

SUMMARY OF CONODONT BIOSTRATIGRAPHY OF THE READ BAY FORMATION
AT ITS TYPE SECTIONS AND ADJACENT AREAS,
EASTERN CORNWALLIS ISLAND, DISTRICT OF FRANKLIN

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Introduction

Thorsteinsson and Fortier (1954) introduced the term Read Bay Formation, and subdivided the formation into four informal members: A, B, C and D, in ascending order. The type sections of members A and B were located at Goodsir Creek, eastern Cornwallis Island, whereas those of members C and D were located some 23 km to the north, in an unnamed creek entering the southwestern side of Read Bay (Thorsteinsson, 1958, p. 49, 64, 65, 69). The type sections and other collecting sites are shown on Figure 41.1. Thorsteinsson (in Thorsteinsson and Tozer, 1970, p. 558, 559) gave the following summary account of the Read Bay Formation at its type sections: "Member A, 1875 feet [571.5 m] of mainly thin bedded argillaceous limestone alternating with generally thick bedded biostromal and fossil fragmental limestone; Member B, 60 to 100 feet [18.3-30.5 m] of shale and minor sandstone; Member C, 3775 feet [1150.6 m] of beds similar to Member A, but with biostromal and biohermal developments that are thicker and commonly dolomitized;

Member D, about 1800 feet [548.6 m] of alternating red calcareous sandstone and argillaceous limestone." Subsequently, the lower beds of member A at its type section have been assigned to the Cape Storm Formation of Kerr (1975), and the base of member A now is drawn at the base of lithologic unit no. 46 of Thorsteinsson (1958, p. 51) (Thorsteinsson, pers. comm., Dec. 1976). At Goodsir Creek, the revised thicknesses of members A and B are 335.4 and 64.9 m, respectively (Thorsteinsson, pers. comm., March 1977). For the most recent account on the geology of Cornwallis Island, the reader is referred to Thorsteinsson and Kerr (1968).

In 1968, the writer collected from some of the localities at Goodsir Creek reported herein (GSC locs. 83335-83349) (see McGregor and Uyeno, 1969). Material from all other localities was provided by and collected over a period of several field seasons by R. Thorsteinsson.

The conodont faunas summarized herein are discussed in full taxonomy by Uyeno and Thorsteinsson (in prep.). The writer is indebted to Dr. Thorsteinsson for access to the stratigraphic information contained in that manuscript.

Previous Conodont Studies

Previous investigations of conodonts in strata equivalent in time to the type Read Bay Formation include the following: Weyant's (1971) study of member C, Read Bay Formation, south of Laura Lakes (Fig. 41.1), and the Douro Formation east of Camp Creek and in an area north of Prince Alfred Bay, both on Devon Island. Conodont species from these localities were listed (Weyant, 1971, Table 8, p. 40). Of the three critical platform elements (all spathognathodontan) on the list, only one was illustrated and described. Correlation of Weyant's faunas with those of the present report, consequently, is extremely difficult. Mirza (1976) studied the conodonts of the Cape Storm and Cape Phillips formations at Vendom Fiord, southwestern Ellesmere Island. In that study, parts of the Cape Phillips Formation are shown as correlatives of the Douro Formation (in revised sense, allowing for the Cape Storm Formation; Fig. 4, p. 12, Sec. B, p. 191-193) but, unfortunately, no conodonts were recovered from this interval.

Conodont Biostratigraphy

The conodont biostratigraphy of parts of the Read Bay Formation and its subjacent unit, the Cape Storm Formation, at Goodsir Creek and the Read Bay area, is summarized in Figure 41.2. In the following discussion, all morphotypes of *Ozarkodina confluens* (Branson and Mehl) are those of Klapper and Murphy (1974). The figured specimens are in the collections of the Geological Survey of Canada, Ottawa.

