

new instrument evidently possesses great advantages. It has no scale attached to it, the graduation and figures being distinctly marked on the stem itself, and the shield effectually preserves them from obliteration by sea-water. The back part of the stem is enamelled white, rendering the graduation and column of mercury extremely distinct.

When the instrument is immersed in the water the descending line may be stopped or checked any number of times, and it is of course quite immaterial in what position the instrument enters the water; the illustrations show at a glance that it will infallibly assume the position "bulb downwards" when descending rapidly, and all that is needed is that care should be taken in the pulling upwards. The first pull in this direction should be quick and sudden and be continued for some little time; at the same time the pulling upwards must be continuous, since stoppages would invalidate the readings.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

A MEETING of the members of the Yorkshire College of Science was held on Monday at Leeds. A sum of 56,000*l.* has now been promised in donations, and the endowments from the Akroyd Foundation, the Clothworkers' Company, and the bequest of the late Mr. Brown would, if capitalised, represent a further sum of about 20,000*l.* On the question of the proposed new university the committee reported that the college had held friendly communications with the authorities of Owens College, but could not at present make them the subject of a public report. Mr. Baines stated that the number of students this year was 355, as compared with 288 last year.

We have received a calendar of the Newcastle College of Physical Science, which contains full information concerning the curriculum at that institution, examination papers, scholarships, &c.

SCIENTIFIC SERIALS

Bulletin de l'Académie Royale de Belgique, No. 4, 1878.—In a further paper on the scintillation of stars, M. Montigny here deals with the changes of colour in stars of red and orange tints. From a table giving the general averages of relative frequency of the seven colours in such stars, it appears that the relative frequency of red much exceeds that of any of the other colours, whether in rainy or dry weather; that red, green, and especially orange, are in much greater proportion in dry than in rainy weather; while on the other hand, the frequency of blue and yellow is more marked under the influence of rain. Taking Pollux and Capella as samples of yellow stars, M. Montigny found in them the frequency of red and especially of yellow was much increased, while the proportion of orange was notably diminished. The proportion of blue was the same as in stars of the other type.—M. Masquelin contributes a valuable paper on the development of the inferior maxillary in man, in which he establishes the concurrence of the two modes of ossification in one bone, viz., that by the direct or metaplastic process, and that by the indirect or osteoblastic. It would thus appear that the histological process of ossification cannot serve to determine the morphological value of a bone.—A paper on oscillations of the Belgian coast, by M. Van Rysseberghe, aims at proving a sinking of the coast at Ostend, but the validity of the evidence is doubted by the reporters.—An interesting report on Daltonism in relation to railway-working is presented by M. Delbecq.—M. Fraipont has a fourth and concluding article on the Acetiniæ of the Ostend coast, and Dr. Woodward records the discovery of a species of Brachyura crustacean in the coal formation near Mons (to which his attention was called by M. de Koninck).—The theory of the telephone is the subject of a note by MM. Navez.

Journal de Physique, May, 1878.—A new spectroscope here described by M. Thollon offers several advantages; it is direct vision and of perfect symmetry, and can be easily adapted to astronomical telescopes; the prisms (movable) are worked by a rigorously geometrical process, so that a ray coming along the axis of the collimator reaches the axis of the telescope only after twice traversing the whole system of prisms with the minimum of deviation; a considerable dispersive power may be had and may be widely modified in the same instrument; lastly, it affords very exact spectrometric measurements.—Some experiments in which

the electro-magnetic rotation of liquids is illustrated with acidulated water containing a little lycopodium powder, the effect being projected by means of Duboscq's new apparatus, are described by M. Bertin. M. Gernez has a note on the production of different hydrates in concentrated supersaturated solutions under the influence of a mechanical action (rubbing the walls of the vessel with a rigid rod).—The metallic reflection of polarised obscure calorific rays is studied by M. Mouton.

Reale Istituto Lombardo di Scienze e Lettere, Rendiconti, vol. xi. fasc. vii.—We note the following papers in this number:—Jealous insanity, by M. Verga.—Expression of pain according to sex, age, individual constitution, and race, by M. Mantegazza.—Contributions to the study of the Italian chiroptera, by M. Regalia.—On the cranium of Volta, by M. Lombrosi.—Examination of the observations made by the committee appointed to adjudicate a prize on the theme, "Programme of a Hospital for Contagious Diseases, suited to the City of Milan," by M. Zucchi.—Study on the prevalent diseases of the vine, by MM. Garovaglio and Cattaneo.

