

enough penetrating force to pass clean through the side of the strongest ironclad afloat—those of the *Hercules* class—or, in other words, is endowed with impact sufficient to pierce twelve inches of iron; and it must be remembered that this last-named distance is one at which gunners can make very good practice, so that, under ordinary circumstances, every other shot would take effect against a target such as is presented by the keel of a large frigate. As regards extreme length of range, a quality of some importance, when, as in the recent instance of the Paris siege, great projecting power is of more importance than precision of aim, this Fraser gun may vie with almost any other, with the exception, perhaps, of Whitworth's cannon. The utmost distance to which "the Woolwich infant," as it has been nicknamed, will in all probability be capable of projecting a shell is about ten thousand yards, supposing the arm to be laid at an elevation of some thirty-three degrees.

So satisfactory, indeed, has this experimental structure turned out, that a further batch of sister guns have forthwith been commenced, and will serve to arm some of our heavy iron-clads which are now building. Only a small number of such weapons will be carried by these vessels—two, or at the most four, apiece—and thus our modern men-of-war will present a perfect contrast to those of a dozen years ago, when a ship, being regarded merely as a box of guns, sometimes received on board as many as a hundred and thirty cannon. Nevertheless, a broadside delivered from four guns of these giant dimensions (for the whole armament being carried in turrets may be brought to bear at one time), representing almost a ton and a half of metal, very far exceeds that which an old first-class three-decker could throw into her antagonist, and would indeed be sufficient to sink most vessels at a first discharge.

As regards the method of building up these large guns, we need say nothing, seeing that the subject was fully discussed recently in these columns. It may be of interest to know, however, that in the present instance as much as fifty tons of metal were employed in constructing the arm, and that at one time thirty tons of this was brought to a glowing white heat for the purpose of welding. The reverberatory furnace in which this massive coil was heated is an apartment in which a dozen persons could dine comfortably, and the length of the bars before coiling amounted to upwards of 1,200 feet. The length of the arm is sixteen feet and a quarter, and its extreme diameter fifty-six inches.

#### A NEW INEXTINGUISHABLE STORM AND DANGER SIGNAL LIGHT

THIS new Signal, possessing most remarkable properties, has now been brought before the public. It was first exhibited at the President's meeting of the Royal Society on 22nd April, when it attracted great attention. The peculiarities of the Signal Light are, that it is self-igniting when placed in water or thrown on the sea. Contact with water being the only means of igniting the lamp, it is inextinguishable when once ignited; neither wind nor storm has any effect upon the flame. The light is of intense brilliancy, and of great duration, and can be seen for a great distance in the open-air. Photographs may be taken by the light of this new signal. Experiments were tried on the evening of 25th April, at ten o'clock, in the presence of some scientific gentlemen, to determine its brilliancy as a signal. A lamp was placed in a bucket of water on the top of Primrose Hill, and the light was so intense that after the signal had been burning for twenty minutes small newspaper-print could be distinctly read at a distance of seventy feet, notwithstanding that the night was thick and foggy. This new signal light will burn for over forty minutes. In construction the lamp is exceedingly simple, and so contrived that

when once burnt the whole may be thrown away. The chemical preparation contained in the lamp is a solid, hard substance, free from danger; not affected by heat, and so non-explosive; and the signal is comparatively inexpensive. Its applications for marine signals are numerous. In case of shipwreck a few lamps thrown on the sea would illuminate the entire scene, and enable assistance to be promptly and efficiently rendered. For rocket-line apparatus it is equally valuable, as, bursting into a flame on falling into the sea, it would indicate the position of the rocket-line. In connection with life buoys it would be a mark to the drowning sailor. In life-boat services it would be a signal to the vessel in distress, and the brilliant light would greatly assist in the rescue. In cases of salvage, ships' signals, tide and harbour warnings, the duration of the light renders this new invention of great value. As a railway signal, to be used by the guards and station porters in cases of accident, it is equally available, and will be of great utility. The difficulties of preparing the chemical compound have been entirely overcome by Messrs. Albright and Wilson, of Oldbury, the contractors for the manufacture of the lamp for Mr. Nathaniel Holmes the patentee.

