AGE AND AFFINITIES OF THE BAGH FAUNA

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In spite of the varied interest—stratigraphical, palæontological and palæogeographical, attaching to this series of strata, no adequate attention was paid to their fauna until the present writer began his work. The author has in a series of contributions to the palæontology of these beds, presented the results of his study of the Echinoidea, Brachiopoda, Bryozoa, Lamellibranchia and the Ammonoidea, and discussed the age of these beds on the basis of the affinities of each fossil group independently of the other; so that we possess satisfactory knowledge of all those members of the Bagh fauna which could be studied with any exactness. Thus it is now that we are in a position to discuss adequately the age of this series of strata and their alleged faunal affinities with the Cretaceous deposits of the Trichinopoly District.

Among the earlier workers Carter had assigned a Neocomian age to these beds; while according to Bose these strata stretched over a long period extending from the Albian to the Senonian. The conclusions arrived at by both these workers were, however, based on admittedly tentative identifications of the fossils and as such their views carry little weight.

Duncan, who for the first time studied in detail the echinoids from these beds, because of the presence of

Nucleolites similis d'Orbigny
Salenia fraasi Cotteau
Cyphosoma cenomanense Cotteau
Hemiaster cenomanensis Cotteau
and H. similis d'Orbigny

of which the first species is from the Chloritic Marl and the remaining four from the Cenomanian of Europe, and Lebanon thought it justified to assign to the Bagh Beds an upper Green Sand horizon. This conclusion was roughly corroborated by Vredenburg from his study of the Bagh ammno-

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3 Bose, 1884, pp. 37–44.
4 Duncan, 1865, pp. 349–63; 1887, pp. 81–92.
nites; while, according to Fourteau⁶ both the echinoids and the ammonites point to a lower Gault horizon.

More recently Mukerjee,⁷ who was working on a small collection of Mollusca from a few exposures of the Bagh Beds in the Jhabua and Ali Rajpur States, has like Bose assigned to these beds a long period extending from the Cenomanian to the Senonian, thus regarding them as approximate equivalents of the Cretaceous Series of Southern India. Besides basing his conclusions on extremely inadequate palaeontological evidence, as the present writer has shown it to be in one of his earlier contributions to the palaeontology of the Bagh Beds, Mukerjee curiously enough thinks it reasonably possible to compress the major portion of the Upper Cretaceous Period, from the Cenomanian to the Senonian, in these poorly fossiliferous limestones attaining a thickness of hardly forty feet as they do in Jhabua and Ali Rajpur States.

To consider then from the present writer’s work such of the more important features of the palaeontological evidence as will help us to determine the age of the Bagh fauna as a whole, we find that out of the total of forty-nine species which the author has recorded from these deposits, we have only five species,

*Neithea morrisi* Pictet and Renevier  
*Plicatula batnensis* Coquand  
*Hemiaster heberti* (Coquand)  
*H. saadense* Peron and Gauthier  
and *H. meslei* Peron and Gauthier,

which are known to occur outside the Narbada valley.⁸ Of these, the first is a very common species in the various sections in the type area around Chirakhan (lat. 22° 22' 30"; long. 75° 7' 30"), and occurs in the Albian and Aptian beds in England, Spain, Switzerland and Japan; while, the other four species are recorded from the Cenomanian beds in Algeria, Tunis and Egypt.

Six, out of the seven species of *Hemiaster* represented in these beds⁹ belong to the groups of *Mecaster*, *Proraster* and *Integaster*, all of which make their first appearance in the Cenomanian. Further, we have in these deposits the genus *Diplopodia* which is not known to survive the Cenomanian age, while *Hemiaster fourteau* Chiplonker, the commonest of the Bagh species, has its nearest ally *H. luynesi* Cotteau in the Cenomanian of Palestine.

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⁶ Fourteau, 1918, pp. 34–53.  
Among the remaining echinoids, while there is a mixture of lower and upper Cretaceous affinities, the majority present an unquestionable lower Cretaceous aspect. Thus the echinoids on the whole point to a Cenomanian (probably the lower portion, as is shown already) age. Among the ammonites\(^{10}\) which are represented by three species, *Namadoceras scindæ* Vredenburg has probably Turonian affinities; but *Knemiceres mintoi* (Vredenburg), the commonest of the ammonites, has an aspect a little younger than the Vraconian; while *Namadoceras bosei* Vredenburg has distinct middle Cenomanian affinities. The ammonites, therefore, on the whole point to a middle to upper Cenomanian age. The brachiopod genus *Malwirhynchia*\(^{11}\) which features very conspicuously in the type area for the Bagh Beds, has unmistakable Upper Green Sand affinities. The Lamellibranchia and the Bryozoa, though, as is already remarked, show a mixture of affinities ranging over a considerable part of the Cretaceous period, they, particularly the Lamellibranchia, indicate middle Cretaceous as the predominant phase in their affinities.\(^{12}\)