Vol. xi., fasc. viii., ix.—In these numbers we note the following:—On dominant diseases of vines, by MM. Garovaglio and Cattaneo.—Studies on the albumen of milk and on the origin of buttermilk curd, by MM. Musso and Menozzi.—On the causes and circumstances affecting hereditary transmission in animals, by M. Lemoigne.—Observations on elephantiasis in the Arabs in the environs of the Ticinese district, by M. Sangalli.—The third molar in the human race, by M. Mantegazza.—On the distribution and termination of nerves in the tendons of man and other vertebrata, by M. Golgi.

Zeitschrift für wissenschaftliche Zoologie, vol. xxx., supplement, part 1.—On the form of the crystalline cones in arthropod eyes, especially phronima, by Oscar Schmidt.—On anomia, with remarks on the muscular system of lamellibranchs, by H. von Jhering.—The poison apparatus of ants, by A. Forel, 41 pp. two plates.—The post-embryonic formation of limbs in insects, by H. Dewitz, dealing especially with formica, 28 pp.—Contribution to the structure and development of the lungs in mammals, by Ludwig Stieda; figures from embryonic sheep, mouse, and horse.—On the ornamental colouring of *Daphnidæ*, by August Weismann. The author believes the colour patterns are secondary sexual characters developed by sexual selection.—On the action of the voluntary muscles in land snails, by H. Simroth.

Vol. xxxi., part 3.—Researches on the structure and development of sponges, part 4, by F. E. Schulze; 42 pp., four plates. This part deals especially with the family *Aplysiadæ*.—Contribution to the development of feathers, by Dr. Th. Studer, Professor at Berne; the feathers of the Penguin, Megapodius, and *Dromæus*, are dealt with and figured in two plates.—On the fertilisation of the egg in *Petromyzon planeri*, by Ernst Calberla, with a discussion on fertilisation generally; 50 pp., two plates.—On the formation of ova, and on the male of *Bonellia viridis*, by Franz Vejdvovsky.

Journal of the Russian Chemical and Physical Societies of St. Petersburg (vol. x. No. 4) contains the following papers:—On the action of peroxide of hydrogen upon the oxygen compounds of thallium, by E. Schöne.—On the action of iodine upon certain urea and amidogen compounds, by W. Roudneff.—On nitrophthalic and oxyphthalic acids, by O. Miller.—On the admixture of zinc in different parts of the body after the intoxication with acetate of zinc, by M. Mazkewicz.—On the action of water and oxide of lead on the halogen compounds of ethylene hydrocarbons, by A. Eltekoff.—On the action of the same substances upon bromide of diamylene, by the same.—On the action of trichlorolactic acid upon urea, by D. Cech.—On the magnetic induction of the two spheres, by O. Chwolson.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, June 19.—John Evans, D.C.L., F.R.S., vice-president, in the chair.—Charles Louis Buxton, Wybrandts G. Olpherts, and William Phelps Richards were elected Fellows of the Society.—The following communications were read:—On the section of Messrs. Meux and Co.'s artesian well in the Tottenham Court Road, with notices of the well at Crossness, and another at Shoreham, Kent; and on the probable range of the lower greensand and palæozoic rocks under