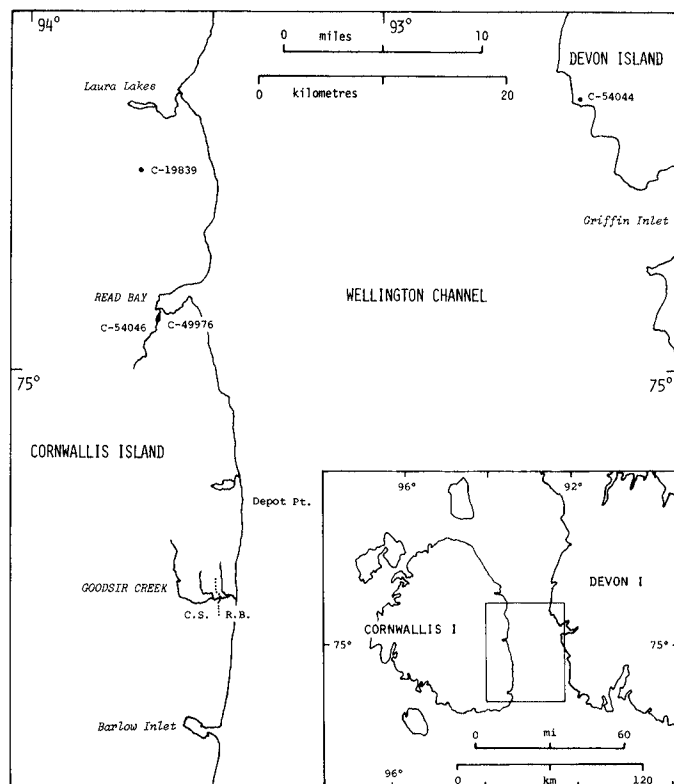
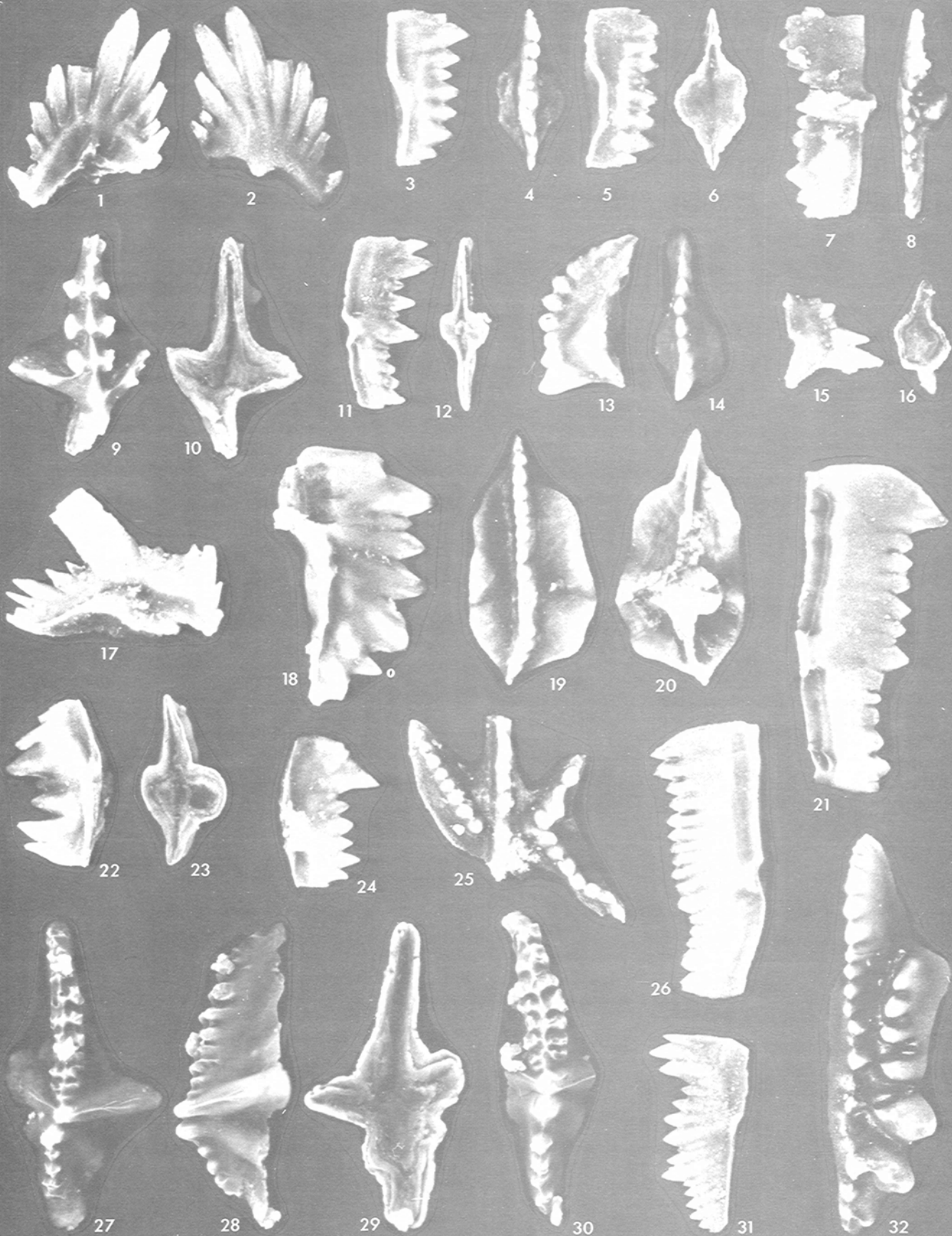


