

pale. This ship, according to the statement of the inventor, can be guided for twelve hours completely under water, the depth of immersion varying between 100 and 300 feet at the option of the commander. Upon the surface the ship can be managed like any other vessel, its rate of speed, however, being less than that of ordinary steamers. The diving is done by means of screws, vertically, and can be accomplished suddenly or gradually. In the same manner the ship can be made to emerge from the water. When the vessel is under water, enough light is supplied to enable those on board to see any obstacle 130 feet ahead, and to regulate the ship's motion accordingly. The air supplied to the vessel is said to suffice for the whole crew for about twelve to fourteen hours. In case of need the air reservoir can be filled again, even under water, by means of telescopic tubes sent up to the surface. The progress of the vessel, as well as the diving, are said to be absolutely noiseless. We give all these details from the inventor's statement with due reserve, but should they prove true, the invention would be likely to prove a highly valuable one even for peaceable objects, apart from its great utility in naval warfare.

It is announced that, at the instance of the Marquis of Lorne, the initiatory steps have been taken for the establishment of an academy of eminent literary and scientific men in Canada, after the plan of the Assembly of the Immortals in France. The proposed body is to be composed of six sections, representing English and French letters, history and archæology, and the mathematical, physical, geological, and biological sciences. It is probable that there will be ten or twelve members in each section. Dr. Dawson is spoken of as the first president.

THE Boston Society of Natural History have published in a separate form various papers on the Palæolithic implements of the valley of the Delaware.

PROF. KIRCHHOFF, of Hallé-a-S., announced at the last meeting of the Saxo-Thuringian "Verein für Erdkunde" that the second German Geographical Congress will take place at Halle during the current year. A committee has been formed.

ON the day following his resignation as Minister M. Paul Bert was nominated president of the Société de Biologie, filling the room which had been vacated by the death of Claude Bernard.

A SLIGHT shock of earthquake was noticed at Agram on January 9 at 2.29 a.m.

WITH regard to the *Jeannette* expedition the latest news received at St. Petersburg, January 28, from Irkutsk, states that Mr. Melville has started for the mouth of the River Lena to resume the search for Lieut. De Long. The search will be carried on with the utmost vigour with the aid of the natives. The supply of provisions is plentiful, so that if necessary the search may be prolonged until far into the summer. Mr. Melville will be accompanied on his expedition by the captain of the steamer *Lena*.

At the meeting of the Geographical Society on February 13 Sir Richard Temple, Bart., G.C.S.I., formerly Governor of Bombay, will deliver a lecture on the Geography of the Birth-place and Cradle of the Mahratta power in Western India. The lecture will be illustrated by the author's own sketches, which have been enlarged for the occasion by his brother, Lieut G. T. Temple, R.N.

FROM the *Compte Rendu des Séances*, just issued by the French Geographical Society, we learn that at their next meeting on February 3, some interesting letters will be read, including one from Dr. Crevaux, who is about to explore the sources of the Pilcomayo in the Bolivian Andes, and afterwards descend the river to its mouth. A paper will also be read by Col. Veniukoff on the unexplored parts of Asia.

THE Moscow Society of Naturalists have appointed a special Commission to inquire into the influence of the decrease of forests on rivers and streams. This Society intend to celebrate, on May 14 next, the fiftieth anniversary of the doctorate of their vice-president, M. Charles Renard, who has for forty-two years rendered eminent service to the Society as well as to science.

AN important meeting of the Executive Committee of the Parkes Museum was held on Friday, Prof. Berkeley Hill in the chair. The Curator, Mr. Mark H. Judge, as Secretary of the recent International Medical and Sanitary Exhibition, presented the final report of the Exhibition Committee, which, after giving a detailed account of the origin and success of the undertaking, concluded as follows:—"The work for which the Exhibition Committee were appointed having now come to an end, they have the satisfaction of handing over to the Executive Committee of the Museum the sum of 933*l.* 11*s.*, together with furniture and fittings to the value of 100*l.*, while contributions to the Guarantee Fund to the amount of 86*l.* 19*s.* have been transferred to the Parkes Museum Building Fund, making the financial result of their labours a profit to the Parkes Museum of 1,120*l.*" The Honorary Secretary, Dr. G. V. Poore, read a communication from the Council of University College, in which that body agreed, with some modifications, to proposals which had been made in behalf of the Museum to the Council of the College in reference to the erection of a building for the Museum. After a long discussion the modifications suggested by the Council of University College were accepted, and it was resolved that steps should be taken to obtain the funds necessary for carrying out the scheme, which embraces (1) the building of an addition to the north wing of the College for the purposes of the Museum; (2) an endowment for the maintenance and management of the Museum; (3) the Museum to be opened free to the public and to be placed on a somewhat similar footing to the North London Hospital, *i.e.* to be autonomous, with due representation of the Council of University College on the Executive Committee of the Museum. It is estimated that 30,000*l.* is the sum that will be required thus permanently to establish the Museum as a national institution. Towards this Mr. Thomas Twining of Twickenham, had written to say that he would subscribe the sum of 100*l.* if one hundred promises of a similar amount were obtained. Promises of subscriptions may be sent to the Curator at the Parkes Museum, University College, Gower Street. Subscriptions may be paid to the account of the Parkes Museum at the Union Bank, Argyl Place, Regent Street.