#### FRESHWATER BATHYBIUS

AT a late meeting of the Natural History and Medical Society of the Lower Rhine, the well-known zoologist, Dr. R. Greeff, noticed an organism inhabiting freshwater and approaching very nearly, both in its structure and mode of occurrence, the celebrated deep-sea *Bathybius Haeckelii* of Professor Huxley.

Dr. Greeff, as much as three years ago, published a notice (in Max Schultze's "Archiv für mikrosk. Anat." Bd. iii., p. 396) of a new shell-less freshwater Rhizopod, which was remarkable for its gigantic stature in comparison with all previously-known organisms of that kind. He called attention at that time to its occasional occurrence in great quantity in the mud of standing waters, and indicated that, on account of its peculiar structure, it could be referred neither to the true *Amœba* nor to the *Actinophryes*. Since that time, the author has never lost sight of this extremely remarkable creature, and he thinks it desirable no longer to keep back his observations, especially considering the high degree of interest that has been excited by the *Bathybius*-mud which has been discovered in the depths and abysses of the ocean (to beyond 25,000 feet).

As regards the occurrence of this freshwater organism, to which the author provisionally gives the name of *Pelobius*,\* and which he considers to be truly comparable with *Bathybius*, Dr. Greeff states that it is found in many standing waters with muddy bottom, which have apparently persisted for a long time, and seldom, if ever, have dried up. Thus, near Bonn the bottom of the Poppelsdorf fish-pond is found occasionally to be almost entirely covered with masses of *Pelobius*; to such an extent, indeed, that sometimes a glass vessel brought up from the bottom contains almost more *Pelobius* than true mud-particles, &c. The *Pelobius* never disappears in these waters, but remains throughout the year in great masses, sometimes in one place, sometimes in another. The cake-like lumps of mud which rise to the surface and float about there by the agency of enclosed gas and air-bubbles, especially during the warm season, also sometimes contain *Pelobius* in masses.

In their external form, in both the living and the contracted state, these organisms present the appearance of more or less spherical lumps, varying from one or two millim. in diameter down to the most minute points, scarcely perceptible by the naked eye. Middle-sized

\* From  $\pi\eta\lambda\delta\varsigma$ , mud. [The name *Pelobius* has been long preoccupied.—Ed.]

examples of about one millim. in diameter are the most abundant. They are generally so densely filled with mud-particles, Diatomaceæ, shells of *Diffugia* and *Arcella*, &c., that by transmitted light they can scarcely be distinguished from the actual mud without experience and careful examination; they may consequently be compared to a living mud. By direct light, on the other hand, they appear as grayish-white, yellowish, or brownish bodies. Their movements consist in an amœboid and often lively creeping by means of processes which are usually broad and lobate; during this process, the transparent body-substance often protrudes at the margins in elevations and undulations. This fundamental substance of the body consists of a *hyaline protoplasm* of irregularly frothy or vesicular consistency, containing, besides the above-mentioned ingested particles, a great number of very peculiar elementary particles. Among these there may be distinguished round or roundish oval nucleiform bodies, and fine bacilliform structures. Of the former by far the greater number consist of shining pale bodies without any special structural characters, but of great firmness, and presenting considerable resistance to reagents (acetic acid and caustic potash). These bodies may possibly be correlated with the coccoliths, &c., of *Bathybius*. Besides these, however, there are less numerous roundish nuclei of softer consistency, and with more or less finely granular contents, which, from their whole nature, must undoubtedly be regarded as equivalent to the ordinary cell-nuclei.

Hence in spite of its great simplicity in other respects, *Pelobius* represents a pluricellular organism, and is not to be referred to the so-called Monera, like *Bathybius Haeckelii*, according to the investigations of Huxley and Haeckel. Nevertheless, in connection with its possible relationship to *Bathybius*, it must be noticed that the cell-nuclei of *Pelobius* may occur in very variable quantity, often in so small a number as almost to disappear altogether; and further, that they can be detected only in the perfectly fresh state. This latter statement applies also to the frothy vesicular arrangement of the body-substance, which disappears immediately after death or the application of reagents.

The second kind of the chief elementary parts of *Pelobius* consists of fine, clear, shining bacilli, which are scattered through the whole body, and likewise present great resistance to the action of acetic acid and caustic potash. These were mentioned by Dr. Greeff in a former publication, when he expressed the opinion that they originate in certain nuclei, which, however, he has since seen reason to doubt.

