presents a not dissimilar coast-line, which may be attributable to a like cause—the impinging action of an ocean current. So we may conclude that if the 40 feet beach mentioned by Mr. Geikie had not been upraised before the Gulf-stream impinged on that coast, it would have been swept down into the depths of the ocean, as I cannot find any traces mentioned of the 20 feet beach where it is not protected by intervening land from the action of the Gulf-stream. On the rising of the land between the White Sea and the Baltic above the sea-level, the return current appears to have been deflected into its present channel by Nova Zembla, then west by the north coast of Iceland, which is now colder than formerly (GEOL. MAG., Vol. VIII. p. 394), down Baffin's Bay, etc,, and it would thus force the Gulf-stream to the southward to its present position.

NOTICES OF MEMOIRS.

I.—PROCEEDINGS OF THE BATH NATURAL HISTORY AND ANTIQUARIAN FIELD CLUB. Vol. II. No. 4. (1873.)

TWO Geological papers are contained in this work:—(1). *Devonian Fossils from the Sandstones on the N.E. of the Quantocks*, by the Rev. H. H. Winwood. The author draws attention to the occurrence of a series of fossils in the dense hard grey sandstones near Holford and Alfoxden, which Mr. Etheridge has determined to be as follows:

Favosites cervicornis.	*Fenestella plebeia.*
Petraia celtica?	*Actinocrinus.*
Atrypa desquamata?	Plant-remains?
Tentaculites.	

These organic remains determine the beds to belong to the Middle Devonian Sandstones on the same horizon as Hangman, and all the country from Ilfracombe to North Petherton, and corroborate the first impressions which Mr. Winwood formed from his examination of the beds. Further, near Dodington Church, limestone bands, containing *Cyathophyllum cæspitosum*, occupying a higher position than the sandstones of Alfoxden and Holford, were identified by Mr. Winwood as corresponding in time with the calcareous bands or lenticular masses which, in the North Devon area, follow the "Hangman grits" in geological succession.

Having also examined the beds at St. Audries, he considered that they belonged rather to the Middle Devonian than to the Lower Devonian according to Etheridge, or to the true Old Red Sandstone according to Jukes. In the words of Mr. Winwood, we can only add that "there is much yet to be learnt of the geology of these hills."

(2). *The Geographical Position of the Carboniferous Formation in Somersetshire, with Notes on Possible Coal Areas in adjoining Districts of the South of England.* The Somersetshire Coal-field presents many features of great interest, which have been treated of largely by Buckland and Conybeare, G. C. Greenwell, and J. McMurtrie: more recently, an exhaustive memoir on the same subject appeared

in the report of the Royal Coal Commission by Mr. Prestwich, assisted by Mr. John Anstie. So much, indeed the greater part, of the workable coal is hidden beneath the newer Secondary rocks, that it is a subject of the highest importance as to the exact limits of the Coal-bearing strata. This question is now discussed by Mr. McMurtrie, who in an accompanying map shows the probable extent of the Coal-measures from Tortworth to the Mendip Hills.

After describing the Coal-measure rocks that appear at the surface in this district, he discusses their range beneath the Secondary strata, and refers briefly to probable coal areas in adjoining districts of the South of England. In regard to the Coal south of the Mendips, he considers it is not unlikely that the southern margin of this supposed basin may show a transition towards the Culm-measures of Devon; but it is equally probable that its northern margin adjoining the Mendips may exhibit the true productive character.

H. B. W.

II.—Description of a Specimen of *Pterodactylus micronyx*, in the Teyler Museum. By Dr. T. C. Winkler, etc., etc., Conservator of the Teyler Museum, Harlem.

DR. WINKLER has lately given the description of a new example of *Pterodactylus micronyx*, found in the Lithographic Stone of Eichstätt, in Bavaria, and obtained by Oberförster Frederick Spaeth, at Schernfeld, in Bavaria, for the Teyler Museum. The miniature fossil skeleton, which is nearly perfect, with most of the bones in their proper places, lies on its left side on a slab of Lithographic Stone.

The following description is given by Dr. Winkler: Head slightly bird-like. Its total length is 0·035 mill., its height 0·011 mill. The frontal bone is entire, but the others are so hidden in the stone that they cannot be determined. The intermaxillary bone is not straight; as in most of the *Pterodactyles*, there seems to be a small depression towards the middle of the bone, which is 0·017 mill. long. The orbit, in which may be seen the greater part of the sclerotic ring (about 0·001 mill. in breadth), is nearly 0·008 mill. in diameter. Dr. Winkler supposes that this bony ring has slipped from its original place downwards and backwards. There is a cavity in front of the orbit, from which (owing to injury) it is not entirely separated. The nasal aperture is of a triangular form, the apex of the triangle being directed forward. The right ramus of the lower jaw is perfect. It is 0·025 centim. long, and seems to be hollow. The condyle is well seen, and on the upper edge of the bone there is an apophysis slightly elevated and pointed, and with a large base, which Dr. Winkler calls the coronal process. The teeth are small and conical; the upper jaw contains at least eleven, the lower five or six. Their length is about 0·001 mill., and they are enamelled.[1]

[1] Dr. Winkler says in his description that the teeth extend to the extremity of the jaws; but his drawing seems to show a small edentulous portion in both the upper and lower jaws.