Figure 41.1. Index map showing the collecting sites of the Read Bay Formation on eastern Cornwallis and western Devon Islands. At Goodsir Creek, dotted line marks the boundary between the Cape Storm (C.S.) and Read Bay (R.B.) formations. Inset map shows the geographic position of the enlarged map.

PLATE 41.1

All figures x40. Figures 1, 2, 7 and 8 from Cape Storm Formation;
all others from Read Bay Formation on eastern Cornwallis Island

- Figures 1, 2. **Asymmetrical palmate element**
Posterior and anterior views, GSC 49769, Cape Storm Formation, Goodsir Creek, GSC loc. 83335.
- Figures 3-6. **Ozarkodina** cf. **O. eurekaensis** Klapper
3. Outer lateral view of a P element, GSC 49770.
 - 4-6. Upper, outer lateral and lower views of a P element, GSC 49771; both from member C, GSC loc. C-19839.
- Figures 7, 8. **Ozarkodina** cf. **O. n. sp. B** of Klapper (in Klapper and Murphy, 1974)
Outer lateral and upper views of a P element, GSC 49772, Cape Storm Formation, Goodsir Creek, GSC loc. 83343.
- Figures 9, 10. **Pedavis latialata** (Walliser)
Upper and lower views of an I element, GSC 49773, member C, Goodsir Creek, GSC loc. C-63576.
- Figures 11, 12. **Ozarkodina remscheidensis remscheidensis** (Ziegler)
Lateral and lower views of a P element, GSC 49774, member C, Read Bay area, GSC loc. C-54046.
- Figures 13, 14. **Pelekysgnathus** n. sp. A
Lateral and upper views of an I element, GSC 49775, member C, Goodsir Creek, GSC loc. C-19837.
- Figures 15, 16. **Pelekysgnathus** n. sp. B
Inner lateral and lower views of an I element, GSC 49776, member D, Read Bay area, GSC loc. C-49976.
- Figure 17. **Kockelella variabilis** Walliser
Inner lateral view of a Pb element, GSC 49777, member B, Goodsir Creek, GSC loc. 83349.
- Figure 18. **Ozarkodina confluens** (Branson and Mehl) morphotype γ of Klapper (in Klapper and Murphy, 1974)
Lateral view of a P element, GSC 49778, member C, Goodsir Creek, GSC loc. C-19837.
- Figures 19, 20. **Polygnathoides siluricus** Branson and Mehl
Upper and lower views of a P element, GSC 49779, member A, Goodsir Creek, GSC loc. C-63573.
- Figures 21, 26. **Ozarkodina** n. sp. A of Klapper (in Klapper and Murphy, 1974)
Lateral views of two P elements, GSC 49780 and 49781, respectively, both from member C, Goodsir Creek, GSC loc. C-63576.
- Figures 22-24. **Ozarkodina** n. sp. G.
- 22, 23. Inner lateral and lower views of a P element, GSC 49782.
 24. Outer lateral view of a P element, GSC 49783; both from member D, Read Bay area, GSC loc. C-49976.
- Figure 25. **Ancoradella ploeckensis** Walliser
Upper view of a P element, GSC 49784, member A, Goodsir Creek, GSC loc. 83347.
- Figures 27-30. **Pedavis** n. sp. T
- 27-29. Upper, outer lateral and lower views of an I element, GSC 49785.
 30. Upper view of an I element, GSC 49786; both from member C, Goodsir Creek, GSC loc. C-19837.
- Figure 31. **Ozarkodina confluens** (Branson and Mehl) morphotype α of Klapper (in Klapper and Murphy, 1974)
Lateral view of a P element, GSC 49787, member A, Goodsir Creek, GSC loc. 83348.
- Figure 32. **Ozarkodina** n. sp. B of Klapper (in Klapper and Murphy, 1974)
Upper view of a P element, GSC 49788, member A, Goodsir Creek, GSC loc. C-63573.



