

although it is pointed out that during the five years that the equatorial has been mounted, "the position of the pole of the instrument has changed only a fraction of a minute of arc." The observations of the satellites of Saturn refer mostly to Japetus, Hyperion, and Titan. The disappearance of the ring took place February 6; Besse's elements were verified by observations of its angle of position on thirty-six nights by Prof. Hall, and on twenty nights by Prof. Holden. There are also observations of the satellites of Uranus and Neptune, besides the fine series on the two satellites of Mars which were placed in the hands of astronomers some time since. A good series of measures of the companion of Sirius was obtained, and the six stars in the trapezium of Orion have been measured in connection with observations of Mr. Otto Struve's selected list of stars for determining the personal errors of observers. Prof. Holden observed the Orion nebula on twenty-eight nights, also six others of the more interesting of this class of objects.

The transit-circle and the 9.6-inch equatorial have been in charge of Prof. Eastman; 3,450 observations were made with the former instrument during the year, while the equatorial has been occasionally employed for a very necessary auxiliary purpose when it is desired to observe the fainter or less accurately computed minor planets on the meridian, viz., in determining previously the approximate correction of the ephemerides; for want of this necessary preliminary observed at Washington, a considerable number of observations on the meridian have been put upon record as observations of faint minors, which have been found to belong to small stars, to the equal vexation of observers and computers.

During the transit of Mercury, seventy-two photographs of the planet upon the solar disk were made at Washington by Mr. Rogers, with one of the photoheliographs used for the transit of Venus. Prof. Harkness proceeded to Texas for the observation of this transit of Mercury, succeeding better with the later than the earlier half of the phenomenon. The compilation and discussion of the observations is proceeding under Prof. Eastman, and will soon be ready for publication.

With regard to the total solar eclipse, it is stated that the liberal appropriation authorised by Congress allowed of a number of separate expeditions being organised, and the co-operation of the leading astronomers of the United States was invited and cordially responded to; but, while the Observatory of Washington was enabled to assist in a financial point of view, the heads of expeditions were left free to arrange their own plan of observation. The report enters briefly into particulars of the stations and success of the observers, to which space will not allow further reference here. With respect to the search for an intra-Mercurial planet or planets, it is mentioned that the following, in addition to Prof. Watson, were so occupied, at least during a part of the time that the sun was obscured:—Prof. Asaph Hall at La Junta, Colorado, with a 5-inch Alvan Clark equatorial, power 150 diameters, sweeping south and following the sun to about 10° distance; Mr. O. B. Wheeler at the same place, with a similar instrument, sweeping below and preceding the sun; Prof. Newcomb at Separation, Wyoming, and Professors Holden and Pritchett at West Las Animas, Colorado, also conducted unsuccessful sweeps for an intra-Mercurial planet.

The Washington Observatory has made arrangements for dropping a time-ball in New York city, at noon daily, which took effect from September 10, 1877; there have been a few failures, the cause of which is explained. The volume of observations for 1875 was daily expected to be delivered from the press at the time the Report was drawn up: we presume there are few real astronomical workers who have not experience of the liberality with which the handsome volume annually issued has been distributed by the United States Naval Observatory.

TEMPEL'S COMET, 1867, II.—Since our last note referring to this comet, M. Gautier has published sweeping-ephemerides, in the calculation of which he first assumes the perihelion passage to occur May 10.9416 Berlin mean time (that being the epoch fixed by his calculations after taking into account the action of Jupiter during the present revolution, which has delayed the comet less than three days), and then varies this date by  $\mp 4$  days; he believes the error of his computation will not exceed these limits. The following are the positions taking  $T = \text{May } 10.9416$  for midnight at Berlin, or roughly for 11h. Greenwich time, during the next period of absence of moonlight, or rather beyond it:—

1879.	Right Ascension. h. m. s.	North Polar Distance.	Log. Distance from Earth.	Intensity of Light.
March 10 ...	15 56 1 ...	98 54.4 ...	0.0960 ...	0.188
" 14 ...	16 1 41 ...	99 10.5 ...	0.0808 ...	—
" 18 ...	16 7 2 ...	99 26.2 ...	0.0657 ...	—
" 22 ...	16 12 2 ...	99 41.6 ...	0.0506 ...	—
" 26 ...	16 16 39 ...	99 56.9 ...	0.0355 ...	—
" 30 ...	16 20 51 ...	100 12.6 ...	0.0206 ...	0.278

An acceleration of four days in the time of arrival at perihelion will alter the comet's position on March 10,  $+10m. 1s.$  in R.A., and  $+1^\circ 4'$  in N.P.D.; and on March 30,  $+11m. 51s.$  in R.A., and  $+1^\circ 11'$  in N.P.D.

