC No. 30488.

Figures 6, 7, 18, 19. "*Rhynchotreta*" *cabotensis* Williams. Side, pedicle and brachial views of specimen with four costae on fold, and brachial view of specimen with three costae on fold (with *Cornulites* sp.), X4. Same locality as fig. 5. Hypotypes, GSC Nos. 30489, 30490.

Figure 8. *Stegerhynchus*(?) sp. Pedicle view of specimen with two costae in sinus, X2. Same locality as fig. 5. Fig. spec., GSC No. 30491.

Figures 9-11. *Stegerhynchus*(?) sp. Brachial and pedicle view of specimens with ill-defined fold and sinus, related to species illustrated in figs. 14-16, X2. Locality 25, bottom of quarry northeast corner. Hypotypes, GSC Nos. 30492-30494.

Figures 12, 13. *Zygobolba twenhofeli*(?) Ulrich and Bassler. Right heteromorphic and left tecnomorphic valves, X10. Same locality as fig. 2. Hypotypes, GSC Nos. 26310, 26308.

Figures 14-16. *Stegerhynchus*(?) sp. Anterior, brachial, and pedicle views of largest specimen with well-defined fold and sinus, X2. Same locality as fig. 9. Fig. spec., GSC No. 30495.

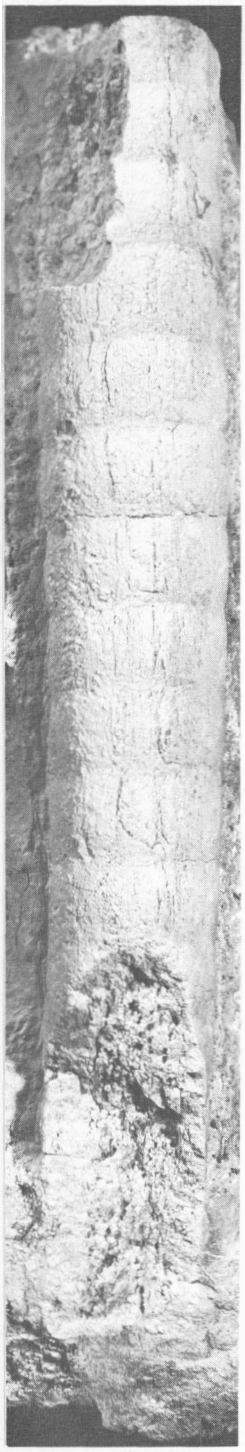
Figure 17. *Apatobolbina* sp. Left tecnomorphic valve, X20. Same locality as fig. 2. Fig. spec., GSC No. 26313.

Figures 20, 21. *Euomphalopterus* sp. Apical and apertural views, X1. Same locality as fig. 9. Fig. spec., GSC No. 30496.

Figure 22. "*Leperditia*" cf. "*L.*" *marginata* (Keyserling). Left lateral view, X3. Same locality as fig. 2. Hypotype, GSC No. 26334.

Figure 23. *Megadiscosorus crassisegmentatus* Foerste. X1. Armstrong tp., 3 miles north of Earlton. Holotype, GSC No. 8726.

Plate IX



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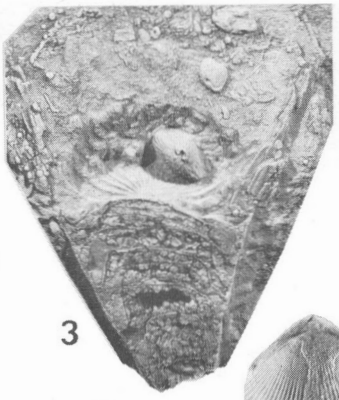

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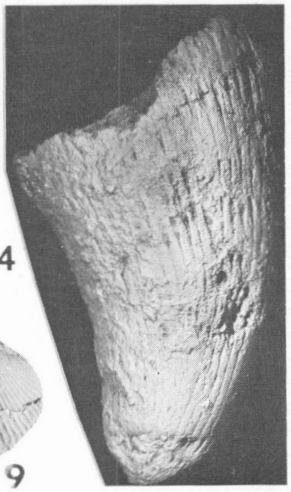

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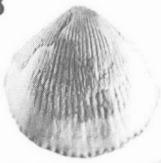

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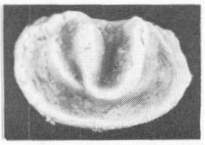

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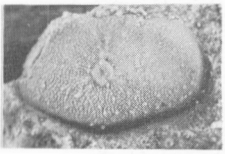

