

of irregular appearance, 80 as stragglers, and 6 as doubtful. Two "ornithological calendars," one giving the times of "migration" and the other those of "nidification," add considerably to the value of this useful work, which must not only of necessity be in the hands of every Italian ornithologist, but which every student of the European Ornis, or of any constituent parts, should have for reference. We trust that the good example thus set by England, America, and Italy will lead to the publication of other similar hand-books.

OUR BOOK SHELF

The Law of Storms, considered practically. By W. H. Rosser. Second Edition. (London: Norie and Wilson, 1886.)

WE welcome with much pleasure the second edition of this useful little work on storms practically considered. The first edition, briefly noticed by us at the time (vol. xiv. p. 504) appeared ten years ago. Since then the researches of meteorologists have materially advanced the science, notably in establishing on a firmer basis the law of the in-moving spiral circulation of the wind in cyclones, and defining with some exactness the limits of variation of the angle of inclination of the winds as they blow inwards toward the centre of storms. In this view especially the last part of the work has been recast, recent investigations being summarised with no little ability, and the results thereafter applied to navigation. The book, which is professedly a practical one, is specially and admirably adapted to give seamen the best available information in handling their ships in storms.

Ueber Manatherium delheidi, eine Sirene aus dem Oligocän Belgiens. Von Dr. Clemens Hartlaub. *Zool. Jahrb.*, vol. i. (1886).

DR. CLEMENS HARTLAUB'S excellent contributions to our knowledge of the recent Sirenians have lately been noticed in these columns (July 8, p. 214). We have now before us his essay on an extinct form of the same peculiar group of mammals. The luxuriance of fossil forms of the Oligocene of Belgium is well known to all zoologists. Upon materials gathered from the Superior Rupelian beds of Hoboken, near Antwerp, which have already produced remains of *Crassitherium* and *Haltitherium*, Dr. Hartlaub finds a new genus of Sirenians, nearly allied to the living Manatee, which he proposes to call *Manatherium*. Its dentition, so far as it is at present known to us, does not materially differ from that of *Manatus*, of which, indeed, it may have been the immediate progenitor; and the necessity for its generic separation from its modern representative is perhaps not altogether evident. The species is named *Manatherium delheidi*, from M. E. Delheid, in whose cabinet of Belgian fossils the remains upon which it is based are contained. Fossil species of true *Manatus* have been described by Leidy and other authors in America, and M. Filliol has assigned some African remains to the same genus. But *Manatherium delheidi* is at present the only European form described as belonging to this exact type of the Sirenians.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

The Tangent Scale in a Galvanometer

ON account of the correspondence which has recently taken place in this and other journals regarding the use of the tangent

scale in a galvanometer, when the plane of the coil makes an angle with the direction of the force in the magnetic field, the following extract from Sir William Thomson's patent, No. 4617 of 1883, and the accompanying remarks, may clear up some of the points that have been raised:—

"In using this instrument I sometimes cause the zero to be at one end of the scale, so that, when the potential is at the prescribed definite amount, the pointer is at the centre mark of the scale of tangents. The deflections are thus more easily observed, on account of the large size of the divisions."

This extract is quite explicit as to taking the zero at one end of the scale, and it is abundantly evident, from the text of the patent and from the illustrative drawings, that the scale referred to is a tangent scale. The essential feature in this use of the tangent scale is that the strength of the current is proportional to the difference between the tangents of the angle corresponding to zero and that corresponding to the deflection due to the current.

The total length of the scale, as shown in the patent already referred to, and used in this Laboratory for over two years, is 120°. Lately, however, the length of the scale has, with considerable advantage, been increased to 147°, thus giving twice the sensibility obtainable with the 120° scale.

As regards Prof. Carey Foster's letter to NATURE of October 7 (p. 546), a tangent galvanometer arranged to use the tangent scale in this manner is essentially adapted to measure currents which flow through its own coil in one direction only, but in these instruments, as designed by Sir William Thomson, the necessary accuracy is secured by the following procedure. The index (which has a range of about 95° on each side the middle point of the tangent scale) is caused to point to a mark exactly 90° from the middle point of the scale, and the relative positions of the coil and the scale are then adjusted, so that, when the index points to the 90° mark, the strongest current which can be safely sent through the coil produces no sensible deflection.

J. RENNIE

Physical Laboratory, the University, Glasgow, October 16

On the Connection between Chemical Constitution and Physiological Action

IN the address delivered by Dr. Brunton on this subject before the Section of Therapeutics and Pharmacology at the last meeting of the British Medical Association, a copy of which was published in NATURE, August 19, p. 375, he observes, in alluding to the adoption of more scientific methods in pharmacology:—"This may be said to have begun about twenty years ago, when the researches which my predecessor in this office, Dr. Fraser, made with Prof. Crum Brown upon the connection between physiological action and chemical constitution inaugurated a new era in pharmacology. . . . We might first date the beginning of this age from Blake's attempts to show that a connection exists between the forms in which the various bodies crystallise, and the mode in which they act on an animal body. . . . Nevertheless, I think we may fairly say that it was the experiments of Crum Brown and Fraser which fairly started pharmacology in the new direction in which it has since been steadily advancing." Now it can, I think, be shown that in these remarks Dr. Brunton has not only misunderstood the scope of my experiments, but that he has been led into error on account of his having no definite idea of the meaning of the term chemical constitution, which he has evidently confounded with that of chemical composition. The same confusion of these terms is not only apparent all through the address, but is also found in the paper on the subject by himself and Dr. Cash, published in the *Transactions* of the Royal Society, 1884.

The term chemical composition is well understood, but the meaning of the term chemical constitution is not so well defined. Perhaps the difference between the two terms may be pointed out in the shortest space by an example. If we take the salts of iron, for instance, we know that the salts of the protoxide have a chemical constitution analogous to the other members of the magnesian group with which they are isomorphous, and that this resemblance in constitution connotes not merely that they crystallise in analogous forms, as Dr. Brunton seems to imagine, but also that they form many analogous chemical compounds which resemble those of the other members of the same group more closely than the compounds of any other group. By the addition of oxygen to the protoxide, not only is its chemical composition changed from FeO to