alized type of selachian from Japan recently announced by Garman under the name Chlamydoselachus is but one of the many signs that our knowledge of pelagic and abyssal life is still very incomplete.

Prof. D. J. Cunningham of the Royal college of surgeons, Ireland, contributes an essay upon the anatomy of certain marsupials and upon the mammalian *pes* (vol. v., 192 p., 13 pl.). The first part of this paper is descriptive, and devoted to Thylacine, Cuscus, and Phascogale; but its preparation led to a general investigation of the foot of mammals, involving the dissection of forty-five species distributed through all the orders. Professor Cunningham's conclusions as to the relations of the intrinsic muscles and nerves of the *pes* in different genera are of great interest, but, being merely incidental to the work of the Challenger, must be passed by with simple mention.

Vol. ii. is chiefly devoted to the report on birds, which is the eighth in the zoölogical series. This is a compound paper in thirteen parts, prepared by the standard British authorities, Sclater, Salvin, Saunders, Forbes, Tweeddale, and Garrod; one paper being also supplied by Salvadori of Turin, and one by Finsch of Bremen. The report on the anatomy of the petrels (Tubinares), by the late W. A. Forbes (vol. iv., 64 p., 7 pl.), is important as throwing much new light on the classification of these remarkable birds. It is based upon collections from the stores of the zoölogical society and the U. S. national museum as well as of the Challenger. The affinities of the petrels are shown to be with the Steganopoda and the storks and herons, rather than with the gulls. The most extensive anatomical monograph is that of the penguins, by Professor Morrison Watson of Owens college, Manchester, of which the first part has been printed (vol. vii., 244 p., 19 pl.). The publication of the second part will complete the ornithological work of the expedition. This essay is full of interest to the general reader as well as to the ornithotomist; since, although structural minutiae are fully discussed, each detail is brightened by some allusion to function, origin, or habit. The conclusions of Professor Watson, concerning the affinities of the Spheniscidae to each other and to other birds, are worthy of much fuller discussion. Many and appreciative allusions are made to Dr. Elliott Coues' monograph of the Spheniscidae, which is frequently quoted.

Professor W. Kitchen Parker's report on the development of the green turtle (vol. i., 58 p., 13 pl.) is an exceedingly weighty contribution to morphology, and concludes with a page of most suggestive generalizations upon the phylogeny of the Chelonia and Reptilia. This investigation was based upon a series of embryos obtained at Ascension Island, in compliance with Professor Parker's particular request, and is one of the most important of the side issues of the expedition.

Dr. Albert Günther's report on the shore fishes (vol. i., 82 p., 32 pl.) contains the identifications of fourteen hundred specimens, representing five hundred and twenty species, of which ninety-four were new. It consists of a series of faunal and regional lists, some of which, particularly those for remote oceanic islands, cover fields hitherto unexplored by ichthyologists; such as St. Paul's Rocks, Ascension, Kerguelen Island, and Juan Fernandez, and also Magellan Straits and the Arafura Sea. The systematic arrangement is all that can be desired: it is to be regretted, however, that the author has been satisfied to publish such brief and cursory diagnoses, and that he gives no tables of proportional measurements, thus causing serious embarrassment to students who have no access to his types. The report upon deep-sea fishes by the same author, at one time announced for vol. iii., is now so far down upon the official list of 'memoirs to follow in subsequent years,' that it is not likely to come to view for a long time. This is all the more to be regretted, since the fishes of the abyssal region are more peculiar, and more generally instructive, than perhaps the members of any other group. Much unstudied material in Italy, France, Austria, and America, is being held until these collections, now eight years in the author's hands, can be made known to the public. The preliminary descriptions published in 1878 are so meagre as to be nearly useless to any one except their author; and the type specimens themselves will, of course, be inaccessible for comparison until the final report is in type. Dr. Günther's success in re-organizing the natural history section of the British museum has been very great, yet it seems unfortunate that administrative work should so entirely monopolize the time of so eminent an ichthyologist.

RAIN IN BELGIUM.

La pluie en Belgique. Par A. Lancaster. Bruxelles, *Hayez*, 1884. [Extract from the Annuaire de l'Observatoire royal de Bruxelles.] 113 p. 16°.