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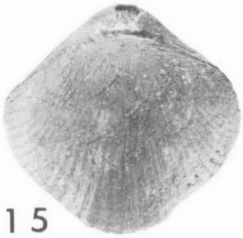

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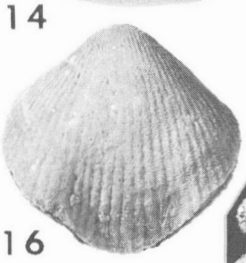

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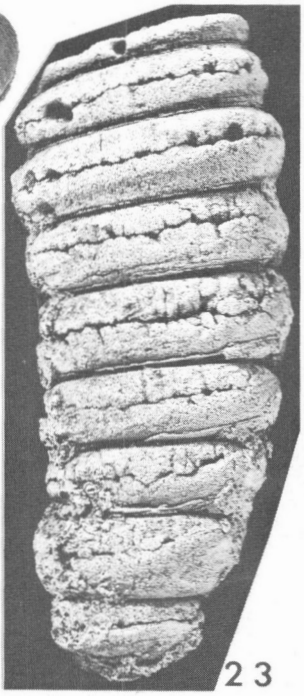

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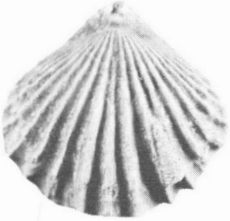

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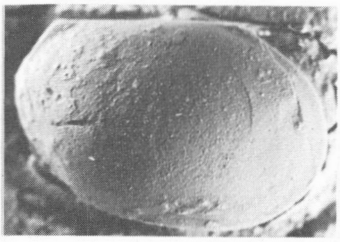

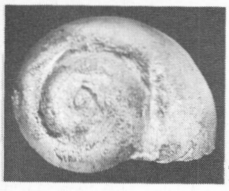

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PLATE X

Thornloe Formation

Figures 1, 5. *Donacoceras timiskamingense* Foerste. Siphuncles, X1. Armstrong Tp., 3 miles north of Earlton and locality 25, road-cut opposite northwestern corner of quarry. Holotype, GSC No. 8043; hypotype, GSC No. 30497.

Figures 2, 6. *Diacalymene* sp. Incomplete cephalon and pygidium, X2. Locality 25, bottom of quarry, northeastern corner. Fig. specs., GSC Nos. 30498, 30499.

Figures 3, 4. *Scutellum* n. sp. Pygidia, X2. Same locality as fig. 2. Fig. specs., GSC Nos. 30500, 30501.

Figures 7, 8, 12, 15. *Encrinurus* sp. cf. *E. ornatus* Hall and Whitfield. Two pygidia with nine pleural lobes, six complete axial rings, and no terminal spine, X2; incomplete cephalon and thorax demonstrating tuberculation variation, X2; and nearly complete specimen with coarsely tuberculated cephalon, X1. Same locality as fig. 2. Hypotypes, GSC Nos. 30502-30505.

Figures 9, 10. *Stegerhynchus neglectum* (Hall). Pedicle and side views, X2. Locality 21. Hypotype, GSC No. 30506.

Figures 13, 16. *Donacoceras arundineum* Foerste. Portion of a siphuncle in weathered longitudinal section and siphuncle with three camerae, X1. Locality 25, northwest corner of quarry. Hypotypes, GSC Nos. 30507, 30508.

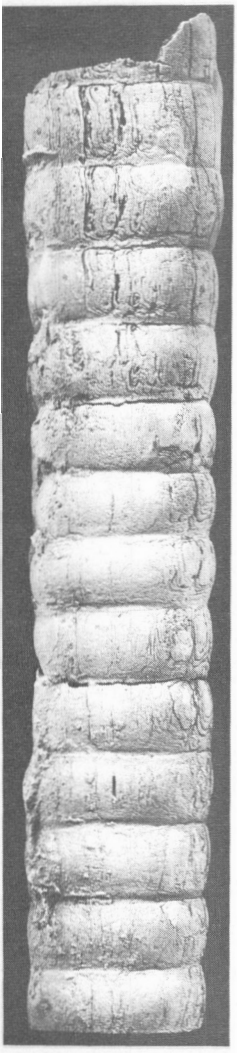
Figure 17. Proetid free cheek associated with *Encrinurus* sp. glabella, X2. Same locality as fig. 2. Fig. spec., GSC No. 30509.

Amabel Formation

Figure 11. *Scutellum* sp. Incomplete cranidium, X1. Road-cut west side opposite radio-tower, Owen Sound-Chatsworth Highway 6-10, Ontario. Fig. spec., GSC No. 30510.

