

VII.—*New Fossils from the Napier Range,  
Kimberley,*

BY

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During Mr. H. P. Woodward's visit to the Kimberley area in the year 1906, with a view of reporting on the Narlarla Hills, he had an opportunity of collecting a few fossils which have proved to be of great interest and importance, on account of the light which they shed upon the exact age of large tracts of country, and the bearing they have on the Geological Maps of the district, as interpreted by the late E. T. Hardman and Dr. R. Logan Jack. These two authorities considered the Napier Range to consist of Carboniferous beds only, with a bed of conglomerate at the base of the series. This "basement conglomerate" mainly consists of fragments of the older igneous and metamorphic rocks and appear to greatly resemble the "Basement Conglomerate" so often found under the Carboniferous Limestone, etc., in the British Isles, and considered to be of Carboniferous age.

From Mr. Woodward's results, however, it is evident that the conglomerate is truly Devonian, and that most likely in Western Australia it is the basal bed of the Devonian strata, and not of the Carboniferous.

Perhaps at this juncture it is advisable to quote Mr. Woodward's account of the beds as exposed in the Barker Gorge—a gorge cut through the Range by the Barker River in its course from the King Leopold Ranges to the Meda River and the Sea. Mr. Woodward writes as follows:—

"The Napier Range consists of a series of crystalline limestone beds which strike in a north-westerly and south-easterly direction and dip at an angle which varies from 12 to 23 degrees to the south-westward. These beds present the usual character of the Palæozoic limestone of this State, viz., they consist of a series of thick solid crystalline beds of a grey colour interbedded with soft calcareous bands of a more argillaceous character, whilst the basement beds consist of calcareous breccia and conglomerate, the enclosures in which consist of masses, fragments, boulders or pebbles of schist, granite, and quartz derived directly from the crystalline schists, granites, and greenstones upon which they rest. This range, which rises to an elevation in places to 400 feet above the adjoining plain from which it rises abruptly, is

fairly riddled with caverns and has been intersected at one or two points by watercourses which have cut deep gorges through it, varying from 2 to 4 miles in length.

"In the gorge formed by the Barker River (142° 43' E. long., 170° 16' S. lat.), one of the tributaries of the Meda River, a fine section of these limestones is exposed dipping beneath the sandstones and shales which form the plain to the south-westward and have provisionally been classed as Upper Carboniferous.\*

"Some little time was spent in searching for fossils in the softer beds above-mentioned, but without success. Just before my departure, however, some red coloured limestones were discovered in a small branch gully upon the south side of the Gorge and near the base of the series, which proved to be full of organic remains. Owing to their hardness, however, forms could only be identified upon the weathered surfaces, and since my party had already started I was only able to carry away as many as my pockets would hold."

These specimens were in due course forwarded to the British Museum, London, for identification by the officers on the staff of that Institution. On the 16th of March, 1908, Dr. Henry Woodward, F.R.S., the late Keeper of the Geological Department, returned the fossils, writing as follows in his covering letter of the same date:—

"I now return the specimens, with such information as I have been able to collect concerning them."

- [6923.] 1.—The fish bone with "berry"-like sculpturing (F327) upon its surface must be referred to a large Devonian fish (new to science) allied to *Coccosteus*, but the specimen is not sufficient to determine accurately its relation to the skeleton.
- [6928.] 2.—Tail of a Trilobite genus—*Proetus*, a new species. (F334)
- [6928A.] 3.—Head of a Trilobite (part of same specimen) (?) (F335) and counterpart of tail.
- [6926.] 4.—Crinoid stem (?) also remains of a gasteropod (F331) shell seen in section, *Loxonema* sp. (?)
- [6929.] 5.—Imperfect specimen of a gasteropod, in white (F336) spar. *Euomphalus* sp. (?)
- [6925.] 7.—A Rhynchonella, near to *R. (Uncinulus) Timorensis* Beyr. and *Pachypora* sp. on same block. (F329)
- [6924.] 10.—A coral, *Phillipsastræa* sp. (F328)
- [6925A.] 11.—*Pachypora* sp. (see [6925], above). (F330)
- [6927A.] 13.—Two crinoidal stems (not determined). (F333)
- [6927.] 14.—A. Crinoidal arm )  
(F332) B. *Goniatites* sp. ) on same block.