Cape Storm Formation

The lowest sampled interval of the Cape Storm Formation is 398.1 m below the top (GSC loc. 83335). This yielded a meagre conodont fauna which includes asymmetrical palmate elements (Pl. 41.1, figs. 1, 2). If this form were laterally skewed, it would resemble remotely the blade element of *Rhipidognathus symmetricus* Branson, Mehl and Branson, a Late Ordovician form (Kohut and Sweet, 1968). A similar form also is present in a sample from the Leopold Formation at the Port Leopold area in northeastern Somerset Island (GSC loc. C-30089), collected by B. Jones (see Jones and Dixon, 1975). At this stage, it is difficult to assess the biostratigraphic significance of the palmate form.

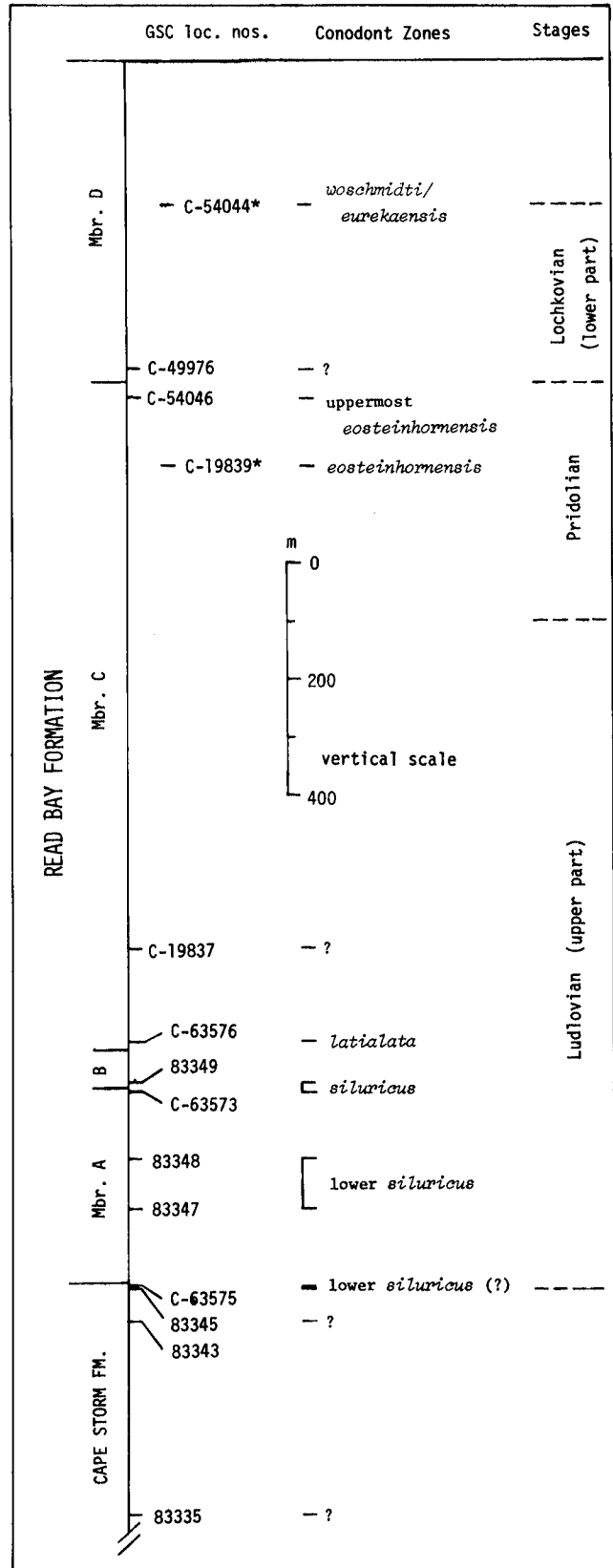
At the level of 9.1 m below the top of the Cape Storm Formation (GSC loc. 83345) is *Ozarkodina* n. sp. B of Klapper (in Klapper and Murphy, 1974) and 55.2 m below that (GSC loc. 83343), *O.* cf. *O.* n. sp. B (Pl. 41.1, figs. 7, 8) occurs. The later differs from *O.* n. sp. B only in the degree of development of accessory denticles on the inner side, and may be its progenitor. *Ozarkodina* n. sp. B was reported, in the Roberts Mountains Formation of Nevada, to be associated with *Polygnathoides siluricus* Branson and Mehl (Klapper and Murphy, 1974, p. 12, 15). Weyant (1971, Table 8, p. 40, sample 15836) also recorded its presence in the Douro Formation, 325 m above the base, east of Camp Creek on Devon Island. *Ozarkodina confluens* (Branson and Mehl) morphotype γ and *O. excavata excavata* (Branson and Mehl) occur at GSC locality C-63575, located 3.0 m below the top of the formation. In Nevada, the range of the former is from *Polygnathoides siluricus* Zone to *Pelekysgnathus index* fauna (i.e., about middle-late Ludlovian boundary to early Pridolian) (Klapper and Murphy, 1974, p. 16). On this basis, at least the upper 9.1 m of the Cape Storm Formation are considered to belong to the *siluricus* Zone.

