Bibliographical Record.

Mivart on Anatomy.—A work on elementary anatomy and of which nearly one half is devoted to the study of the preliminary subject of osteology may appear too insignificant to notice. But the accuracy and novelty of Mr. Mivart's facts demand more deliberate examination than we could afford in the case of a mere school book.

The author's object has been to corroborate the teaching of modern comparative anatomy by reference to man, and to prove that man's body cannot be comprehended by itself. To do this, a reference to the condition and development of every separate bone which the human skeleton presents when compared with the similar answerable, or identical bones in the skeleton of animals is necessary. This investigation Mr. Mivart carries out in detail. We shall first consider his general morphological facts.

In the main, he agrees with Professor Owen, that the trunk and skull form a series of answerable segments which are to all intents and purposes "somatomes" (a word not used by him), or vertebrae. We transcribe the author's generalised ideas, respecting the development of the osseous skull.

"The cranial characters presented by man, may be indicated in the following generalised manner:—The skull may be said to consist of a central axis (formed by the basi-occipital and basi-sphenoid) to which ascending and descending arches are annexed, and in which certain structures are intercalated. We have the occipital arch, and in front of this, a second arch formed by the great alæ of the sphenoid and the parietals, and again in front, a third arch formed by the orbital alæ, and the frontal. Into the median gap, bounded by the arch of the frontal, the olfactory organ (the ethmoid) is, as it were, thrust. Into the gap left on each side, between the lateral, occipital and the great alæ of the sphenoid, the auditory organ (the temporal bone) is thrust. Similarly, the much smaller lateral gap left between the great alæ of the sphenoid is related to the organ of sight, which, though not ossified in man like the olfactory and auditory organs, is protected by bony expansions (the bony orbit) round it. Beneath the basis cranii, we have (1) the great cornua of

1 Lessons in Elementary Anatomy. By ST. GEORGE MIVART, F.R.S., Lecturer on Comparative Anatomy at St. Mary's Hospital. London, 1873.
the hyoid, which send up no connecting ligaments to it, but which through the basi-hyal are connected by the lesser cornua with the styloid processes. (2) In front of this hyoidean arch, we have the mandibular arch, and (3) again in front of this, the arch of the upper jaw, ending posteriorly in the pterygoid bones and amalgamated in front with the open covering of the nostrils (the nasals) and with the outer protection of the orbits (the malars) which latter send back a bony arch (the zygoma), to the bony envelope of the auditory organ."

We wish we could introduce the diagram by which this important generalisation is explained and justified.

The arrangement is not so lucid as that of Owen, but may be defended by a reference to some of the discoveries of Mr. W. Kitchen Parker. Many bones are described which are not familiar to ordinary students of human anatomy. That some of them, the epiotic undoubtedly, do not form part of the axial skeleton in any vertebrates may be admitted. They are essentially dermal bones, akin in nature to the ossifications which are found on the skull of the ganocephalous reptiles. This confusion between the surface bones and those of the axial skeleton has before time led into serious error. Unless Mr. Mivart can demonstrate that all the ossification which bear the eccentric titles (unknown to the comparative anatomy of Owen's school) of epiotic, epibranchial, opisthotic, sphenotic, os transversum, hyomandibular, pharyngo-branchial, &c., are in all cases parts of the trunk system of bones, or at least diverging appendages from it, the classification of the bones of the skull will be embarrassed by the addition of a dozen supernumerary bones, the precise homologies of which have never been accurately determined. While giving the fullest credit to Mr. Kitchen Parker for his original researches on the skeleton of birds, as embodied in his excellent memoir on *Balæniceps rex* in the 'Transactions of the Zoological Society,' we think that the origin of the ossification of the "epiotic" bone, for example has not been shown to arise from any portion of the axial skeleton. Less light is thrown upon its affinity by the investigations which have been made with more or less scientific exactitude into the skull of fishes, as e.g. that of *Polypterus*. We wish Mr. Mivart had here given a table in which the diverging axial growths of the occipital bone for example had been given, and these relations shown with the intruding surface bones which form no part of the central or endo-skeleton of the vertebrate animal. There is another matter on which much confusion seems to arise, although it dates from a prior period in the history of the science than the time of the publication of Mr. Mivart's work. It was hinted at by the researches of Béclard that the upper part of the supra-occipital bone above the semi-circular curved line in man is really and not merely developmentally separate from the lower part of the supra-occipital. This is a
generalisation to which many modern thinkers are inclined to give their assent. But the homologies of the par-occipital and ex-occipital bones rest, so far as regards our certain sources of knowledge, precisely in the same state as that in which they were left in the time of Professor Owen. The researches of Professor Camille Bertrand, important as they are with relation to the homologies of the branchial arches, do not in the slightest way dispel the obscurity into which the occipital segment when considered under more complex conditions than the skull of the cod and crocodile appears to be cast. We hope that some future student guided by the light of Mr. Mivart may grapple with this bone of contention, lapis offensionis et petrum scandalis, and enable us to solve its apparently undecipherable and enigmatic nature. But nothing will be gained by packing the bones of the outer or membranous skeleton in with those of the axial trunk vertebrae, and expecting students then to master the general and special homologies of the occipital segment. It is true Mr. Mivart has not precisely done this, yet a careless reader of his words, or a first year’s osteological student might be led to infer conclusions which the master (if we understand him aright) would probably repudiate.