\* See Hardman's 1884 Report, pages 9 and 20.

"I am sorry to offer you such poor determinations, but (although the rock is full of fragments) the specimens are very imperfect and obscure, the small Brachiopod, the pygidium (tail) of the Trilobite and the coral, *Phillipsastræa*, being the only clearly preserved ones. The facies of the fauna, especially the fish plate *Cocosteus* (c.f.), is undoubtedly Devonian."

On an enclosed slip Dr. Woodward writes:

"The matrix and the fossils agree closely with the Devonian of Adorf in Waldeck, Germany, see E. Halzapfel, 'Die Goniatiten-Kalke von Adorf in Waldeck,' *Palæontographica* Bd. XXVIII., Lief. VI., Jan., 1882, pp. 225-262, pls. XLIV., (I.), XLIX., (VI)."

Two other enclosures are of interest, being letters from Dr. A. Smith Woodward concerning the fish remains. On the 25th of March, 1907, this authority writes:

"The Western Australian Fossil looks remarkably like a piece of a large Devonian Coccostean, hitherto unknown in the Australian Region, but it is not good enough for exact determination. I will try a fragment under the microscope to discover whether the tissue is true bone."

Again, on the 25th of the following month the same gentleman gives the following information:—

"I have compared this bone again and am sorry it is too imperfect to determine from its shape its true nature. The texture and the ornament agree more closely with those of Coccostean fishes than with any other. I therefore think the new fossil belongs to one of the armoured Devonian fishes such as have not hitherto been satisfactorily determined in Australia."

It will be thus seen that competent opinion is agreed upon the age of these red limestones being Devonian, in fact, not the slightest suspicion is expressed by Dr. Woodward in his letter as nothing could be more definite than his assertion.

If we regard such genus represented separately we notice that the facies is as follows (1):—

Genus.	Distribution in Time.
1. <i>Pachypora</i> sp. . . . .	Silurian to Devonian.
2. <i>Phillipsastræa</i> sp. . . . .	Devonian and Carboniferous.
3. <i>Rhynchonella</i> ( <i>Uncinulus</i> )	Devonian chiefly.
4. <i>Euomphalus</i> sp. . . . .	Silur. Dev. Carbonif., Perm., Trias.
5. <i>Loxonema</i> sp. . . . .	Silur. Dev. Carbonif. Perm. Trias.
6. <i>Goniatites</i> ( <i>Glyphioceras</i> )	Devonian and Carboniferous.
7. c.f. <i>Cocosteus</i> . . . . .	(Coccostean fish) Devonian only.

On analysis it is apparent that the facies is most decidedly Devonian. We have one form, the Coccostean fish, which is absolutely confined to that age; one genus, *Pachypora*, which becomes extinct before the Carboniferous, a coral, *Phillipsastræa*, which,

(1.) *Fide* Zittel.

though present in Carboniferous rocks is most plentiful in the Devonian, and a cephalopod, *Goniatites* (*Glyphioceras*) that is equally abundant in Devonian and Carboniferous times. *Euomphalus* and *Loxonema* though at their prime in the Carboniferous are plentiful in the Upper marine Devonian. The only possible exception is the *Rhychonella* (*Uncinulus*) *c.f.* *Timorensis*, but this loses its weight when we remember that the specimen is *not identical* with the Timor form but that it bears a *great resemblance* to that shell, and bear in mind that some of the Brachiopod shells living to-day in the seas off the coast of Australia, Great Britain, etc., can scarcely be distinguished from their ancestors found in some of the oldest fossiliferous beds of Europe and America.

The existence of the true Devonian beds in Western Australia was formerly more or less a matter of conjecture, as the true Devonian fossils were few and very far between, so that this confirmatory evidence from the Napier Range is very opportune, and reflects credit upon the authorities who determined the presence of Devonian beds when undertaking the pioneer geological work in this vast State twenty years ago.