Read Bay Formation

Member A. The lowest sample from member A that yielded conodonts is from 125.0 m above the base (GSC loc. 83347). This locality, and another which is 213.4 m above the base (GSC loc. 83348), yielded collections with *Ozarkodina confluens* morphotype α , *Ancoradella ploeckensis* Walliser and *Polygnathoides siluricus* (Pl. 41.1, figs. 25, 31). The overlap of the latter two zonal markers occurs in the lower part of the *siluricus* Zone at Cellon (Walliser, 1964, p. 97) and at Pete Hanson Creek IIE in Nevada (Klapper and Murphy, 1974, p. 12). At GSC locality C-63573, located 2.9 m below the top of member A, *Ozarkodina* n. sp. B of Klapper and *Polygnathoides siluricus* were recovered (Pl. 41.1, figs. 19, 20, 32), indicating that the *siluricus* Zone extends at least as high as this locality. Chitinozoans also were recovered from GSC locality 83348 (F.H. Cramer, pers. comm., Jan. 1970). By tracing the carbonate units northward into the graptolite-bearing shale facies of the Cape Phillips Formation on eastern Cornwallis Island, R. Thorsteinsson (pers. comm., March 1977) found that member A is entirely above the *fritschi-linearis* Zone.

Figure 41.2 (opposite)

Summary of conodont biostratigraphy of the Read Bay Formation at its type sections and the upper part of the Cape Storm Formation at Goodsir Creek. Localities with asterisk (*) are not from the type sections and their stratigraphic positions are only approximate.



