We have recently had occasion to notice the fact that the plans of the new observatory at Cincinnati, U.S., had been approved, and were about being carried into execution. It gives us pleasure to record the rapid progress that has been made in this work, as evinced by the fact that on the 28th of August the corner-stone of the new building now in process of erection on Mount Lookout was laid with becoming ceremonies. The site chosen for the new observatory is about four miles north-east of that on Mount Adams, where the original observatory, founded by Prof. O. M. Mitchell, was established. The corner-stone that was laid in 1843 on that elevation by John Quincy Adams has been carefully removed to the new site, and appropriately forms the corner-stone of the new equatorial pier. The observatory has, by means of a tripartite agreement with the city and the heirs of Nicholas Longworth, now passed into the hands of the Cincinnati University. The proceeds, amounting to 50,000 dols., realised on the sale of the property on Mount Adams have been invested for the support of the art department of the university. The city, however, has pledged itself to maintain the observatory when once established, and the establishment has itself been hastened by the liberality of Mr. John Kilgour, who has given four acres of ground as a site for the new building, and added 10,000 dols. for the latter. The site is admirably adapted for the purpose of the institution. It is one of the highest points in the county, commanding a beautiful and extended view, and it is not likely that the difficulty experienced at the old site from the smoke and vapours of the city will for a long time if ever, trouble the astronomers on Mount Lookout. The new edifice faces south, having a width of about sixty feet, a depth of ninety feet, and two wings, making the breadth through the wings about one hundred feet. One of the wings will be used for the meridian instruments; and in the centre of the building, on a brick pier thirty-six feet high and seventeen feet in diameter, will rest the big telescope. The building will be two stories high, except in the centre, where the revolving turret of iron for the equatorial will add half a story. The structure is to be of pressed brick, with freestone trimmings.

The additions to the Zoological Society's collection during the last week include an Arabian Baboon (*Cynocephalus hamadryas*) from Arabia, presented by Miss Sandon; a Wild Cat (*Felis catus*) from Scotland, presented by Sir T. Riddell, Bart.; three Gray's Terrapins (*Clemmys grayi*), and some Moorish Tortoises (*Testudo mauritanica*) from Persa, presented by Hon. E. Ellis; an African Goat (*Capra hircus*) from Bedah, presented by Mr. J. A. Croft; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Lady Stirling; two Blue-throated Parrots (*Pionus sordidus*) from Venezuela; an Active Amazon (*Chrysotis agilis*) from Jamaica, and a Blackish Sternothere (*Sternothoerus subniger*) from Madagascar, purchased.