Beneath the lower jaw is the long thin bifurcated hyoid bone, the horns of which are 0·007 mill. in length, and the body of the bone measures 0·004 mill. The neck is curved. The cervical vertebræ are certainly more robust than the dorsal; but these are all too much metamorphosed and mineralized to be accurately described and separately measured. The tail is short, and seems to contain nine or ten vertebræ. Only the debris of the true ribs are seen; they are very thin. As for the false ribs, the author cannot detect a single trace of them, and he agrees with Hermann von Meyer that the parts sometimes taken for those organs are abdominal ribs.

The sternum, coracoid, and scapula are too much hidden to admit of a description. The humerus is more or less curved; its length is 0·018 centim.; the width of the acromial extremity is 0·003 mill., and that of the cubital extremity 0·005 mill. The fore-arm is composed of two long bones, which seem to be anchylosed together. The ulna of the right arm is 0·023 centim. in length; the superior extremity of the right radius is 0·012 mill. in width; all these bones seem to have been hollow.

Near the remains of the fore-arm are seen two small very thin bones, which Dr. Winkler believed to be the bones named "Spann-knochen" by the German savants; but after a careful examination, he found them to be the remains of the ossified tendons of the two bones of the left arm, as already noticed in *Pterodactylus Wurtembergicus*, by Quenstedt. The carpal bones are not sufficiently well seen to be described. The slender metacarpal bones are not visible, but we notice the two strong metacarpal bones of the long fingers belonging to either hand. Their length is 0·022 mill., their width in the middle 0·001 mill., and at both extremities 0·0015 mill. Nearly the whole of the fingers of both hands are visible. Of those of the left hand, which reposes on the right, the first has two phalanges; the ungual phalanx still bears the impression of its claw. The second finger has three phalanges. Although the ungual phalanx is nearly entirely hidden in the stone, we can nevertheless recognize its contour and that of the claw. It is doubtful whether the third finger has three or four phalanges.

As for the three small fingers of the right hand, which are under those of the left, it is easy to see that they are exactly similar. The long finger of the right hand is composed of four phalanges; the length of the first is 0·03 cent. The apophysis of the carpal extremity (seen in *Pterodactylus spectabilis*) is not visible in *P. micronyx*, being covered by the matrix. The second phalanx has been lost; but from the impression it has left in the stone, we easily obtain its length, which is 0·025 centim. The third phalanx is separated from the preceding by the femur; its length is 0·02 centim. The fourth phalanx tapers off to a point, without a claw; its length is 0·021 centimetres. The long finger of the left hand agrees with that of the right, but is partly hidden by several other bones. The two femora are complete. That on the right side is quite visible; it is a little curved, it has a length of 0·018 centim. The tibial extremity is expanded. That on the left side is not

entirely shown. The tibia is a long hollow bone, of 0·026 centim. in length.

There is no trace of the peronæus. The tarsus is composed of at least three bulbiform bones, and of a bone which has a resemblance to the astragalus.

The feet are quite visible and perfect, with the exception of part of the right foot; they are both in the same position. The metatarsal bones differ in length; the first is 0·008 mill.; the second 0·007 mill.; the third 0·005 mill.; and the fourth 0·0035 mill. The thickness is about the same in all. The first toe shows two phalanges; the second, third, and fourth seem each to have three. On the outside of the left foot, and more confusedly also on that of the right, there is a small organ composed of two short strong phalanges, which the author says cannot be a fifth toe-bone, because it does not possess any metatarsal. Hermann von Meyer calls it the "Stümmel" (or stump).

From the preceding description, it appears that in comparing this specimen with the species of *Pterodactylus* most nearly related to it —viz. *Pt. brevirostris, Pt. Meyeri, Pt. Kochi, Pt. spectabilis*, and *Pt. micronyx*—we find that *Pt. brevirostris* is distinguished from our specimen by its shortness, by the smallness of the cervical vertebræ, the number and dimensions of the phalanges of the feet, and the relative length of the metacarpal bones. *Pt. Meyeri* differs by the length of its fore-arm, which is greater than that of its metacarpus, and we have seen that in the Teyler specimen these two were equal. *Pt. Kochi* presents the same objection as *Pt. Meyeri*. *Pt. spectabilis* shows a longer head, a shorter metacarpus; the long finger is also shorter and thinner, the metacarpus is very different in respect to the relative length of its bones as compared with this specimen. *Pt. micronyx* (Meyer), on the contrary, agrees so closely with it, that Dr. Winkler refers it without hesitation to that species. He also considers that the small size of his specimen indicates that it was not adult, and it is probable that it, like *Pt. brevirostris* and some others, was only the young state of some other species.

REVIEWS.

Researches on Fossil Birds.[1] By M. Alph. Milne Edwards.

THE great work on fossil birds by M. Alph. Milne Edwards is just completed, and in a short paper read to the Academy of Sciences, the author has given the general results to which he has been led by these researches, carried on for twelve years, during which period about twenty thousand bones of birds have been arranged from different strata, yielding nearly 130 new species, besides establishing the characters of the different faunas, from the Cretaceous epoch to the present time.

The new facts recorded have to some extent confirmed the results to which the study of the fossil Mammalia and Reptiles has led, and

[1] Abstracted from the Ann. des Sciences Naturelles, 1871, Sér. 5, Zoologie, tom. xvi.