Figure 14. *Scutellum laphami* (Whitfield). Incomplete left half of pygidium, X1. One-quarter mile east of corner of Providence Bay lighthouse road and Providence Bay-South Baymouth Highway, Manitoulin Island, Ontario (GSC loc. 27844). Hypotype, GSC No. 30511.

Plate X



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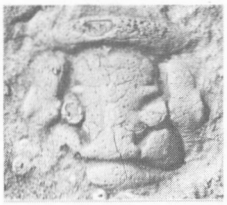

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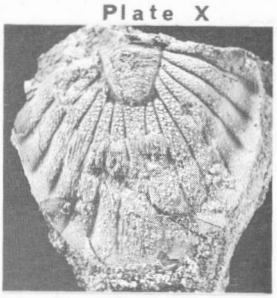

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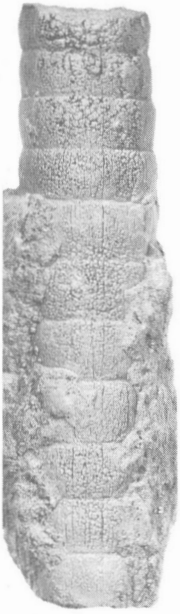

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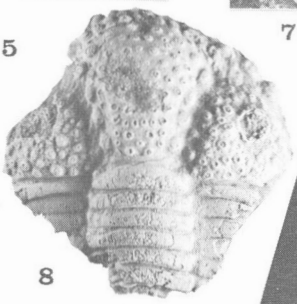

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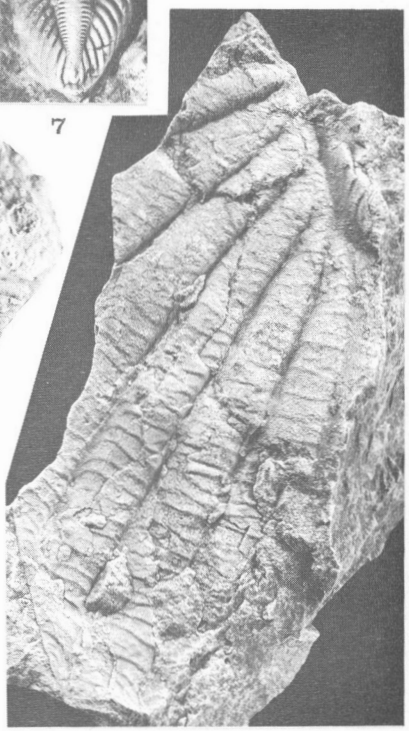

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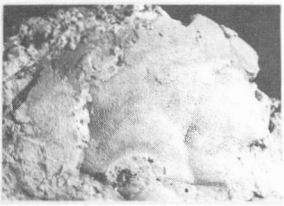

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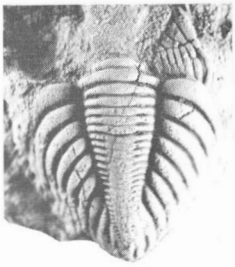

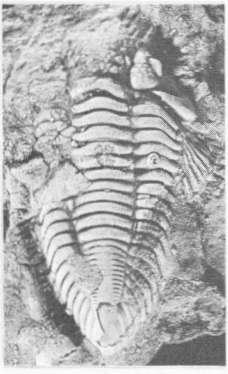

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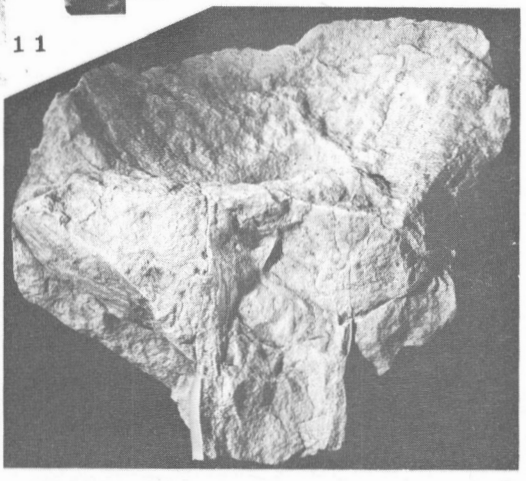

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PLATE XI

Thornloe Formation

Figure 1. *Catenipora* sp. Surface view, X2. Locality 10, abandoned quarry. Fig. spec., GSC No. 30511.

Figure 2. *Whitfieldella nitida* (Hall). Side view, X2. Same locality as fig. 1. Hypotype, GSC No. 30512.