The author has devoted much time and trouble to the investigation of the developmental history of this interesting organism, an exact knowledge of which would be in many respects of the greatest importance. He proposes to publish what has hitherto been observed upon this point (which in some respects recalls the Myxomycetes) in a detailed memoir upon *Pelobius* in Max Schultze's "Archiv für mikrosk. Anatomie," in which some other Rhizopods found under the same conditions as *Pelobius*, and resembling it, will also be described.

#### NOTES

THE intelligence of the death of Sir John Herschel will fall on the whole scientific world with a sense of personal bereavement. Though he had attained above the ordinary span of life, his mind was still in the maturity of its powers; and few men have been so familiarly known by their writings and their discoveries beyond the narrow pale of the world of science. Next week we hope to give a biography of the great astronomer whose loss we deplore. It is fitting that Herschel II. should be buried in Westminster Abbey, and it is creditable to the authorities that his ashes will be permitted to rest there.

THE annual visitation of the Royal Observatory by the Board of Visitors is fixed to take place on the 3rd of June.

LETTERS have been received in this country from Dr. Adolf Bernhard Meyer, who left Europe last year for a journey through a part of the Malayan Archipelago and New Guinea. He reached Manado in Celebes in November last, just as the wet season commenced. He had chosen this place as his starting point, because he had been informed by a celebrated traveller in the East that the fine season commenced at Manado in the month of October. Nevertheless, he succeeded in making large collections of birds, reptiles, and fishes, which are on their way home.

THE Anniversary Meeting of the Geographical Society takes place on Monday next at 1 P.M., and that of the Linnean on Wednesday at 3. The Victoria Institute holds its annual meeting at eight o'clock on Monday, 22nd May, at the Society of Arts Rooms, John Street, Adelphi, when the Rev. W. J. Irons, D.D., will deliver the address.

A MANUAL OF ORGANIC CHEMISTRY, by Dr. Henry E. Armstrong, F.C.S., Professor of Chemistry in the London Institution, is advertised by Messrs. Longmans and Co., as being in preparation for their admirable series of Text-books of Science.

AT a session of Council on Saturday last, the Right Hon. Lord Belper, vice-president in the chair, Mr. E. J. Poynter, A.R.A., was appointed Slade Professor of Fine Art in the College. The buildings, forming part of the north wing, which have been designed for the Fine Art School, are nearly completed, and it is intended to open the classes for drawing, painting, and sculpture at the beginning of the College session in October next. The late Mr. Felix Slade has established at the college six scholarships for proficiency in those branches of Art, each of the value of 50*l.* per annum tenable for three years, and which may be held by ladies.

AN exhibition of Palæolithic Stone Implements will be on view at the rooms of the Society of Antiquaries, Somerset House, from May 19th to 25th inclusive, from 11 A.M. to 6 P.M.

AT the General Examination of Women at the University of London, just concluded, four passed in honours and nine in the first division. It is understood there were about double that number of candidates.

WE learn from the *Academy* that the Zoological Collection of the British Museum has been lately enriched by the purchase of a magnificent series of Sponges from South Africa, the majority of which are likely to prove new to science. It is to be hoped that the group of the *Spongiada*, now attracting so much attention in scientific circles, will receive a more liberal allotment of space in the new museum to be erected at Kensington. The utter unfitness of the present building to meet the daily increasing requirements of the national collection is evidenced from the fact that numerous groups of the *Invertebrata* are literally "crowded out," and entirely unrepresented in the series devoted to public exhibition, for want of the necessary space. This, and the inadequacy of the present slender staff of the Natural History department to effect the thorough and systematic arrangement of the extensive and valuable collection, and to elevate it to that high scientific status enjoyed in the leading continental museums, demand the most earnest and speedy attention.

MR. BOUCARD, the well known dealer in specimens of Natural History, and traveller, formerly living in Paris, but now resident in London, proposes the publication of a work on the Coleoptera of Mexico and Central America, including the adjacent portions of the United States, especially the Pacific region. He earnestly desires contributions of specimens, whether named or not, to be used in his investigations, and will return such as he is not per-