SCIENTIFIC SERIALS

The *Journal of Mental Science*, October 1873. This journal is still occupied with only medico-psychological subjects. The Morisonian Lectures on Insanity for 1873 begun in this number are of great interest, and mark the advance of Science in this painfully important branch of knowledge. Nothing, we think, can be more evident than that Dr. Skae proceeds on a scientific principle when he attempts to classify the various forms of insanity according to the bodily disease or condition, as far as it can be ascertained, which proceeds or accompanies the insanity. And it is surprising that even Dr. Maudsley should be found among those who cavil at Dr. Skae's classification, instead of adopting his principle and making the most of it. With insanity Science has made a beginning, but that is all.—In an article by Dr. J. T. Dickson on "The Functions of Brain and Muscle Considered in Relation to Epilepsy" we have a rather singular hypothesis concerning the functional relation of the brain to the muscular system. We cannot afford to indicate this curious theory; we doubt if we quite understand it; but we can inform the scientific world generally, on the authority of Dr. Dickson, that what they have been in the habit of believing on this subject "is not only improbable, but impossible." Dr. Hughlings Jackson has, it seems, been at the pains to quote against Dr. Dickson some passages from Herbert Spencer's Psychology; but he could have little known with whom he had to deal. Dr. Dickson quietly remarks—"From this it would seem that Spencer holds somewhat the same, though the untenable view." Was there ever a finer example of how completely original ideas can free a mind from the degrading thraldom of authority? Does Spencer differ from me? why then that is the worse for Spencer.—The article of most general interest is "The Morbid Psychology of Criminals," by Dr. D. Nicolson, continued from last number, and still unfinished. It abounds in valuable observations, and good practical common sense. When in prison criminals offer good opportunities for observation, but we do not perceive that their "emotional displays" can with strictness be said to mark anything specially morbid. From all that is said, we cannot gather more than that criminals are like the much larger class to which they generally belong, namely people of a low type of mind. The unfortunates that find their way into our prisons are, we regret to think, far from the only people who cannot help insanely acccusing others of wicked designs against them; whose minds are lawless and undisciplined; who must have their "breakings out;" and for whom, when they become intolerably insolent and violent, "a good drubbing on the spot" would be the most appropriate medicine. People, when inclined to what they ought not to do will not be deterred by the fear of punishments that are not painful, or which are too distant to act on their dull imaginations. This leads to large considerations, but we can only say that it would be a great matter for social progress if our tender-hearted philanthropists—those who busy themselves with theories of home, school, and prison discipline, distributing gratis wonderful receipts for the painless cure of all bad habits—could be brought to understand a little better than they do the real nature of the material on which they have to work. The review of the Lunacy Blue Books will be found interesting; also "Antiquarian Scraps relating to Insanity," by Dr. T. W. McDowall.

Journal of the Royal Geological Society of Ireland, vol. xiii., Part 3, for the session 1872–73, contains E. T. Hardman on the occurrence of gypsum in the Keuper Marls, near Coagh, Co. Tyrone.—Prof. T. Rupert Jones, on some Foraminifera from the chalk of the North of Ireland.—P. S. Abraham, notes on the geology of the Hartz.—Prof. Macalister, a description of two Veddah skulls, and Presidential address (which latter gives an able summary of the work done by German petrologists with the object of determining the mineral constitution and structure of plutonic, metamorphic, volcanic and other rocks by the aid of the microscope).—Prof. E. Hull, on the microscopical structure of the Limerick carboniferous Trap Rocks, and on the microscopical structure of Irish granites.—Col. Meadows Taylor, the Coal fields of Central India.—R. J. Cruise, Analysis of the Leitrim coal, remarks on the coal area of the district.—Dr. Studdert, on the Lough Allen coal from the Arigna District, Co. Leitrim.—G. H. Kinahan, on the carboniferous ingenite rocks of the County Limerick.—E. T. Hardman, on the occurrence of siliceous nodular brown Hæmatite (Göthite) in the carboniferous limestone beds near Cookstown, Co. Tyrone, &c., and on an analysis of white chalk from the County of Tyrone, with notes on the occurrence of zinc therein.—Rev. Dr. Macloskie, on the silicified wood of Lough Neagh.—Dr. Tichborne, on the formation of crystalline minerals having the spherical form.

The 2nd and 3rd numbers of the 7th volume of the *Canadian Naturalist* commence with a paper by Dr. Dawson on impressions and footprints of aquatic animals and imitative markings on carboniferous rocks, those considered being invertebrate. The paper originally appeared in *Silliman's Journal*.—Mr. G. F. Mathew continues a description of his impressions of Cuba, and enters into detail respecting the botany of the island.—Mr. Whiteaves gives an account of a deep-sea dredging expedition round the island of Anticosti, in the Gulf of St. Lawrence, in which upwards of 100 species of marine invertebrata new to the Gulf of St. Lawrence were added to the previously recorded fauna.—Dr. Dawson also contributes a paper on the geological relations of the iron ores of Nova Scotia, considering first the bedded ores of the Lower Helderberg series, and of Nictaux and Moose River; next the veins of iron ore of the East River of Pictou, Shubenacadie, and other parts.—Dr. Nicholson, of Toronto, describes some new fossils from the Devonian rocks of

Western Ontario, including *Zaphrentis fenestrata* (n.s.) *Blothrophyllum approximatum* (n.s.); *Heliophyllum colbornensis* (n.s.); *Petraia logani* (n.s.); and *Alecto canadensis* (n.s.).—A detailed report is given of the meeting of the American Association for the Advancement of Science, of which an abstract has already appeared in our pages.