London, by Prof. Prestwich, F.R.S., V.P.G.S. The well-known boring at Kentish Town in 1856 showed the absence at that point of lower greensand, the gault being immediately succeeded by hard red and variegated sandstones and clays, the age of which was at first doubtful, but which were finally considered by the author to approach most nearly to the old red sandstone near Frome, and to the Devonian sandstones and marls near Mons, in Belgium. The existence of some doubt as to this identification rendered the boring lately made at Messrs. Meux's brewery particularly interesting, and the method of working adopted by the Diamond-boring Company, by bringing up sharply cut cores from known depths, gave special certainty to the results obtained. The boring passed through 652½ feet of chalk, 28 feet of upper greensand, and 160 feet of gault, at the base of which was a seam 3 or 4 feet thick, of phosphatic nodules and quartzite pebbles. Beneath this was a sandy calcareous stratum of a light ash-colour, passing into a pale or white limestone, and this into a rock of oolitic aspect. Casts and impressions of shells found in this bed showed it to be the lower greensand, whose place it occupied. The boring was carried further in the hope of reaching the loose water-bearing sands of this formation, but the rock became very argillaceous, and, when 62 feet of it had been passed through, the boring entered into mottled red, purple, and greenish shales, dipping at 35° in an unascertained direction. These beds continued through a depth of 80 feet, when, their nature being clearly ascertained, the boring was stopped. The fossils of these coloured beds, which included *Spirifer disjuncta*, *Rhynchonella cuboides*, and species of *Edmondia*, *Chonetes*, and *Orthis*, show them to be of Devonian age. Thus, the existence of palæozoic rocks at an accessible depth under London and the absence of the Jurassic series, as maintained long since by Mr. Godwin-Austen, is experimentally demonstrated. These facts are of interest in connection with the question of the possible extension of the coal-measures under the cretaceous and tertiary strata of the south-east of England. The beds found at the bottom of Messrs. Meux's boring are of the same character as the Devonian strata which everywhere accompany the coal-measures in Belgium and the north of France, being brought into juxtaposition with them by great faults and flexures. The author refers especially to a remarkable section at Auchy-au-Bois, in the western extremity of the Valenciennes coal-field, which is particularly interesting from its furnishing evidence that the Hardingen coal-field, between Calais and Boulogne, is a prolongation of that of Valenciennes, and because the same strike and a prolongation of the same great fault observed at Auchy-au-Bois through Hardingen would carry the southern boundary of any coal-field in the south-east of England just south of Maidstone, thence passing a little north of London. Hence it is in the district north of London that there is most probability of the discovery of the carboniferous strata. The extent of country in which shafts could be sunk to the palæozoic strata will, however, be limited by the presence of the water-bearing lower greensand, which probably reaches close to London in the south, reappears in Buckinghamshire and Bedfordshire, thirty or forty miles north of London, and probably extends some distance towards the city under the chalk hills of those counties and Hertfordshire. The nature of the representative of the lower greensand in the boring, and the characters of the fossils contained in it, lead the author to the conclusion that in it we have a deposit produced near the shore of the neocomian sea, here probably consisting of cliffs of Devonian (or carboniferous) rock. From these cliffs the calcareous material which here replaces the usual loose sands of the lower greensand was perhaps derived by the agency of springs; and the shore-line itself must be situated between the south end of Tottenham Court Road and the Kentish Town boring. The sandy beds of the lower greensand will probably be found to set in at no great distance to the southward, presenting the conditions necessary for storing and transmitting underground waters. A test boring made by Mr. H. Bingham Mildmay at Shoreham Place, about five miles from Sevenoaks, and in which the lower greensand was met with at about the estimated depth (450 feet) and furnished a supply of water, seems to confirm these views.—Notes on the palæontology and some of the physical conditions of the Meux's-well deposits, by Charles Moore, F.G.S. The chief interest of Mr. Moore's investigations centres in the sixty-seven feet of strata intervening between the gault and Devonian. In this marly and oolitic-looking deposit he found no less than eighty-five different kinds of organisms, exhibiting a singular admixture of

marine and lacustrine forms of life. Foraminifera are rare, but entomostraca and polyzoa are very abundant. Some genera are found, such as *Carpenteria*, *Saccammina*, *Thecidium*, and *Zellania*, of which the range in time is greatly extended by these investigations. The author fully confirms Mr. Etheridge's reference of the beds in question to the neocomian period, widely as they differ in physical characters from the lower greensand strata of the south-east of England. From a careful study of the nature and condition of preservation of the minute organisms, he concludes that the deposits which contain them were formed at first in shallow lacustrine hollows on the surface of the Devonian rocks now lying buried at a depth of 1,000 feet below London, and that these lakes were invaded by the waters of the neocomian sea, with the deposits of which their sediments were in part mingled, and under which they were finally buried.—The chair was then taken by Prof. Prestwich, M.A., F.R.S., vice-president.—On *Pelanechinus*, a new genus of sea-urchin from the coral rag, by W. Keeping, F.G.S., Professor of Geology in the University College of Wales.—Remarks on *Saurocephalus*, and on the species which have been referred to that genus, by E. Tulley Newton, F.G.S., of H.M. Geological Survey.—A microscopical study of some Huronian clay-slates, by Dr. Arthur Wichmann.—On a section through Glazebrook Moss, Lancashire, by T. Mellard Reade, F.G.S.—On the tertiary deposits on the Solimoes and Javary Rivers in Brazil, by C. B. Brown. With an appendix by R. Etheridge, F.R.S., and communicated by him.—On the physical history of the English lake-district, with notes on the possible subdivision of the Skiddaw slates, by J. Clifton Ward, Assoc. R.S.M., F.G.S.—On some well-defined life-zones in the lower part of the Silurian (Sedgw.) of the Lake-district, by J. E. Marr. Communicated by Prof. T. M'K. Hughes, F.G.S.—On the upper part of the Bala beds and base of Silurian in North Wales, by F. Ruddy. Communicated by Prof. T. M'K. Hughes, F.G.S.