Figure 3. *Cladopora*(?) sp. X2. Same locality as fig. 1. Fig. spec., GSC No. 30513.

Figure 4. *Favosites* sp. Side view of corallum with 3 mm diameter corallites, X2. Locality 11, upper 5 feet. Fig. spec., GSC No. 30514.

Figure 5. *Ptychophyllum*(?) sp. X2. Same locality as fig. 4. Fig. spec., GSC No. 30515.

Figure 6. *Catenipora huronensis* (Teichert). Surface view of corallum, X2. Same locality as fig. 4. Hypotype, GSC No. 30516.

Figure 7. "*Vermipora niagarensis* Rominger". X2. Same locality as fig. 4. Hypotype, GSC No. 30517.

Figure 8. *Mendacella*(?) sp. Pedicle view, X1. Same locality as fig. 1. Fig. spec., GSC No. 30518.

Figure 9. *Catenipora microporus* (Whitfield). Surface view, X2. Same locality as fig. 4. Hypotype, GSC No. 30519.

Figure 10. *Zygospiraella*(?) sp. Pedicle view, X2. Locality 2. Fig. spec., GSC No. 30520.

Figure 11. *Syringopora timiskamingensis* Hume. Side view of corallum, X1. Lake Timiskaming area. Holotype, GSC No. 9103.

Figure 12. *Cystiphyllum niagarense* (Hall). Weathered vertical interior, X1. Same locality as fig. 1. Hypotype, GSC No. 30521.

Figure 13. *Catenipora louisvillensis* (Stumm). Surface view, X1. Same locality as fig. 4. Hypotype, GSC No. 30522.

Figure 14. *Favosites* sp. Side view of corallum with 1 mm diameter corallites, X1. Same locality as fig. 4. Fig. spec., GSC No. 30523.

Figure 15. *Stegerhynchus*(?) sp. Brachial view of specimen with three costae on fold, X2. Locality 11, lower 5 feet. Fig. spec., GSC No. 30524.

Figure 16. *Stegerhynchus*(?) *neglectum* (Hall). Pedicle view, X2. Locality 21. Hypotype, GSC No. 30525.

Figure 17. *Zygobolba logani* Copeland. Left and right tecnomorphic valves associated with a right tecnomorphic valve of *Bolbineossia didictyosa* Kesling, Heany, Kauffman, and Oden, X15. Same locality as fig. 15. Paratypes, GSC Nos. 26324,a; hypotype, GSC No. 26325.

Figure 18. "*Leperditia*" *caeca* Jones. Right lateral view of a valve immersed in liquid, X4. Same locality as fig. 15. Hypotype GSC No. 26335.

Figure 19. *Stokesoceras* sp. cf. *S. engadinense* Foerste. X1. Harley Tp., 1 mile southeast of Thornloe. Hypotype, GSC No. 8707.

Plate XI

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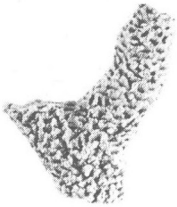

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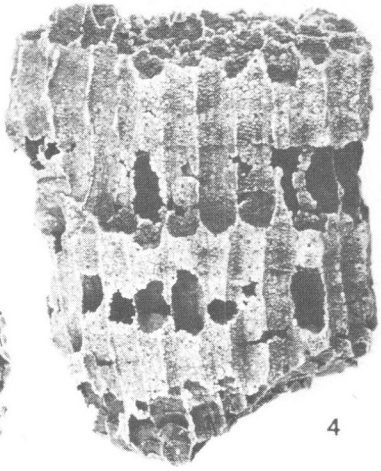

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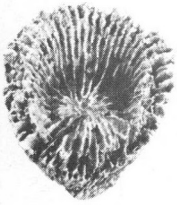

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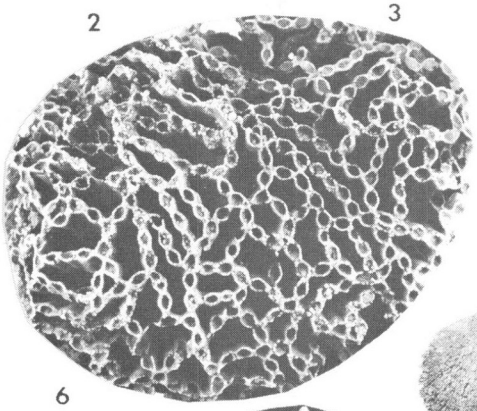

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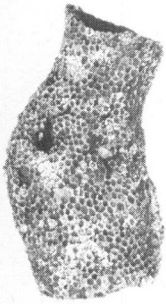

