Jurassic-Cretaceous palynology of Byers Peninsula, Livingston Island, Antarctica

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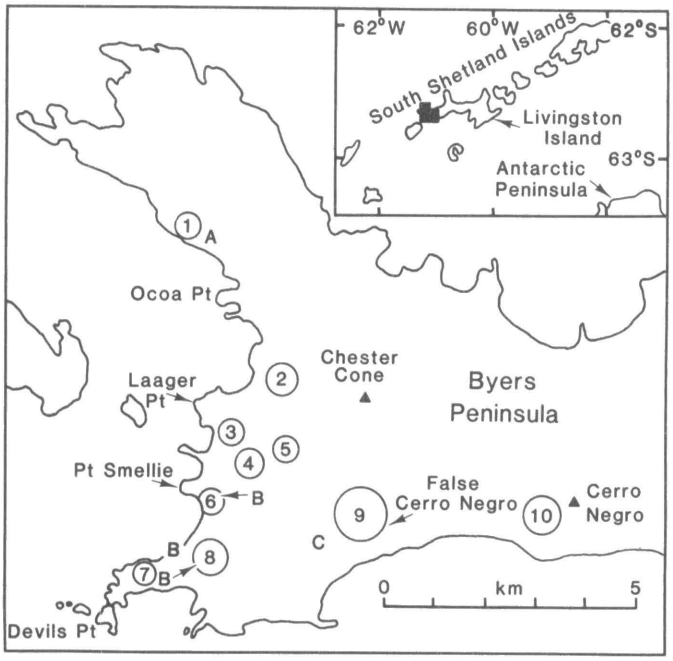
Samples from 5 of 10 localities on Byers Peninsula, Livingston Island (figure), contain stratigraphically useful palynomorph species. The assemblages range in age from possible uppermost Jurassic (Tithonian) to Lower Cretaceous (Barremian). Apart from recycled specimens, they are the first Tithonian-Barremian palynomorphs reported from Antarctica.

Forty-eight samples collected during the February 1980 expedition (R/V *Hero* cruise 80-2; Elliot and Askin 1980) to Byers Peninsula were examined for palynomorphs. Outcrops of fine-grained sedimentary rocks suitable for palynological study were scarce, and in many cases the sediments were too baked by adjacent igneous rocks for preservation of palynomorphs. Ten main localities were sampled, of which localities 2, 4, 6, 9, and 10 (figure) include productive samples. Samples from the other localities are barren of palynomorphs or contain skeletal grains too poorly preserved to identify.

The productive samples contain often abundant but poorly preserved spores and pollen (land-plant-derived microfossils) and dinoflagellates (marine phytoplankton). Among the spores occurring in most samples and identifiable to species level are the long-ranging species *Cyathidites australis* Couper,



Map of Byers Peninsula showing palynology sample localities (numbered circles). The letters show location of fossil invertebrate faunas data as Tithonian (A), Berriasian (B), and Valanginian (C) by Gonzalez-Ferran, Katsui, and Tavera (1970), Tavera (1970), Covacevich (1976), and Smellie, Davies, and Thomson (1980).

C. minor Couper, *Stereisporites antiquasporites* (Wilson and Webster) Dettmann, *Osmundacidites wellmanii* Couper, *Baculatisporites comaumensis* (Cookson) Potonié, and *Gleicheniidites circinidites* (Cookson) Dettmann. Distribution of a few stratigraphically useful species of palynomorphs is discussed below.

Locality 2, an approximately 5-meter-thick marine section in a small high valley northeast of Laager Point, includes three productive samples. These contain dark brown to black and corroded, abundant spores and dinoflagellates, plus uncommon bisaccate pollen. The assemblages include the spores *Cicatricosisporites australiensis* (Cookson) Potonié (? Oxfordian-Upper Cretaceous), *C. ludbrookii* Dettmann (Berriasian-Albian—ranges of spores are for southern continents), and the dinoflagellate cf. *Broomea simplex* Cookson and Eisenack. The range of *Broomea simplex* is mid-Kimmeridgian-Tithonian; the diagnostic intercalary archeopyle is not visible in the Byers specimens, hence the cf. designation. A tentative Tithonian or Berriasian age is suggested for this outcrop.

Four samples from locality 4, a valley between Laager and Smellie Points, contain dark brown to black, corroded, abundant spores and dinoflagellates, and uncommon bisaccate pollen. These include *Cicatricosisporites australiensis, Contignisporites cooksonii* (Balme) Dettmann (Oxfordian-Albian), *Aequitriradites spinulosus* (Cookson and Dettmann) Cookson and Dettmann (? Tithonian-Albian), and dinoflagellates *Canningia* sp., *Batioladinium* sp., and *Batioladinium* sp. cf. *B. micropodum* (Eisenack and Cookson) Brideaux (late Neocomian-Albian). A Neocomian age is suggested for these samples. Nearby ammonite faunas (figure) are Berriasian (basal Neocomian) in age.

Two samples from locality 6, Point Smellie, contain amber to brown, though torn and mineral-scarred, palynomorphs. The species *Murospora florida* (Balme) Pocock (Middle Jurassic-Albian), and long-ranging *Classopollis chateaunovi* Reyre, *Tsugaepollenites damperi* (Balme) Dettmann and *T. trilobatus* (Balme) Dettmann were observed, together with dinoflagellates *Fusiformacysta salasii* Morgan (early-late Neocomian), *Pareodinia ceratophora* Deflandre (? Toarcian-Albian), *Batioladinium* spp., and *Canningia* spp. The Neocomian age suggested by the palynomorphs is in keeping with the Berriasian age derived from ammonites from this locality (figure).

Locality 9, approximately 2 kilometers south of Chester Cone and between 200 meters and 1 kilometer west of False Cerro Negro, includes a wide area of several small outcrops. The outcrops are probably stratigraphically above the beds containing Covacevich's (1976) Valanginian fauna, 1 to 0.5 kilometer to the southwest. Preservation of palynomorphs throughout this area is extremely poor. Only 3 samples of 11 contain very corroded spores, pollen, and dinoflagellates. The rest are effectively barren. The productive samples contain *Cicatricosisporites australiensis, C. ludbrookii, Appendicisporites* sp., and dinoflagellates *Batioladinium* sp. cf. *B. micropodum, Palaeoperidinium cretaceum* Pocock (Hauterivian-Cenomanian), and *Pareodinia ceratophora*. From the assemblage composition it appears that these samples are of late Neocomian (Hauterivian-Barremian) age.

Locality 10 includes a nonmarine, mostly volcaniclastic rock section on a ridge southwest of Cerro Negro. Plant megafossils from near the top (eastern part) of this ridge were assigned a "Wealden" age by Fuenzalida (1965) and Araya and Hervé (1966). Hernández and Azcárate (1971) later compared the flora to that of the Barremian Baqueró Formation of Santa Cruz Province, Argentina. Seven samples from this section contain brown spores and pollen grains. The assemblages are dominated by the distinctive spore *Cyatheacidites tectifera* Archangelsky and Gamerro, which was described from the basal part of the Baqueró Formation (Archangelsky and Gamerro 1965) of Barremian age (Archangelsky 1967). Preliminary study indicates that this is its only previously reported occurrence. The palynomorph assemblages substantiate the previous assignment of a Barremian age to the volcaniclastic beds west of Cerro Negro.

The lack of palynomorph species diagnostic of Aptian or younger rocks, together with the absence of any tricolpate angiospermous pollen, supports a pre-Aptian age for all these samples.

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