Journal of the Franklin Institute, Oct. 1873.—We have here the second portion of Prof. Thurston's valuable paper on the molecular changes produced in iron by variations of temperature. He comes to the conclusion that at temperatures above 600° and below 70° F., iron conforms to the general law for solid bodies, that increase of temperature diminishes tenacity but increases ductility and resilience, while decrease of temperature has the opposite effect. Below 70° the tenacity increases with diminishing temperature at the rate of 0·02 to 0·03 per cent. for each degree F., while the resilience decreases in much higher ratio. Between ordinary temperatures and a point somewhere between 500° and 600°, on the other hand, iron shows marked deviation from the law, the strength increasing to the extent of about fifteen per cent. with good iron. The practical result is, that as iron does not lose its power of sustaining "dead" loads at low temperature, but greatly loses its power of resisting shocks, the factor of safety in structures need not be increased in the former case, where exposure to severe cold is apprehended; but that machinery, rails, and other structures which have to resist shocks should have large factors of safety, and be protected, if possible, from extremes of temperature.—Mr. Lowe communicates "something new concerning the physical properties of steam," viz., that the external work given out by steam in expanding from the temperature (t') to the temperature (t), bears a constant ratio to the difference; that is, to ($t' - t$). He considers the latent heat performs the internal work, while the sensible heat only is available for external work; in which case that vapour whose latent heat is the smallest, other things equal, would be the best agent for converting heat into work.—A paper on statistics of coal, is compiled from Mr. James McFarlane's "Coal Regions of America."—Mr. Bilgram furnishes an "Elementary treatment of Zeuner's slide-valve;" and Mr. Murphy has a paper on "Bridge building considered normally."—There are descriptions of machinery for utilisation of coal waste, a stone-cutting machine, and a machine for making paper boxes. The latter produces match-boxes at the rate of 3,000 in an hour. Paste is dispensed with, the slips of wrapper being fastened by delicate staples of iron wire.

American Journal of Science and Arts, November, 1873. In this number we find two contributions in chemistry from the Massachusetts Institute of Technology, in one of which it is shown that by solution of cast-iron in an acid, there may be obtained, besides gaseous bodies, which escape with the hydrogen, volatile hydrocarbons, boiling between 93° and 155° C., and probably belonging partly to the saturated, partly to the non-saturated series. Of the latter, considerable quantities may be condensed by combination with bromine, after having passed through a freezing mixture.—Prof. H. L. Smith gives a series of investigations made in the Queen's Chamber of the Great Pyramid, as supporting the view that a high degree of geometrical and astronomical knowledge must have been possessed by the builders, but without superhuman accuracy. In a paper on rocks of the Helderberg era, in the Connecticut Valley, Prof. Dana endeavours to show that Staurolitic slate, hornblendic rocks, gneiss, mica schist, &c., are extensively developed in a *formation of Helderberg age*, and probably the Upper Helderberg or Lower Devonian. There is a letter from Dr. B. A. Gould, Director of the Cordoba Observatory (date Aug. 5), giving an account of work recently done there. Zone observations had been begun in September last year, and were nearly half completed, some 50,000 stars having been observed. From a note on the hypsometric work of the U.S. Geological and Geographical Survey of the Territories, we learn that four stations were established: at Denver, 5,000 feet above the sea; Cañon City, 6,000 feet; Fair Play (in the South Park), 10,000 feet; and Mount Lincoln, 14,000 feet; the observations at each being taken three times daily. The U.S. Signal Service have recently established a permanent meteorological station on the summit of Pike's Peak, about 14,000 feet high; the observations will be published daily by telegraph, and will doubtless be of high scientific and popular interest.—Of the remaining matter we may note suggested improvements in filter pumps, and in the arrangement of shutters in a dome for an equatorial telescope.