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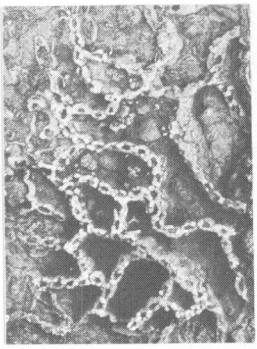

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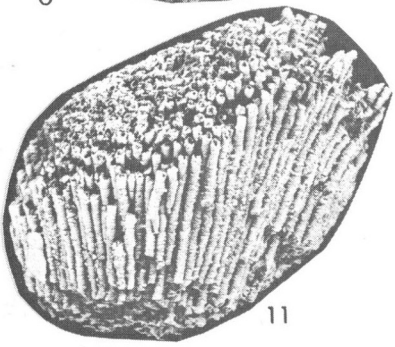

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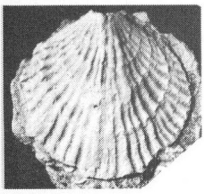

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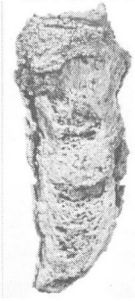

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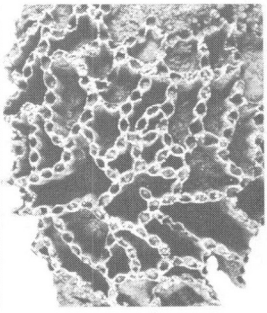

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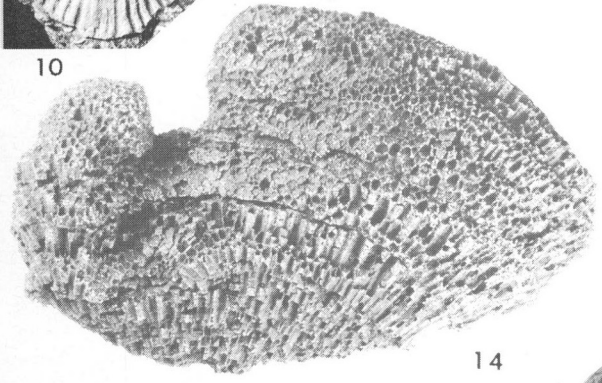

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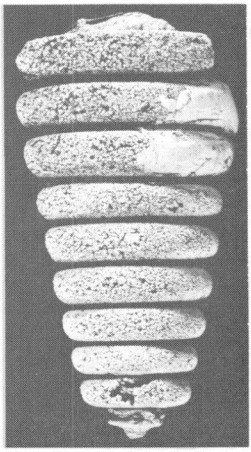

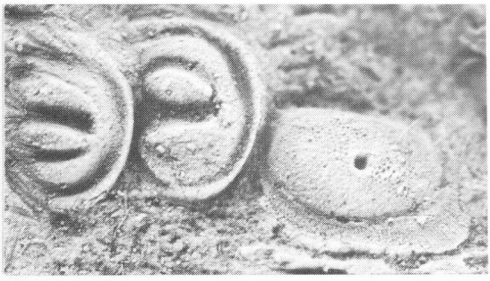

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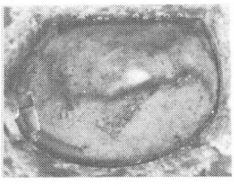

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PLATE XII

Thornloe Formation

Figure 1. *Favosites hispidus* Rominger. Surface view of corallum, X2. Locality 11, upper 5 feet. Hypotype, GSC No. 30526.

Figure 2. *Favosites* sp. Surface view of corallum with 3 mm diameter corallites, X1. Same locality as fig. 1. Fig. spec., GSC No. 30527.

Figure 3. *Arachnophyllum striatum* (d'Orbigny). Surface view of a single corallite, X1. Same locality as fig. 1. Hypotype, GSC No. 30528.

Figure 4. *Propora glabra* (Owen). Side view of a corallum, X1. Same locality as fig. 1. Hypotype, GSC No. 30529.

Figures 6, 10. *Coenites crassus* (Rominger). Surface views of two coralla, X2 and X1. Same locality as fig. 1. Hypotypes, GSC Nos. 30530, 30531.