BIOLOGICAL NOTES

NEW FISHES FROM CENTRAL ASIA.—The last number of the *Bulletin* of the Imperial Academy of Sciences of St. Petersburg contains an interesting communication from Prof. Kessler on the fishes obtained by Prjvalsky during his recent expedition to Lob-Nor, a district previously unvisited by any naturalist. Herr Prjvalsky's collection from Lob-Nor and the basin of the Tarim contained examples of eleven species of fishes, eight of which belong to the family of *Cyprinida*, and three to that of *Cobitida*. As might have been expected, nearly the whole of these are new to science, and belong to genera (*Diplychus*, *Schizothorax*, &c.) characteristic of the high lands of Central Asia. One of the Cyprinoides is so peculiar as to necessitate the institution for it of a new genus, which Herr Kessler proposes to call *Aspiorhynchus*. *Aspiorhynchus prjvalskii*, as Prof. Kessler names this fish, in honour of its discoverer, inhabits the lower Tarim and Lob-Nor, where it attains a considerable size and furnishes an excellent article of food. Prof. Kessler suggests that two of the fishes obtained by the late Dr. Stoliczka during Forsyth's expedition to Yarkand, which were referred by Dr. Day to the genus *Ptychobarbus*, probably belong to his genus *Aspiorhynchus*.

DREDGING OPERATIONS, GULF OF MEXICO.—The last *Bulletin* (No. 9) of the Museum of Comparative Zoology at Harvard College, Cambridge, Mass., contains an account of some wonderful new or rare forms of echini, by A. Agassiz, of corals by L. F. de Pourtalés, and of ophiurans, by T. Lyman, all the specimens having been dredged, during the survey of the United States steamer *Blake*, in the Gulf of Mexico. Preceding the technical descriptions there is a bibliographical notice of the publications relating to the deep sea investigations carried on by the United States Coast Survey from 1850 to the present time. Of the echini described and figured in the present number is a most interesting new species of *Dorocidaris* (*D. blakei*). While the recent *Cidaridae*, so far as at present known, do not by any means show the great variety in the form of their spines, which is found so common among the fossil genera of the family; yet here we have at least one species in which the variety of the shape of the spines is extreme. Its long tapering spines would have indicated its position in *Dorocidaris*, but its extraordinary flattened fan-shaped spines seem nearly identical with those of the Jurassic genus *Rhabdocidaris*—when

alive these echini were of a brilliant vermilion colour. *Salenia pattersoni* spec. nov., is described as the most exquisitely coloured of the living Saleniæ, thus far found; the test was of a light cream colour, as well as the shafts of the primary spines. These are banded with a brilliant vermilion, the two colours nearly equally divided. The secondary spines are also cream-coloured, but separated at the base by dark violet lines which extend from the apical to the actinal system. Similar dark violet lines separate the genital and ocular plates. *Conoclypus sigsbei* is described as a magnificent species; by far the most striking sea-urchin which A. Agassiz had ever seen. The first time it was seen the dredge brought up half a dozen of the huge, brilliant lemon-coloured specimens. All these species, as well as the remarkable *Periaster limicola*, are figured from photographs. Count Pourtalés describes a number of new or rare forms of corals. As far as our present knowledge goes, he writes, no sea-bottom can rival in abundance of deep-sea corals the West Indian. It is not at all unfrequent for a single cast of the dredge to bring up a dozen different species represented by more or less numerous specimens of each. A very young specimen of *Holopus* was dredged from a depth of 100 fathoms. It has been sent for study to Sir Wyville Thomson, but a beautiful figure by A. Agassiz is here given. Several new species of *Antedon* are described by Pourtalés. A large number of new species and two new genera of ophiuroids are described by Théodore Lyman. The descriptions are accompanied by excellent figures.

UNITED STATES FISH COMMISSION.—Messrs. G. Brown Goode and Tarleton H. Bean give an account of some fifty species of fishes from the east coast of the United States, some of which are new to science and all of which are new to the fauna of that portion of the American States. Among the more interesting of the new forms may be mentioned *Phycis chesteri*, the largest specimens measured without the tail about eight inches in length; they were taken off Cape Ann. A new species of Dr. Günther's genus *Haloporphyrus* was taken on the outer edge of Le Have Bank at a depth of 400 to 500 fathoms. Two specimens of the rare *Kenoropsis brachyptera* (Lowe) Gill, were obtained; one was found clinging to the side of a sword-fish, harpooned in the channel south-west of George's Bank, and the other on the deck of a Halibut trawler fishing to the north-east of George's Bank, at a time when sword-fish were being taken on the trawls. A specimen of *Nemichthys scolopaceus* was taken alive from the stomach of a cod caught on the same bank. *Amia calva* is reported from St. John's River, Florida, and from Spruce Creek, a tributary of Halifax River, about lat. 28°. Its range has not hitherto been recognised south of Charlestown, South Carolina, from whence Garden sent specimens to Linnæus (*American Journal of Science and Arts*, January, 1879).