Thus, while discussing the age of the Bagh Beds on the basis of their fauna as a whole, we are faced with a certain amount of diversity of evidence as furnished by the various groups of fossils. It is, however, not an uncommon occurrence; because all groups of animals inhabiting a particular basin of sedimentation do not necessarily, and often they do not, flourish nor evolve at the same rate as those in the neighbouring basins. But each group of animals is, however, bound to show more or less close affinities to their allies in the adjoining basins, in accordance with the environments as they affected them. Hence the inference of the age of the deposits containing them, when based on the affinities of each group of animals separately, is bound to be more or less different. Therefore, while fixing the age of a formation we have to attach more weight, not to the whole range of affinities shown by all the various forms, as was done by Mukerjee,\(^{13}\) but to the more predominant elements of the fauna and the general aspect as shown by the assemblage of species.

In the present case we have recorded in these beds a few species of which the age in other areas is definitely known; while for the rest of the species we have to rely upon their affinities towards species in other parts of the world. Thus with the four Cenomanian species mentioned above and the definite Cenomanian aspect of the echinoids, brachiopods and the ammonites which

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\(^{10}\) Chiplonker, 1941, pp. 271-75.

\(^{11}\) Chiplonker, 1938, pp. 312-13.

\(^{12}\) Chiplonker, 1939 b, pp. 99-106; 1939 c, pp. 256-70.

\(^{13}\) Mukerjee, 1938, pp. 197-98.
form the more dominant members of the Bagh fauna, we are justified in considering Cenomanian as the most appropriate age for these beds.

In the list of the Bagh fossils Bose mentions a number of South Indian Cretaceous species. While admitting that they were only roughly identified, he endeavours to show with their help that the different members of the Bagh Beds are approximately equivalent to those of the South Indian Cretaceous Series\(^{14}\); and to explain what he considers as anomalous occurrences of some of the South Indian species in the Narbada valley, he\(^ {15} \) invokes the idea of submergence of a land barrier intervening between the Narbada valley and the Trichinopoly District, during the "Nodular Limestone" period, which could thus facilitate the intermigration of the faunas of these two zoological provinces. Bose's work has already been sufficiently criticised by Duncan,\(^ {16} \) and any further allusion to even the more important features of his work would be nothing but repetition of Duncan's remarks.

The present author had an opportunity of seeing Mukerjee's molluscan collection from the Jhabua-Ali-Rajpur area; it is neither extensive nor well preserved, and as mentioned on a previous occasion,\(^ {17} \) it needs a closer study before his claim for the presence of *Protocardium pondicherriense* d'Orbigny and *Cardium (Trachicardium) incomptum* Sowerby in the Bagh Beds could be accepted. *Turritella (Zaria) multistriata* Reuss is another species in Mukerjee's collection, which he\(^ {18} \) mentions as a typical South Indian form. It is neither a characteristic fossil in the Trichinopoly deposits nor is it in any way typical of South India. It is reported to be quite widely distributed in Lybia and Central Europe. This species, however, as judged from the numerous published figures and descriptions, appears to be a heterogeneous group of, in all probability, related forms; and the specimens from the Bagh Beds of Jhabua identified by Mukerjee as *Zaria multistriata* Reuss, might be found to belong to this stock from Central Europe. During the course of the writer's study of the Bagh fossils *Pinna mathuri* Chiplonker,\(^ {19} \) is found to be the only species in his collection which shows some distant relations to *P. arata* from South India and *P. vanhaepeni* from Pondoland, of which the latter two species are again allied to European stock. These species therefore, cannot be considered as presenting a South Indian element in the Bagh fauna; they rather add to the already abundant evidence which the present author has brought forth from his study of all the different groups of fossils

\(^ {14} \) Bose, 1884, pp. 37-43, 48-50; Oldham, 1893, p. 250.
\(^ {15} \) Bose, 1884, pp. 38-39.
\(^ {16} \) Duncan, 1887, pp. 81-92.
\(^ {17} \) Chiplonker, 1939 c, p. 271.
\(^ {18} \) Mukerjee, 1938, pp. 197-98.
\(^ {19} \) Chiplonker, 1939 c, pp. 256, 270-71.
from the Bagh Beds, to show that, the fossil fauna of the Narbada valley belongs to the Mediterranean zoological province and had no direct connection across the Indian Peninsula, with that of the Southern Ocean.

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BIBLIOGRAPHY