THE additions to the Zoological Society's Gardens during the past week include a Toque Monkey (*Macacus pileatus* ♂) from Ceylon, presented by Mrs. Evans; an Azara's Fox (*Canis azarae*) from South America, presented by Mr. Owen E. Grant; an Indian Vulture (*Cyps, bengalensis*) from India, presented by Capt. Th. Leportier; a Chimpanzee (*Anthropopithecus troglodytes* ♀) from West Africa, deposited.

OUR ASTRONOMICAL COLUMN

THE OBSERVATORY OF HARVARD COLLEGE, U.S.—The Annual Report of the proceedings of this Observatory, presented to the visiting Committee in November last by the present zealous director, Prof. Pickering, has been issued. Aided by the subscription raised in 1878 for the support of the Observatory for five years, the director has been enabled to keep the establishment in great activity, and his Report will be a gratifying proof that the funds placed so liberally by subscribers at his disposal are being dispensed in a manner that must prove of great advantage to the progress of astronomical research. Three instruments the equatorial of 15-inches aperture, the meridian circle, and the meridian photometer, have been kept in active

work. With the former, sixty-four eclipses of Jupiter's satellites were observed photometrically, an improvement having been introduced by which the number of settings is largely increased. A single observer, it was found, could make but three settings in a minute, or one in twenty seconds. With an assistant to record, the time is reduced to about nine seconds, while by the employment of two assistants, one of whom reads the photometer circle, while the other records and observes the time by the chronometer, the time is reduced to five seconds. It is probable that, as the observer does not remove his eye from the eyepiece, the accuracy of the observations is increased, and the satellite followed nearer to the point of disappearance. The search for objects having singular spectra, which only admits of being carried on in perfectly clear, moonless nights, had been much interrupted by other current work. The most notable result was the discovery of the peculiar spectrum of the star Lalande 13412, a seventh magnitude; two of the lines appear to be coincident with two in the spectrum of the great comet of 1881, as described by Dr. Konkoly; "accordingly, while other comets have a spectrum identical with that of the stars of Secchi's fourth type, this comet contains a substance as yet unknown, which one star only is as yet known to contain." The star L^2 Puppis was found to have a banded spectrum; its declination is more than forty-four degrees south of the equator, and at the time of Prof. Pickering's examination it was less than two degrees above the horizon. Its variability was pointed out by Dr. Gould (*Uranometria Argentina*, p. 279); he inferred a period of about 135 days; maxima occurred in 1874 on Feb. 8 and June 25; the star is stated to be red in all its stages and remarkably so about minimum, limits of variation 3.6 and 6.3. The position for 1875.0 is in R. A. 7h. 9m. 43s., N. P. D. $134^{\circ} 26'$. 2. The spectra of all the stars north of -40° , marked as red or coloured in Dr. Gould's work have been examined at Harvard College, no peculiarity of spectrum being detected in the majority. Algol and the star D. M. $81^{\circ} 25'$ were assiduously studied photometrically. The meridian-circle had been in use on 250 days. The work originally proposed for the meridian-photometer, viz., the measuring on three nights the light of each of the naked eye stars visible in the latitude of the Observatory, was essentially completed on August 25, 1881, but it is intended to continue the observations for another year, as the necessary delay in reduction and publication will not be greatly increased thereby. With the view to a more complete comparison of the photometric observations with those made by the naked eye, which the *Uranometria Argentina* affords the means of doing as far as 10° north, all the stars in the *Atlas Cælestis Novus* of Heis north of the equator and brighter than the sixth magnitude, are being measured by the eye, aided by an opera-glass when necessary. It is intended that each star shall be measured by three observers, who are to compare it with two stars in the vicinity of the pole, one a little brighter, the other a little fainter; the interval between the two stars is supposed to be divided into ten parts, and the brightness of the star under comparison is estimated on terms of this interval. Prof. Pickering mentions that out of about nine thousand comparisons required for this work, nearly a quarter have been already made.

Vol. xiii. of the "Annals" now in process of publication will contain results of work with the large equatorial, under the direction of the late Prof. Winlock, and micrometrical measures up to the present time. These include measurements of double stars, observations of nebulae and their spectra, satellites of Saturn, Uranus, and Neptune, satellites of Mars during the oppositions of 1877 and 1879, &c. Vol. xiv. will contain the measures made with the meridian-photometer.