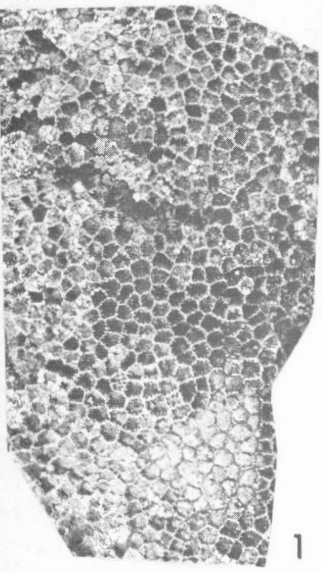
Figures 7, 8. *Syringopora dalmanii* Billings. Side and surface views of two coralla, X1 and X2. Head of Lake Timiskaming, Ontario, and same locality as fig. 1. Holotype, GSC No. 2618; hypotype, GSC No. 30532.

Figure 9. *Dolerorthis* sp. X1. Locality 2. Fig. spec., GSC No. 30533.

Figure 11. *Arachnophyllum pentagonum* (Goldfuss). Surface view of a corallum, X2. Same locality as fig. 1. Hypotype, GSC No. 30534.

Fossil Hill Formation

Figure 5. *Propora glabra* (Owen). Side view of a corallum, X1. Hillside section con. XIV-XV road northeast of The Slash, Manitoulin Island, Ontario. Hypotype, GSC No. 30535.



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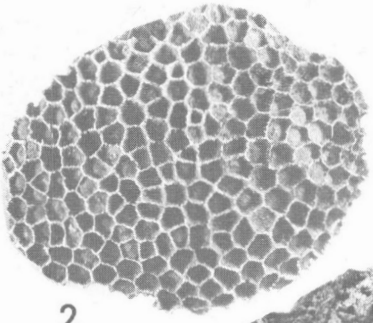

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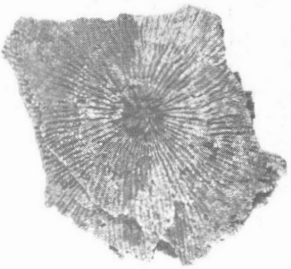

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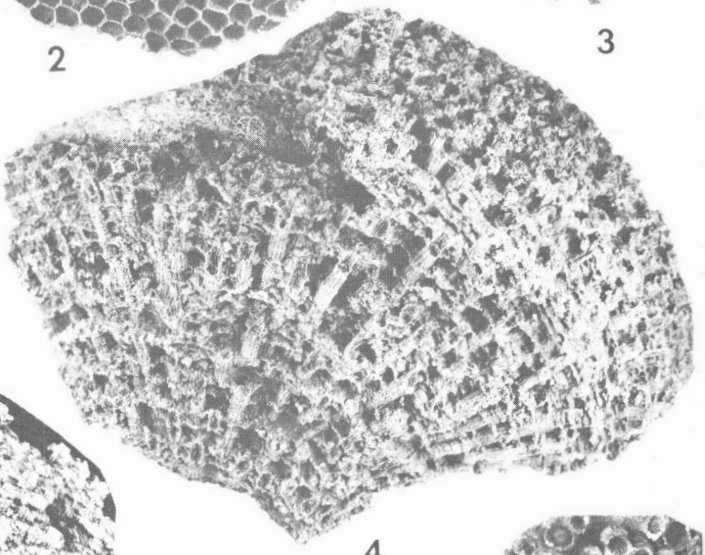

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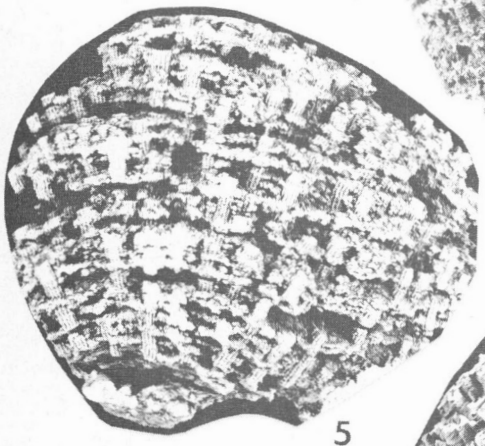

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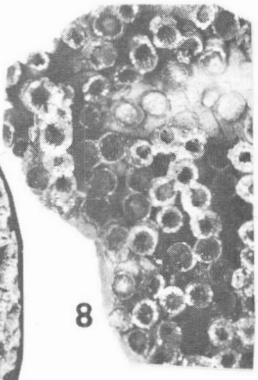

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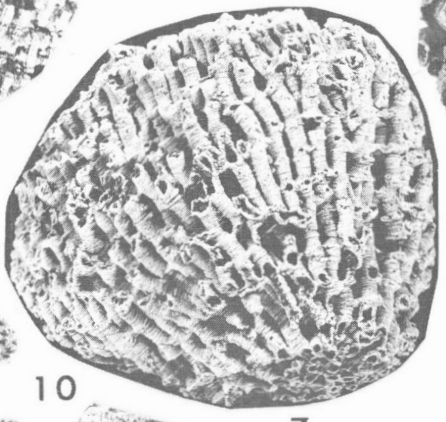

