matters arising

Biostratigraphy of Seymour Island, Antarctica

THE paper by Hall on Cretaceous and Tertiary dionflagellates from Seymour Island, Antarctica[1] contains misleading information. In particular the stratigraphic columns in Fig. 1 do not represent the known field relations. The overlap of sections S-13 and S-3 seems most unlikely on geological grounds; the sections are less than 3 km apart, the sediments have different provenances, and represent different facies (S-13 is delta plain, and the lower part of S-3 is prodelta or delta slope, and palaeo-current indicators suggest southeastward flow). The base of the measured section S-3 is not the base of that part of the sequence. Section S-11 occurs below the unconformity above which S-13 is located; the Palaeocene age may well be correct, but there is no overlap in time with S-13. The age of the beds at Cape Wiman (S-16) is open to debate, but the correlation indicated in Fig. 1 is an oversimplification of the possible interpretations.

The ammonite-dated strata form part of a homoclinal sequence dipping to the south-east and occupying the whole of the southern half of Seymour Island. Howarth[2] figured several ammonites from near the base of the section, and one ammonite from near where the unidentified ammonite was found that contains 'early Senonian' dinoflagellates in the matrix. Howarth assigned an Early to Middle Campanian, or possible late Campanian age, to the ammonites he described. The strata from which the 'unidentified' ammonite comes are unconsolidated, so that fossils are found, with few exceptions as loose material on dip slope surfaces or at the base of short sections. The ammonite was collected on a dip slope. The southern half of Seymour Island, unlike the northern part north of Cross Valley, lacks glacial debris, and therefore the ammonite cannot be considered a glacial erratic. The 'unidentified ammonite' belongs to the genus *Maorites*, is identified specifically as *M. densicostatus* (Kilian and Reboul), and others of this species are figured by Howarth[2]. Hall's postulate of an 'early Senonian' age seems to be in conflict with the ammonite data. Until proven otherwise, the most likely explanation of this apparent conflict is that the dinoflagellates had been reworked from older strata or, as stated by Sarjeant[3], that the exact ranges of these dinoflagellate species are uncertain.

Finally we would note that Simpson[4] regards the so-called Miocene beds as Late Eocene, though possibly either Middle Eocene or Early Oligocene. Furthermore, Von Ihering[5] recognised the Eocene affinities of the molluscs.

Hall's data are very valuable, but some of the statements and conclusions are misleading for those not familiar with the local geology. Papers on the stratigraphy and palaeontology of the Tertiary rocks on Seymour Island have been presented at the Third Symposium on Antarctic Geology and Geophysics at Madison, Wisconsin, in August, 1977.

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HALL REPLIES—In 1975 I examined sediment samples from four measured sections on Seymour Island, Antarctic Peninsula in a pilot study of dinoflagellates, spores, and pollen. A series of palynologic assemblages from two sections, S-3 and S-11, contained numerous diagnostic dinoflagellates; the sections were provisionally assigned a late Eocene–early Oligocene age and a Palaeocene age, respectively. However, sections S-13 and S-16, the correlations of which Elliot and Zinsmeister are critical, are represented collectively only by three samples. Concerning age dating, I reported that "neither of the samples from S-13 provides conclusive information"[1]. I also suggested a Palaeocene or late Cretaceous age for S-16 based on one dinoflagellate assemblage. Not only did I report the unsureness of the correlations of S-13 and S-16, but question marks were drafted adjacent these sections in Fig. 1 of ref. 1, further stressing the uncertainty of the correlation of these two sparely sampled sections. The correlations shown in the figure that are misleading to Elliot and Zinsmeister are clarified on reading the text of the article.

The dinoflagellate species *Cyclonephelium distinctum* and *Deflandrea cretacea* have greater ranges than I acknowledged in the article. Thus my age assignment of 'early Senonian' to the ammonite matrix (unidentified when I submitted the manuscript but subsequently referred to *Maorites densicostatus*) is indeed unwarranted.

Elliot and Zinsmeister cite Simpson's[2] review of fossil penguin material and Von Ihering's[3] 1927 molluscan studies from Seymour Island as previous interpretations of an Eocene age for these beds, an implied criticism that my corresponding conclusion based on dinoflagellates is less than original. I give Simpson full credit for his conclusions in my article: "The dinoflagellates evidence supports Simpson's conclusion that the fossil penguin materials from Seymour Island, presumedly from the upper part of section S-3 or its equivalent, are no older than late Eocene and no younger than early Oligocene"[1]. Von Ihering's fortuitous interpretation in 1927 of an Eocene age for the Seymour Island Series was disputed by Antarctic scholars for over 40 yr; the beds were regarded as Miocene in age[4] until Simpson's vertebrate work and the supporting evidence of the dinoflagellates.

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2. Simpson, G. G. *Proc. R. Soc.* **B178**, 357–387 (1971).
3. Von Ihering, H. *Neues J. Min. Pal.* **51**, 240–301 (1927).
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Asymmetrical displacement currents

KOSTYUK *et al.*[1] have recorded an asymmetrical displacement current in snail neurones (*Helix pomatia*) which, because of a similar voltage dependence, they have associated with the calcium conductance change caused by membrane depolarization. It was noted that the characteristics of the 'calcium gating currents' in snail[1] and *Aplysia*[2] neurones were different, and it was suggested that at least part of the difference was due to a technical problem with series resistance. However, we think that there are indeed actual differences in the displacement currents recorded in the two neurones.

First, in voltage-clamp studies in snail neurones, it has not been possible to demonstrate separate channels with

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