Poggendorff's Annalen der Physik und Chemie. No. 7. 1873. In this number, M. Quincke continues his "Optische Untersuchungen," investigating at some length the behaviour of polarised light on its passage through gratings.—M. Riess enunciates thus a new kind of reaction of currents: a wire circuit, part of which is traversed by a given (Leyden) battery current, remaining unaltered, various secondary currents, produced in it successively, react on the primary, so that the weaker secondary corresponds to the stronger primary.—Dr. Voller has examined the influence of temperature on electromotive force of galvanic combinations, and finds that with salt solutions in contact with copper or zinc, the force is diminished by rise of temperature, whereas with acids it is increased.—An interesting paper by Prof. Villari treats of the time flint glass takes to be magnetised, demagnetised. and to turn the plane of polarisation. He rotated a glass cylinder between the poles of an electro-magnet, where it acted like a cylindrical lens to polarised light passing through the poles. When not magnetised, the cylinder, whether in motion or at rest, was neutral to the light; but when magnetised, its plane-rotating power considerably diminished with increasing velocity of rotation; the reason being that, in such quick revolution, each diameter remained too short a time in the axial direction to acquire all the magnetism it would otherwise have. To give flint glass such diamagnetic intensity, as became observable by rotation of the plane, required at the least 0·″001244, while to give it all the diamagnetism it is capable of taking under a strong magnet, at least 0·″00241 was necessary.—"A contribution to the theory of thermal currents," by M. Avenarius, appears to be an appropriation of results published by Prof. Tait in 1870, and which are incorporated in the professor's Rede Lecture for this year. A similar remark will apply to M. Topler's application of air-friction to the deadening of galvanometer needles, &c., which is simply Sir W. Thomson's dead-beat principle.—M. Raye criticises unfavourably M. Zöllner's theory of sun-spots and protuberances; his own theory represents, in the sun, something like what occurs in our cyclones, in which there is an *upward* air-current carrying with it aqueous vapour, which forms above into a cloud. He thus differs from Faye, who supposes a *descending* current, in the solar cyclones.—M. Hennig describes an apparatus for quantitative spectrum analysis, and M. Schneider continues his account of salts of sulphur. We find also notes on galvanic reduction of iron under the influence of an electromagnetic solenoid, and on the reflection and refraction of sound; from the St. Petersburg and Vienna academies respectively.—An abstract of an instructive paper by M. Vogel on the spectra of comets we hope to give shortly.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, Nov. 19.—Prof. Ramsay, F.R.S., vice-president, in the chair.—The following communications were read:—"Supplemental Note on the Anatomy of *Hypsilophodon Foxii*," by Mr. J. W. Hulke, F.R.S. The material for this note was a slab from Cowleaze Chine, containing portions of two individuals of *Hypsilophodon Foxii*, one consisting of a skull with a great part of the vertebral column, the other of a portion of the vertebral column. The author described some details of the structure of the skull, and especially the palatal apparatus. In connection with the question of the generic rank of *Hypsilophodon*, the author stated that in *Hypsilophodon* the centra of the sacral vertebræ are cylindroid and rounded below, whilst in *Iguanodon* they are compressed laterally and angulated below.—"The Drift-beds of the North-west of England, Part 1, Shells of the Lancashire and Cheshire Low-level Clay and Sands," by Mr. T. Mellard Reade. The author gave a list of the localities in which shells were found, and stated that in all forty-six species had been met with distributed through the clay-beds, those found in the sand-seams being rare and generally fragmentary and rolled. He contended that the admixture of shells in the boulder-clay was due to the tendency of the sea to throw up its contents on the beach, whence changing currents and floating ice might again remove them, and to the oscillations of the land bringing all the beds at one time or another within reach of marine erosive action. He maintained that it is in the distribution of land and sea at the period of deposition of the Lancashire deposits, and not in astronomical causes, that we must seek the explanation of the climate of that