

Journal of the Geological Society

Discussion of Portlandian faunas

Journal of the Geological Society 1976, v.132; p335-336.
doi: 10.1144/gsjgs.132.3.0335

**Email alerting
service**

click [here](#) to receive free e-mail alerts when new articles cite this article

**Permission
request**

click [here](#) to seek permission to re-use all or part of this article

Subscribe

click [here](#) to subscribe to Journal of the Geological Society or the Lyell Collection

Notes

Discussion of Portlandian faunas

PROFESSOR D. V. AGER writes: Although the general ecological composition of the Portlandian faunas, especially in terms of absentees, was touched upon by Townson (1975) in his fifth conclusion, I think it deserves more emphasis. It is a little unfortunate that all the fossil evidence from a variety of sources and from a great variety of horizons and localities, is lumped together in Townson's table 2. Such is the fame of the huge ammonites and abundant large bivalves of the Portland Limestone that the fact is generally overlooked that this is, in fact, a very low diversity fauna. Arkell (1956, p. 616) argued the case that the size of these molluscs was clear grounds for postulating for them at least a sub-tropical environment and Townson has confirmed the generally held belief that these beds were deposited in very shallow water. It is therefore all the more anomalous that we should have here a shallow-water, sub-tropical or tropical, marine, Mesozoic limestone almost completely lacking such obvious groups as the corals, brachiopods, echinoderms, belemnites, nautilids and other groups of molluscs. I have recently suggested (Ager 1975) that if one looks at all the upper Jurassic formations of the Dorset coast, one can see, in general terms, a progressive exclusion of (i) corals, (ii) echinoderms (iii) belemnites (iv) brachiopods (v) ammonites and (vi) all other marine molluscs. In detail one notes terebratulids departing before the rhynchonellids and the rhynchonellids before the inarticulates and all brachiopods disappearing well below the Portland Limestone. The obvious explanation of these progressive exclusions is one of changing salinity and the evidence of the evaporitic Purbeck Beds above leads one to the conclusion that it is a trend towards hypersalinity, as suggested by Townson in his conclusions, but not hyposalinity as suggested in his figure 5. In some respects it is the mirror image of the faunal changes at the bottom of the British Jurassic.

DR W. G. TOWNSON replies: I thank Professor Ager for his comments and for pointing out the drafting error on fig. 5. I agree that the Portland Group fauna is low in diversity; it is only spasmodically high in density (Table 2 is a palaeoecology summary, however, and not a distribution chart.).

Faunal distribution was controlled by seawater composition and substrate conditions (conclusions 4, 5, p. 636). I agree that the rarity or absence of certain groups is probably a reflection of salinity fluctuations from normal to hypersaline (table 2 shows how many of the bivalves are probably hypersaline genera).

I have not yet seen Ager 1975 but my list of "progressive exclusion" based on observations of the Dorset upper Jurassic (late Kimmeridgian onwards) is:

- (i) Inarticulate brachiopods (last published record in Lingula Shales, table 1).
- (ii) Belemnites (last published record in Rhynchonella Marls, table 1).
- (iii) Articulate brachiopods (rhynchonellids and terebratulids together in the Corton Hill Member, table 1).
- (iv) Corals (colonies present in the Dancing Ledge Member, fig. 3).
- (v) Ammonites, bivalves, gastropods and echinoderms (echinoid and possibly asteroid debris is present in the grainstones of the Winspit Member, Facies 4, p. 624).

(i v) Red Algae *Solenopora* is present in the Winspit Member (fig. 3) and the basal beds of the Lulworth Member (table 1) as recorded by Pugh 1969.

This differs from Professor Ager's list but the overall trend is still one of progressive influence of hypersalinity. The absence of dasycladacean algae probably also indicates that hyposalinity was not the case. The admirable paper by West (1975 *Proc. Geol. Assoc.* **79**: 513-23) continues the environmental history of the area and should be read in conjunction with my own.

References

- AGER, D. V. 1975. The Jurassic World Ocean. *Proc. northern north Sea Sympos., norweg. Petrol. Soc.* 1-43.
- ARKELL, W. J. 1956. *Jurassic geology of the world*. Oliver & Boyd, Edinburgh.
- TOWNSON, W. G. 1975. Lithostratigraphy and deposition of the type Portlandian. *Jl. geol. Soc. Lond.* **131**, 619-38.