Mr. Mivart’s zoological classification of the class mammalia is not much in accordance with that which is generally adopted in England, and we regret that he has seen reason to place the Hyracoidae in a separate order, apart from the Rhinocerine Perissodactyla, to which the little “shaphan,” or coney, is closest allied. The reasons for this change are not explained by him; but the “zonular” (i.e. “annular”) and deciduate placenta of Hyrax, cannot be held to be a sufficient character to separate it from the rest of the order, which have the placenta diffused and non-deciduate. The character of the ribs, the simple stomach and complex caecal structures, the form of the foot, tetradactyle on the anterior and tridactyle on the hind foot, coupled with the exact resemblance of the patterns of the molar teeth in hyrax and rhinoceros appear to give an insight into its affinity deeper than that which would assign to hyrax the value of a distinct order of mammalia. An argument resting alone on placental similarity would class the hyrax and the elephant in the same group of carnivora as bears, seals and lions.

Mr. Mivart’s researches as to the shape, form and development of the appendicular skeleton in man and the lower animals are of the highest interest. He points out that the upper limbs in man are suspended from an incomplete long girdle attached to the back bone, on its dorsal aspect by soft parts only, but on the ventral aspect abutting against the median portion of the paraxial system, i.e. against the sternum, doing this nevertheless only with the clavicles. Man, as our author says, has but an imperfect shoulder girdle, compared with what is possible, for, in some animals this part joins the
sternum by great coracoids, to which precoracoid bones are appended as in *Echidna*, and in others as *Raia* it abuts against the neural axial canal, thus becoming a really complete shoulder girdle. This point is certainly interesting.

We may notice another passage in which the author says—

“There is never a highly developed pelvic girdle without a rudiment of a pelvic limb; but we may, as we have seen in *Anguis* have a well-developed pectoral girdle without any rudiment of a pectoral limb.

“Again, we may have (as in *Lialis*) leg bones without a foot (fig. 168), but we never meet with arm bones without a hand.”

Such are a few of the points of interest presented by Mr. Mivart’s important and instructive little volume. That it is destined in the hands of the practical teacher to fulfil a high mission, there can be little doubt.

**Lewis on Haematozoa in Blood.**—Dr. T. R. Lewis, Assistant-Surgeon on special duty, attached to the Sanitary Commission with the Government of India, has forwarded to us a pamphlet, in which he describes a haematozoan that he has found in human blood, especially in cases of patients suffering from chylous urine. He first discovered it in 1870, in the case of a young and emaciated East Indian, in whom coagula rapidly formed in the milky urine soon after it was passed. On teasing these out under the microscope, filaments were seen which were at first supposed to be the mycelium of a fungus, but which were speedily recognised to be minute animal organisms resembling the anguillulae of starch paste. Some specimens were forwarded to Mr. Busk, and the name of *Filaria Sanguinis Hominis* was applied to it. Dr. Lewis states, he has now examined the blood of not less than fifteen to twenty patients suffering from chylous urine and hematuria, and in all he has been able to satisfy himself of the presence of the haematozoan. Its numbers must be very great, one or two being visible in almost every large drop of blood obtained by a mere puncture of the finger with a needle. When examined in blood just drawn, it is found to be very active, exhibiting snake-like movements. The surface presents very fine transverse striae on the surface, and appears to be enveloped in an extremely delicate tube closed at both ends, in which it is capable of elongating or shortening itself. Rudiments of an intestinal canal in the form of a short chain of aggregated molecules are frequently visible towards the centre, and a bright spot exists at the terminal point of the anterior portion suggestive of an oral aperture; immediately below this is a somewhat elongated vacuole. In size and form the haematozoan approximates more closely to the *Filaria medinensis*, or

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1 On a *Haematozoan Inhabiting Human Blood; its Relation to Chyluria and other Diseases*. By T. R. Lewis, M.B. Calcutta, 1872. Pp. 50.