Member B. The only sample of member B that yielded any conodonts is from 6.1 m above the base of the unit (GSC loc. 83349). The recovered fauna is poorly preserved, with only a few specimens that are sufficiently complete to allow identification. These specimens include the Pb (Pl. 41.1, fig. 17), M and Sa elements that can be assigned to *Kockelella variabilis* Walliser (apparatus G of Walliser, 1964; locational notation after Sweet and Schönlaub (1975), and adopted by Barrick and Klapper (1976)). The upper limit of the range of *K. variabilis* is the *siluricus* Zone (Walliser, 1964, p. 40, 56, 63), which suggests that the lower part of member B is still within that zone. Chitinozoans were recovered also from this locality (F.H. Cramer, pers. comm., Jan. 1970).

Member C. The lowest conodont-bearing sample of member C at Goodsir Creek is from 15.2 m above the base (GSC loc. C-63576). This sample yielded *Pedavis latialata* (Walliser), *P. cf. P. n. sp. T*, and *Ozarkodina n. sp. A* of Klapper (in Klapper and Murphy, 1974) (Pl. 41.1, figs. 9, 10, 21, 26), and indicate the *latialata* Zone. *Ozarkodina n. sp. A* also occurs in the *latialata* Zone in the Roberts Mountains Formation at Birch Creek II in Nevada, and in the Cellon section in the Carnic Alps, according to Klapper and Murphy (1974, p. 15). In the same section at Goodsir Creek, 174 m above the base of member C (GSC loc. C-19837), are *Pedavis n. sp. T*, *Ozarkodina confluens* morphotypes α and γ , and *Pelekysgnathus n. sp. A* (Pl. 41.1, figs. 13, 14, 18, 27-30). Associated with these conodonts are *Atrypella cf. A. foxi* Jones and *Hemiarages aquilonius* Whittington (R. Thorsteinsson, pers. comm., March 1977). On the basis of conodonts, the age of this sample cannot be determined precisely, but *O. confluens* morphotype γ and the stratigraphic position of the sample suggest an assignment between the *latialata* and *eosteinhornensis* Zones.

At the type section of member C, 24.4 m below the top of the unit (GSC loc. C-54046) are *Ozarkodina confluens* morphotype α and *O. remscheidensis remscheidensis* (Ziegler) (Pl. 41.1, figs. 11, 12). These conodonts can be assigned to the uppermost *Ozarkodina remscheidensis eosteinhornensis* Zone of late Pridolian age (see Klapper and Murphy, 1974, p. 19).

At GSC locality C-19839, located some 12 km north of the member C type section, and stratigraphically near the top of member C, the fauna contains *Ozarkodina confluens* morphotypes α and γ , and *O. cf. O. eurekaensis* Klapper (Pl. 41.1, figs. 3-6). The latter has been reported previously from the Roberts Mountains Formation at Birch Creek II in Nevada in the *eosteinhornensis* Zone (in restricted sense; Klapper and Murphy, 1974, Table 2), and is of late Pridolian age.

Member D. Faunal control of member D at its type section is restricted to the basal part of the unit. At GSC locality C-49976, 21.3 m above the base of member D, are *Ozarkodina n. sp. G* with large basal cavity, and *Pelekysgnathus n. sp. B* (Pl. 41.1, figs. 15, 16, 22-24). In lateral view, the former has the general outline of some morphotypes of *O. confluens* or *O. remscheidensis remscheidensis*, but the basal cavity is similar to that of *O. n. sp. F* of Klapper (in Klapper and Murphy, 1974). The age of this fauna can be stated only in broad terms of late Pridolian through early Lochkovian.

The only other available collection of conodonts from member D is from western Devon Island (GSC loc. C-54044). The exact stratigraphic position of this

locality within the member is difficult to determine accurately, but R. Thorsteinsson estimates it to be about 1000 feet (300 m) above its base. The collection includes *Ozarkodina remscheidensis remscheidensis* and *O. n. sp. F* of Klapper. The first occurrence of *O. n. sp. F* at Birch Creek II in Nevada is well above (48.5 m) the base of the *Icriodus woschmidti* Zone, and is within the early Lochkovian age strata (Klapper and Murphy, 1974, Table 2). *O. n. sp. F* continues higher into the *Ozarkodina eurekaensis* Zone in Nevada.

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