The completion of a fifty-years series of uninterrupted observations of rainfall at Brussels

is taken by Lancaster as a fitting occasion for the preparation of a neat compendium of rain-records for all Belgium. The longer series, besides Brussels, are forty-three years at Ghent, thirty-five at Liége, twenty-three for Ostende, and twenty for Les Waleffes. The entire list, prepared for the end of 1882, contains one hundred and twenty-seven stations, with an average record of four and a half years; but of these, thirty-eight are for only one year, and sixty are for two years or less. At present the observatory receives the results attained at over two hundred stations. The chief general conclusions, which, unfortunately, are not shown either by map or diagram, are as follows: along the littoral lowlands an annual fall of about 650 millimetres, rising to a maximum in the highlands of the Ardennes (altitude about 400 metres) of from 900 to 1,100 millimetres. For 1882, rain and altitude of station are thus related: —

Below 10 m. . . . 825 mm.	200 to 400 m. . . . 1,220 mm.
10 to 100 " . . . 875 "	400 to 700 " . . . 1,375 "
100 to 200 " . . . 1,020 "	

According to seasons, the ratios are, winter, 100; spring, 95; summer, 129; autumn, 119. Along the coast the maximum is in autumn: in the interior, it is in summer. Heavy rains occur chiefly in the summer. In Brussels, since 1833, there have been sixty-nine records of 25 to 50 millimetres of rain in a day, thirty-four of these being in June, July, and August. A general increase in the annual rainfall is suspected since 1865, the evidence being as follows: —

Ghent . . 1838-64, 753 mm.	Ghent . . 1865-82, 981 mm.
Brussels . . 1833-64, 700 "	Brussels . . 1865-82, 778 "
Liége . . . 1847-64, 743 "	Liége . . . 1865-82, 796 "

The sun-spot cycle does not find strong confirmation from the records at Brussels.

Minimum.	Maximum.	Difference.
1833 . . . . 646 mm.	1837 . . . . 714 mm.	68 mm.
1843 . . . . 736 "	1848 . . . . 750 "	14 "
1856 . . . . 670 "	1860 . . . . 695 "	25 "
1867 . . . . 682 "	1870 . . . . 737 "	55 "
1878 . . . . 818 "	1882 4 . . . . 824 "	6 "

The little volume is chiefly valuable as bringing the older records up to time, and preparing for future work with the greatly increased number of stations of the past few years.

A NEW ASTRONOMICAL JOURNAL.

Bulletin astronomique, publié sous les auspices de l'Observatoire de Paris. Par M. F. TISSERAND. Tome i., No. i., Janvier. Paris, *Gauthier-Villars*, 1884. 64 p. 8°.

THE great number of new observatories in France now beginning active work has rendered a publication of this character a necessary adjunct of the labors of the astronomers of that country; and it will embrace two distinct parts, the first of which will contain the late observations made at the French observatories, ephemerides of planets and comets, and memoirs and notices relating to various topics in theoretical and practical astronomy. The second part is to be devoted to notices of current astronomical news, and a *résumé* of the chief periodical publications and of memoirs. This latter feature is a most fortunate one, and will make the *Bulletin* a desideratum in all observatories and scientific libraries. The special periodicals embraced in the *revue* of the January *Bulletin* are the *Monthly notices* of the Royal astronomical society, *The observatory*, the *Sidereal messenger*, the *American journal of science*, *Copernicus*, and the *Astronomische nachrichten*. The first part of the same number contains a brief paper by Tisserand, on the theory of the motion of the small planet Pallas, followed by observations of the satellites of Mars and Neptune by the Henrys, of the comet Pons-Brooks by Bigourdan and Perigaud, — all these at the Paris observatory, — and observations of the latter object by Trépied, at Alger; ephemerides of the small planets Mnemosyne, Diana, Alcmene, and Parthenope; and is concluded with the first part of a paper by Schulhof and Bossert, on the late return of the comet of 1812. Appended to the January *Bulletin*, under the head of *Variétés*, are, a paper on *les phénomènes crépusculaires*, by Radau; the comets and planets of 1883, by Bigourdan; and the new observatory of Rio de la Plata.

It would be a matter of the greatest interest to those engaged in new and original research, if a department relating to unpublished investigations could be added to the *Bulletin*. Brief notes in such a department, relating to work already in hand, its progress at various stages, and to projected research, the material for which may be in process of accumulation only, would be likely to lead to a more effective and happy state of co-operation among astronomers and observatories than now exists.

The *Bulletin astronomique* is published from the press of Gauthier-Villars, and is gotten up in the attractive style, and with that good typo-