Anthropological Institute, June 11.—Mr. John Evans, D.C.L., F.R.S., president, in the chair.—Dr. J. Beddoe, F.R.S., read a paper on the Bulgarians, referring more especially to the skull-form, on which he quoted Virchow and Kopernicki, but gave also some observations of his own. Not one of sixteen skulls hitherto examined, and procured in different districts of Bulgaria, presented anything like the true Slavonic type, though a few slightly approximated towards it. Almost all were of a cylindrical form, with a considerable parieto-occipital development, and a low, narrow, sloping frontal region; there was an absence of frontal parietal bosses; the skulls inclined to be long, except those few which indicated an admixture of the Slavic type. The majority nowise reminded one of either the Slavic or Turkic form, nor were they much like Esthonian skulls, but they were probably rather Ugrian than anything else. In some of them the great degree of prognathism, the deep nasal notch and horizontal nasal bones reminded Virchow of the Australian type. If the *physique* of the Bulgarians was a difficult and obscure subject, their *morale* presented its own difficulties. They differed from the Serbs in some points favourably; in more, perhaps, unfavourably, though some of their worst faults were doubtless what naturally arose in a subject race. The heroic type which appeared among the Serbs, whether they were Mussulman, Rayah, or free Christian, and culminated in the splendid barbarians of the Montenegro, was absent here. There was no chivalry, but mere ferocity, in their ballads. Their religion was little above Fetichism, and had little connection with morality. Manliness, generosity, truthfulness, and respect for women were scarcely to be expected of such a people; but ambition was there, and industry and acquisitiveness to a degree not found among the Serbs; and the desire of knowledge was there, and the capacity to learn, and, but for the interference of Russia, and the vast amount of moral and physical evil brought about thereby, they might gradually, under a government which, though faulty, was improving, have developed into better things.—Miss A. W. Buckland read a paper on the stimulants of the ancients and of modern savages. The paper commenced by stating that all races have acquired the use of stimulants in some form, but that the stimulants of the lower races, such as the Australian, consists merely of leaves and roots, chewed for their strengthening and invigorating properties, this being only a slight advance upon the instinct which prompts the inferior animals to seek out certain plants for medicinal purposes. The first step towards the manufacture of stimulating drinks is seen in the kava of the South Seas. This art of producing fermentation by the masti-

ating process can be traced in a line across the Pacific from Formosa, where rice is the ingredient thus employed, to Peru and Bolivia, where maize is used for the same purpose, the manufacturers being always women. The next advance is that acquired by agricultural races, who make a kind of beer from the chief cereal grown by them. This liquor probably reached our shores from Egypt, where it was very early known, through the lake dwellers, and still forms the principal drink of all African races. Pastoral tribes, meanwhile, use the milk of their flocks and herds and the honey of wild bees in the manufacture of their fermented drinks: hence the celebrated *koumiss* and *mead* of Scythic nations, the same liquors reappearing among the Kafirs in South Africa, the vessels used in both countries being the skins of animals, which were also used for storing wines in the East. Later, in Greece and Rome mead was a favourite beverage of the Scandinavians and Anglo-Saxons, and there seems to be a shadow of the Scythic *koumiss* in the Devonshire liquor known as white or grout ale, whilst both liquors may be traced more distinctly in the famous *amrita* and *soma-wine* of the Vedas. Various plants and fruits have been used in all civilised and semi-civilised countries from very ancient times in the manufacture of wines, but grape juices had formerly a circumscribed range, having been confined to Western Asia, Egypt, Greece, and Rome, but forbidden in China and the vines extirpated. The religious ceremonies and prohibitions attached to these various beverages were briefly noticed, as also the deification of plants on account of their medicinal properties and the form and material of drinking vessels, whilst alcohol, the latest and most pernicious development of the art of manufacturing stimulants was only mentioned as not having been included among the beverages of the ancients nor known to savages until introduced by Europeans.—The Director then read a paper by Mr. John Sanderson on polygamous marriage in South Africa.