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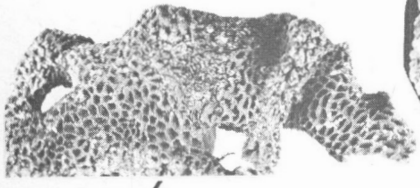

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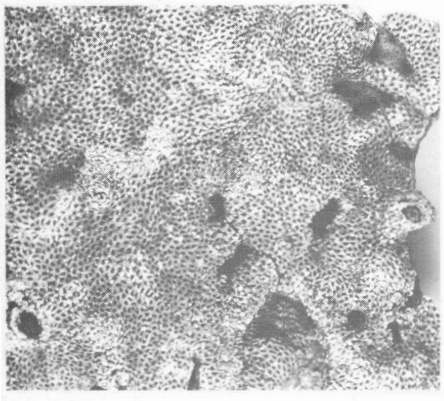


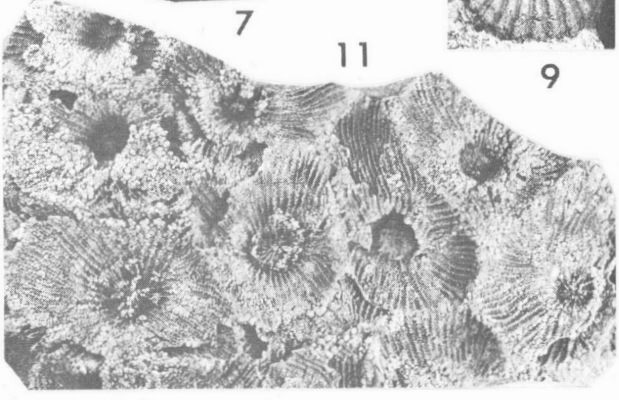


PLATE XIII

Thornloe Formation

Figures 1, 24. *Huroniella timiskamingensis* Foerste. X1. Harley Tp., 1 mile southeast of Thornloe, and locality 9. Holotype, GSC No. 8705; hypotype, GSC No. 30536.

Figures 2, 6, 8. *Plicostricklandia* n. sp. aff. *P. manitouensis* (Williams). Pedicle views, X1. Locality 1. Hypotypes, GSC Nos. 30537-30539.

Figures 3, 16, 21. *Antirhynchonella* sp. Posterior, pedicle, and side views, X1. Locality 1. Fig. specs., GSC Nos. 30540, 30541.

Figure 4. *Kionoceras* sp. cf. *K. loxias* (Hall). Portion of a large phragmocone, X1. Locality 1. Hypotype, GSC No. 30542.

Figures 7, 9, 13, 19. *Plicostricklandia multilirata* (Whitfield). Posterior, pedicle, and anterior of an incomplete steinkern, and pedicle views, X1. Locality 2. Hypotypes, GSC Nos. 30543, 30544.

Figures 10, 11. *Pentameroides* sp. Posterior and brachial views, X1. Locality 2. Fig. spec., GSC No. 30545.

Figure 12. *Amphicoelia* sp. Left valve, X1. Locality 2. Fig. spec., GSC No. 30546.

Fossil Hill Formation

Figure 5. *Kionoceras* sp. cf. *K. loxias* (Hall). X1. Junction of Manitowaning-South Baymouth and The Slash roads, lot 4, con. II, Assiginack Tp., Manitoulin Island, Ontario (GSC loc. 70815). Hypotype, GSC No. 30547.

Amabel Formation

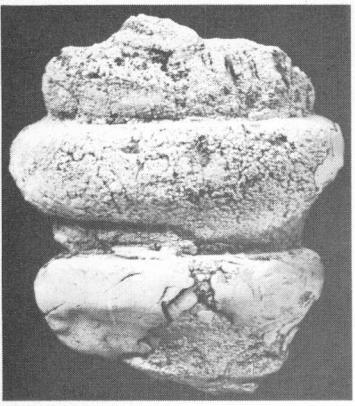
Figures 14, 15. *Plicostricklandia multilirata* (Whitfield). Brachial views, X1. North-south road west of Lake Wolsley, Manitoulin Island, Ontario. Hypotypes, GSC Nos. 30548, 30549.