An important and much-wanted bibliographical work has been undertaken by Mr. Chandler, viz., the collecting of references to observations of stars of known or suspected variability, those of each star being brought together; on the completion of this work it is intended to measure the comparison-stars photometrically, and to effect a reduction on a uniform system of all the observations of the variable-stars of long period.

The staff of computers employed upon the ordinary reductions of observations with all three instruments includes several ladies. We suspect that those who are competent and have had opportunity of judging of the work of the lady-computer (who is to be found elsewhere than at Harvard Observatory) will be of opinion that she is well able to hold her own against even the practised computer of the other sex. If proper opportunities and encouragement were afforded, we might hear of Madame Lepautes in our own day.

BIOLOGICAL NOTES

DELICATE TEST FOR OXYGEN.—T. W. Engelmann proposes, in the *Botanische Zeitung*, a new test, of an extremely delicate nature, for determining the presence of very minute quantities of oxygen, namely, its power of exciting the motility of bacteria. If any of the smaller species, especially *Bacterium termo*, are brought to rest, and then introduced into a fluid in which there is the minutest trace of free oxygen, they will immediately begin to move about freely; and if the oxygen is gradually introduced, their motion will be set up only in those parts of the drop which the oxygen reaches. In this way Engelmann was able to determine the evolution of oxygen by *Euglena* and by chlorophyll-granules.

PROTHALLIUM AND EMBRYO OF AZOLLA.—The development of the prothallium and embryo of *Azolla*, hitherto but imperfectly known, have been followed out by Prof. Berggren (*Lunds Univ. Arsskrift*) in the case of *A. caroliniana*, and found closely to follow the phenomena in *Salvinia*. The endospore splits, on germination, along its three edges; and the prothallium, on escaping, has the form of a slightly convex disk, consisting in the middle of several layers of cells, at the margin of only one, and separated below by a thin hyaline membrane from the large protoplasmic spore-cavity. Shortly afterwards an archegonium is formed, consisting of four cells inclosing the oospore, and of four neck-cells. When quite mature, the part of the prothallium which projects outside the spore is nearly hemispherical, and three obscure wings are produced by three longitudinal furrows. After fertilisation the oospore is divided by the first oblique division-wall into a smaller upper cell facing the neck of the archegonium, and a somewhat larger lower cell filled with coarse-grained protoplasm. By successive walls vertical to one another and to the first division-wall, and parallel to its longitudinal axis, the embryo is then divided into octants. In each octant a wall next appears parallel to the first division-wall, and the entire embryo then consists of sixteen cells arranged in four parallel rows. After fertilisation the embryo breaks through the prothallium near the archegonium, and the prothallium then surrounds the foot of the embryo like a cup, carrying the withered archegonium on its dorsal side behind the scutellum. To prepare for fertilisation the massulae of the macrosporangia, with their anchor-shaped glochidia, fix themselves in large numbers to the epispore of the macrospores which are floating on the surface of the water. The central fibrous portion of the floating apparatus is perforated by a narrow canal, through which the antherozoids probably reach the archegonium. By their subsequent growth the prothallium, and later also the embryo, force themselves into this canal and increase its size. By this means the three floating bodies are displaced from their original position, and finally stand at a right angle from the macrospore. The indusium which covers the floating apparatus in the form of a brown cap is at the same time pushed upwards, and finally forced against the embryo. The hood like fibrous layer which is closely applied to the floating apparatus is turned over, and surrounds the foot of the embryo like a collar. Shortly afterwards the embryo detaches itself from the macrospore, the margins of the scutellum become broader, and then lie on the surface of the water in the form of cups or scales.

PHYLLOMIC NECTAR GLANDS IN POPLARS.—In a very interesting memoir on this subject, Mr. Wm. Trelease calls attention to the fact that these glands have been very generally overlooked, and that they have been considered of little value by the systematic botanist. He accounts for this by their being occasionally suppressed, and of their limitation to the earlier-formed leaves. Still most of the American botanists refer to them, and Michaux figures them in his monograph of the genus. In May, 1880, Mr. Trelease's attention was drawn to examine the leaves of a small aspen by the action of some bees. The tree was covered with its newly expanded foliage, and the bees were flying from leaf to leaf; they were seen to be collecting nectar which was poured out from a double gland at the base of each leaf. These glands were placed on the upper surface of the petiole at its union with the blade. On section and microscopical examination they showed the usual structure. They were found not to occur on all leaves, but as a rule only on the first half dozen or less which appear on each branch in the early spring; and later on in the season, when these have fallen off, one may sometimes examine all the leaves without detecting a single glanduliferous one, and this on a species which produced