PARIS

Academy of Sciences, July 16.—M. Fizeau in the chair.—The following among other papers were read:—Remarks on the influence of atmospheric electricity of weak tension on vegetation, by M. Berthelot. *A propos* of M. Grandeaux's experiments, M. Berthelot recalls his own, proving fixation of free nitrogen on organic matters under weak electrical action, &c., such action (in nature), being probably more efficacious than that of thunderstorms, owing to its duration and extent.—On a *brochure* of M. Hirn relating to whirlwinds, by M. Faye. M. Hirn distinguishes two kinds of descending whirling movements, represented by cyclones and by trombes. The former (he considers) are propagated naturally downwards by simple lateral communication of a gyratory motion, originating in the upper regions. They enlarge and diminish in rapidity (owing to friction). For the other class, which become more and more restrained in their transverse dimensions (and take the figure of an upright, not an inverted, funnel), he calls in a small force in the form of electricity of the clouds, and the attraction between them and the ground through an imperfectly conducting medium. M. Faye doubts this view, and supposes mechanical identity of the two phenomena.—Processes and apparatus for study of the velocity of propagation of excitations in different kinds of motor nerves in mammalia, by M. Chauveau. In this note he merely describes his mode of experimentation, which was on mammalia of large size, chloralised, or subjected to section of the bulb and artificial respiration. He used induced currents for the (uncovered) nerve, by the unipolar method. At each turn of an automatic distributor the current is passed to a different point of the nerve. The results of experiment are stated to differ from those of Helmholtz in his experiments on the nerves of a killed frog.—General Morin referred to the loss sustained by the Section of Mechanics in the death of General Didion, author of a "Traité de Balistique," &c.—On galvanoplasty of cobalt, by M. Gaiffe. Cobalt may be advantageously substituted for iron and nickel, as a protective layer for engraved and typographic plates. M. Gaiffe uses a bath of neutral solution of the double sulphate of cobalt and ammonia; the anode a sheet of platinum or (better) a plate of cast or forged cobalt. The current is kept at about six B.A. units, and reduced to three, when the whole piece has become white. The deposition may be made nearly as rapid as that of nickel.—On the existence of lesions of the anterior roots in acute ascending paralysis, by M. Vulpien. These lesions, found in every preparation (the spinal cord being unaltered), consisted in fragmentation of the myeline into drops and droplets, hypergenesis of the protoplasm of each inter-annular segment, and

multiplication of the nuclei of Schwann's sheath. The cylinder-axis had completely disappeared.—M. Ducretet presented (through M. Du Moncel) a stethoscopic microphone of great sensibility. He utilises M. Marey's delicate tambours, the vibrations of sound from the body acting on the elastic membranes.—Discovery of a comet by Mr. Lewis Swift, at Rochester, U.S. (telegram from the Smithsonian Institution).—Measurement of the calorific intensity of solar radiations, by M. Crova. This relates to observations last year. The intensity at mid-day increased from the end of January to March 15, when there was a maximum of 1'320 cal. The minimum was on June 28 (1'023 cal.); then the radiation increased, and on October 16 reached the pretty high value of 1'260 cal. As before, the weakest radiations were with S. or S.W. winds and comparatively high temperatures; the strongest with N. or N.W. winds and low temperatures; the former winds increasing, the latter diminishing the vapour in the atmosphere. The author adds some observations on this last point.—On the reform of some processes of analysis in laboratories of agricultural stations, and observatories of chemical meteorology; volumetric determination of sulphate contained in water, by M. Houzeau. A new method for the latter is described.—The septicity of putrefied blood is destroyed by a very long contact with compressed oxygen at high tension, by M. Feltz.—Identity of nature of spontaneous and traumatic erysipelas; consequences, by M. Real. A discussion took place on explosions in flour-mills, *à propos* of a recent letter of Mr. Lawrence Smith from the United States.—Structure of the stem of *Sigillaria*, by M. Renault.

GÖTTINGEN

Royal Society of Sciences, March 2.—The following, among other papers, were read:—Comparative anatomy of the crystalline lens, by Prof. Henle.—The bursæ of Ophiura and their homologies with the Pentremites, by Prof. Ludwig.

May 4.—The systematic position of *Sclerophylax* and *Cortesia*, by Prof. Grisebach.—Observations on the pharmacology of Salicin, by Dr. Marmé.—Relation of the left intercostal vein to the vena azygos, by Prof. Brunn.—Some Avestic words and forms, by Prof. Bezzenberger.—Coptic-Arabian inscriptions in the University library, by Prof. Wüstenfeld.

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