AMERICAN CÉDOGONIACEÆ.—Dr. V. B. Wittrock has just published a revision of the species of Cédogoniaceæ found in America, as far as they are known (*Botaniska Notiser utgifne af C. Nordstedt*, November, 1878). The list contains twenty-three species belonging to the genus *Cédogonium*, and eight belonging to the genus *Bulbochæte*. Of these, nine are found in Greenland, five in Pennsylvania, one in California, five in Mexico, three in the West Indies, one in Venezuela, one in Bolivia, and seven in Brazil. It would seem very certain that this number constitutes but a small part of the species which will by further investigations be discovered; still it enables the author to draw, with a considerably high degree of probability, the following conclusions:—1. That the cédogoniaceous vegetation of America differs but little from that of the European. 2. That the species found towards the more northern portion of this area are perfectly identical with those to be met with in Northern Europe, while the

species met with in the more southern portion of the same area are either species quite different from those met with in Europe, or, at most, extreme varieties of European forms. Only one of the South American species forms an exception to this (*Cédogonium crispum* (Hass.) Wittr.), which would seem to be nearly a cosmopolitan. 3. That the genus *Bulbochæte* has in America, as in Europe, most of its species indigenous to the cold temperate or arctic zone. Of the eight species known from America, five are natives of Greenland.

CHEMICO-AGRICULTURAL STATIONS IN ITALY.—Stations for the scientific observations of subjects connected with agriculture in its widest sense, have now been for several years established throughout Italy. These are under the general control of a Minister of Agriculture. We have lately received the reports (Atti) of the stations at Rome and Palermo, contributed by Prof. J. G. Briosi; they have, as might be expected, mostly to do with the subject of the diseases of the vine and the olive. Among the more important of these reports are the following: On the Phytoptus of the Vine (*Phytoptus vitis*), with figures; an account of the Marciume of the Vine (*Albinia wockiana*), with figures; on a Fungoid Disease attacking Lemons (*Fusisporium limoni*), with figures. At Messina a lemon-tree, in good condition, of fair size, will, it is reckoned, produce about 2,000 ripe fruit each year. These fruits are sold at from twenty to forty lire the thousand, according to size and quality, so that a lemon orchard is of great value, and a good deal of distress has been caused by the destruction of the lemon crops by this disease.

ASPARAGIN IN PLANTS.—The physiological rôle and distribution of asparagin in the plant kingdom have been lately studied by Herr Borodin (*Botanische Zeitung*, 51 and 52, 1878). He states, as the result of his researches, that whenever a vigorous part of a plant becomes poor in non-nitrogenous substances, asparagin occurs as a product of decomposition, and accumulates. This may be explained in either of two ways: either the presence of non-nitrogenous matters hinders the decomposition of albumen, while these alone are decomposed; or (conversely) in life albumen is always decomposed and asparagin constantly formed, but where carbohydrates are present albumen is regenerated, and it is only where these are deficient that asparagin accumulates. The former hypothesis supposes different processes of decomposition in life according as carbohydrates are present or not; Herr Borodin thinks it therefore the more improbable, and adopts the other, doing so the more readily that the regeneration of albumen from asparagin and carbohydrates certainly occurs, and is necessary for the transference of the albuminous matters. Not all carbohydrates are adapted for regeneration of albumen from asparagin, and therefore asparagin may accumulate even when carbohydrates are present. Such unsuitable carbohydrates are starch and the oils, whereas glucose is the suitable form.

#### THE PIC DU MIDI OBSERVATORY

OUR readers may remember that early in the year General de Nansouty, the hardy director of the Pic du Midi Meteorological Observatory, was cut off from communication with the world below, the severe weather having so affected the telegraph as to prevent it from acting. Fears were entertained for the General's safety, and M. Albert Tissandier resolved to organise a party for the ascent of the Pic and the succour of the veteran observer. An interesting account of this ascent appears in *La Nature*, to which we are indebted for the accompanying illustrations. The snow-storm having somewhat abated at Bagnères-de-Bigorre on January 9, M. Tissandier resolved to attempt the Pic next day, in company with three of General Nansouty's usual guides.