Guelph Formation

Figures 17, 18, 25. *Plicostricklandia castellana* (White). Pedicle, anterior, and side views of three valves, X1. East-west trail about 1¼ mile east of Michaels Bay, Manitoulin Island, Ontario (GSC loc. 30876). Hypotypes, GSC Nos. 30550, 30551.

Figures 20, 22, 23. *Antirhynchonella* sp. Pedicle and side views, X1. Same locality as fig. 17 and Michaels Bay road (GSC loc. 32439), Manitoulin Island, Ontario. Fig. specs., GSC Nos. 30552, 30553.

Plate XIII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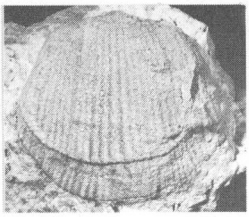
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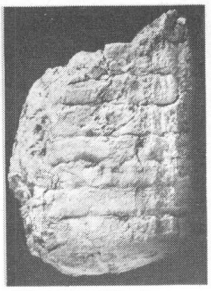
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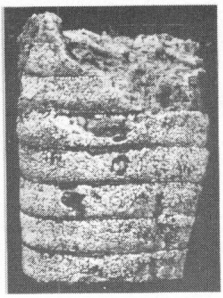
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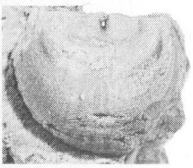
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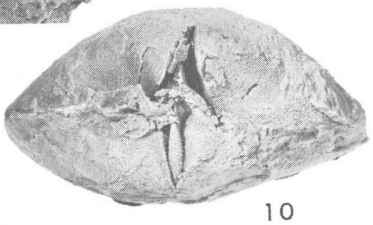
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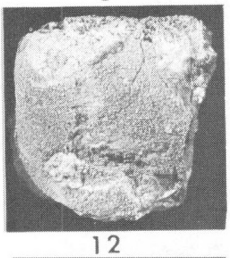
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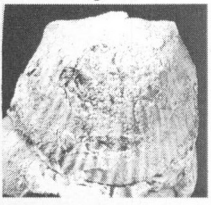
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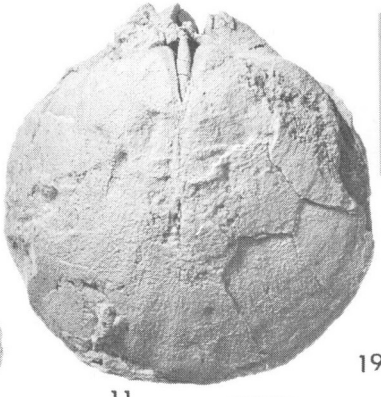
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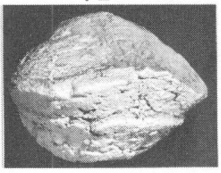
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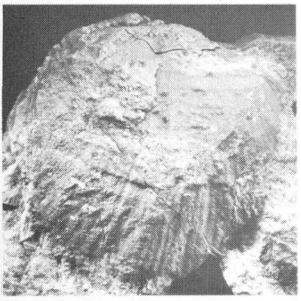
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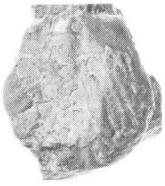
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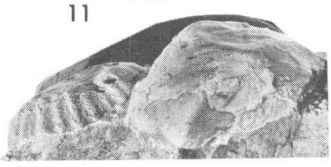
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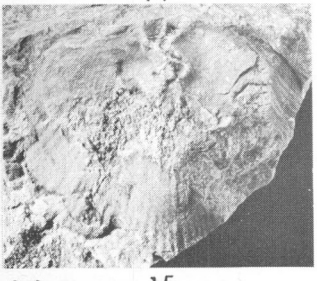
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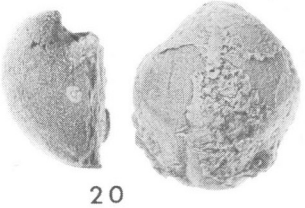
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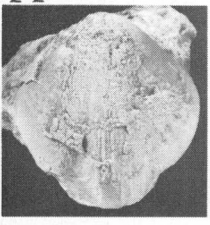
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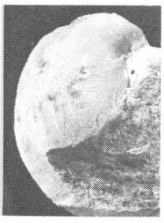
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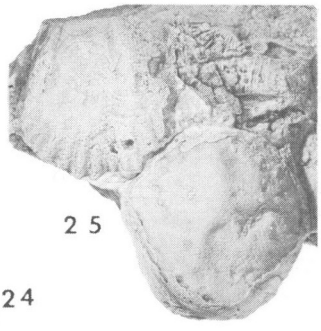
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